

**Selected Abstracts**  
**of**  
**The 1<sup>st</sup> International Conference**  
**on Public Health and Hygiene**  
**(ICPHH 2018)**  
**September 14-16, 2018**  
**Zhengzhou, Henan, China**

## Supplement to January-February

## PUBLIC HEALTH AND HYGIENE

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## **Frontier Research in Public Health and Hygiene** **Abstracts of the 1<sup>st</sup> International Conference on Public Health and Hygiene (ICPHH 2018)**

Public health is concerned with improving the health of the population and should be available to the whole population, especially for those who are at risk and living in rural areas, rather than just to the most accessible population. Despite great achievements made in the field of public health, people still face the burden of disease, including morbidity and mortality and lack of food safety. Thus, it is of great significance to research in this field to improve the quality of healthcare and to solve the above issues for the benefit of all mankind.

In this context, the 1st International Conference on Public Health and Hygiene (ICPHH2018) was held at Zhongzhou International Hotel, Zhengzhou, China during September 14 to 16, 2018, to provide a platform for the academic researchers to communicate their work. This conference was hosted by the Asia Society of Applied Mathematics and Engineering (Asia-SAME) and assisted by a Technical Committee, which aimed at bring opportunities for researchers, professors, experts and practitioners to share ideas and exchange their experiences under the theme 'public health and hygiene'.

For the purpose of contributing to public health, it was decided to bring out a supplement on the theme of

Frontier Research in Public Health and Hygiene containing the best papers on this field presented at ICPHH 2018. Based on the selection criteria of originality, significance, relevance and contribution to the area, 150 short papers and abstracts were selected for the supplement out of 323 short papers and abstracts received.

All the papers published in the issue are of the standard essential for publication. These papers are expected to promote academic exchange and could help lay the foundation for further in-depth research. Besides, these also could inspire and goad other authors and scholars to dig deep into this field, to find better solutions for the deficiencies in the present public healthcare

Finally we would like to appreciate the efforts of all the authors for attending the conference and providing their short papers and abstracts, all the technical committee members for setting stringent criteria for selection as well as all the editors and editorial assistants of IJPS for their efforts to bring out this supplement. Everyone involved in the conference made a huge contribution without which this could not have been materialized.

## Abstracts

### TRACK 1: CLINICAL MEDICINE

#### Improving the Formulation of Weilexin

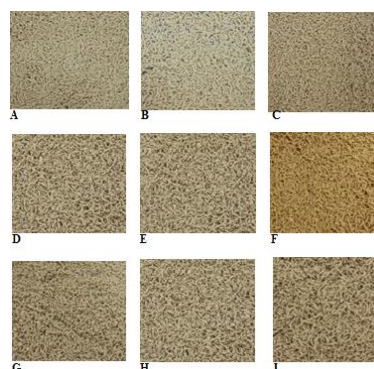
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The active ingredient of Weilexin Granules is a polysaccharide extracted from hericium. It is prepared from *Hericium cuspidatum* by deep fermentation and has the activity of regulating release of gastric acid and protecting gastric mucosa. The main ingredients of *Hericium erinaceus* are polysaccharides with poor solubility in normal temperature water and slow dissolution rate at 100°. Current formulation of Weilexin granules contains sucrose, which is unsuitable to diabetic patients. The aims of this study were to improve the formulation of weilexin granules, to improve its therapeutic efficacy, and to expand its clinical applications. Analytical methods were developed for polysaccharides from Weilexin Granules, and sugar-free and instant-soluble granules were developed. According to the analytical method for polysaccharides in pharmacopoeia, the phenol sulphate and the dinitrosalicylic acid methods were selected for quantitative determination of the total sugar and reducing sugar of *Hericium cuspidata*, respectively. Sugar-free and fast dissolving excipients were screened using single factor design. Sucrose was removed and replaced. The effects of excipients on granule moulding, heap density, angle of repose, hygroscopicity and solubility were investigated. Optimal excipients and formulations of granule were identified by a comprehensive scoring method. In addition to changing the excipients, spray drying was used to alter physical factors of polysaccharides, including shape, surface area and others to increase their dissolution rate. Using the single factor method and using the dry powder rate to determine the relative density of the extract, the inlet temperature, the temperature of the vent, the entrance velocity and the spray drying process parameters. An absorption peak was found at 490 nm after the phenol sulphate colorimetric reaction. The absorbance was linear versus glucose concentration in the range of 0.02-0.15 g/l. The regression Eqn. was  $A = 4.008C + 0.0856$  ( $r=0.9994$ ; recovery=105.5%,  $RSD=2.4\%$ ). The average total sugar content of the extract was 61.07%. After colorimetric reaction with dinitrosalicylic acid, an absorption peak was obtained at 550 nm. The absorbance was linear versus glucose concentration in the range of 0.125-1 g/l. The regression Eqn. was  $A = 0.9066C + 0.0224$  ( $r=0.9993$ ), with

average recovery of 94.8% ( $RSD=3.7\%$ ). The average content of reducing sugars in the extract was 31%. In addition, the indicators of precision, accuracy and reproducibility of the two methods were all satisfactory. A typical formulation for sugar-free and fast dissolving granules was composed of extract and mannitol at 1:4.5. This composition has fast dissolution rate, does not absorb moisture, and have good fluidity. Spray drying parameters for concentrate are: relative density of 1.18, inlet air temperature of 120-130°, outlet temperature of 80-100°, and fluid speed of 150 ml/h. Both the phenol sulphate method and the DNS method were simple, accurate, stable and reproducible. Slow dissolution rate was effectively solved by adopting spray drying and rescreening of granule excipients. The new formulation dissolved in hot water in <1 min, and was more suitable for diabetic patients.



**Fig. 1: Preparations of Weilexin granules with different excipients**

**A: Starch; B: CMC-Na; C: mannitol; D: starch+mannitol; E: starch+CMC-Na; F: starch+dextrin; G: soluble starch+mannitol; H: soluble starch+CMC-Na; I: soluble starch+dextrin**

**TABLE 1 DETERMINATION OF SOLUBILITY**

Material	Excipient quality (g)	Dissolved particle mass (g)	Dissolution rate (%)	Melting time (s)
Starch	0.3073	0.0539	17.50	80
CMC-Na	0.3006	0.2231	74.22	70
Mannitol	0.3013	0.2978	99.14	45
starch+CMC-Na	0.3000	0.0633	21.10	55
starch+mannitol	0.3006	0.2190	72.85	64
Starch+dextrin	0.3010	--	--	120
Soluble starch+dextrin	0.3015	0.2502	82.98	50
Soluble starch+CMC-Na	0.3012	0.0640	21.25	54
Soluble starch+mannitol	0.3045	0.2603	85.48	90

Starch+dextrin: Precipitation was excessive, difficult to dry, and the weight was > the quality of accessories

2

#### Extract from *Phellinus igniarius* Induces Apoptosis of Liver Cancer Cells Through Caspase-dependent Mitochondrial Pathway

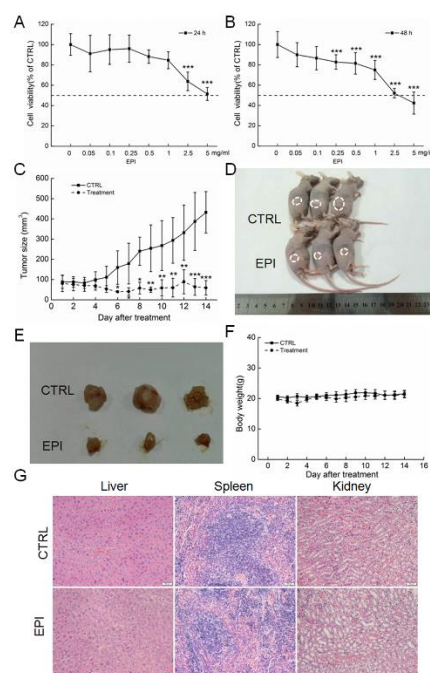
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Malignant tumor, as one of the major diseases endangering human health, is the second leading cause of death in the world. Liver cancer ranks third among the causes of cancer deaths worldwide, and is the fifth most common malignancy. It is urgent to find new treatment methods for liver cancer owing to the limitations and adverse effects of traditional used agents of liver cancer. In recent years, Chinese medicine is becoming more and more popular due to its mild efficacy and low side effects. *Phellinus Igniarius*, as a macrofungi, is a valuable Chinese herbal medicine with a variety of pharmacological activities, including antioxidant, antiinflammatory, immune regulation and antitumor. The present article investigated the antitumor activity of the extract from *Phellinus Igniarius* (EPI) in SMMC-7721 cells systematically. The liver cancer cells (SMMC-7721) were purchased from ATCC and seeded into 96-well plates or 6-well plates. The cell viability was measured by MTT test. And the Muse™ Annexin V & Dead Cell Apoptosis Kit was applied to analyse the cell apoptosis. The intracellular ROS level and mitochondrial membrane potential (MMP) in SMMC-7721 cells after treatment with EPI were detected by 2,7-dichlorofluorescein diacetate (DCFH-DA) and 5,5',6,6'-Tetrachloro-1,1',3,3'-tetraethyl benzimidazolylcarbocyanine iodide (JC-1) staining. Then the SMMC-7721-xenograft tumor mouse model was established to investigate the antitumor activity of EPI *in vivo*. After 14 days of intragastric administration, the nude mice were euthanized. The liver, spleen and kidney tissues were used for H&E staining. The tumours and cells were taken for Western Blot detection. Dose-dependent reductions in cell viability were observed in SMMC-7721 cells treated with EPI and the IC<sub>50</sub> was 4.6 and 3.7 mg/ml at 24 h (fig. 1A) and 48 h (fig. 1B), respectively. EPI-induced apoptosis of SMMC-7721 cells, increased ROS level and decreased MMP. In SMMC-7721-xenograft tumor mouse models, tumor growth inhibition was obvious in nude mice treated with 30 mg/kg of EPI for 14 consecutive days, which showed a 86.3% reduction in tumor size compared with vehicle mice (fig. 1C, D and E). Moreover, EPI had no significant effect on body weight (fig. 1F), and organ structures including liver, spleen and kidney in nude mice (fig. 1G). Western blot results showed that EPI could not only increase the content of cleaved caspase-3, -8, -9, but also increase the expression of Bax and decrease the expression of Bcl-2 in tumours and SMMC-7721 cells. In this study, we demonstrated that EPI showed strong toxic effects on SMMC-7721 cells by inhibiting cell viability, enhancing apoptosis *in vitro* and inhibiting the growth of xenografted tumours *in vivo*. Western blot performed on

cells and tumours confirmed that the caspase-dependent mitochondrial pathway was related to EPI-induced liver cancer cells damage. All data suggest that the EPI has inhibited liver cancer.



**Fig. 1: EPI induced cytotoxicity in SMMC-7721 cells and suppressed tumor growth in SMMC-7721-xenografted nude mice models after 14 days of administration at 30 mg/kg. (A) and (B) EPI dose- and time-dependently inhibited cell viability in SMMC-7721 cells. ( $n=6$ ) \*\*\* $P<0.001$  versus control cells. (C) Tumor volumes were measured every day. Tumor sizes are expressed as mean $\pm$ SD ( $n=3$ ). \*\*\* $P<0.001$  vs. control group. Tumor-possessing nude mice (D) and tumor tissues (E) were separated from vehicle and EPI-treated groups. (F) Mean ( $\pm$ S.D) body weight of control group and EPI-treated group ( $n=3$ ). (G) Hematoxylin and eosin staining of liver, spleen and kidney tissues from nude mice ( $n=3$ ). A: —■— 24 h; B: —■— 48 h; C and F: —■— CTRL, --●-- treatment**

### Acknowledgments

This work was supported by the Special Projects of Cooperation between Jilin University and Jilin Province in China (SXGJSF2017-1).

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## *Paecilomyces tenuis* Mycelial Aqueous Extract Ameliorates Cyclophosphamide-Induced Immunosuppression in Mice

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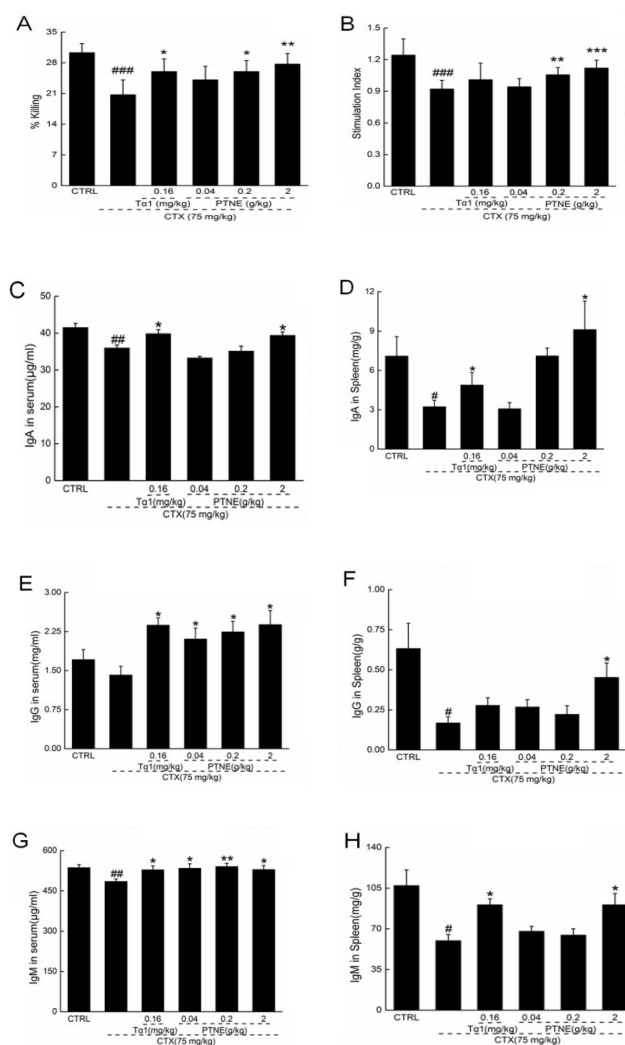
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*Paecilomyces tenuipes* is the anamorph of *Cordyceps takaomontana*, bioactive compounds of which are similar to that of *Cordyceps sinensis* and has been considered as

substitute of *C. sinensis*. Meanwhile, *P. tenuipes*, a famous Chinese medicinal entomopathogenic fungus, has been traditionally served as folk medicine in Asia for years. Although study has documented that *P. tenuipes* exerts immuno-modulating activity through increasing the activity of lactate dehydrogenase and acid phosphatase in alveolar macrophages and peritoneal macrophages of human mononuclear cells, there is no published study that shows its immunomodulatory effect on cyclophosphamide (CTX)-induced immunosuppression. The objective of this study was to evaluate immunomodulatory property of *P. tenuipes* mycelium aqueous extract in CTX-induced immunosuppressed mouse model. *P. tenuipes* mycelium was extracted three times with 40-fold double-distilled water at 80° for 3 h. After centrifugation at 4000 rpm for 10 min, the supernatant of *P. tenuipes* mycelium aqueous extract (PTNE) was collected, concentrated and freeze-dried for further using. All animal experiments were carried out by the Institution Animal Ethics Committee of Jilin University. Sixty BALB/c mice (male, 8-week-old) were housed in an environmental control room (12-h light/dark cycle, 23±1°), of these fifty were injected with CTX (75 mg/kg) for 3 days, and another ten mice were injected with the same volume of normal saline serving as control group (CTRL). The CTX-treated immunosuppressed mice were randomly assigned to five groups (n=10) and treated with 0.16 mg/kg thymosin  $\alpha$ 1 (T $\alpha$ 1) twice-weekly, daily with dose of 0.04, 0.2 and 2 g/kg PTNE for 14 days, respectively. The other mice were orally treated with the same volume of normal saline for 14 days. After administration, blood was sampled from each group. The mice were then sacrificed and the spleen was harvested. The other partial spleen was prepared into splenocytes and cultured with YAC-1 cells, which was subsequently applied to detect the level of lactate dehydrogenase according to the instruction, assessing natural killer (NK) cell cytotoxicity. The splenocytes suspension was incubated with or without Con A to evaluated splenocyte proliferation ability by measuring cellular MTT reduction. The concentrations of immunoglobulin (Ig)A, IgG, IgM in the serum and spleen were determined using enzyme-linked immunosorbent assay kits according to the manufacturer' instruction. Activation of NK cell induces multiple cytokines synthesis and secretion, exerting immunomodulatory property and targeting infected cells for lysis. The appropriate system stimulated with Con A to allow the T cells to induce differentiation to lymphoblast, and the splenocyte proliferation ability is considered as one of reliable parameter to value the immunologic function. The significant declines of NK cell cytotoxicity and splenocyte proliferation were observed in CTX-treated mice compared with saline-treated mice (p<0.001, fig. 1A and B). Administration of 0.2 and 2 g/kg PTNE showed noticeable restoration in the NK cell cytotoxicity and splenocyte proliferation (fig. 1 A and B), showing its immunological function. Immunoglobulins, the classic immunocompetent

molecules, exert the immunomodulatory activities through binding to antigen specifically. Compared with the control group, CTX lowered IgA, IgG and IgM levels in serum and/or spleen (fig. 1 C-H). These changes were normalized by 2 g/kg PTNE treatment (fig. 1 C-H). Two-week PTNE administration significantly upregulated CTX-caused a significant decrease in NK cell cytotoxicity, splenocyte proliferation and IgA, IgG and IgM levels in serum and spleen of mice. All results indicated that PTNE prevents CTX-induced immunosuppression in BALB/c mice, which suggested that PTNE could be used as a potential therapy to mediate immunosuppressive diseases



**Fig. 1: Two-week PTNE and T $\alpha$ 1 administration upregulated NK cell cytotoxicity (A), splenocyte proliferation (B), the levels of IgA (C and D), IgG (E and F), and IgM (G and H) in serum and spleen of mice with CTX-induced immunosuppression. Results are represented as means±SEM (n=10). ###P<0.001 in a comparison with the control group, \*\*\*p<0.001 in a comparison with the model group. PTNE: *P. tenuipes* mycelium aqueous extract; T $\alpha$ 1: thymosin  $\alpha$ 1; CTX: cyclophosphamide**

#### Acknowledgements

This work was supported by the Special Projects of Cooperation between Jilin University and Jilin Province (SXGJSF2017-1).



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## Formulation Screening for Liposomes Encapsulating Antibacterial Peptide from *Rana*

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Early antimicrobial peptides refer to a class of basic polypeptide substances with antibacterial activity found in insects, including amphibian antimicrobial peptides. This is an active peptide present in the secretions of amphibious skin with certain antimicrobial activity. The *Rana* antibacterial peptide is taken from the *Rana* skin. It is effective against Gram-negative bacteria, Gram-positive bacteria, and fungi, which can cause skin wound infection. In addition, the *Rana* antibacterial peptide also has the advantages of being less susceptible to drug resistance, rapid onset, and low toxic side effects. In addition, some of the polypeptides in *Rana* skin have shown anti-tumor effects. Liposomes are attractive as drug delivery vehicles due to their biocompatibility. Polyethylene glycol (PEG)-coated liposomes have reduced uptake by the reticuloendothelial system and exhibit prolonged circulation time. The purpose of this study was to load the *Rana* antibacterial peptide into liposomes to form *Rana* antibacterial peptide liposomes (RALP) using a membrane homogenization method. The particle size and encapsulation rate were used as indicators, and a single factor analysis was used to screen and optimize the formulation by adjusting the phospholipid content, the ratio of the drug to lipid, and the pH of the solution. Simultaneously, we added 0.2 % PEG<sub>2000</sub>-DSPE to the liposomes prepared under optimal conditions. The particle size distribution of the PEGylated *Rana* antibacterial peptide liposome (PEG-RALP) was observed to be uniform by a particle size analyser, and the particle diameter of the antibacterial peptide liposome was 183 nm, and the polydispersity index (PDI) was <0.1. As shown in fig 1A, the particle size of the antibacterial peptide liposomes with PEG was not significantly different from uncoated liposomes. Scanning electron microscopy showed uniformity of liposomal morphology (fig. 1B). Furthermore, PEGylated liposomes have superior colloidal stability compared to conventional liposomes. A diffusion cell study was used to determine the rate of transdermal transport, as shown in fig. 1C. The drug retention rate after 12 hours reached 92 %, indicating that the liposome dosage form played a very positive role in the sustained release of the antibacterial peptide. This experiment will play an important role in the research of new formulations of antimicrobial peptides.

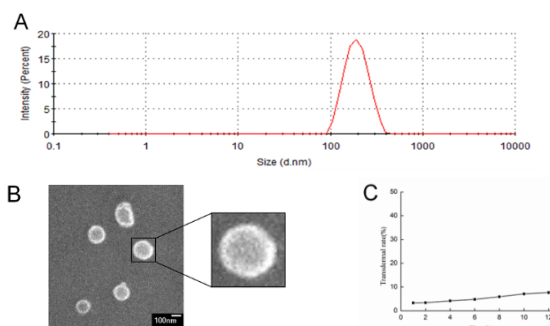


Fig. 1: Size distribution of RALP (A), SEM image of PEG-RALP (B), antibacterial peptide liposome transdermal rate (C)

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## Effect of Chitosan Coating on the Quality and Antioxidant Enzymes of the Sweet Cherry (*Prunus avium* L.) During Storage

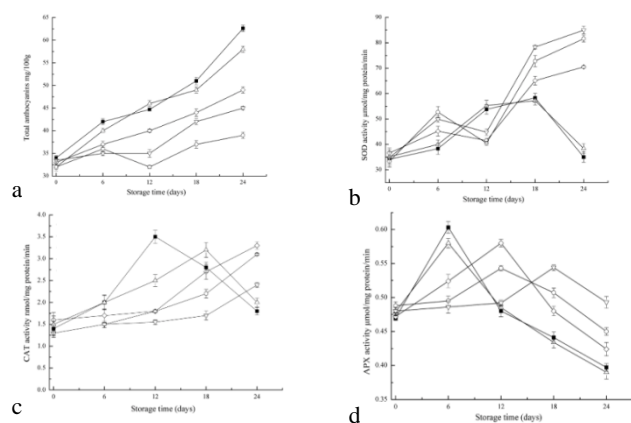
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Sweet cherry (*Prunus avium* L.) is widely distributed in Turkey, United States, Iran, Germany, Russian Federation and Italy<sup>[1]</sup>. The trade of sweet cherry is expected to expand, with world exports reaching a record of nearly 300 000 tons on rising demand from Asian countries, particularly from China. The sweet cherries have been considered to be an important source of antioxidants, fibre, vitamin C, carotenoids and anthocyanins that are believed to aid in defending against some chronic diseases such as cancer, cardiovascular disease, diabetes, obesity or inflammatory disorders<sup>[2]</sup>. However, sweet cherry fruit is susceptible to chilling injuries so they have to be stored at a moderate temperature<sup>[3]</sup>. With increasing consumers' demand for minimally processed and preservative-free fresh products, there is an urgent need to find an alternative storage method for the fruits. The purpose of this study was to analyse the effect of chitosan as an edible coating on quality, bioactive substances and antioxidant activity of the sweet cherry fruits during storage time. Commercially mature sweet cherry (*Prunus avium*) fruits used in this study was hand-harvested at the Ying Yuan farm, Jinzhou, Dalian, China. Chitosan film-forming solution was ready as described by the method<sup>[4]</sup>. Chitosan solutions were made by dissolving 0.1, 0.3, 0.5 and 0.75 % w/v chitosan in acetic acid (0.5 ml acetic acid/100 ml deionized H<sub>2</sub>O). Anthocyanin content was determined by the methods<sup>[5]</sup>. Superoxide dismutase (SOD) activity, ascorbate peroxidase (APX) activity, catalase (CAT) activity was determined by the method<sup>[6,7]</sup>. The total anthocyanin concentration increased during the storage period (fig. 1a), but this

increase was delayed in chitosan-coated sweet cherries in a concentration-dependent manner except for the fruits treated with 0.75 % w/v chitosan. In 0.75 % chitosan-treated fruits, anthocyanin concentration at harvest was 39 mg/100 g after 24 d of storage, while these values were significant different with 58 mg/100 g, 49 mg/100 g, 45 mg/100 g for fruits coated with chitosan at 0.1, 0.3 and 0.5 % w/v at day 24, respectively ( $p < 0.05$ ). Data agreed with the study<sup>[8]</sup>, which showed anthocyanin contents ranged from 1 mg/100 g to 432 mg/100 g in different genotypes of sweet cherry. Fig. 1b presents SOD activity of fruit during storage. In general, SOD activity in the chitosan-coated fruit peel increased gradually and always keeping significantly higher enzymes activity than control throughout 24 d of storage. The increase of SOD activity after chitosan treatment may delay the free radical accumulation in fruit pulp, causing the conversion of free radical to  $H_2O_2$ , which eventually generates to non-toxic molecules catalysed by other enzymes<sup>[9]</sup>. As shown in fig. 1c, CAT activity in the control group decreased rapidly after 12 d while the 0.1 % w/v treatments at 18 d. CAT activity with higher chitosan concentration of 0.1, 0.3, and 0.75 % w/v were higher than that of 0.5 % chitosan at most of storage time. The results showed that 0.5 % w/v chitosan is the most efficient concentration in maintaining high CAT activity of sweet cherry ( $p < 0.05$ ), which may be important in the defence mechanisms against oxidative stress. In this study, APX activity in control and 0.1 % w/v chitosan-treated fruit rapidly increased and then significantly decrease from day 6 to 24 d (fig. 1d). Exposure to 0.3, 0.5 and 0.75 % w/v chitosan delayed the sharp reduction of APX activity, with the latest peak ( $0.54 \pm 0.004 \mu\text{mol/mg/min}$ ) found in the 0.5 % w/v treatment at 18 d. Chitosan coating treatment performed positive role in maintaining higher concentrations anthocyanins, and delaying the increases of antioxidant activities of enzymes. It was suggested that 0.5% w/v chitosan coating is the best concentration in keeping freshness of sweet cherries for 24 d at  $10^\circ$ .



**Fig. 1: Change of total phenolic contents (a), SOD activity (b), CAT activity (c) and APX activity (d) in sweet cherry stored at  $10^\circ$  during storage times**

—■— Control; —△— 0.1 % w/v; —◇— 0.3 % w/v; —▼— 0.5 % w/v; —○— 0.75 % w/v

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## 6 Research Progress on Antioxidant Activity of Phenolic Compounds in Fresh-cut Vegetables Induced by Injury Stress

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Phenolic compounds are the secondary metabolites of plants, which have antioxidant activity and can effectively scavenge reactive oxygen free radicals and inhibit membrane lipid peroxidation<sup>[1]</sup>. The main phenols in plants are monophenol, phenolic acid, hydroxy cinnamic acid derivatives and flavonoids, including flavonoids, isoflavones, flavonols, flavones and anthocyanins. The biological and pharmacological functional activities of phenolic substances are mainly antioxidant, antiinflammatory, antitumor, antiviral and antiallergic, especially in the prevention of chronic human diseases with potential health benefits, including prostate cancer and other

types of cancer, cardiovascular disease, diabetes and neurodegenerative diseases<sup>[2]</sup>. Health and nutrition survey showed that the population with higher intake of fruits and vegetables in dietary structure had a lower risk of cardiovascular, cerebrovascular diseases, mental disorders and various cancers<sup>[3]</sup>. In this paper, the research on phenolic content and antioxidant activity of fresh-cut vegetables was reviewed in recent ten years<sup>[4]</sup>. Recent studies have shown that fresh vegetables, as fresh foods, are excellent sources of phenolic substances because they contain more phenolic substances. Proper daily intake of fresh fruits and vegetables can help maintain human health and increase the body undefined resistance to oxidative damage, prevention of cancer and cardiovascular diseases<sup>[5]</sup>. Research suggests that plants can be used as biological plants to produce phenolic substances with medicinal and nutritional uses by simply increasing the stress and intensity of injury, such as injured carrots and potatoes, which can be used as a cheap part of a daily diet that abundant phenolic antioxidants were derived from them<sup>[6]</sup>. It was found that fresh-cut processing could significantly improve the phenolic content and antioxidant ability of these products of fresh-cut carrot, onion, potato<sup>[6-8]</sup>. Phenols, the most important, abundant and ubiquitous compounds in plants, are considered to be major contributors to the total antioxidant capacity of vegetables<sup>[9]</sup>. Fresh-cut vegetables as a mechanical processing injury product, also known as pre-processed vegetables or slightly processed, is the fresh vegetable classification. Fresh-cut vegetables account for an increasing proportion of total vegetable sales with convenient characteristics such as ready-to-eat, ready-to-use and ready-to-cook<sup>[10]</sup>. The processing process of fresh-cut products is the process of mechanical damage stress. Fresh-cut vegetables are induced to synthesize and accumulate phenols in a short period of time because they are stimulated by the injury of cutting processing. Comparison in the contents of phenolic substances in fresh whole fruits and vegetables and Fresh-cut fruits and vegetables was shown in Table 1. The greater the damage intensity caused by fresh-cut processing, the more damage signals are generated and the faster the signal perception and transmission from the surface injured cells to the internal cells, Furthermore, phenylalanine ammonia-lyase (phenylalanine ammonia-lyase, PAL) activity was induced to increase the amount of phenolic substances needed for catalytic synthesis to achieve the purpose of callus and metabolic balance. PAL is the first key enzyme in phenylpropane metabolic pathway. Its activity determines the synthesis rate of phenylalanine through phenylpropane metabolic pathway and accumulates in injured tissues, and increases the antioxidant activity of cell tissues<sup>[11]</sup>. In this sense, fresh cutting or preprocessing of vegetables can improve the nutrition of products and maintain human health. Garlic, ginger and other vegetables must be mashed or shredded mechanically to obtain more phenols substances for playing a good antioxidant role<sup>[12]</sup> and

bactericidal effect<sup>[13]</sup>, and to induce a series of biochemical reactions to produce or synthesize special flavour compounds<sup>[14]</sup>. Fresh-cut vegetables as a mechanical processing injury product could be used as a method to increase the content of phenols in fruits and vegetables after harvest, and to enhance their antioxidant activity and medicinal value. It suggests that fresh-cut treatment of vegetables is an innovative, simple, feasible and effective method to obtain more phenolic substances with antioxidant activity.

**TABLE 1: COMPARISON IN THE CONTENTS OF PHENOLIC SUBSTANCES IN FRESH WHOLE FRUITS AND VEGETABLES AND FRESH-CUT FRUITS AND VEGETABLES**

Fruits and vegetables	Content (mg/100 g)	Fresh-cut fruits and vegetables	Content (mg/100 g)	Increase times
Carrot	48	Fresh-cut carrot	250	5.2
Potato	50	Fresh-cut potato	95	1.9
Dragon fruit	602	Fresh-cut dragon fruit	1250	2.1
Broccoli	150	Fresh-cut broccoli	280	1.9
Onion	298	Fresh-cut onion	451	1.5
Lettuce	20	Fresh-cut lettuce	29	1.5
Sweet potatoe	90	Fresh-cut sweet potato	110	1.2

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## Phytochemical Constituents of the Rhizomes of *Sophora tonkinensis*

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*Sophora tonkinensis* (Leguminosae) is an important traditional Chinese medicine, and the rhizomes of *Sophora tonkinensis* also be called “*Shan-Dou-Gen*” in Chinese. It is widely distributed in Southern China, Japan and Vietnam, and has been mainly used to treat liver complaint, sore throat and acute pharyngolaryngeal infection in traditional Chinese medicine (TCM)<sup>[1]</sup>. Previous phytochemical researches have indicated that this plant mainly includes isoprenylated flavonoids, quinolizidine alkaloids, saponin and triterpenoids<sup>[2-4]</sup>. Pharmacological investigations have indicated that the rhizomes of *Sophora tonkinensis* possess promising antiinflammatory, analgesic, antipyretic, antitumour, antiarrhythmic and antioxidant activities<sup>[5-6]</sup>. In order to further explore the pharmacodynamic foundation, the studies on the chemical constituents of the rhizomes of *Sophora tonkinensis* were carried out in this paper. The <sup>1</sup>H and <sup>13</sup>C-NMR spectra were recorded on a Varian Mercury Plus-400 MHz spectrometer (Varian, USA) using tetramethylsilane (TMS) as an internal standard. ESIMS and HR-ESIMS were obtained on Agilent Series 1100 SL mass spectrometer. Semi-preparative HPLC separation was performed on a LC-20AR (Shimadzu Corp., Japan) instrument equipped with aSPD-20A UV/Vis detector (Shimadzu, Japan), and chromatogram column was YMC ODS-A C18 (250×10 mm, 5 μm). HPLC analysis was performed on a LC-2010A (Shimadzu, Japan) instrument equipped with an UV/Vis detector. The rhizomes of *Sophora tonkinensis* were collected from Yulin, Guangxi province, China, and authenticated in the Faculty of Jiamusi, Heilongjiang University of Chinese Medicine. The air-dried and pulverized rhizomes of *Sophora tonkinensis* was extracted thrice with deionized water at 50°, each time for 3 h, and the combined solution was concentrated under reduced pressure to yield a crude extract. The crude extract

was dissolved in moderate amount of deionized water and then loaded on a D101 macroporous adsorbent resin column, eluted gradually with H<sub>2</sub>O, 30, 60, and 95 % EtOH, gradually. The fraction that eluted with 30 % EtOH was separated by medium pressure liquid chromatography (MPLC) with ODS column, successively eluted using H<sub>2</sub>O, 10, 20, 30 and 100 % MeOH to yield seven fractions (Fr. 1-5). Fr. 1 was further separated by Semi-preparative HPLC on YMC ODS-A C18 column using 30 % MeOH as mobile phase to yield compound 1 and 2. Fr. 2 was further purified by Semi-preparative HPLC on a YMC ODS-A C18 column using 40 % MeOH with 0.1 % TFA as mobile phase to yield compound 3. Fr. 4 was further separated by Semi-preparative HPLC on a YMC ODS-A C18 column using 45 % MeOH with 0.1 % TFA as mobile phase to yield compound 4, 5 and 6. The fraction that eluted with 60 % EtOH was subjected to MPLC with ODS column, eluted successively with 20, 30, 40, 50, 100 % MeOH to yield six fractions (Fr. 1-5). Fr. 1 was further separated by Semi-preparative HPLC on a YMC ODS-A C18 column using 45 % MeOH with 0.1 % TFA as mobile phase to yield compound 7 and 8. Fr. 5 was further separated by Semi-preparative HPLC on a YMC ODS-A C18 column using 50 % MeOH with 0.1 % TFA as mobile phase to yield compound 9. The fraction that eluted with 95 % EtOH was chromatographed by MPLC with MCI column, stepwise elution using 60, 70, 80, 90 and 100 % MeOH to yield five fractions (Fr. 1-5). Fr. 1 was further separated by Semi-preparative HPLC on a YMC ODS-A C18 column using 65 % MeOH with 0.1 % TFA as mobile phase to afford compound 10. Chemical investigation on the rhizomes of *Sophora tonkinensis* led to the isolation of eleven compounds, and their structures were elucidated through extensive spectroscopic methods including NMR and ESI-MS analyses. Compound 7 was obtained as amorphous yellow powder. The molecular formula was determined as C<sub>16</sub>H<sub>12</sub>O<sub>5</sub> by HR-ESIMS at m/z 284[M]<sup>+</sup>. <sup>1</sup>H-NMR (400 MHz, CDCl<sub>3</sub>) δ: 12.51(1H, s, -OH), 10.82(1H, s, -OH), 8.08(2H, m, H-2, 6), 7.63(3H, m), 7.00(1H, s, H-3), 6.32(1H, s, H-8), 3.87(3H, s, -OCH<sub>3</sub>); <sup>13</sup>C-NMR: (CDCl<sub>3</sub>, 100MHz) δ: 163.1(C-2), 105.1(C-3), 182.1(C-4), 156.3(C-5), 99.2(C-6), 157.3(C-7), 127.8(C-8), 149.7(C-9), 103.8(C-10), 130.9(C-1'), 126.3(C-2'), 129.3(C-3'), 131.1(C-4'), 129.3(C-5'), 126.3(C-6'), 61.5(-OCH<sub>3</sub>). The above data was basically consistent with the literature<sup>[7]</sup>, so the compound 7 was identified as wogonin. The ten compounds were determined as matrine (1), oxymatrine (2), sophocarpine (3), oxysophocarpine (4), sophoridine (5), cytosine (6), wogonin (7), formononetin (8), syringin (9), luteolin (10), and their structures were summarized in Fig.1. A total of six quinolizidine alkaloids (1-6), three flavonoids (7, 8, 10) and one phenylpropanol glycoside (9) were isolated from the rhizomes of *Sophora tonkinensis*, and the compound 7 was first isolated from the genus *Sophora*.

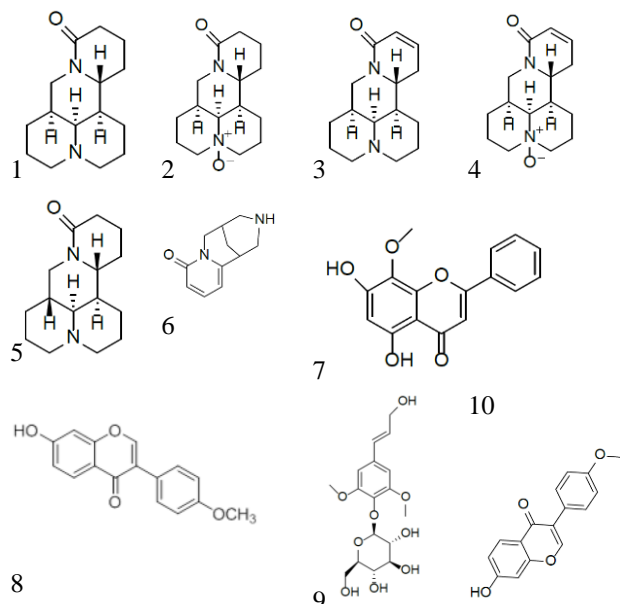


Fig. 1: Structures of compounds 1-10

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## Adsorption Kinetics and Isotherms of Flavonoids from *Pteris esquirolii* on Macroporous Resin

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*Pteris esquirolii*, belonging to the genus *Pteris* (Pteridaceae), is a very ordinary fern plant and broadly distributed in tropical and sub-tropical regions around the world. Historically, the genus *Pteris* was used as herbal medicine for hundreds of years to treat apoplexy, diarrhoea, haemorrhage, snake bites, and so on. Recent advances in the phytochemical investigations have showed that the genus

*Pteris* is rich in flavonoids<sup>[1]</sup>, sesquiterpenoids<sup>[2]</sup>, and *ent*-kaurane diterpenoids<sup>[3-4]</sup>. Furthermore, flavonoids possessed significant antitumor, antiinflammation activities on the basis of prior modern pharmacological studies<sup>[5]</sup>. The aim of this work was to investigate the static adsorption behaviours, including kinetics and isotherms of flavonoids from *Pteris esquirolii* on macroporous resins. Rutin standard was obtained from the National Institutes for Food and Drug Control (Beijing, China). NKA-II resin was obtained from Cangzhou Bonchem Co., Ltd. (Hebei, China). UV-2600 spectrophotometer (Shimadzu Corporation, Japan) was used for analysis of flavonoids. The whole plant of *Pteris esquirolii* were collected from Kunming, Yunnan province, China, and authenticated in the Faculty of Jiamusi, Heilongjiang University of Chinese Medicine. Static adsorption kinetics tests were studied by mixing 50 ml sample solutions with 1 g hydrated resin and the flasks were then shaken at 298.15 K for 8 h. And the adsorption isotherms for flavonoids on NKA-II resin were studied by mixing 50 ml sample solutions shaken at 298.15 K, 308.15 K, 318.15 K. Eqn. 1, the pseudo first-order kinetics model:  $\log(q_e - q_t) = \log q_e - k_1 t / 2.303$ , Eqn. 2, the pseudo second-order kinetics model:  $t/q_t = 1/k_2 q_e^2 + t/q_e$ , Eqn. 3, the particle diffusion kinetics model:  $q_t = k_i t^{1/2} + C$ , Eqn. 4, the Langmuir isotherm model:  $1/q_e = 1/q_m + 1/b q_m C_e$ , Eqn. 5, The Freundlich isotherm model:  $\log q_e = \log K_f + 1/n \log C_e$ . In these Eqns.,  $q_e$ ,  $q_t$ ,  $q_m$  were the equilibrium adsorption capacity (mg/g), the flavonoids adsorption capacity (mg/g) and the maximum adsorption capacity (mg/g), respectively.  $k_1$ ,  $k_2$ ,  $k_i$  were the rate constants of pseudo first-order kinetics, pseudo second-order kinetics and particle diffusion kinetics models, respectively,  $b$  was the Langmuir constant (mg/l).  $K_f$  was the Freundlich constant [(mg/g) (L/mg)<sup>1/n</sup>]. Table 1 summarized the Eqns. and parameters obtained from the three kinetics models for flavonoids on NKA-II resin. The particle diffusion kinetics curve did not pass through the origin, which suggested that the adsorption rate of flavonoids from *Pteris esquirolii* on NKA-II not only depended on the intra-particle diffusion<sup>[6]</sup>. As the highest  $R^2$  value and smaller  $\Delta q$ , the pseudo second-order kinetics model was the best model to describe the adsorption process. Table 2 summarized the equations and parameters obtained from the two isotherm models for flavonoids on NKA-II resin. It was found that the adsorption capacity increased with the decrease of temperature, which indicated that the adsorption process was exothermic. Langmuir model could account for the adsorption equilibrium data, which also indicated that the adsorption of flavonoids from *Pteris esquirolii* on NKA-II resin was monolayer adsorption. From the static experimental results with NKA-II resin, it was found that the experimental data of the adsorption of the flavonoids on NKA-II resin fitted best to the pseudo second-order kinetics model, and there were two rate-controlling steps during the adsorption process. At 298.15 K, 308.15 K and 318.15 K, the equilibrium experimental data were well-fitted to Langmuir isotherms

model, and it was also found that the adsorption process was exothermic, and the adsorption capacities increased with the decreasing of adsorption temperature.

**TABLE 1: ADSORPTION KINETICS EQUATIONS AND PARAMETERS FOR FLAVONOIDS ON NKA-II RESIN.**

Kinetics models	Equations	Dynamic parameters
Intra-particle diffusion model $q_t = k_d t^{1/2} + C$	$q_t = 1.1331t^{1/2} + 27.1082$	$k_d = 1.1331 \text{ mg}/(\text{g}\cdot\text{min}^{1/2})$ $C = 27.1082 \text{ mg/g}$ $R^2 = 0.9618$
Pseudo-first-order model $\log(q_e - q_t) = -k_1 t + \log q_e$	$\log(q_e - q_t) = -0.0039t + 1.4083$	$k_1 = 8.9817 \times 10^{-3} \text{ min}^{-1}$ $q_e = 21.6035 \text{ mg/g}$ $R^2 = 0.9518$
Pseudo-second-order model $t/q_t = 1/k_2 q_e^2 + t/q_e$	$\frac{t}{q_t} = 0.0193t + 0.4768$	$k_2 = 7.8123 \times 10^{-4} \text{ g}/(\text{mg}\cdot\text{min})$ $q_e = 51.8135 \text{ mg/g}$ $R^2 = 0.9977$

**TABLE 2: ADSORPTION ISOTHERM EQUATIONS AND PARAMETERS OF FLAVONOIDS ON NKA-II RESIN.**

Models	T (K)	Equations	Parameters		
			b (L/mg)	$q_m$ (mg/g)	$R^2$
Langmuir $\frac{C_e}{q_e} = \frac{C_e}{q_m} + \frac{1}{q_m b}$	298.15	$\frac{C_e}{q_e} = 0.0058C_e + 3.6831$	0.0016	172.4138	0.9906
	308.15	$\frac{C_e}{q_e} = 0.0062C_e + 4.1714$	0.0015	161.2903	0.9926
	318.15	$\frac{C_e}{q_e} = 0.0068C_e + 4.6058$	0.0015	147.0588	0.9954
Freundlich $\log q_e = \frac{1}{n} \log C_e + \log K_f$	298.15	$\log q_e = 0.4618 \log C_e + 0.6186$	$K_F [(\text{mg/g})(\text{L/mg})^{1/n}]$	$1/n$	$R^2$
	308.15	$\log q_e = 0.4563 \log C_e + 0.5957$	14.1553	0.4618	0.9742
	318.15	$\log q_e = 0.4349 \log C_e + 0.6156$	3.9418	0.4563	0.9742
			4.1267	0.4349	0.9754

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## Assessing the Quality of Chinese Propolis using Liquid Chromatography Fingerprints Coupled with Chemometrics

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chromatographic fingerprint for the quality control of Chinese propolis. High performance liquid chromatography method was applied to establish the chromatographic fingerprint. The separation was performed on a Phenomenex Kinetex EVO C<sub>18</sub> column (250×4.6 mm, 5 μm) with a gradient elution composed of acetonitrile and 0.4 % phosphate acid. The column temperature was set at 30°C, and the flow rate was 1.0 ml/min. The detection wavelength was at 360 nm. Chemometrics was utilized in cluster and similarity analysis. Fourteen characteristic peaks were discovered in the fingerprint. The mutual model of Chinese propolis was established, and the similarities were calculated. The similarities of 12 samples were all above 0.90. The method was successfully used to distinguish the inferior Chinese propolis (similarity below 0.9) from the authentic ones. The method is simple and applicable with good reproducibility. It could be used for the quality control and quality assessment of Chinese propolis.

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## Identification of the Main Components of *Coriolus Versicolor* Fruiting Body

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The main objective of the present study was to establish the

*Coriolus versicolor* (CV) is one of notable medicinal fungi

with a variety of pharmacological activities, which is mainly grown on a variety of broad-leaved tree piles, fallen woods and branches all over the world. In this study, the main components of *Coriolus versicolor* fruiting bodies (CVF), obtained from Heilongjiang province, China, were identified, including crude protein, crude fibre, crude fat, ash, trace elements, total sugar, total flavonoids, total alkaloids, total triterpenoids, reducing sugar, mannitol, vitamin B (B1, B2, B3, B6), hydrolysed amino acids and fatty acids. The identification of the main components of CVF is of great significant influence on the in-depth study of CV. According to the Chinese National Standard method to identify CVF main composition, in which total sugar, total triterpenoids, total flavonoids, total alkaloids, reducing sugars are determined by UV/Vis spectrophotometer (Agilent 8453, USA), high performance liquid chromatography (HPLC), column: SHISEIDO C18, 4.6×250 mm, 5 µm; column temperature: 30°; flow rate: 1 ml/min; injection volume: 10 µl; mobile phase: acetic acid, sodium acetate-methanol, gradient elution; wavelength: 270 nm; Agilent 1200, USA) determination of the vitamin B content, HPLC (column: using octadecylsilane bonded silica as a filler, 4.6×250 mm × 5 µm; column temperature: 40°; wavelength: 254 nm; mobile phase A was 93:7 (v/v) sodium acetate-acetonitrile, mobile phase B was 8:2 (v/v) acetonitrile-ultra-pure water; flow rate: 1 ml/min; Agilent 1260, USA) determination of hydrolysed amino acid composition. The Pb, As, Cd, Zn, Se and Cu contents were determined using inductively coupled plasma mass spectrometry (ICP-MS, ICP-AES, Thermo Fisher, USA), Cr, k, Na, Ca, Fe and Mn contents by inductively coupled plasma spectrometer (ICP-OES optima 8000, Perkin Elmer, USA), and aliphatic acid composition by gas chromatography mass spectrometry (column: TG-5MS 30 m×0.25 mm×0.25 µm; Mass spectrometry conditions: ion source temperature 280°, transmission line temperature: 280°, solvent delay time: 5.00 min, scanning range 30-400 amu, ion source: EI source 70 eV (Thermo Fisher Trace1310 ISQ, USA). Crude protein, crude fibre, crude fat and ash were detected using conventional methods. CVF sample contains crude protein 7.97 %, crude fiber 8.3 %, crude fat 0.3 %, ash 3.9 %, total sugar 12.5 %, reducing sugars 10.9 %, total flavanone 0.069 %, total alkaloids 0.047 %, total triterpene 0.37 %, vitamin B<sub>1</sub>, B<sub>6</sub> are not detected, vitamin B<sub>2</sub> 34.06 mg/kg, vitamin B<sub>3</sub> 6.81 mg/kg, The contents of Pb, As, Cd, Zn, Se, and Cu are 2.81, 0.285, 0.388, 16.9, 0.32, 10.3 mg/kg respectively, and the contents of Cr, k, Na, Ca, Fe and Mn are 117.1, 3228, 43, 3634, 1703, 209.7 mg/kg, respectively. The results of hydrolysed amino acid composition are shown in Table 1. The results of hydrolysed amino acid composition are shown in Table 2. CVF is rich in total sugar (12.5 %), reducing sugar (10.9 %), protein (7.94 %), vitamin B<sub>2</sub> (34.06 mg/kg), various amino acids, aliphatic acid (C16.0:1746.32 mg/kg, C18.2N6C:1514.27 mg/kg) and trace elements (Ca:3634 mg/kg, K:3228 mg/kg, Fe:1703 mg/kg, Mn:209.7 mg/kg, Cr:117.1 mg/kg, Na:43 mg/kg,

Zn:16.9 mg/kg). Among them, vitamin B<sub>2</sub> can enhance the absorption of iron ions, strengthen liver function and have antioxidant activity; C16.0 is an important component of plant oils. C18.2N6C has the effect of lowering blood cholesterol and blood lipids in human blood, treating atherosclerosis. Iron ions are an important part of hemoglobin; manganese ions participate in haematopoiesis in the body, promote intracellular fat oxidation, and prevent atherosclerosis; chromium ions can inhibit cholesterol synthesis and promote protein metabolism. Also, potassium and sodium ions maintain body fluid balance and normal body function. Calcium ions are important substances in bone formation and participate in the blood coagulation process as a blood coagulation factor.

**TABLE 1: CVF HYDROLYSED AMINO ACID COMPOSITION**

No.	Hydrolysed amino acid type	Content (g/kg)
1	Aspartic acid	0.237
2	Glutamic acid	7.126
4	Serine	2.084
5	Glycine	1.093
6	Histidine	0.084
7	Arginine	2.019
8	Threonine	1.143
9	Alanine	1.687
10	Proline	5.594
11	Tyrosine	0.620
12	Valine	1.427
13	Methionine	0.337
14	Isoleucine	1.582
15	Leucine	1.883
16	Phenylalanine	1.128
17	Lysine	1.046

**TABLE 2: CVF ALIPHATIC ACID COMPOSITIONS**

No.	Aliphatic acid type	Content (mg/kg)	No.	Aliphatic acid type	Content (mg/kg)
1	C10.0	4.06	19	C18.3N6	(<0.50) <sup>a</sup>
2	C11.0	0.73	20	C20.0	12.00
3	C12.0	9.13	21	C20.1	7.33
4	C13.0	1.29	22	C20.2	1.21
5	C14.0	22.39	23	C20.3N3	5.66
6	C14.1	2.06	24	C20.3N6	0.65
7	C15.0	75.83	25	C20.4N6	(<0.50) <sup>a</sup>
8	C15.1	(<0.50) <sup>a</sup>	26	C20.5N3	3.13
9	C16.0	1746.32	27	C21.0	4.10
10	C16.1	53.79	28	C22.0	50.07
11	C17.0	7.62	29	C22.1N9	41.61
12	C17.1	(<0.50) <sup>a</sup>	30	C22.2	3.60
13	C18.0	79.29	31	C22.6N3	(<0.50) <sup>a</sup>
14	C18.1N9C	90.39	32	C23.0	10.98
15	C18.1N9T	(<0.50) <sup>a</sup>	33	C24.0	51.92
16	C18.2N6C	1514.27	34	C24.1	10.78
17	C18.2N6T	(<0.50) <sup>a</sup>	35	C8.0	6.50
18	C18.3N3	44.46			

<sup>a</sup>Undetected values less than 0.5

## 11 Effects of *Rhodiola sachalinensis* Herbal Residues on Antioxidant Activity of Polysaccharides and Cultivated of *Pleurotus djamor*

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In order to develop and utilize the herbal residues, the industrial dregs and waste materials, *Rhodiola sachalinensis* was used as substrate for cultivation of *Pleurotus djamor*. Biological conversion rate and contents of polysaccharides, fat and protein in *Pleurotus djamor* were investigated. And antioxidant activity *in vitro* was tested. The results showed biological conversion rate of *Pleurotus djamor* cultivated in *Rhodiola sachalinensis* (42.81%) was lower than control (59.53 %). But, polysaccharides (51.11 %), protein (14.66 %) and fats (0.09 %) of *Pleurotus djamor* cultivated in *Rhodiola sachalinensis* were higher than control (39.85, 10.18, 0.07 %). Scavenging rate on DPPH free radicals of polysaccharides (3 mg/ml) was 72.48 % similar with V<sub>C</sub> control (0.08 mg/ml, 78.69 %). This study provides a reference for the utilization of residues and has important significance for the cultivation of *Pleurotus djamor*.

### Acknowledgments

The research was supported by Department of Education of Guangdong Province "Innovation Strong School Project" (2016KQNCX208), Doctoral Promotion Plan of Zhuhai College of Jilin University (2018), Guangdong Provincial College Students Innovation and Entrepreneurship Training Program (201713684018).

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## Optimization of Liquid Fermentation Medium for Mycelium of *Pleurotus djamor*

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The single factor method was used to optimize carbon source, nitrogen source and inorganic salt species affecting the growth of *Pleurotus djamor*. The results showed that glucose as carbon source, peptone as nitrogen source and KH<sub>2</sub>PO<sub>4</sub> as inorganic salt, the mycelium biomass was the highest, respectively. And using the orthogonal design method, the influence of fermentation medium components was peptone>glucose>VB<sub>1</sub>> KH<sub>2</sub>PO<sub>4</sub>. The optimal liquid fermentation medium of *Pleurotus djamor* was determined to be glucose 50 g/l, peptone 25 g/l, KH<sub>2</sub>PO<sub>4</sub> 0.5 g/l, vitamin B1 0.15 g/l according to the maximum of mycelia. This study provides a reference for the development of *Pleurotus djamor*. *Pleurotus djamor*, namely *Pleurotus djamor*, Fungus door, Basidiomycot, Agaricale, Pleurotaceae<sup>[1-3]</sup>, the red oyster mushroom fruit body is rich in nutrients and belongs to low-fat<sup>[4]</sup>, high-protein health

food. It contains a variety of essential and non-essential amino acids, polysaccharides, vitamins and minerals. Many activities were investigated including anti-tumor, anti-bacterial and anti-immune immunity function<sup>[5-10]</sup>. Liquid fermentation conditions optimization of *Pleurotus djamor* can provide the best nutrient environment for mycelium. The research could provide theoretical basis for development of *Pleurotus djamor*. The fungal strain was isolated from the fruiting body of a natural *P. djamor* from in our lab. The strain was maintained on potato dextrose agar (PDA) slant at 4°C and transferred every two months. The strain was initially grown on PDA in a Petri dish for 5–6 days, and then transferred to the seed culture medium by punching out 5 mm<sup>2</sup> of the agar plate culture with a sterilized self-designed cutter. The seed culture was grown in 500 ml of flask containing 200 ml of potato dextrose broth (PDA) medium prepared in the lab at 20° on a rotary shaker incubator at 150 rpm for 5 days. The single parameter experiment was performed to find the optimal culture conditions. Parameters such as carbon source, nitrogen source, inorganic salt were investigated using the basic medium. The basic medium was composed of glucose 50 g/l, peptone 25 g/l, KH<sub>2</sub>PO<sub>4</sub> 0.5 g/l, VB<sub>1</sub> 0.15 g/l. The selected carbon source was glucose, sucrose, fructose, maltose, lactose. The selected nitrogen source included Yeast powder, (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub>, peptone, (NH<sub>4</sub>)Cl, (NH<sub>4</sub>)NO<sub>3</sub>. And inorganic salt was KH<sub>2</sub>PO<sub>4</sub>, MgSO<sub>4</sub>, KCl, NaCl, (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub>. On the basis of the single parameter experiment, an orthogonal experiment L<sub>9</sub> (3<sup>4</sup>) was applied for the evaluation of the combination effects of the 4 parameters on the production of bioactive polysaccharides (Table 1). And the nine experiments were finished according to the orthogonal experiment L<sub>9</sub> (3<sup>4</sup>), respectively (Table 2).

**TABLE 1: FACTORS AND LEVELS OF ORTHOGONAL TEST L<sub>9</sub> (3<sup>4</sup>)**

Levels	Parameters			
	Glucose (g/l)	Peptone (g/l)	KH <sub>2</sub> PO <sub>4</sub> (g/l)	VB <sub>1</sub> (g/l)
	A	B	C	D
1	30	5	0.3	0.05
2	50	15	0.4	0.15
3	70	25	0.5	0.25

The dry weight of the mycelium was used as the evaluation index, and the experimental data were used to compare the influence of various factors on the difference in mycelial yield. Carbon sources have great influence on the biomass. In order to find out a suitable carbon source for the mycelium growth (such as Glucose, sucrose, fructose, maltose, lactose) were evaluated in the basic medium. And the glucose was determined (Glucose has the highest mycelium content, that was 0.5483 g). The nitrogen sources are essential factors for mycelium growth. Six nitrogen sources including peptone, yeast extract, beef extract, NH<sub>4</sub>NO<sub>3</sub>, NH<sub>4</sub>Cl, and (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> was selected. The result showed the peptone (peptone has the highest mycelium content, that was 0.2983 g) was more suitable mycelia growth than other nitrogen sources. Mineral ions are

commonly recognized as the favourable bio-elements for mycelium growth. The influence of inorganic salts on mycelia growth was investigated by using various mineral sources including  $\text{KH}_2\text{PO}_4$ ,  $\text{MgCl}_2$ ,  $\text{ZnSO}_4$ ,  $\text{CuSO}_4$  and  $\text{CaCl}_2$ . The result showed  $\text{KH}_2\text{PO}_4$  ( $\text{KH}_2\text{PO}_4$  has the highest mycelium content, that was 0.4281 g) was highest than other mineral sources. Results indicated that the fermentation medium significantly affected the yield of mycelium in the culture broth. In brief, according to the *r* values in Table 2, the influence of the fermentation medium components on the growth of *P. djamor*. was peptone>glucose>BV<sub>1</sub>> $\text{KH}_2\text{PO}_4$ . Finally, the optimum fermentation medium for the production of mycelium was composed of glucose 50 g/l, peptone 25 g/l,  $\text{KH}_2\text{PO}_4$  0.5 g/l, vitamin B1. 0.15 g/l. At the optimal fermentation medium, the highest biomass was 1.381 g.

**TABLE 2 RESULTS OF ORTHOGONAL TEST L9 (3<sup>4</sup>)**

Experimental combination	A Glucose (g/l)	B Peptone (g/l)	C $\text{KH}_2\text{PO}_4$ (g/l)	D VB <sub>1</sub> (g/l)	Mycelium dry weight (g)
1	1	1	1	1	0.550
2	1	2	2	2	1.209
3	1	3	3	3	1.104
4	2	1	2	3	0.189
5	2	2	3	1	1.381
6	2	3	1	2	1.369
7	3	1	2	2	0.295
8	3	2	3	3	0.369
9	3	3	1	1	0.856
K1	0.954	0.345	0.763	0.929	
K2	0.980	0.986	0.751	0.958	
K3	0.507	1.110	0.927	0.554	
R2	0.473	0.765	0.176	0.404	

The optimal fermentation medium for the mycelium of *P. djamor* was obtained by using a single factor and orthogonal design methods, which was a composition of glucose 50 g/l, peptone 25 g/l,  $\text{KH}_2\text{PO}_4$  0.5 g/l, and VB1 0.15 g/l. The results are helpful to establish an efficient and controllable fermentation process for *P. djamor*. In addition, this study also provided a simple and efficient strategy for the development of *P. djamor*.

#### Acknowledgements

The research was supported by Department of Education of Guangdong Province "Innovation Strong School Project" (2016KQNCX208), Doctoral Promotion Plan of Zhuhai College of Jilin University (2018), Guangdong Provincial College Students Innovation and Entrepreneurship Training Program (201713684022).

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## Preparation and *in vitro* Release of Lutein Ophthalmic *in situ* Gel

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Lutein widely existed in vegetables and fruits, and is also the main pigment in human retinal macular region. Lutein has been proved to be a promising functional factor in food and medicine for the prevention and treatment of retinal macular degeneration. However, the oral bioavailability of lutein preparation was extremely low *in vivo*. In this experiment, lutein was prepared into a temperature-sensitive ophthalmic gel preparation, which can increase the direct absorption of drugs in the eyes, and is convenient for patients to use. And, there are few studies on the preparation of lutein into an eye gel. In this experiment, different types of Poloxamer were used as gel matrix to prepare lutein gel *in situ* gel preparation, and the release of lutein *in vitro* was investigated. Firstly, different concentrations of Poloxamer 188 and Poloxamer 407 solution were prepared respectively. The configuration method is that 100 ml of deionized water was poured into a beaker placed in ice, adding Poloxamer slowly while stirring until completely dissolved, and then put it in the refrigerator for overnight preservation. According to the preliminary experimental results, 11, 20 % of P188 solution and 20, 23 and 30 % of P407 solution were prepared respectively. According to Table 1, three matrix solutions were prepared.

**TABLE 1: MIXED TABLES OF DIFFERENT CONCENTRATIONS OF P407 AND P188 IN DIFFERENT PROPORTIONS**

Ratio (ml)	P407 (%)	P188 (%)
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	20	23	30	11	18
1	20	-	-	5	-
2	-	20	-	5	-
3	-	-	20	-	5

The preparation of artificial tears, precision weighing of sodium bicarbonate 2.18 g, sodium chloride 6.78 g, calcium chloride dihydrate 0.084 g, potassium chloride 1.38 g, with distilled water to 1000 ml, dissolved and mixed. *In vitro* release test method was the treated dialysis membrane was fixed between the supply pool and receiving pool of the transdermal test apparatus. And the fresh simulated artificial tears 15 ml was added into the receiving tank, the temperature sensitive lutein gel was added to the supply pool, and the temperature was controlled at 35.5°. After the experiment began, 5 ml of release medium was taken out of the receiving tank after 30 min (and then once every 1 hour). At the same time, simulated artificial tears of the same temperature and equal volume were added immediately. The samples were filtered by 0.45 µm microporous membrane and the lutein content was determined by high performance liquid chromatography. The three matrix solutions were placed in a constant temperature water bath pot and heated slowly. At the same time, we constantly observe the morphology and fluidity of the matrix in the beaker. When the matrix solutions heated to 32°, the number 1 and 2 had no obvious change, which fluidity and the drippability were good. While the number 3 matrix solution changed from the solution to the gel state at 32°, and the dropping ability was good (about one drop per second). It can be determined that number 3 can take place phase transition and the temperature is 32°. Mixture of matrix and artificial tears, the three matrix solutions and simulated artificial tears were mixed respectively and evenly at 40:7 (v: v). Then the three mixture was placed in a constant temperature water bath pot and heated slowly, while the matrix form and drippability were continuously observed. When the substrate was heated to 34-35°, the number 1 mixture solution and 2 had no obvious change, which fluidity and the drippability were all good. While the number 3 mixture solution changed from the solution to the gel state, and the dropping property was good (about one drop per second). It can be determined that number 3 can take place phase transition, and the phase transition temperature is 34-35°. According to the above phenomenon, the best gel effect can be obtained when the matrix concentration is 30 % P407 and 18 % P1888, and the mixture ratio is 4:1. With different proportions of poloxamer, a temperature-sensitive ophthalmic gel matrix with good dropping and viscosity can be obtained. After loading lutein, the cumulative release *in vitro* can reach 95% at 6 h. The data shows that the dissolution of drug is in accordance with zero order kinetic equation.

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## Oral Administration of Tanshinone IIA does not Attenuate Two Lineages of

## Transgenic Adenocarcinoma of Mouse Prostate Carcinogenesis

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Tanshinone IIA (TIIA), a major active component isolated from Chinese Traditional Medicine *Danshen*, has been marketing in China and Asian countries for treatment of coronary heart disease in clinical use over 15 years. Recently, extensive *in vitro* and *in vivo* experimental studies have demonstrated inhibitory activities of TIIA against cancers of various organ sites in cell culture models and in some cases with preclinical animal cancer models. Here, we evaluate whether oral administration of TIIA starting from 8 weeks of age inhibits the growth of prostate epithelium and neuroendocrine carcinomas (NE-Ca) in the transgenic adenocarcinoma of mouse prostate (TRAMP) model. Two groups of male C57BL/6 TRAMP mice as well as two group of C57BL/6 wild type mice were treated daily by oral gavage with coin oil or TIIA (1.5 mg per mouse), 5 days a week. After 20 weeks' treatment, we found that TIIA gavage did not affect mouse body weight and main organ weights; however, it neither improved the NE-Ca lineage burden in the TRAMP mice nor inhibited the growth of epithelial lesions estimated by prostate weight. Measurement of TIIA content in plasma was detected by LC-MS/MS method at 4 h after the last dose, which indicated similar concentrations in TRAMP mice and their wild type littermates, with the value of 98±30.9 (SD) ng/ml (-0.33 µM) and 136±45.1 ng/ml (-0.46 µM), respectively. We further investigated single dose pharmacokinetic study of the same dose level of TIIA in same vehicle in C57BL/6 wild type mice and found that the plasma TIIA C<sub>max</sub> was 81.9±8.2 ng/ml (-0.28 µM) at t<sub>max</sub> of 2.4 h. Our data showed that oral gavage of TIIA did not attenuate two lineages in TRAMP mouse model, and results suggested that either the threshold level of TIIA was not achieved through the route and dose/form of delivery to exert *in vivo* efficacy or that the TRAMP prostate carcinogenesis model was refractory to TIIA in both the epithelial lineage and neuroendocrine lineages.

### Acknowledgements

The authors appreciate Animal Facility staffs in Texas Tech University Health Sciences Center for animal care and daily maintenance, and Mr Peixin Jiang for continuous supports



of animal work during the experiments.

## 15 Cardamonin Reverses Doxorubicin Resistance in Human Hepatocellular Cancer Cells

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Hepatocellular carcinoma (HCC) is one of the most common type of malignant tumor worldwide. HCC is also one of the most aggressive human malignancies. Surgical excision, chemotherapy, and irradiation therapy are the major therapeutic options. However, more and more researches indicate that tumor cells can easily develop resistance to different chemotherapeutic agents, which termed multidrug resistance (MDR). Multidrug resistance (MDR) against chemotherapeutic agents is the main reason to the failure of HCC therapy. One strategy for reversal of multidrug resistance is to combine anticancer drugs with modulators. Our aim was to identify an effective MDR reversing agent firstly, and then obtain an insight into its reversal effect. Doxorubicin is a chemotherapeutic drug, principally used for solid tumours treatment such as HCC. However, resistance to DOX develops in several lines and results in the deficiency of therapeutic efficacy. Cardamonin was commonly used as traditional medicinal plant in China. It has been reported that cardamonin can inhibit various cancer cells proliferations, including lung cancer, breast cancer, prostate cancer. However, the effect of cardamonin on the reversal of MDR in HepG2/DOX was unclear. In our study, doxorubicin-resistant cells HepG2/doxorubicin (HepG2/DOX) derived from parental cells (HepG2) was generated and treated with cardamonin. The reversal effect of cardamonin on MDR tumor cells was investigated using the DOX sensitive HepG2 cells and DOX resistant HepG2/DOX cells. HepG2/DOX cells were induced by stepwise increasing concentration of DOX on HepG2 cells. After treatments for 8 months, cells were investigated for resistance against other anticancer drugs such as 5-FU, vincristine, cisplatin and paclitaxel. HepG2/DOX cells were observed to be resistant to DOX and to multiple anticancer drugs, including 5-FU, vincristine, cisplatin and paclitaxel. The IC<sub>50</sub> of these drugs in HepG2/DOX cells was significantly higher compared with that in the parental HepG2 cells, which is sensitive to these drugs. HepG2/DOX cells were about 30-fold more resistant than the parental HepG2 cells to DOX. The cytotoxicity of cardamonin at various concentrations (from 0.1 to 50 µg/ml) in HepG2 and HepG2/DOX cells was detected and compared. Both HepG2 and HepG2/DOX cells were nearly

equally sensitive to cardamonin, with IC<sub>50</sub> values of 16.3 and 38.3 µg/ml (Table 1). These results indicate that cardamonin is effective against both drug-sensitive parental and resistant cancer cells. Nontoxic concentrations of cardamonin were determined in HepG2 and HepG2/DOX cells. The IC<sub>10</sub> values were 3.8 and 4.9 µg/ml, respectively (Table 2). Cardamonin showed lesser cytotoxicity in normal L02 cell lines. So 4 µg/ml cardamonin were chosen to study the reversal of MDR. To determine whether cardamonin can affect the activity of DOX in HepG2/DOX cells, HepG2/DOX cells were treated with various concentrations of DOX (1, 10, 20, 40 µg/ml) and with 4 µg/ml cardamonin using MTT assay.

**TABLE 1 DETERMINATION OF IC<sub>50</sub> OF MULTIPLE ANTICANCER DRUGS**

	HepG2 IC <sub>50</sub>	HepG2/DOX IC <sub>50</sub>	Resistant fold
Doxorubicin	0.78±0.21	24.2±0.98	31.02564103
Cisplatin	0.65±0.02	18.7±0.21	28.76923077
Paclitaxel	0.31±0.03	10.9±0.89	35.25806452
Vincristine	0.67±0.09	10.8±2.11	16.11940299
5-FU	1.46±0.22	98.4±4.19	67.39726027

**TABLE 2 IC<sub>50</sub> AND IC<sub>10</sub> OF NCTD ON L02, HEPG2 AND HEPG2/DOX CELLS**

	L02	HepG2	HepG2/DOX
IC <sub>10</sub>	7.8±0.81	3.6±0.22	4.2±0.33
IC <sub>50</sub>	50.3±2.1	23.3±0.91	31.3±1.2

The results indicated that cardamonin significantly reverses the cytotoxicity of DOX to HepG2/DOX cells. In conclusion, HepG2/DOX multidrug-resistant cell line was successfully established. Our data strongly imply that Cardamonin effectively reverses MDR at nontoxic concentrations. The present results indicate that Cardamonin is a novel and potent MDR reversal agent and may be a promising drug for tumor chemotherapy.

## 16 Hybrid Artificial Root Foraging Approaches for Medical Image Segmentation

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Image segmentation plays an important role in the field of medical imaging to help the doctor diagnose abnormality in any part of the body from the PET scan or MRI scan. The goal of medical image segmentation is to extract a set of contours with special pharmacological significance from the medical image or a group of regions collectively cover the entire medical image. In the past decades, there are many methods have been proposed to process the medical image segmentation. Bi-level threshold or multilevel threshold of image histograms is known as the popular tool in various practical applications, which fall into two categories:



conventional approaches and intelligent approaches. The classical Otsu criterion can transform the multi-level threshold segmentation into an optimization problem, in which the computational determination of the threshold is the key issue. However, along with the increasing of the threshold number, the computational complexity will rise exponentially. In this work, we introduce a new hybrid artificial root foraging approaches to handle the complex medical image segmentation problem based on multilevel threshold. The proposed algorithm is initially designed to mimics the iterative root foraging behaviours. The root-to-root communication and co-evolution mechanism are used to improve the exploration ability and the diversity of root population. Individuals exchange information in a different efficient topology with root-to-root communication, the hierarchical spatial population is structured with co-evolution mechanism. The experiments of segmentation on a set of tested medical images are performed. With the new medical image segmentation method based on hybrid artificial root foraging approaches, the comparative segmentation results obtained on the basis of several benchmark medical images show the superiority of the proposed algorithm in terms of optimization accuracy computation efficiency. Numerical and statistical comparisons show that the proposed approach is an efficient technique for multilevel threshold of medical images.

#### Acknowledgements

This work was supported in part by the Liaoning Science and Technology Plan Project (Grant number: 2017020141-201) and Shenyang Science and Technology Project Plan Project (Grant number: 17175300).

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### Antioxidant Activity of *Pleurotus djamor* Polysaccharides Cultivated in Litchi Hull

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*Litchi chinensis* Sonn is the sole member of the genus Litchi in the soapberry family, *Sapindaceae*. It is a tropical tree native to the Guangdong and Fujian provinces of China. The lychee bears small fleshy fruits. It is delicious, sweet and contains many active ingredients, which is popular among people. Litchi shell is inedible. So a large amount of litchi shell waste will be produced. If it is not handled properly, it will further pollute the environment. *Pleurotus djamor*, commonly known as the pink oyster mushroom, is a species of fungus in the family *Pleurotaceae*. It could utilize huge variety of agricultural waste. In this study, litchi shell was used as substrate mix with cottonseed husk and

wheat bran to culture *P. djamor*. The content and antioxidant activity of polysaccharide isolated from *P. djamor* fruit body was studied. The polysaccharides of *P. djamor* fruiting bodies were extracted and detected using hot water extraction and phenol sulphuric acid method. DPPH clearance rate was used to test antioxidant effect of polysaccharides. The results showed the biological conversion rate of litchi hull (57.07 %) as substrate was slightly lower than raw materials (59.53 %). And the DPPH clearance rate of polysaccharide from *P. djamor* cultured with litchi hull (3 mg/ml, 70.78 %) was higher than Vc (0.07 mg/ml, 68.37) and lower than no litchi hull group (3 mg/ml, 76.44 %). This study provides a reference for the utilization of litchi hull and has important significance for the development of *P. djamor* health products.

#### Acknowledgements

The research was supported by Department of Education of Guangdong Province "Innovation Strong School Project" (2016KQNCX208), Doctoral Promotion Plan of Zhuhai College of Jilin University (2018), Guangdong Provincial College Students Innovation and Entrepreneurship Training Program (201713684018).

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### Applicability Analysis of the Right to Conceal in the Treatment of Advanced Cancer

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With the improvement of medical standards, the awareness of rights protection of patients and their families is getting stronger and stronger, and the risk of nursing care for nursing staff will become larger and larger. To this end, it is particularly important to analyse the applicability of the right to conceal in advanced cancer treatment. To explore the coping experience of self-experience burden (SPB) in patients with advanced cancer, analyse its coping style, analyse SPB and related factors in patients with advanced cancer, and provide theoretical scientific basis for evidence-based nursing practice, and further the basis for developing SPB research tools. This study used the phenomenological research method in qualitative research, and used in-depth interviews and participation observation as the main methods of collecting data. The data analysis method proposed by Giorgi was used to analyse and sort out the data. From January 2018 to June 2018, 60 patients with advanced cancer who were hospitalized in the oncology department of two comprehensive tertiary hospitals in a city were selected, including 31 males and 29 females, describing their own diseases. SPB and response experience arising from care needs.

This study analysed the interview data and found that SPB is a common concern in patients with advanced cancer. The cancer patient SPB experience is reflected in the following main relevant areas, and the results describe and discuss these categories and topics in detail. The cause of 1. SPB formation- concerns about others: SPB caused by the impact of own diseases and care needs on family members, including physical, economic, emotional, social and other factors, in addition to the upcoming death Six themes of the impact of family integrity and concerns about the future; 2. SPB's emotional experience- impact on oneself: including the hardships brought to the family by their own drag, and the frustration, self-blame, guilt, pain, regret Emotional reactions such as loss of self-worth and loss of self-esteem. 3. SPB's response- minimizing the burden: Describes the coping strategies that cancer patients take to reduce the burden on others and reduce their negative effects, and are divided into problem-centered responses and emotional-centered responses. Firstly, SPB is a common pain experience and feeling in patients with advanced cancer. 90 % of cancer patients have a burden of feeling. 76 % of cancer patients have moderate to severe burdens. The economic and emotional factors and the impact on the family are the main factors that form SPB, the reason. SPB is also one of the factors affecting the medical decision-making and quality of life of cancer patients, and is easily overlooked. Secondly, studies have found that cancer patients with strong SPB expression may have significant stress in some areas, and patients sometimes tend to conceal symptoms and needs to reduce the burden on others, and the current situation is not optimistic. Clinicians should pay attention to encourage the use of positive and effective coping styles for cancer patients to minimize the negative impact of SPB on cancer patients. Thirdly, the results of this study provided evidence for evidence-based nursing practice for patients with advanced cancer, and contribute to the implementation of overall care; SPB can be used as an indicator to evaluate the quality of life of cancer patients; in summary, the applicability of the right to conceal in advanced cancer treatment should be analysed according to the actual situation of the specific family.

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## Modelling and Analysis of the Effect of Higher Vocational Sports on Chronic Obstructive Pulmonary Disease

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Chronic obstructive pulmonary disease (COPD) has the characteristics of high incidence, high mortality, high disability rate and heavy burden. It has become a serious public health problem in the world, so it can effectively

alleviate or reduce the incidence and mortality of COPD. Clinical research has become an important research direction in academia. To this end, the effects of higher vocational sports training on oxygen partial pressure and lung function in patients with COPD were discussed. Sixty patients with COPD in different vocational colleges were selected. Sixty patients with stable moderate to severe COPD were randomly divided into two groups. The observation group included 15 cases of moderate COPD and 15 cases of severe COPD. The control group had 15 cases of moderate COPD and 15 cases of severe COPD. The observation group was trained in lung rehabilitation exercise for 12 weeks. The 6-minute walking distance (6 MWD), the change of lung function and the number of acute COPD episodes (AECOPD) and different clinical indicators were compared before and after training. There were significant differences in the number of 6 MWD and AECOPD seizures between the observation group and the control group before and after the training, which was statistically significant ( $p < 0.01-0.05$ ). There was no significant difference in lung function changes, which was not statistically significant ( $p > 0.05$ ). After intervention in higher vocational sports training, the oxygen saturation level of 60 patients with COPD was significantly higher than that before intervention ( $p < 0.05$ ); the pulmonary function symptoms were significantly lower than before intervention ( $p < 0.05$ ). The levels of FVC and FEV1 in the study group increased significantly, and the difference was statistically significant ( $p < 0.05$ ). Higher vocational sports training can improve 6 MWD in patients with COPD, reduce the number of AECOPD episodes, and have no obvious effect on improving lung function. It can effectively strengthen the patient's oxygen supply capacity, improve lung function, and is suitable for clinical promotion.

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## Optimal Segmentation of Brain MRI using Bio-inspired Approaches

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Various neural disorders can be identified through segmentation of brain magnetic resonance images (MRIs), which is an invaluable tool in many studies of neurodegenerative diseases. It is very important to obtain a highly accurate and robust tissue segmentation technique. Several methods have been suggested for the segmentation process in literature, but when the number of thresholds increases, there is the problem of long processing time. Bio-inspired methods are effective and robust algorithms, which have been proved to have the ability to meet the challenge of MRI multi-level

segmentation. In this work, we describe a novel multi-level thresholding based on bacterial foraging algorithm for many-objective optimization, which named the hybrid many-objective bacterial foraging optimizer (HMOBFO) algorithm. The main idea of the proposed algorithm is combining the crossover-archives strategy and the life-cycle optimization strategy together, the goal is exploring the search region in order to find the optimal solution. With the crossover-archive strategy, we assign different selection principles according to an external archive and internal archive, the main purpose focus on diversity and convergence separately. With the life-cycle optimization strategy, according to the local landscape, we assign the principle that individuals can switch their states periodically throughout the colony lifecycle, the main purpose satisfy the diversity of the population and avoid redundant local search, all of which may perform significantly well. The proposed algorithm is tested using several standard reference functions to compare its performance with other classical many-objective optimization methods. Experimental results show that, compared with other algorithms, the HMOBFO algorithm can significantly improve performance and deal with the multi-objective problem with satisfactory convergence, diversity, and complexity. The main purpose is promoting clinical decision and diagnosis by using the HMOBFO algorithm, which can segment the cerebrospinal fluids, grey matter and white matter from the axial, T2-weighted MRI slices of human brains perfectly. The HMBFO algorithm has been proven to be an excellent alternative for solving segmentation of brain magnetic resonance images.

#### Acknowledgements

This work was supported in part by the Liaoning Science and Technology Plan Project (Grant number: 2017020141-201) and Shenyang Science and Technology project plan project (Grant number: 17175300).

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### Feature Extraction of Fracture of Medical CT Foot-based on Intelligent Image

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Aiming at the computer-aided diagnosis of medical CT foot fracture, a feature extraction method of foot fracture image based on intelligent image is proposed. Because the image of medical CT foot fracture is unavoidable to be disturbed by noise in the process of acquisition, and the particularity of its imaging principle causes the phenomenon of blurred edge of the target image, the image of CT foot fracture is denoised first, and the contour of the image of medical CT

foot fracture is depicted by symmetry algorithm. According to the method of maximum inter-class variance, the pretreated foot fracture image was binarized. The background pixel was set to 0, the target pixel was set to 1, and no holes in the target area were ensured. According to the texture feature of intelligent image, grey feature, texture feature and morphological feature value of foot fracture image are extracted from binary image, and the image feature is extracted. Sixty CT images of foot fracture in a hospital were selected as the research object, and 60 images were randomly divided into two groups. The feature extraction method and the traditional feature extraction method were used to extract the features of the two groups. Compared with the two different methods, the accuracy of feature extraction is higher, about 96.8 %. Using intelligent image to extract the features of medical CT foot fracture image can effectively improve the image quality, and the accuracy of feature extraction is high. It can effectively assist doctors to locate the foot fracture injury accurately and speed up the diagnosis and treatment.

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### Effect of 5-Hydroxytryptamine Reuptake Inhibitor and Ideological Guidance on the Population of Students with Anxiety Disorder

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To study the effect of 5-hydroxytryptamine reuptake inhibitor combined with thought guidance on the students with anxiety disorder in order to relieve the psychological pressure and promote the development of students' physical and mental health. Sixty students with anxiety disorder were divided into experimental group ( $n=30$ ) and control group ( $n=30$ ). Thirty patients in the experimental group were treated with 5-hydroxytryptamine reuptake inhibitor and thought-guided therapy, while the control group was not treated. The anxiety of the two groups was observed at day 5, 10 and 15, and the effect of treatment was evaluated using the Hamilton anxiety rating scale (HAM-A), and Young's mania rating scale (YMRS). After 5 days, compared with the control group, the effective rate and cure rate of anxiety disorder in the experimental group are increased by 38 and 40 %, respectively; After 10 days, the effective rate and cure rate of anxiety disorder are increased by 45 and 52 %, respectively; After 15 days, the effective rate and cure rate of anxiety disorder were increased by 60 and 65 %, respectively. The HAM-A and YMRS of the 5th, 10th and 15th day were evaluated and the results showed that the scores of the experimental group were significantly different from those of the control group ( $p<0.01$ ). 5-hydroxy tryptamine reuptake inhibitor and ideological

guidance have a good effect on the treatment of students with anxiety disorder.

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## Application of Electron Spin Resonance in Detecting Ischemic Cerebrovascular Disease

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Cerebrovascular disease (CVD) is a group of diseases that seriously harm human health. The mortality and disability rates are very high, which cause a huge economic burden to the society. The application of electron spin resonance (ESR) in the detection of ischemic cerebrovascular disease (ICVD) was studied in order to reduce the incidence of ICVD. From May 2016 to May 2017, 60 patients with ischemic cerebrovascular disease were selected and divided into two groups: one group was treated with ESR and the other with nuclear magnetic resonance (NMR). The conventional magnetic resonance imaging (MRI), fluid attenuated inversion recovery sequence, DWI and ASL, MRA sequences were examined in patients with ischemic cerebrovascular disease. The signal characteristics, area size and the relationship with blood vessels were analysed by various DWI, ASL, MRA techniques. The observation shows that the detection results of ischemic cerebrovascular diseases by electron spin resonance technique are more accurate and the detection rate of small area cerebral infarction is higher than that of nuclear magnetic resonance technique. Electron spin resonance (ESR) technique can be used to quantitatively analyse the degree of cerebral blood flow perfusion in patients with ischemic cerebrovascular disease and complete the detection of ischemic cerebrovascular disease.

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## Analysis of Serum Interleukin-6 in Patients with Depression by Emotional Counselling

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The effect of group emotional counselling based on positive psychology on serum interleukin-6 in college students with depressive symptoms, it provides reference for universities to carry out health psychological counselling and intervention. A total of 1870 college students in a Chinese University screened 200 college students who may have depressive symptoms, to intervene in the form of group

counselling, the experimental design of the experimental group and the control group was carried out, Detection and comparison of 63 cases of unipolar depression before and after emotional counselling (single phase depression group), the levels of IL-6 in serum of 80 patients with bipolar depression (bipolar depression group) and 143 controls (control group) after counselling were measured, the relationship between serum IL-6 level and life satisfaction factor was analysed. The serum levels of IL-6 in the case group before counselling and the control group were (64.56±7.10) ng/l and (22.54±2.99) ng/l, respectively, the difference between the two groups was statistically significant ( $F=1362.51$ ,  $p<0.01$ ). The serum IL-6 levels in the unipolar depression group and the bipolar depression group were respectively (65.11±7.21) ng/l and (63.85±6.95) ng/l, there was no significant difference between the two groups. Emotional counselling is positively correlated with serum IL-6 level in depressive episode patients ( $r=0.19$ ,  $p=0.025$ ). Positive group counselling can improve serum interleukin-6, mental health of depressive college students to a certain extent, and can improve the well-being index.

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## Application Study of Skin Stretch Band Repairing Soft Tissue Defects in Athlete's Foot

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To investigate the value of external stretcher (ETE) in the treatment of skin and soft tissue defects in the foot and ankle, from July 2017 to February 2018, 8 patients with soft tissue defects of the foot and ankle were treated with skin ETE, including 6 males and 2 females; aged 5 to 85 years, mean 51.6 years; 3 cases of non-ischemic diabetic foot 2 cases of traumatic skin defect and bone exudation in the right ankle, 1 case of left lateral malleolus skin ulcer, 1 case of non-union of the left ankle joint after rheumatoid arthritis, 1 case of right foot dorsal skin defect and 1 case of soft tissue defect. The area is at most 5.0×12.0 cm and the minimum is 3.5×3.5 cm. The needle insertion point and the needle exit point of the skin ETE were marked on both sides of the wound, each needle being 1.8 cm apart and 0.5 cm from the edge of the wound. The silicone band was pulled 1 or 2 times a day during treatment to maintain proper tension until the wound is closed. All 8 patients were followed up for 2 to 20 months with an average of 5 months. Among them, 7 patients recovered, and 1 patient with rheumatoid arthritis who had no wound healing after left ankle joint fusion (wound 5.0×3.5 cm) did not heal after skin ETE treatment. Considering long-term application of hormones, wound around the skin Containing collagen atrophy, can withstand the small tension. Skin ETE is used

to treat skin and soft tissue defects of the foot and ankle. The operation time is short, the local damage caused by the patient is small, and the postoperative recovery is fast. It is especially suitable for elderly patients with non-ischemic diabetic foot ulcer.

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## Correlation between Five Quantitative Hepatitis B and Liver Histopathology and Antiviral Efficacy in Patients with Chronic Hepatitis B

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The objective of the work is to explore the correlation between the five items of hepatitis B in patients with chronic hepatitis B and the pathological and antiviral effects of liver tissue and the clinical diagnostic value of the judgment of the condition. Four hundred patients with chronic hepatitis B admitted to a hospital in Shanghai from January 2017 to January 2018 were selected as observation group, and 80 healthy patients were used as control group in the same period. Both groups were tested for serum hepatitis B in the early morning after enrolment. Quantitative and liver tissue levels were assessed and the relevance of the two was assessed. The results of five tests of hepatitis B in two groups were divided into eight models. HBsAg, HBeAg, HBcAb positive and HBsAg, HBeAg positive patients had higher liver tissue detection rate and higher liver tissue levels. There were no abnormalities in the detection and liver histopathology and virus levels. There were significant differences in HBsAg, HBeAg and HBcAb between the positive group and the negative group ( $P < 0.05$ ). There was a significant difference between HBsAb and HBeAb compared with the control group. There was a significant negative correlation between HBsAb, HBeAb and liver tissue quantification ( $p < 0.05$ ). HBsAg, HBeAg and HBcAb were positively correlated with liver histopathology ( $p < 0.05$ ). Hepatitis B Quantitative and Liver Histopathology and Antiviral Therapy have a good correlation. The simultaneous detection of both can better reflect the HBV virus replication and disease progression in this type of patients.

### Acknowledgements

This research is supported by Correlation between the Five Quantities of Hepatitis B and the Pathological and Antiviral Effects of Hepatitis B Patients (17277758D).

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## Comparison of Clinical Value of

## Different Imaging Diagnosis in Patients with Lumbar Disc Herniation

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The accuracy and clinical value of X-ray, CT and MRI were compared in patients with lumbar disc herniation. Eighty-seven patients with lumbar disc herniation who were treated in a hospital from September 2017 to May 2018 were examined by X-ray, CT and MRI. The diagnostic value of the three examination methods was compared and analysed, and the medical imaging findings of patients with lumbar disc herniation were analysed. Among 87 patients with disc herniation, the detection rates of X-ray, CT and MRI were 35.63, 60.92 and 87.36%, respectively. The detection rate of X-ray examination was significantly lower than that of MRI and CT, and the difference was statistically significant ( $p < 0.05$ ). The detection rate of MRI was significantly higher than that of CT, and the difference was statistically significant ( $p < 0.05$ ). MRI is superior to X-ray and CT in the diagnosis of lumbar disc herniation, but its diagnosis time is too long. CT diagnosis is more sensitive than X-ray diagnosis, and it is very suitable for clinical use. If the CT diagnosis results are different, it needs to be combined with MRI diagnosis. The combination of the two methods can improve the detection rate.

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## Software Design for Quantitative Monitoring of Gastrointestinal Function Recovery in Patients after Laparoscopic Surgery

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At present, the gastrointestinal rehabilitation monitoring and evaluation method cannot obtain more objective analysis data. Therefore, through software monitoring methods, the changes of gastrointestinal indexes of patients after laparoscopic surgery can be tracked and monitored, and an evaluation file can be established to provide further diagnosis for doctors. Two hundred patients who underwent laparoscopic surgery in a urology department of a hospital from January to June 2018 were selected as subjects, and the age and gender of the patients were summarized. Develop gastrointestinal rehabilitation treatment monitoring software independently under Visual Basic 6.0 environment. The software is mainly divided into the intelligent

acquisition part of gastrointestinal information based on ARM microprocessor and the signal encoding and decoding processing part based on FPGA. History of preoperative long-term anaesthetic, preoperative long-term use of steroids, preoperative albumin, laparoscopic approach, pneumoperitoneum, blood loss, postoperative hemoglobin minimum, hemoglobin decline, postoperative potassium The lowest value, postoperative mean potassium value, postoperative mean calcium value, postoperative mean magnesium value, postoperative bedtime and influx time, body mass index, and history of previous abdominal surgery were analysed. On this basis, the gastrointestinal information is dynamically collected, multiple feature points are selected to describe its health indicators, and an objective data file is established based on the patient's gastrointestinal information. Test results on the software show that the gastrointestinal function can be well monitored using the designed software. The software is an innovative study on the recovery of gastrointestinal function in patients after laparoscopic surgery. It can replace the traditional rehabilitation assessment method based on subjective evaluation and objectively reflect the rehabilitation of patients.

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### **Effect of Early Nursing Support on Severe Craniocerebral Diseases with Hypernatremia**

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The objective of the work was to explore the nursing characteristics and role of early nursing support in the treatment of patients with severe craniocerebral diseases complicated with hypernatremia. The test subjects were 40 patients with severe craniocerebral diseases and hypernatremia in a hospital. The 40 patients were basically the same. They were divided into two test groups, each with 20 patients. 20 patients with severe craniocerebral disease and hypernatremia were treated with early care support, and the vital signs of the patients were continuously observed, and complications such as high fever and high blood sugar were noted. Under the support of early care, the intensive catheter for deep venous hemodialysis is treated, the anticoagulant adverse reactions are observed, the machine alarm is processed in time, and the aseptic operation is strictly observed. The other group of patients did not receive early care support and only had normal medication. After six months of testing, 42 patients were cured in 35 patients and 7 patients died. Among them, 20 patients who were supported by early care were all survived and cured, and the serum sodium of the cured patients was significantly lower than that before treatment and the

APACHE II score was significantly decreased ( $p < 0.01$ ). In the other group, only 15 patients were cured and 7 died. Of the patients who died, 5 died of multiple organ failure, and 2 died of expensive treatment. Patients with severe craniocerebral disease complicated with hypernatremia have a higher mortality rate. Early care support plays a more important role in improving the condition. At the same time, appropriate nursing measures can effectively improve the prognosis of patients and reduce the mortality rate.

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### **Relationship between Nutritional Risk and Quality of Life in Patients with AMI and DM**

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The objective of the work was to investigate the impact of current nutritional risk on quality of life in patients with acute myocardial infarction (AMI) complicated with diabetes (DM) during admission. A total of 500 patients with AMI and DM who were admitted to the Department of Cardiology, People's Hospital of People's Hospital from June 2017 to June 2018 were enrolled. The questionnaires used in the trial included the Nutritional Risk Screening Scale 2002 (NRS2002), the Social Support Scale (SSRS), the Medical Response Scale (MCMQ), the General Hospital Anxiety and Depression Scale (HADS), and the multi-dimensionality of myocardial infarction. Evaluation Scale (MIDAS), Chinese Version Perception Stress Scale (CPSS). The nutritional status, psychological status, social support status and quality of life of the subjects were investigated, and the clinical data of the patients were recorded. The relationship between nutritional risk and quality of life in patients with acute myocardial infarction complicated with diabetes was obtained by t test and analysis of variance. Factors affecting the quality of life of such patients include yielding response, nutritional risk, treatment, and monthly income per capita. The incidence of nutritional risk in patients with AMI and DM was 34.1%; the quality of life of AMI patients with DM was positively correlated with nutritional risk and yield response. The analysis shows that treatment methods, nutritional risks, coping with response, and monthly income per capita have both direct and indirect effects on patients' quality of life. Patients with acute myocardial infarction (AMI) complicated with diabetes mellitus (DM) should be screened for early nutrition risk, investigate the psychological state of the patient, and carry out clinical nutritional intervention and psychological intervention to

improve the quality of life of patients.

### Acknowledgements

The research is supported by the Study on the Relationship among nutritional risk, coping modes and quality of life of AMI with DM patients, Education Science Foundation Project by National Nursing Association of Higher Medical Education Society (GJHLZ160016).

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## Effect of Nursing Care Training on Improving Cognitive Ability of Alzheimer's Disease Patients

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In recent years, nursing care training has been widely known, and its therapeutic effect on Alzheimer's type Alzheimer's disease (AD) remains to be further studied and analysed. This article is to observe the effect of comprehensive rehabilitation treatment of AD on cognitive function in patients in the early and mid-term, and to explore possible improvement methods of AD treatment. One hundred patients with Alzheimer's type dementia in a city hospital were used as test subjects, and 100 patients were randomly divided into a treatment group and a control group. The duration of the test was 3 months, during which the control group was given medication and exercise was performed and communication was considered daily. In addition to conventional drug therapy and exercise therapy, the treatment group also provides nursing care therapy for the elderly. The elderly care for the patients and enhance the quality of life of the elderly. Finally, the results of pre-treatment and post-treatment evaluation were obtained using a mini-mental state scale (MMSE) and a modified Barthel index (MBI). After 3 months of treatment, there was a significant difference in the therapeutic effects of the two groups of Alzheimer's type dementia patients. After the one-month treatment, the MMSE and MBI were significantly improved compared with the control group ( $p < 0.05$ ). After 3 months, the MMSE and MBI scores were significantly different, and the difference was statistically significant ( $0.01 < p < 0.05$ ), compared with the control group, the scores of each item did not improve significantly ( $p > 0.05$ ). Nursing care training can improve the cognitive function of patients with AD, and the quality of life has been effectively improved, which has a very positive effect in delaying the condition of AD patients.

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## Evaluation of Clinical Diagnosis and

## Treatment of Respiratory Infection in Children under Aerosol Therapy

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The objective of the work was to evaluate the clinical diagnosis and treatment of respiratory infection in children under aerosol therapy. A total of 145 children with respiratory infections in our hospital from January 2016 to October 2018 were collected as the evaluation method. Case patients were randomly divided into control group and experimental group. For the control group, only routine treatment and nursing measures were taken, and intravenous infusion of ambroxol hydrochloride was still used for treatment. The experimental group was treated with aerosolized ambroxol hydrochloride under the premise of ensuring routine treatment and care. The clinical treatment effect of the two groups of infected patients was observed, and the therapeutic effects were compared and analysed. According to the comparison of the results data, the healing effect of the experimental group was significantly better than that of the control group. The recovery rate of patients treated with aerosolized ambroxol hydrochloride was significantly higher than that of the control group. In the treatment of respiratory infections in children, the treatment of aerosol inhalation is very effective, greatly speeding up the treatment efficiency, improving the recovery rate of the patient's condition, and reducing the incidence rate. This method has certain clinical application and promotion.

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## Effects of Spironolactone Combined with Conventional Therapy on Exercise Endurance, Cardiac Function and Serum BNP 32 levels in Patients with Heart Failure and Chronic Atrial Fibrillation

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The objective of the work was to investigate the effects of spironolactone combined with conventional exercise on endurance, cardiac function and serum myocardial injury in patients with heart failure and chronic atrial fibrillation, as well as the clinical efficacy of patients with cardiac function. Eighty patients with heart failure were selected, and the cardiac function was graded II-IV as per New York heart Association (NYHA). All patients were treated with

diuretics, digitalis, and vaso convertase inhibitors. They were randomly divided into two groups: 40 patients in the spironolactone group. On the basis of the daily administration of spironolactone 20 mg; 40 patients in the control group, except for the administration of spironolactone, the rest of the treatment was the same as the treatment group. Dynamic observation of NYHA classification before treatment and 1 month after treatment and determination of serum BNP 32 concentration in patients with heart failure before treatment and 3 months after treatment by enzyme-linked immunosorbent assay. At the same time, echocardiography was used to measure left ventricular ejection fraction and left ventricular end diastolic diameter. The total effective rate of clinical comprehensive efficacy after treatment with spironolactone group and control group was 85.7 and 76.2 % ( $p<0.05$ ), and the effective rates were 61.9 and 42.9 %, respectively ( $p<0.05$ ). NYHA grades improved after 1 month of treatment in both groups, but the improvement was significant after treatment with spironolactone ( $p<0.05$ ). After treatment, the left ventricular ejection fraction was significantly increased in the spironolactone group ( $p<0.05$ ), and the left ventricular end-diastolic diameter was significantly decreased ( $p<0.05$ ). After treatment, the levels of serum BNP in the two groups decreased significantly ( $p<0.05$ ), but the decrease in the spironolactone group was more significant ( $p<0.05$ ). There was a negative correlation between the decrease of serum BNP level and the increase of left ventricular ejection fraction before and after treatment with spironolactone group ( $r=-0.42$ ,  $p<0.05$ ), but positively correlated with the decrease of left ventricular end-diastolic diameter ( $r=0.60$ ,  $p<0.05$ ). Spironolactone combined with conventional therapy is the cornerstone of heart failure treatment, can slow down the development of atrial fibrillation in heart failure, delay the process of disease, not only for patients with heart function has a positive improvement, but also significantly improve the quality of life of patients.

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## Endogenous Pathogenic Factors of Arrhythmia in Physical Education

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The pathological phenomena appearing in physical education are not only related to the quality of teaching and the health of students, but also related to the sustainable development of physical education. Aiming at the problem that the existing methods lead to the endogenous pathogenic factors of students with arrhythmia in physical education, there are problems of complex process, large research base and low accuracy of diagnosis results. A research method based on

quantitative analysis is proposed. Using content analysis method, set the endogenous aetiology and pathogenesis analysis categories of students' arrhythmia in physical education, and constructs the category content for analysis, including the abnormal sinus node sensation caused by external factors. Excited conduction status, students' normal physical condition, teacher feedback coding and frequency statistics of relevant content, combined with electrocardiogram for physical diagnosis, and determining endogenous pathogenic factors of arrhythmia in physical education. The experiment showed that the time of diagnosis of the cause was reduced by about 50 % compared with the existing method, and the diagnostic category was more targeted, with an accuracy rate of 99.5 %. This method is used to study the endogenous pathogenic factors of students with arrhythmia in physical education. The diagnostic categories are highly targeted, short-lived and accurate, so as to ensure the health of students more effectively.

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## Effect of Early Nutritional Support on the Clinical Efficacy of Gastrointestinal Cancer Patients

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The objective of the work was to explore the effect of early nutritional support on the clinical treatment of patients with gastrointestinal cancer, and to find out the value of early enteral nutrition in the postoperative treatment of patients with gastrointestinal cancer. Eighty patients with gastrointestinal cancer admitted to the Department of Oncology from July 2010 to July 2014 were randomly divided into observation group and control group, with 400 cases in each group. The control group received routine rehydration, and the observation group received enteral nutrition support on the basis of the control group, and the nutritional status of the two groups before and after treatment was compared. There were no significant differences in TP, Alb, TRF and PA between the two groups before treatment ( $p>0.03$ ). After treatment, the nutritional indexes of the control group were significantly lower than those before treatment ( $p>0.03$ ). There was no significant change in the nutritional index before and after treatment in the observation group ( $p>0.03$ ); After treatment, the nutritional status of the observation group was significantly better than that of the control group ( $p>0.03$ ). Early nutritional support can significantly improve the nutritional status of patients with gastrointestinal cancer, improve the prognosis and quality of life, and the clinical application of the value.



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## Case Analysis and Treatment Plan for Toxic Brain Injury Caused by Gas Explosion

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The objective of the work was to analyse the clinical characteristics and treatment of toxic brain injury caused by inhalation injury caused by gas explosion. The clinical characteristics of poisoning brain injury under the inhalation injury of gas explosion process are obtained, in order to reduce the morbidity rate and mortality rate by early diagnosis and early treatment. Inhalation injury occurred in 185 people in the incident. The incidence rate was 88%, of which 38 died and the mortality rate was 20.5%. Fifteen patients developed toxic brain injury. The data of 15 patients with delayed brain injury caused by carbon monoxide poisoning were retrospectively analysed and analysed. The inhalation injury caused by gas explosion in 210 cases was complicated. The gender, age, time of treatment and hyperbaric oxygen treatment time of 15 patients with delayed brain injury caused by carbon monoxide poisoning were statistically significant ( $p < 0.05$ ). The clinical manifestations are complex and diverse. The incidence of dementia and faecal incontinence is 100.0%, and the incidence of bilateral white matter symmetrical butterfly or plaque-like long T2 signals is as high as 80.0%. There were 196 cases (88.69%) with combined injuries, 164 cases (74.21%) with respiratory insufficiency, 159 cases (71.95%) with pulmonary infection and 59 cases (26.70%) with death. Inhalation injury caused by gas explosion has imaging findings of pulmonary exudation and bronchial obstruction, and respiratory insufficiency occurs early; timely release of airway obstruction and maintenance of effective gas exchange, correct and timely pulmonary resuscitation is the main measure of treatment. Strengthening the clinical analysis and risk factors analysis of delayed brain injury caused by carbon monoxide poisoning, and early prevention and control (especially hyperbaric oxygen therapy) have important clinical value for clinical judgment of disease, improvement of clinical efficacy and improvement of prognosis.

### Acknowledgements

The research is supported by Natural Science Foundation of China (51604091), the project on youth backbone teachers of college school in Henan province (Grants serial number: 2017GGJS153).

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## The Structure of Oral Microbial Community in the Elderly with Chronic Periodontitis

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The community structure of oral microorganism was examined in the elderly with chronic periodontitis. The combination of biome structure and chronic periodontitis provides evidence for the study of bacterial aetiology and pathogenesis of periodontitis. According to the specimens of the third National Oral Epidemiology Survey, the elderly in a community were divided into two groups: saliva group with chronic periodontitis and saliva group with non-diseased periodontitis. The composition of oral microbial community was described by the distribution curve of species abundance, the spatial heterogeneity of microbial community was studied by Taylor power law, and the relationship between inflammation and microbial community was analysed. The results of the two groups showed that the microbial community in the saliva group of periodontitis was significantly higher than that in the non-diseased group, and the effect on the sputum microbes in the oral cavity was obvious, and streptococcus belongs to the core biota in saliva of periodontitis patients. The microbial communities in the oral cavity and the chronic periodontitis of the elderly had a significant influence on the structure of the microbe community in saliva. The abundance of microorganism in the saliva of the patients with chronic periodontitis was different but the species might be constant. May aim at this difference change to develop the correlation medicine, the slow light periodontitis symptom.

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## The Curative Effect of Prescription for Strengthening Spleen, Activating Blood, Eliminating Accumulation Combined with Western Medicine in Treatment of CAG

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The objective of the work was to observe the curative effect

of prescription for strengthening spleen, activating blood, eliminating accumulation combined with western medicine in treatment of CAG. A total of 148 patients with CAG were divided into control group and observation group, each containing 74 patients. The patients in control group were treated with western medicine, while the patients in observation group were applied with prescription for strengthening spleen, activating blood, eliminating accumulation combined with western medicine. The clinical efficacy and the long-term recurrence rate between two groups were compared. The endoscopic pathological scores, interleukin-8 (IL-8), interleukin-11 (IL-11), tumour necrosis factor- $\alpha$  (TNF- $\alpha$ ), trilobulin 3 (TFF-3) and gastrin-17 (GAS-17) levels were analysed before and after treatment. The endoscopic pathological scores, IL-8, IL-11, TNF- $\alpha$ , and TFF-3 levels were significantly decreased in both groups after treatment,  $p < 0.05$ ; the GAS-17 level was significantly improved after treatment for both groups,  $p < 0.05$ . All the above indexes in the observation group were significantly better than those in the control group,  $p < 0.05$ ; the clinical efficacy of the observation group was significantly better than that of the control group,  $p < 0.05$ ; the long-term recurrence rate of the observation group was significantly lower than that of the control group,  $p < 0.05$ . The prescription for strengthening spleen, activating blood, eliminating accumulation combined with western medicine in treatment of CAG can significantly reduce the degree of gastric mucosal lesions, reduce the level of inflammatory response, and regulate the levels of TFF-3 and GAS-17, and help to avoid long-term relapse.

### 39 Effective Treatment and Preventive Measures for Lower Limb Deep Venous Thrombosis after Orthopaedic Trauma Surgery

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The objective of the work was to explore the effective treatment and preventive measures for lower limb deep venous thrombosis after orthopaedic trauma surgery. In this study, 236 patients who had undergone bone trauma surgery in our hospital from October 2017 to October 2018 were selected as subjects. They were randomly divided into observation group and control group, each containing 118 patients. The control group was treated with conventional drug anticoagulation therapy, and the observation group was applied with targeted preventive measures on the basis of conventional drug anticoagulation therapy. Finally, the incidence and treatment efficiency of lower extremity deep venous thrombosis were compared between the two groups. The incidence of lower limb vein thrombosis in the

observation group was 14.4 % (17 cases), which was significantly lower than 69.5 % (82 cases) in the control group,  $p < 0.05$ . The total effective rate of treatment after lower extremity deep venous thrombosis was 94.1% in the observation group, which was significantly higher than that (85.4 %) in the control group,  $p < 0.05$ . Targeted preventive measures can significantly reduce the incidence of lower limb deep venous thrombosis after surgery in patients with orthopedic trauma. In addition, the interventional therapy and the implantation of the deep vein filter combined with anticoagulation therapy can achieve significant curative effect for patients with lower limb deep vein thrombosis, which is worthy of being promoted in clinical application.

## Track 2: PHARMACEUTICAL ANALYSIS

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### Analysis of Different Processed Products Volatile Oil *Magnolia officinalis* and their Antibacterial Effects *in vitro*

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The objective of the work was to analyse the volatile oils ingredients of raw *Magnolia officinalis* and ginger *Magnolia officinalis*, and to explore the antibacterial effect of the volatile oils of raw *Magnolia officinalis* and ginger *Magnolia officinalis in vitro*. *Magnolia officinalis* was processed with ginger; The volatile oil of raw *Magnolia officinalis* and ginger *Magnolia officinalis* was extracted using the steam distillation. The extraction process of volatile oil was optimized using the orthogonal experiment. The ingredients of volatile oil were identified using the gas chromatography-mass spectrometer (GC-MS). The antibacterial zones of inhibition of the two kinds of volatile oil against *Staphylococcus aureus* and *Escherichia coli* were measured using the disk agar diffusion method. The minimum inhibitory concentrations (MIC) of the two volatile oils were measured using the tube dilution method. The optimum extraction technology of *Magnolia officinalis* volatile oil was, soaking for 6 h, extracting for 8 h, solid-liquid ratio 1:9. GC-MS method was used to isolate and identify 63 and 56 kinds of chemical constituents from the raw and ginger *Magnolia officinalis*. There were 36 kinds of ingredients. The highest ingredient of volatile oil was  $\beta$ -eudesmol (37.92, 31.43 %), followed by  $\alpha$ -eudesmol (25.83, 20.35%) and  $\gamma$ -eudesmol (17.18, 13.64 %). Most of the volatile oil ingredients of ginger *Magnolia officinalis* were lower than those of raw *Magnolia officinalis*. The antibacterial screening showed that raw *Magnolia officinalis* and ginger *Magnolia officinalis* had inhibitory

effects on *Staphylococcus aureus* and *Escherichia coli*. The diameters of comprehensive bacterial inhibition zones of ginger *Magnolia officinalis* were 21.5 mm and 22.38 mm, the diameters of comprehensive bacterial inhibition zones of raw *Magnolia officinalis* were 18.90 mm and 18.58 mm; The MICs of raw *Magnolia officinalis* volatile oil were 0.15 and 0.125 g/ml, The MICs of ginger *Magnolia officinalis* volatile oil were 0.1 and 0.75 g/ml. The components and contents of *Magnolia officinalis* volatile oil have changed greatly before and after processing. Both raw *Magnolia officinalis* and ginger *Magnolia officinalis* volatile oil have the bacteriostatic effects, and the antibacterial activity of ginger *Magnolia officinalis* is stronger than that of raw *Magnolia officinalis*.

### Acknowledgements

This work was supported by the Characteristic Innovation project of Ordinary Colleges and Universities in Guangdong in 2017 (Grant No. 2017KTSCX211) and the Innovation Cultivation Project of Zhuhai College of Jilin University (Grant No. 2017XJCQ004).

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## Producing Pharmaceutical Intermediate: Cyclic Carbonates Catalysed by the Immobilized Salen-Co (III) Catalysts

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Cyclic carbonates are widely used as pharmaceutical intermediates. Recent work in catalytic systems for the conversion from CO<sub>2</sub> and epoxides to cyclic carbonates has been widely reported that include homogeneous and heterogeneous catalysts. They include simple alkali metal salts, ionic liquids, phosphines, metal complexes. However, their shortcomings have been realized. None of these catalysts can be considered as highly active under mild conditions. At the meanwhile, the preparation processes of the catalysts are complex and the costs are high. So it is desired to develop a catalyst which can overcome these drawbacks for the above reaction. In this study, synthesis of cyclic carbonates from epoxides and CO<sub>2</sub> were carried out in a 50 ml stainless-steel autoclave equipped with a magnetic stirrer and automatic temperature control system. The yields of cyclic carbonates were obtained by Shimadzu GC-14C. The supported Co contents of catalysts were determined by a TAS-986G atomic absorption spectroscopy. The supported catalyst 1c exhibited greater activity and selectivity than catalyst 1a and 1b in the cycloaddition reaction of epoxides and carbon dioxide to produce cyclic carbonates with co-catalyst TBAB (0.5 mmol) at 100°

under 5 MPa in a short reaction time of 6 h. Especially, the supported catalyst 1c was easily recovered by simple filtration and could be reused at least five times with little loss of activity (figs. 1 and 2).

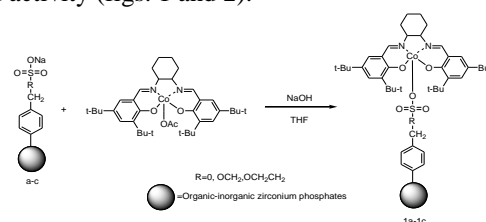


Fig. 1: The synthetic route to heterogeneous catalysts 1a-1c

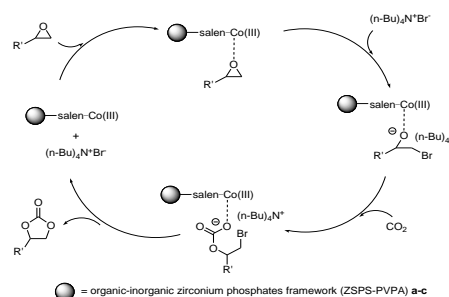


Fig. 2: Plausible reaction mechanism

In this work, a series of heterogeneous catalysts 1a-1c have been successfully synthesized by immobilization of salen-Co (III) onto the organic- inorganic zirconium phosphonates supports (ZSPS-PVPA) a-c. The resultant catalysts 1a-1c exhibited significantly enhanced activity towards the production of cyclic carbonates. Particularly catalyst 1c is a versatile, recyclable, and reusable solid catalyst for the cycloaddition reaction of CO<sub>2</sub> and epoxides up to 79.2-90.3 % productivity levels of products under mild reaction conditions.

### Acknowledgements

This research was financially supported by the Natural Science Research Project of Guizhou Provincial Education Office in 2015 ([2015] 416) and support from Guizhou Province Science and Technology Fund in 2016 ([2016]1059).

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## Management of Anaesthetics for Anaesthesia Care

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Nowadays, with the rapid development of anaesthesia technology discipline, the scope of anaesthesia disciplines is also expanding, it is not limited to surgical anaesthesia, and its application in severe resuscitation and pain treatment is getting deeper and deeper. In this context, the variety of narcotic drugs has become more and more, which greatly increases the difficulty in managing these drugs. This article explores the management methods of narcotic drugs in anaesthesia care. In the anaesthesia care, the drug is

required to be managed by a person, and the relevant personnel are required to prepare a drug registration and recovery registration. Since the base of the anaesthetic drug is always the same, the total amount of daily medication and the remaining medicines should be equal to the drug base. If there is an error, the relevant personnel must find the cause and send the medicine after it is correct. In order to make the drug Proper use, to prevent loss, therefore, the responsibility to each anaesthesiologist, the establishment of a taxonomic drug release registration book. Before the operation, each anaesthesiologist will receive the appropriate types and quantities of narcotic drugs and psychotropic drugs from the narcotics drug dealers according to the size of their anaesthesia surgery, using the special box for the naphtha drugs marked with their own names. The name, quantity, and batch number are registered in detail on the registration form of the drug and drug collection and recycling. The two parties sign the certificate. After the operation is over, the anaesthesiologist needs to return the prescription and the remaining drugs. After checking, the confirmation and signature are confirmed. Under this method, the narcotic drugs can be reasonably applied, effectively preventing the use of the poisonous and narcotic drugs from confusing, expiring and flowing into the society. Strengthening the management of narcotic drugs in anaesthesia care can ensure the safety of medical drugs in the operating room.

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### Study and Analysis of Pharmacological Effects of Different Chrysanthemums

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Chrysanthemum has been widely cultivated in China and has a long history. It is a typical plant with excellent medicine and food. It is commonly used in traditional Chinese medicine for medicine and food. To explore the role of traditional Chinese medicine on different kinds of chrysanthemums, various medicinal chrysanthemums sold in the market were collected. Research data, summarizing their pharmacological effects and clinical applications is of high value. Collecting various Chinese herbal chrysanthemums from different places in the market in recent years, the more common chrysanthemums mainly include Gongju, Chrysanthemum, Chrysanthemum, Jiju, Huaiju, Chrysanthemum, Chrysanthemum, Chuanju, and Xiangju. The type and corresponding pharmacological effects were tested. According to the test results, different kinds of chrysanthemums exerted antiinflammatory, antiviral, antiparasitic, antibacterial, antioxidant, antitumor and antimutagenic effects, which have certain effects on the

cardiovascular system, cholesterol metabolism and immunity of the body. After investigation, Xiangju is a new chrysanthemum variety selected from semi-wild chrysanthemums. It is the only concentrated chrysanthemum in China, and the volatile oil, chlorogenic acid and total flavonoids are significantly higher than other similar varieties. Xiangju aqueous extract has obvious relaxation effect on phenylephrine pre-contracted rabbit thoracic aortic rings, which significantly reduces carotid blood pressure in anesthetized rats, and its antihypertensive effect is significantly stronger than that of other chrysanthemums. Studying the pharmacological effects of various types of chrysanthemum can make the drug more accurate in the clinical application process, so that the drug can better serve the majority of clinical patients.

### Acknowledgements

This study was supported by National Natural Science Foundation of China (No. 31600386) and Natural Science Foundation of Shandong Province (No. ZR2015CL014).

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### Efficacy of Cisplatin Combined with Temozolomide in the Treatment of Recurrent High-grade Gliomas

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Analysis of the efficacy of cisplatin combined with temozolomide in the treatment of recurrent high-grade gliomas. A hundred patients with recurrent high grade glioma confirmed by pathology were selected, 50 of them were as control group, while the control group was not treated. The other 50 cases were treated with cisplatin combined with temozolomide. During the treatment, MRI, liver and kidney function, blood cells were re-examined, and the changes of the disease were judged. The curative effect of the two groups was compared and observed. The effective rate of treatment in the observation group is as high as 89 %, and the effective rate in the control group is only 40 %, which is significantly lower than that in the observation group (49th), the difference is great, and the difference is statistically significant; After treatment, the incidence of side effects in the observation group is 12 % and the incidence of side effects is small. The combination of cisplatin and temozolomide in the treatment of recurrent high-grade gliomas has a high effective rate and a low incidence of side effects. The results indicate that the combination therapy of cisplatin and temozolomide is effective in the treatment of recurrent high-grade gliomas, and has a good application value.

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## Preventive Effect of Anthocyanins from Purple Potato on Liver Injury in Mice

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In order to enhance the added value of purple sweet potato, the preventive effect of anthocyanin on liver injury in mice was studied, which can provide theoretical support for purple potato anthocyanins as liver protection function products. The liver injury model of mice is established with 60% ethanol, which is divided into acute alcoholic liver injury and subacute alcoholic liver injury. Mice were given different concentrations of purple potato anthocyanin, the concentration of which was set at 80, 120, and 160 mg/kg to observe the growth of mice within 30 days. Organ index, aspartate aminotransferase (AST), alanine aminotransferase (ALT), ethanol dehydrogenase (ADH), superoxide dismutase (SOD) and glutathione transferase (GST) in serum were measured. For acute alcoholic liver injury mice, purple potato anthocyanin could significantly decrease the activity of AST, ALT in serum and the index of liver and spleen, increase the content of ADH and renal index, and increase the activity of SOD and GST in liver. It could reduce the degree of liver tissue injury in mice, and has a dose-effect relationship; for subacute alcoholic liver injury mice, purple potato anthocyanin could decrease the activity of AST, ALT in serum and ADH in liver, and increase the activity of SOD and GST. Purple potato anthocyanins have a good protective effect on liver injury in mice.

### Acknowledgements

The research is supported by Science and Technology Research Project of Hubei Provincial Department of Education [B2017567].

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## Effects of Paeoniflorin on Oxidative Stress and Inflammatory Response in Rats with Ischemia-Reperfusion Injury

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The objective of the work was to investigate the effects of paeoniflorin on myocardial cells oxidative stress and inflammatory response in rats with ischemia-reperfusion injury, to clarify the protective effect and mechanism of paeoniflorin on myocardial ischemia-reperfusion injury. 40 Wistar rats were randomly divided into four groups, with 10

rats in each group: sham operation group (only thoracotomy, but not ligating LAD), ischemia-reperfusion group (I/R group), low dose paeoniflorin group (60 mg/kg) and high dose paeoniflorin group (120 mg/kg). The rats in the administration group were intraperitoneally injected with paeoniflorin 20min before moulding, and the rats in other groups were injected with the same amount of normal saline. The rat MI/RI model was established by ligating the left coronary artery (30 min) followed by reperfusion (2 h). The blood samples were taken from abdominal aorta. The contents of TNF- $\alpha$ , IL-6, MDA, CAT, SOD and GSH were detected using the ELISA method. The pathological changes of necrotic cardiac muscle tissue were observed using the Hematoxylin-Eosin staining. The contents of NF- $\kappa$ B and p-NF- $\kappa$ B were detected using the Western blot method. Compared with the sham operation group, the contents of TNF- $\alpha$ , IL-6 and MDA in the rat of I/R group were significantly increased ( $p < 0.05$ ), but the contents of CAT, SOD and GSH were significantly decreased ( $p < 0.05$ ); Compared with I/R group, the contents of TNF- $\alpha$ , IL-6 and MDA in high dose paeoniflorin group were significantly decreased, but the contents of CAT, SOD and GSH were significantly increased ( $p < 0.05$ ). The low dose paeoniflorin group showed no significant difference. HE staining showed that the morphological structure of the myocardium was significantly improved in high dose paeoniflorin group. Western blot method showed that NF- $\kappa$ B and p-NF- $\kappa$ B were highly expressed in I/R group, but significantly decreased in high-dose paeoniflorin group. Paeoniflorin can protect the myocardium from ischemia-reperfusion by antioxidation and inhibiting inflammation. The mechanism may be related to the inhibition of NF- $\kappa$ B signalling pathway.

### Acknowledgements

This work was supported by the Characteristic Innovation project of Ordinary Colleges and Universities in Guangdong in 2017 (Grant No. 2017KTSCX211) and the Innovation Cultivation Project of Zhuhai College of Jilin University (Grant No. 2017XJCQ004, 2018XJCQ012).

## Track 3: HEALTH CARE AND TREATMENT

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## Effect of Sports Teaching on the Improvement of Bone and Tendon Joint Injury in Adolescents

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The effect of exercise teaching on the bone and tendon joint injury was explored in adolescents. In order to provide experimental basis for the study of bone tendon joint injury,

the teaching of exercise place is used to alleviate the injury of bone tendon joint in teenagers. One hundred male students in physical education department of a certain school were selected as observation objects, and were divided into two groups under the condition of sports events and exercise frequency. The control group was taught by ordinary physical education, while the experimental group was taught by the method of exercise place. After 6 and 10 weeks, the healing of bone tendon joint injury and the changes of resting heart rate, diastolic blood pressure and vital capacity were observed in the two groups. From the results obtained after 6 and 12 weeks, it can be seen that the bone tendon joint injury in the experimental group is better and the cure speed is faster, and the indices of quiet heart rate, diastolic pressure and vital capacity have been obviously changed ( $p < 0.01$ ). The exercise teaching method can produce more obvious cure effect on the injury of bone and tendon joint, and it is an effective teaching method to promote the physical health of young people.

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### **Study on the Effect of Resistance Training on Cardiovascular Disease Risk Factors in Young People**

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In recent years, the proportion of young people suffering from cardiovascular diseases is increasing. The effect of resistance training on cardiovascular risk factors and its physiological mechanism was explored in young people, Resistance training refers to indirect changes in body metabolism by improving muscle mass, thereby reducing the risk of cardiovascular disease. Forty young people were selected as subjects, 20 of them were male and 20 of them were given resistance training for 6 months. These subjects were given aerobic training, which mainly exercised the whole body muscles, 6-12 muscles each time, repeated twice a week; aerobic training accompanied by general resistance exercise, mainly on the upper and lower trunk muscles alternate training, exercise cycle for the next day. After six months of resistance training, it can be concluded that the content of subcutaneous fat and visceral fat in all young people have a significant downward trend, visceral fat reduction in male youth is more obvious than in female. Resistance training can be used to prevent and treat cardiovascular disease as an effective exercise method, can reduce the risk of cardiovascular disease to a certain extent.

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### **Image Feature Extraction for Fracture and Dislocation of Elbow Joint in**

## **Medical CT Based on Computer Intelligent Image**

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In computer aided diagnosis, it is a difficult problem to extract the features of CT images. In order to solve the problems of low accuracy and large error in traditional methods, a feature extraction method for medical CT elbow fracture and dislocation images based on computer intelligent images is proposed. Edge detection operator was used to pre process the external contour and internal soft tissue features of medical CT images of elbow fracture and dislocation, and edge detection was performed on the images of elbow fracture and dislocation. The threshold is processed according to the result of edge detection in order to ensure the continuity of image features. The outer contour line of elbow fracture and dislocation is found out by morphological thinning method, and the distance between the two farthest points on the boundary is calculated by the diameter formula of the boundary. The smoothness of the tumor is distinguished according to the computed results, and the smoothness of the image is extracted. The experimental results show that the proposed method has high accuracy and low error rate in extracting the features of medical CT elbow fracture and dislocation images. The proposed method can effectively extract the features of CT images of elbow fracture and dislocation, and provide certain research direction and reference value for current medical CT image feature extraction methods.

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### **Treatment and Prevention of Humeral Throw Fracture in Tennis Training**

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The finite element analysis method was used to simulate the occurrence process of humeral bone fracture in tennis training, and the injury mechanism of limb bone throwing was explored to realize the treatment and prevention of humeral bone fracture during tennis training. Spiral CT scan of the humerus of healthy adult volunteers, and the formation of the humeral bone fracture model through the relevant modelling software, using the skilful Boolean calculation function of Solidwork2013 software to simulate fracture reduction, complete the humeral spiral fracture and internal fixation moulding. The assembly, evaluation of the maximum equivalent stress of different placement positions of the steel plate under various working conditions, the

maximum comprehensive displacement of the fracture block, the maximum comprehensive displacement of the fracture end and the maximum equivalent stress, to achieve the treatment and prevention of the tibia throw fracture in tennis training. Through experiments, it was found that an inward rotation force was applied to the tibia, and a spiral force concentrated zone appeared in the lower middle part of the humerus, which overlapped with the predilection site of the humeral bone fracture. According to this feature, the treatment plan for the humeral bone fracture was determined. Through the research on the treatment and prevention of humeral throw fracture in tennis training, the treatment plan for humeral bone fracture can be effectively formulated.

## 51 Statistical Analysis of the Insurance System of COPD in Society Members of Economic Law

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In order to study the influencing factors of patients with stable chronic obstructive pulmonary disease (COPD), the insurance system was statistically analysed based on the results of the study. Questionnaires were used to investigate the disease cognition and treatment compliance of 135 patients with stable COPD. Ninety patients with poor compliance were randomly divided into treatment group (45 cases) and control group (45 cases). After 6 months of health education intervention, the treatment group observed changes in disease cognition and treatment compliance. Forty-six point seven percent of patients had good treatment compliance. After 6 months of health education intervention, the compliance of the treatment group was significantly higher than that of the control group, and the difference was statistically significant ( $p < 0.05$ ). According to the results of the research, the insurance system was statistically analysed. It was found that the insurance system of chronic obstructive pulmonary disease among members of the economic law is different from other diseases and should be specially formulated.

## 52 Optimal Design of Visual Communication for Prevention of Human Eye Diseases

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Visual communication design is the main form of information communication in modern society. So many terminal media fill our visual world every day. In recent years, human eye diseases appear the trend of rejuvenation, so it is urgent to solve the problem of visual fatigue in visual communication design. This paper presents an optimal analysis method for visual communication. The visual signification function is constructed by using the current sampling state, the luminance curve is constructed by the luminance saliency value of the visual region, and the luminance state transition matrix and observation matrix are used. Based on this, the visual communication salience map of the luminance effect of human eyes is established, and the visual communication of the luminance effect of human eyes is optimized and analysed in multiple scales, and the prevention of human eye diseases is accomplished. The results show that the results of this method are closer to the ideal luminance curve and can increase the flicker frequency by up to 32 times under 256 grey levels, and can effectively reduce the discomfort caused by flicker and prevent human eye diseases. The optimal design method of visual communication for the prevention of human eye diseases can relieve the symptoms of ocular discomfort and avoid the occurrence of eye diseases. To achieve the most comfortable visual experience.

## 53 Analysis on the Effect of Neurophysiological Rehabilitation in Patients with Depression

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The objective of the work was to explore the neuropathological rehabilitation effect and clinical treatment of psychological counselling methods for depression. A total of 104 patients with depression admitted to a hospital from March 2016 to March 2018 were randomly assigned to a control group (52 patients) and a treatment group (52 patients) according to a random number table. Both groups were given a 6-week course of treatment, and the control group received general treatment. The treatment group was given psychological counselling. Psychological analysis and influencing factors were analysed using the Minnesota Multiple Personality Questionnaire (MMPI) related scale and the self-inflicted psychological rehabilitation factor table. According to the analysis results, comprehensive treatment measures such as cognitive therapy, behavioural therapy, psychological counselling, family therapy, and social support therapy were adopted to analyse the effect. The two groups of depression

self-rating scale (SDS), HAMD scale factor and neurological deficit degree scale (CSS) score were compared. The clinical efficacy of the two groups was analysed. At 3 and 6 w after treatment, the SDS scores of the treatment group were significantly lower than those of the control group ( $p < 0.01$ ). After treatment, the HAMD scale factor scores of the patients in the treatment group were significantly lower than those in the control group ( $p < 0.01$ ). The total effective rate of the treatment group was 92.31%, which was significantly higher than that of the control group (76.92 %). At 6 and 12 w after treatment, the CSS scores of the treatment group were significantly lower than those of the control group ( $p < 0.01$ ). Psychological counselling for depression can improve depression and promote neurological recovery.

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### Auxiliary Effect of Visual Effects of Anime Styling Symbols on Rehabilitation of Autistic Children

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With the development of the national economy and the gradual improvement of people's living standards, at the same time, because of the increasing social pressure, parents are often busy with work and neglect the emotional communication with children. The number of children suffering from autism is increasing. This has become the present day problem that cannot be ignored by the society. In order to improve the emotional communication between parents and children, to enhance the relationship between parents and children, so that children have a healthier and happy childhood, the use of anime styling symbol visual effects for assisted rehabilitation of autistic children. In the experiment, 100 children with autism were chosen and divided into two groups. 50 children with autism in the control group watched regular anime every day. These cartoons did not have vivid symbolic visual effects and characteristics. The other 50 children with autism were treated with animated cartoons that displayed visual effects with significant styling symbols. The symbolic vision mainly included vocal modelling, action modelling, interactive music games and dramatic performances, and sound. Four aspects of modelling. After 3 months, the effect of treatment on children with autism was observed. The autistic children in the experimental group had improved significantly and were able to complete simple communication with parents, while the control group of children with autism was not effective. The visual effect of anime styling symbol has a certain auxiliary effect on the rehabilitation of autistic children.

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### Influence of *Taijiquan* on Rehabilitation of Patients with Limb Movement Disorder

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With the continuous development of medical technology, the recovery rate of patients with motor impairment of limbs is increasing. However, the current method of rehabilitation of patients with dyskinesia has a single form of rehabilitation and low efficiency, which will seriously affect the quality of life of patients. Therefore, improving the motor function of patients with motor impairment of limbs has become one of the focuses of rehabilitation therapy. In this study, the subjects were all from patients with motor impairment of the extremities who were treated at the rehabilitation centre of a hospital of Chinese Medicine University from 2017 to 2018. The subjects were divided into *Taijiquan* group and control group. The number is the same and each subject is volunteered to participate in the experiment. First, *Taijiquan* action content suitable for patients with motor impairment of the extremities was developed. The two groups of subjects were routinely treated in the hospital during rehabilitation, and the *Taiji* group added *tai chi* rehabilitation training. The clinical rehabilitation status of motor dysfunction in the two groups under the intervention of *Taijiquan* rehabilitation method was tested by 8 w. Several weeks of *Taijiquan* exercise have significantly improved the overall health changes of stroke patients. *Taijiquan* practice significantly improved the balance ability, walking speed. The *Taijiquan* rehabilitation method has obvious therapeutic effects on the rehabilitation of upper and lower extremity motor function in patients with motor impairment of extremities.

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### The Early Identification and Early Warning Model of Ischemic Stroke Based on Cloud Computing

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Ischemic stroke associated pneumonia is a major disease that seriously endangers the life and health of middle aged and old people. Early identification and early warning model of ischemic stroke based on cloud computing is established, which provides intelligent, humanized and preventive medical and health services for high-risk stroke



patients. Firstly, the risk factors for pneumonia associated with acute ischemic stroke were established through meta-analysis. Secondly, based on the risk factors of moderate or higher correlation strength obtained from meta-analysis, the early warning score for acute ischemic stroke related pneumonia was developed, the risk of ischemic brain mortality was identified early, and high-risk patients were selected as the key subjects for nurses to observe. Taking a tertiary hospital as an example, 137 hospitalised patients with acute ischemic stroke were selected, including 16 patients in the related ischemic stroke group and 121 patients in the non-ischemic stroke group. Correlation was established between cerebral stroke death as the dependent variable and meta-analysis of the following associated medium intensity risk factors such as age 60 or above, atrial fibrillation, coronary disease, invasive operation of the trachea, swallowing dysfunction, hypoalbuminemia as independent variable, a logistic regression model has been established. According to the logistic regression model, regression coefficient of each risk factor, establishing early warning, evaluation of acute ischemic stroke associated pneumonia. The application of IoT technology in home health monitoring and remote medicine, as well as the popularization of cloud computing, is conducive to the early identification of ischemic stroke, providing intelligent, humanized and preventive medical and health services for high-risk stroke patients. The objective of the study of a total of 24472 cases, of which happen ischemic cerebral ischemic brain death group and no single group of 3049 and 3049 respectively, were 60 years old, male, diabetes mellitus, atrial fibrillation, coronary heart disease, high blood pressure, there is the trachea of invasive operation, swallowing dysfunction, hypoalbuminemia can increase after acute ischemic stroke patients at risk of flu-related pneumonia; (2) the regression model was established according to the logistic regression analysis results,  $y = 1.304x$ , for age+1.736x for atrial fibrillation+1.207x coronary heart disease+2.842x tracheal invasive operation+2.219x dysphagia+1.118x hypoalbuminemia. Early warning score was established on the basis of logistic regression model: 1.3 points for age more than 60, 1.7 points for atrial fibrillation, 1.2 points for coronary heart disease, 2.8 points for invasive tracheal procedure, 2.2 points for dysphagia and 1.1 points for hypoalbuminemia. The total score was 10.3, with 0-4.9 classified as low risk group and 5-10.3 as high risk group. The area under the ROC curve of this score was 0.83, and the sensitivity and specificity were 80.4 and 76.6 %, respectively. The early warning score of the correlation of acute ischemic stroke developed in this study is simple and practical, which can provide a basis for clinical evaluation of the risk of related cerebral infarction, suggesting that clinical nurses need to give closer observation and more targeted nursing measures to reduce the occurrence of acute ischemic stroke.

## Acknowledgements

The research is supported by Henan Province Institution of Higher Education Young Backbone Teacher Funding Scheme. Item No. 2014GGJS-268; Henan Province Institution of Higher Education Young Backbone Teacher Training Scheme. Item No. 2016GGJS-190; Zhengzhou local colleges and universities skilled top teacher workshop member. Item No. Higher Education Department of Zhengzhou Education Bureau [2017] 97.

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## Cloud-Based Cerebrovascular Disease Intelligent Health Perception System

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The continuous improvement of the social and economic level and the continuous advancement of medical information reform have made the living standards of residents more important and their health status has become more important. The traditional cerebrovascular health service system cannot meet the needs of users, and cannot provide real-time, cross-regional, long-term, easy-to-operate services. In this paper, an intelligent health monitoring system based on cloud platform is designed to realize the human body. Detection, monitoring and health intervention of vital signs. It provides a positive and effective solution for the prevention and treatment of cerebrovascular diseases. Based on cloud computing technology, a set of intelligent health awareness system for cerebrovascular disease was designed and finally realized on the system software. The system is mainly composed of a body data collector, a mobile terminal and a cloud platform. The data of the human body is collected by the sensor and pre-processed, and then the parameters are transmitted to the cloud platform, and the data is stored and analysed on the cloud platform, thereby physiology of the human body. The parameters are monitored in real time and remotely, which is more convenient and intelligent. The cerebrovascular disease intelligent health perception system has played an active and effective role in the monitoring and treatment of cerebrovascular diseases and the prevention of complications. The system has many monitoring parameters and high precision, and can realize remote transmission, processing and display of data, and provides more convenient and high-quality services for cerebrovascular patients.

## Acknowledgements

This research is supported by Educational and Teaching Research and Reform Funds for Southwest Minzu University - A Study on the Construction and Application of Teaching Resources in the SPOC Blended Teaching Mode (2018YB25).

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## Effect of Intensive Interval Training on Exercise Rehabilitation in Patients with Chronic Heart Failure

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In order to find a way to effectively treat chronic heart failure, explore the clinical effect of intensive interval training on exercise rehabilitation in patients with chronic heart failure. Clinical effects analysis was performed using a controlled experiment. A total of 34 patients with stable chronic heart failure were selected. The computers were randomly divided into experimental group and control group, with 17 patients in each group. The two groups of conventional treatments were guaranteed to be the same, with a training period of 12 weeks. In the control group, the treatment method was not different from the daily routine, and the patients in the experimental group were subjected to the intermittent exercise training method, thereby performing clinical effect analysis. In the 12-week Zhou Qi training, the first 2 weeks as an adaptive training week, exercise training with a power bicycle with a strength of 30 to 50% HRmax, 3 times a week, each training time is 20 minutes; the remaining 10 weeks as reinforcement. During the interval training week, the training was carried out with a power bicycle with a strength of 80% to 90% HRmax, 3 times a week, each training time was 30 minutes; finally, the control group and the experimental group were respectively tested for 6 minutes walking distance to measure. The heart rate variability index is used as an indicator to evaluate the clinical effect, and the results are analysed. Comparing the test results of the experimental group and the control group, after 12 cycles of training, the time domain index and the frequency domain index of the experimental group were much larger than the control group. The time domain index and the frequency domain index directly reflected the autonomic nerve function of the human body. The greater the change in the time domain index and the frequency domain index, the better the autonomic function. Strengthening indirect training has played a significant role in improving the autonomic function of the human body, and can effectively accelerate the healing process of patients with chronic heart failure, and the clinical effect is better.

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## Application of Abdominal Shock Method in Teaching of Avoiding Accidental Injury in Physical Education Classroom

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There are safety accidents in physical education classroom, which have bad social impact on the school. It is almost impossible for a PE teacher not to encounter unexpected accidents in his life. It is very important to discuss the practical effect of abdominal shock method in the teaching of avoiding accidental loss in physical education class. Three hundred cases of high-intensity sports training programs such as sprint, gymnastics and throwing were selected in the physical education classroom. They were randomly divided into observation group and control group, with 150 cases in each group. Both groups set up normal physical education classroom training, including high-intensity sports such as sprint, gymnastics, and throwing. The observation group mastered the abdominal impact method on the basis of the control group, and observed the avoidance effect and injury degree of the accidental injury in the physical education classroom. The number of accidental injuries in the experimental group was higher and the injury was more serious. In the control group, the number of accidental injuries in the physical education classroom was small, and the degree of injury was mild. The application of abdominal impact method in physical education classroom could effectively avoid the number and degree of accidental injuries, and verify the effectiveness and safety of abdominal impact method.

### Acknowledgements

The research is supported by Heilongjiang Higher Education Reform Project: The Optional Course Setup of Social Physical Education in the Background of Sino-Russian Cooperation, (SJGY0211).

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## Evaluation of CT in the Treatment of Acute Cerebral Infarction

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The objective of the work was to analyse the evaluation method and value of CT for the clinical treatment effect of acute cerebral infarction. In our hospital from August 2016 to October 2017 during the clinical CT in 132 cases of acute cerebral infarction in hospital department of Neurology, usually with CT perfusion imaging data were retrospectively analysed. CT perfusion imaging in patients before and after treatment, CT imaging changes of different treatment effect were observed. Of 132 patients, 109 were diagnosed as acute cerebral infarction, and the diagnostic accuracy was 82.58. The results of CT perfusion imaging

showed that 131 of 132 patients were diagnosed as acute cerebral infarction. The diagnostic accuracy of CT perfusion imaging in 89 patients with lesions located in basal ganglia was significantly higher than that in plain CT scan ( $p < 0.05$ ), and the local cerebral blood flow and local cerebral blood volume after treatment were significantly higher than those before treatment. The mean transit time of contrast agent was significantly lower than that before treatment ( $p < 0.05$ ). There were significant differences in local cerebral blood flow, regional cerebral blood volume and the mean transit time of contrast agent between the two groups ( $p < 0.05$ ). The fraction CT perfusion imaging plays a good role in the diagnosis of acute cerebral infarction, and it can effectively evaluate the curative effect of thrombolytic therapy in patients with acute cerebral infarction, and should be widely used in clinical diagnosis. Theoretical basis can be provided for the evaluation of curative effect in patients with acute cerebral infarction.

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### **Application of Neurocognitive Mode in the Improvement of Medical English Reading Ability of Cerebrovascular Diseases**

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Cerebrovascular disease is one of the major diseases in the neurology department. The discipline is developing faster and faster, which makes it necessary to highlight the importance of medical English learning ability related to cerebrovascular disease. Medical English is professional English and plays an important role in the training of neurologists. Compare and analyse the methods and effects of different neurocognitive models in improving the reading ability of medical English in cerebrovascular diseases. Neurologists were trained using 2 different neurocognitive models. The 2 neurocognitive models were non-invasive brain function cognition and cognitive psychology of conscious animals. The neurologists, divided into 2 groups, were trained for 2 mo and then the medical English skills of the 2 groups of physicians were evaluated. In order to further reflect the doctor's English reading ability, 100 cases of cerebrovascular patients were introduced, and the number of patients was half of the gender. The 2 groups of neurologists treated the patients. The treatment involved a large amount of medical English reading content. After 2 mo of treatment, the patient's condition was observed. Finally, the effects of 2 neurocognitive models on the improvement of medical English reading ability of cerebrovascular disease were summarized, and the application effects were analysed. Different neurocognitive patterns have different effects on the medical English

reading ability of cerebrovascular diseases. Through practical application, neurocognition can be well applied in the improvement of medical English reading ability of cerebrovascular diseases. The neurocognitive model plays an important role in the improvement of medical English reading ability, and has a very good application prospect in current clinical medical skills.

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### **The Role of Interactive Furniture Design in the Rehabilitation of Children with Autism**

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The objectives of present study; pay attention to the attempt of interactive furniture in the rehabilitation of autistic children and its promotion to the rehabilitation of autistic children, to help autistic children break through their existing closed systems. Through the analysis of the status quo of autistic groups and the cognitive characteristics of autistic children, it is pointed out that the creation of a good family space environment has a positive role in promoting the improvement of their deficiencies. Based on the theory and method of psychotherapy, the autistic children are treated with interactive furniture design method, and the unique physiological and psychological effects of interactive furniture design are correctly applied. Interactive furniture design can promote the development of autistic children's perception and attention, promote the development of autistic children's motor skills and limb coordination, and improve the social interaction ability of autistic children. Interactive furniture design plays a positive role in the rehabilitation of autistic children. It plays an active role in eliminating the psychological barriers of autistic children, helping them to concentrate, cultivate imagination, develop language ability, and strengthen their ability to participate in and integrate into social activities.

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### **Effect of Soothing Music Therapy on Patients with Alzheimer's disease**

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The objective of the work was to study the effect of music therapy on Alzheimer's disease (AD) and to find a good treatment for AD. Sixty patients with AD were randomly

divided into 2 groups: group A and group B. Group A was treated with acupuncture combined with soothing music every 5 days for 10 weeks. Group B was treated only with acupuncture for 10 weeks. After treatment, the mental state scale and daily life self-care ability of the two groups were compared, and the scores of the mini-mental state examination scale (MMSE), the daily life self-care ability scale (ALD) and the agitation behaviour scale (CMAI) were completed. After treatment, the mental state of the two groups is better than that before treatment, the MMSE, ADL score was improved, and the CMAI score was decreased. The MMSE, ADL score of group A was significantly higher than that of group B, and the CMAI score of group A was significantly lower than that of group B ( $P < 0.05$ ). Soothing music therapy can effectively improve the mental state of patients with AD, enhance their ability to take care of themselves, and lay a solid foundation for further research on treatment methods.

#### **Track 4: MEDICAL APPARATUS AND INSTRUMENTS**

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### **Compensation Mechanism of China's Three Levels of Public Hospitals in the Framework of System Dynamics**

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This paper is closely related to the “new health care reform” of China since 2009, and the interaction between government compensation, market compensation (medical service income and drug sales income) and social compensation is studied according to the classification of income and expenditure in the Hospitals' Financial System implemented in 2012. At the same time, the sensitivity analysis of increasing the government financial subsidy, improving the price of medical service, increasing other incomes, and comprehensive analysis of three kinds of policies are used to discuss the compensation mechanism of the three levels of public hospitals in China after the abolition of the medicine mark-ups, so as to help China's public hospitals develop faster and better. In this paper, the system dynamics model of the compensation mechanism of public hospitals in China is constructed by using the theories and methods of system dynamics. The model mainly includes two large subsystems, namely, the income subsystem and the expenditure subsystem. According to the “Hospital Financial System” which was implemented on January 1st, 2012, the income and expenditure of public hospitals are classified, and they are pushed down to the lowest index by layer by layer. In addition, the difference

and proportion analysis are introduced in the model, which is more intuitively reflecting the relationship and interaction between each index. Through simulation, the study reflects the influence of the changes of each basic factor on the total income of Chinese public hospitals, as well as the relationship between the various factors, and analyses the impact of the changes on the whole system. The simulation results show that, firstly, when the growth rate of Chinese government financial subsidy income reaches 40 %, the public hospitals in China will maintain normal development under the support of financial subsidy income. Secondly, when the medical service charge of public hospitals is increased by 16 % each year, it can have a significant positive impact on the total income of public hospitals, which will guarantee the public hospitals to take the profits and losses, and thus make up for the larger losses after the abolition of the medicine mark-ups. Then, even if other income growth rate is 50 %, the total income growth of public hospitals is still negative and cannot reverse the situation. The main reason is that the base number of other incomes of public hospitals in China is too small and the proportion in the total income is low. Finally, to abandon the unrealistic increase of all kinds of income and make comprehensive use of various compensation channels, in the case of the increase of government financial aid income by 20 %, the increase of the price of medical service by 11 %, and the increase of 35 % for the one-time increase with 5 million Yuan as the base of the basic period of the social donation, China's three levels of public hospitals will be able to cancel the addition of medicine mark-ups, with normal development and operation. Raising the price of medical service is a more direct and effective compensation method for the three levels of public hospitals in China at the present stage. The public hospitals in China urgently need to increase the absolute amount of social donations and introduce a large amount of social capital, to a certain extent, to alleviate the income pressure of public hospitals after the abolition of medicine mark-ups. Vigorously developing social compensation, a new compensation channel, will inject new blood into the compensation mechanism of public hospitals in China, and will also play an important role.

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### **Public Health Expenditure and Income Redistribution: an Empirical Analysis Based on China**

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After the new health care reform in 2009, China's public

health expenditure increased significantly, resulting in a substantial expansion of medical services supply. Under the new health care reform framework with the tendency of paying attention to the medical care, can we expand the outpatient service by weakening the inpatient service, to achieve the goal of the new health care reform? To answer this question, the most important foundation is to study the benefits of the outpatient service expansion in China. Based on the typical fact analysis of the new health care reform in China, this paper describes the demand function of individual or household to medical service, quantifies the behaviour response of individual or household to outpatient service expansion, studies the benefits of outpatient service expansion, and analyses the effect on income redistribution of the increase of public health expenditure. And on this basis, the study explored how to achieve more efficient supply of public health services, so as to provide policy recommendations for deepening health care reform in China. To reveal the beneficial direction of outpatient service expansion since the new health care reform in China, this paper innovated the BIA framework, broke through the limitations of cost accounting and static analysis, and used the compensation variation (CV) change method to identify the marginal benefit destination of the expansion of public medical service through the construction of the demand function of personal medical service and the method of compensation variation change. On this basis, we further evaluated the income redistribution effect of outpatient service expansion. The studies in this paper made progress at least in three aspects. First, by estimating the individual's public health service demand function, the behavioural response of the individual to the changes in the public health policy is brought into the benefit destination analysis to identify the marginal benefit destination of the expansion of the public health service. Second, based on personal indirect utility function, the personal medical service demand function is set up. By estimating individual's compensation variation change, the personal benefit evaluation of the public medical service is measured, and the internal defects of the cost accounting are overcome. Third, by constructing panel data, we estimated individual demand function and effectively solved the problem that cross sectional data cannot control the fixed effects. The results showed that: (1) From the time trend, both the outpatient service and the cost sharing of outpatient service were more inclined to lower income groups in 2017 than in 2010, indicating that the trend of new health care reform was getting better and better. (2) The outpatient service expansion caused by the change of public health policy has not affected the social inequality, but due to the different responses of the different income groups to the changes of public expenditure policy, the increased medical service demand for medical services will not be distributed among the different income groups according to the existing income distribution grid. (3) The lowest income groups benefited most from 2010 to 2017, mainly due to the

increase in medical service accessibility and the increase in government medical services, and the biggest losses caused by the rising price of medical services and the increase in the opportunity cost of medical treatment. The marginal benefit of outpatient service expansion in recent years is flowing to low-income groups. The compensation variation change estimates based on the personal indirect utility function show that the outpatient service after the "new health care reform" in China will help to reduce social inequality, with the reduction level close to 6 percentage points, but the private cost that will take place in outpatient service is also included. When the initial income is extended, the outpatient service after China's new health care reform is expanding, but the increase in the price of medical services has offset the reduced social inequality. In recent years, the dynamic development trend of marginal benefits of new health care reform is developing towards the benefit of the lowest income groups. If the government changes the way of medical aid, by raising the level of financial aid used in outpatient service and reducing the price of outpatient service, it can not only encourage all income groups to increase the demand for out-patient services, but also increase the benefit of low-income groups by a greater margin.

#### Acknowledgments

This work was financially supported by National Social Science Fund (13BJY149 and 14BJY076), Fundamental Research Funds for the Central Universities (SWU1709261, SWU1809014, and SWU1809411), and Social Science Planning Project of Wenzhou City (18wsk210).

#### 66 Impacts of the New Rural Medical Pension Scheme Program on Medical Expenditure in Chinese Households

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The rapid long-term economic development in China in the past 30 years coupled with the implementation of family planning and the impact of population mobility in the process of urbanization in China has led to a gradual increase in the average life expectancy of the Chinese people. Some regions in China are already facing the problem of population aging. In order to solve the increasingly serious problem of care for the elderly, Chinese

government began to implement the New Rural Medical Pension Scheme (NRPS) in 2009, which covered, non-student populations aged 16 and over who were not enrolled in the basic medical insurance system. The government also planned to expand the NRPS to all regions throughout the nation before 2020. According to the statistics, the insured rate among the populations aged 15 and over before the implementation of NRPS in 2008 was 20.34 %, which had rapidly increased to 72.06 % in 2013. The implementation of NRPS resembled the experimental process which a government undertakes to formulate social welfare and pension policies. In this note we apply difference in difference approach to investigate the impact of the NRPS implementation to household medical expenditures. The empirical model is defined as follows, Eqn. 1,  $Y_i = \beta_0 + \beta_1 NRPS_i + \beta_2 No\ pension_i + \beta_3 NRPS_i \times No\ pension_i + \varepsilon_i$ , where,  $i$  is the observed household sample and  $Y_i$  is the household's medical expenditures. NRPS is a dummy variable and when NRPS=1, the household is insured in the NRPS. When No pension=1, the sample household does not have any pension insurance before the NRPS implementation. This study primarily used the estimated value of  $\beta_3$  in Eqn. 1 to capture the changes in medical expenditures of the household that did not have any pension prior to the implementation of NRPS. The empirical data used in the present study came from the CHARLS in Chinese Peking University, The study collected data from the heads of the household who were 45 and older during the period of 2008-2012. Table 1 is a summary of the impact which each explanatory variable has on household medical expenditures. The empirical data shown in column 1 indicates that the variable of "NRPS\*No Pension" significantly decreases the household medical expenditures. The estimated value of the variable "NRPS\*No Pension" is -0.947 and statistically significant, indicating that the implementation of NRPS brings the negative impact on the household's precautionary saving in medical cares that enrol after the NRPS implementation but do not have prior pension coverage, as compared to the households that do not enrol in the NRPS and already have pension coverage before the NRPS implementation. The empirical results showed that the implementation of NRPS enabled households to lower the preventive portion of their savings whose did not have any prior pension insurance but were later covered under the basic medical insurance system. The impact of the NRPS implementation on household medical expenditures in Chinese household was analysed. Empirical results revealed that there was a significant decrease in expenditures on medical cares by the groups who did not have coverage of the pension system before the NRPS implementation but were covered after the policy implementation. For further extension in the future we think the implementation of NRPS may also bring the impact on household investment behaviour or healthcare patterns.

TABLE 1: RESULTS

Dependent variable: log (household medical expenditure)		
	Coefficient	Standard Error
Education years	0.043**	0.018
Male	50.182	0.144
Family persons	0.086**	0.041
Married	-0.372	0.408
Separated	0.201	0.525
Living in the city or not	0.305	0.175
log(family deposits)	0.026	0.017
NRPS	0.854	0.524
No Pension	-0.371	0.222
NRPS* No Pension	-0.947**	0.446
N	1191	
R2	0.203	

\*\*P&lt;0.05

### Acknowledgments

This study was supported by Talent Project by Qianjiang in Zhejiang province (project No. QJC1803005).

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## Surgical Robot Dynamic Pose Error Control Method

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The current surgical robot pose error control method ignores the influence of joint motion and yaw angle on pose accuracy, cannot effectively control the error range of robot dynamic pose, and has low accuracy of lesion localization range problem. According to the end pose matrix of the surgical robot, the error pose matrix model was established, and the joint motion influence parameters and the declination influence parameters of the attitude accuracy were analysed. Based on this, the error compensation software was developed, and the multi-point pose comprehensive measurement method was combined to compensate the comprehensive error of the positioning of the surgical robot. The target space transformation matrix of the surgical robot was established, and the position of the surgical robot was calibrated in the space of the equal pose error precision to compensate the error of the pose point area. The fuzzy inference method was used to adjust the error range between the actual joint rotation angle and the ideal rotation angle, and the range was transformed into the space coordinate system. The spatial mapping was overlapped and iterated to find the optimal positioning, thus completing the dynamic attitude error control of the surgical robot. The simulation experiment shows that the proposed method and other two literature methods were used to locate the simulated lesions. The accuracy of the proposed method was higher than the literature method 31.2 %, and the postoperative wound surface was relatively small 26.7 %. The proposed method could better complete the dynamic pose error control of the surgical robot.

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## Important Parameters and Maintenance Measures of Haemodialysis Equipment

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Haemodialysis apparatus is mainly used in the clinical treatment of patients with acute and chronic renal failure. Metabolic waste in the blood is removed by haemodialysis apparatus. Normal haemodialysis apparatus is of great significance to the quality of haemodialysis. It lays the foundation for clinical quality. This paper analyses the important parameters and maintenance measures of the haemodialysis instrument. The haemodialysis instrument is divided into two parts: water route and blood route. The main factors influencing the dialysis effect are: dialysate ratio, dialysate temperature, ultrafiltration volume and blood flow. (1) The dialysate matching system is composed of electrode, A liquid pump and B liquid pump that test conductance. Eliminating the interference of controllable mixing error, the dialysate is sent to electrolyte test. (2) The temperature of dialysate is tested and debugged after one hour of normal operation of the instrument. (3) 1000 ml standard measuring cup filled with 1000 ml reverse seepage water was connected to the blood circuit. By setting the ultrafiltration value and working for 2 h, the reduction of water in the measuring tube was observed, and the amount of water in the measuring tube was calculated. Ultrafiltration. (4) The leakage of blood and the rotor of blood pump were investigated experimentally. Any serious error in the above analysis will affect the dialysis quality of haemodialysis instruments. After each dialysis, the instrument cleaning should be carried out according to the standard operation procedure to ensure the cleaning and disinfection time. When the outside temperature changes, must carry on the water temperature monitoring and the debugging. The calculated ultrafiltration amount should be controlled within 5 with the set value error. Every half a year to clean the photoelectric detection device, improve the detection sensitivity.

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## Automatic Control Method of Radioactive Wastewater Treatment Equipment in Hospital

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The hospital's radioactive sewage will be discharged to the standard, reducing the risk of radioactive contamination. The hospital's radioactive sewage treatment equipment is mainly composed of a degradation unit and a decay unit, and a computer is used to control the radioactive sewage treatment equipment. Select 5 decay cells with a maximum storage capacity of 20 cubic meters to put the waste liquid generated by the hospital into the decay cell. When the waste liquid reaches the water level of the decay cell, the concentration of the radioactive sewage in the first decay cell is indicated. Already below the emission concentration, the tank with the highest concentration can be drained, and then the above steps are repeated until all the radioactive sewage concentrations are up to standard. Through experiments, the proposed method reduced the concentration of radioactive sewage in hospitals from 90 % to 23 % in a short period of time. It can be seen from the trend of radioactive sewage concentration in hospitals that this method can effectively treat nuclear medicine radioactive wastewater. The radioactive sewage automatic treatment equipment has high level of automatic control of hospital radioactive sewage treatment, and has low investment. It can effectively treat nuclear medicine radioactive wastewater, and can discharge the hospital radioactive sewage to the standard. It can reduce the harm to the environment and the people around it.

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## Real-Time Monitoring and Maintenance of Medical Imaging Instrument Faults Based on Association Mining

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In order to change the current status of medical imaging instrument fault monitoring and maintenance, real-time monitoring and maintenance of medical imaging instrument faults based on association mining was proposed. By obtaining the fault data space coordinates, the fault data cluster centre was determined, and the fuzzy decision method was used to calculate the fault data dependency of the complex medical equipment. On this basis, based on the K-Means clustering algorithm, the medical equipment fault data was clustered, the Bayesian scoring function was determined, the OFWSC algorithm was used to weigh the data cluster features, and the association mining method was introduced to monitor the complex equipment fault data. When the improved method is adopted, the monitoring accuracy is 98% and the false negative rate is 5% compared with the traditional monitoring method. At the same time, the medical imaging instrument failure rate is reduced. The improved fault monitoring method has better detection accuracy, efficiency and time than traditional methods, and

has certain practicability and superiority.

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## **Interactive Design Method of Colour Intelligent Processing for Colour Blind Patients**

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Colour blindness is a defect that cannot correctly perceive some or all of the colours, which brings great inconvenience to the life and work of patients. At present, the digital technology for colour blind patients is relatively lacking, so it is necessary to study the colour intelligent processing method for colour blind patients. The interactive design method of colour processing for colour blind patients was studied from the point of view of interactive design. This paper analysed the physiological characteristics and colour design theory of colour blind patients, summarized the colour discrimination characteristics of colour blind patients, proposed an interactive mapping algorithm between real colours and colours seen by colour blind patients, and established a colour model for colour blind patients. Combined with this model, the product colour design tree is established, the colour horizon of colour blind patients was transformed and displayed, and the interactive design of colour intelligent processing was realized, which brings convenience to colour blind patients. The experimental results show that the proposed interactive design method of intelligent colour processing can help colour blind patients to identify colours, and the accuracy of colour identification is higher than that of traditional method 36%, and the proposed method runs more efficiently. It greatly facilitates the life of colour blind patients. The proposed method can realize intelligent, rapid and accurate interactive design, which is an important technology to assist the normal life and work of colour blind patients, and provides a reference for future research.

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## **Business Operation and Fiscal Input of Public Hospitals in China: A Case Study of 21 Municipal Public Hospitals in Beijing from 2012 to 2015**

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Since China started the new health care reform in 2009, in order to solve the problem of seeing a doctor is difficult and expensive, a large number of fiscal funds have been put into public hospitals in order to protect their non-profit character and provide cheaper medical services with high quality for the residents. From 2009 to 2014, the total expenditure on medical and health services was 4 trillion Yuan, of which the central government expenditure amounted to 1 trillion and 200 billion Yuan. However, due to the existence of soft budget constraints in public hospitals, fiscal support has not brought about the expected effect. Public hospitals continue to lose money and their debts have risen sharply. In this context, how to understand the loss of public hospitals and evaluate the effectiveness of financial input is crucial to the implementation of the forthcoming health care reform. The research on soft budget constraint of public hospitals in China often starts from paternalism and ignores the influence of brotherhood competition between public hospitals. Based on the specific operation of 21 municipal public hospitals in Beijing, this study observes the characteristics of the business operation of public hospitals under the soft budget constraints, and analyses the impact of this brother competition on Chinese medical reform. At present, the domestic research on the soft budget constraints of public hospitals often uses large sample volume and regression analysis methods to reveal the relationship between fiscal subsidies and hospital operation and investment. However, in view of the more exploratory questions in this study, we are concerned about whether and how fiscal subsidies cause the loss of business in public hospitals in reality. We give up a large sample of quantitative research methods, and choose the method of case study, combining with field research and interview, to analyse in depth the financial statement data from 2012 to 2015 of the selected 21 municipal public hospitals in Beijing. Through the in-depth analysis of 21 municipal public hospitals in Beijing, this study provides new empirical evidence for the soft budget constraints of public hospitals, and describes the complete logical chain of more subsidies and more deficits. Public hospitals will determine the loss of business operations in the same year according to the budget of the basic fiscal expenditure provided by the government, and the more financial subsidies, the greater amount can be lost. The increase in the amount of business losses mainly stems from the rapid growth of personnel costs. At the same time, the cost of consumables in public hospitals, driven by kickbacks and dark profits, has increased rapidly, squeezing the disposable income that can be used for personnel and other expenditures in the hospital business income, resulting in a loss and a reverse pressure on fiscal input. Under the soft budget constraints, the fiscal input itself does not improve the operation of the public hospitals, even triggers the comparison between the public hospitals, and further stimulates the expenditure of the personnel, resulting in greater losses. Since the new health care reform, despite the massive fiscal investment in public



hospitals, in order to pay for reform, in fact, it cannot change its inherent behaviour mode. In the new stage of medical reform, we should be more cautious about the demands of public hospitals for increasing financial input and reflect on the meaning of public welfare. Ownership does not determine whether the institutions have public welfare, and the distortion of public hospitals under fiscal subsidies is more likely to cause the loss of social welfare. In the next stage of medical reform, we can consider the cancellation of direct fiscal subsidies to public hospitals, turn from supplement suppliers to mending party, and let patients vote by foot to determine the trend of financial funds; at the same time, the public hospitals are forced to open their financial operation information to let social supervision play a role.

### Acknowledgments

This work was financially supported by National Social Science Fund (13BJY149 and 14BJY076), Fundamental Research Funds for the Central Universities (SWU1709261, SWU1809014, and SWU1809411), and Social Science Planning Project of Wenzhou City (18wsk210).

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## The Efficiency of Cooperation between Three Levels of Hospitals and Community Health Service Centers in China

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Under the condition that the total amount of medical resources is seriously tense and the distribution of high quality medical resources is imbalanced, in the face of the complex problem of cooperative governance in the construction of health system service capacity, the Chinese government is committed to establishing the union of the three levels of hospitals and the community health service centers by coordinating the staffing of the public hospitals, that is, the building of the Medical Union. The modes of cooperation between the 3 levels of hospitals and the community health service centers in China mainly include the direct management model, the trusteeship model, the hospital management model, the merger and reorganization model, the cooperative aid model and the joint model. This paper studied the differences between different models, evaluate the cooperation efficiency of the 6 models, and put forward some policy suggestions on how to improve the cooperation efficiency of the 3 levels of hospitals and the community health service centers. From the perspective of new structural economics, this paper selected the input

index and output index of the cooperation efficiency evaluation of 3 levels of hospitals and community health service centers by using the principle component analysis method, and selected 45 pairs of cooperative community health service centers and 3 levels of hospitals in Beijing by random stratified sampling. As a sample, the hospital used DEA method to evaluate the efficiency of the cooperation between the 45 pairs of hospitals and the community health service centers. The BBC model in DEA is used to analyse the efficiency of cooperation between 3 levels of hospitals and community health service centers in China. When calculating the total efficiency (TE), the efficiency provided by the BCC model is the pure technical efficiency (PTE) and the scale efficiency (SE) is removed. A comparative analysis of 45 pairs of hospitals and community health service centers shows that the average efficiency of cooperative efficiency is 54.3 %. There are a total of 15 pairs with PTE and SE both equalling to 1, accounting for 33.33% of the total sample. From the scale return conditions, there are 5 pairs of decision-making units with increasing returns to scale, accounting for 11.11 %, and 40 pairs of decision making units that are constant return to scale, accounting for 88.89%. Among the 45 pairs of samples in the 3 levels of hospitals and the community health service centers, there are 15 DEA valid pairs, with a ratio of 33.33 %, and 30 DEA invalid pairs, with a ratio of 66.67 %. Overall, in the 6 cooperation modes, the efficiency of direct management mode is the highest, with a higher effective unit ratio and a higher average comprehensive efficiency. The overall efficiency of the total resource allocation of the 3 levels of hospitals and the community health centers is not high. The main reason is the low efficiency of resource allocation, rather than the shortage of resources. The cooperation between the 3 levels of hospitals and the community health service centers is closely related with a variety of cooperative members, such as suppliers, demand holders, payers, and many other collaborative contents, such as information, service, process, resources and decision-making strategy. In the cooperative system, the stakeholders of the three levels of hospitals and the community health service centers are large, the interest areas are interlaced, and the amount of information between different boundary levels increases, which constitutes an obstacle to the sharing of information across different boundaries. Therefore, we need to enhance the level and efficiency of resource allocation between three levels of hospitals and community health service centers.

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## Symbiotic Mode of Private and Public Dental Hospitals Based on Logistic Model

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With the reform of the medical and health care system, the mode of operation behaviour of China's private hospitals and public hospitals will evolve into a mode of symbiosis. The difference between the symbiosis mode and the parasitic mode is that the interest produced by the para genes is between the private hospitals and the public hospitals will bring the instability to the hospital. The purpose of this study is to analyse the rational allocation of dental health resources between private dental hospitals and public dental hospitals, the running efficiency of private dental hospitals and public dental hospitals, and the development potential of private dental hospitals, and to explore the symbiotic evolution and symbiosis effects between private and public dental hospitals, so as to provide suggestions for promoting the common development of private and public dental hospitals. In this paper, the Logistic model was used to analyse the symbiotic evolution process of private and public dental hospitals, to solve the stable solution of the symbiosis between private and public dental hospitals, and to adjust the symbiotic model, so that the symbiotic benefits of private and public hospitals can be reasonably divided between them. According to the stability analysis of the equilibrium point of the symbiotic evolution of private and public dental hospitals, the actual scope of the stability solution is  $0 < \theta_{12} < 1$ ,  $0 < \theta_{12}\theta_{21} < 1$  and  $\theta_{21} > 1$ . Among them,  $\theta_{12}$  is the contribution of the natural market scale saturation to the output of the public dental hospitals, and  $\theta_{21}$  is the contribution of the natural market scale saturation to the output of the private dental hospitals. When the private and public hospitals meet the above three conditions, the symbiosis between them can be stable. The development of private dental hospitals is related to that of public dental hospitals. When private dental hospitals enter the medical service market, they will have a competitive effect on the output of public dental hospitals, but they will not damage the interests of public dental hospitals. And the development of public dental hospitals will also produce competitive effect on private dental hospitals. The impact of the symbiosis between private and public dental hospitals has different effects on the welfare benefits of the medical service market. If the contribution of private hospitals to public hospitals is greater than that of public hospitals to private hospitals, private hospitals have been better developed and have great promoting effects on the reform of public hospitals. If the contribution of the hospital to the output of public hospitals is less than that of the public hospitals to the private hospitals, the survival of the private hospitals is still not optimistic, and they need to be further supported by the policy.

#### Acknowledgments

This work was financially supported by Chongqing Municipal Commission of Health and Family Planning Key

Project Fund (2016ZDXM020), National Social Science Fund (13BJY149 and 14BJY076), and Fundamental Research Funds for the Central Universities (SWU1709261, SWU1809014, and SWU1809411).

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## Evaluation of Input-output Efficiency of China's Hospitals: Based on Factor Analysis and DEA Model

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The Chinese government's structural reform of supply side is the basic requirement of its health care reform. However, the structural imbalance between insufficient supply of resources and the waste of resources has been an important factor hindering the progress of China's medical industry. In this context, whether the supply structure of the hospital is reasonable and whether to invest or not to achieve the maximum output have become the basic questions to be answered first in the structural reform of the supply side in the field of hospitals. Therefore, the objective of this study is to evaluate the input-output efficiency of China's hospitals, in order to provide empirical evidence and policy recommendations for promoting the supply side structural reform in its hospitals. In this paper, we use DEA as the main method and factor analysis as a supplement to evaluate the input-output efficiency of China's hospitals. The hospitals of 31 provinces, municipalities and autonomous regions in China are selected as the research object. First, we used factor analysis to extract public factors from 14 input and output indicators, reduce the number of evaluation indicators and eliminate the correlation among the indicators. Then, the public factors are used as input and output to guide the C<sup>2</sup>R model of constant scale in the DEA method. And the inconstant BC<sup>2</sup> model is used to evaluate the input-output efficiency of hospitals in 31 provinces, municipalities and autonomous regions in 2017, including comprehensive efficiency, pure technical efficiency, scale efficiency and the return of scale. Through the above empirical analyses, we can draw the following results: (1) Hospitals in 17 provinces in China in 2017 are relatively effective, and they are in the same scale, accounting for 54.84%. The hospitals in 14 provinces are DEA invalid, accounting for 45.16%, of which 9 provinces are in increasing returns to scale and 5 provinces are in diminishing returns of scale. (2) The main causes of inefficiency in hospital input-output including the low efficiency of scale, that is, the supply structure and operation scale of the resources are not reasonable, the technical efficiency is not good, that is, the technical level of the utilization of resources is not high, without full use of the resources. (3) The input-output DEA inefficient

provinces can be divided into two categories: hospitals in 3 provinces and cities such as Tianjin, Shandong and Ningxia have achieved the maximum output and do not need to be improved; the hospital input in the other 11 provinces and cities does not achieve the maximum output, gaps remaining at least in one input or output. The input-output efficiency of hospitals in 31 provinces in China is low, and the gap between different provinces and cities is obvious. The hospitals in 14 provinces have blind expansion of the scale, with too much emphasis on hardware and software, leading to the serious waste of medical resources and the low efficiency of the overall hospital. We should push forward the structural reform of supply side, pay attention to the fairness of resource allocation, optimize the allocation of resources, encourage technological innovation in hospitals, and constantly improve the level of medical care. As for the provinces with maximized output, in order to achieve the effective target of input-output DEA efficiency, only a reasonable hospital supply structure is needed and the operation scale is to be optimized. As for the provinces without maximized output, in order to achieve the effective target of input-output DEA efficiency, not only a reasonable hospital supply structure and an optimized operation scale are needed, but the technology of hospital resource utilization is to be improved.

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## **The Monopoly of Public Hospitals and the Efficiency of the Medical Industry: Empirical Study with Inter-provincial Panel Data of China**

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For a long time, monopolized public hospitals are dominating the supply market of China's medical services. With the deepening of China's new round of medical and health system reform, improving the efficiency of public hospitals and optimizing the allocation of medical resources have become the focus of the reform of the new era. The purpose of this paper is to reveal the economic logic of the 3 monopoly properties of public hospitals and their phenomenon of seeing a doctor is difficult and expensive, to study the influence of the public hospital monopoly on the management efficiency of medical institutions in China from 2010 to 2015, and to provide policy suggestions for the reform of the medical and health system for future. In this paper, we used the Bootstrap-DEA method to empirically study the influence of public hospital monopolization on the operation efficiency of medical institutions in China from 2010 to 2015. In the first stage of the empirical study, the Bootstrap-DEA method was used to

evaluate the operating efficiency of hospitals in various provinces in China from 2010 to 2015. As for the selection of the DEA model (CCR and BCC model), the output of the hospital is difficult to measure, and the output of the medical service provided by the hospital cannot be the same. In this paper, the model of variable scale and output oriented BCC model is selected as the basic model. On the basis of measuring the operating efficiency of the hospital system in 31 provinces and autonomous regions of China from 2010 to 2015, this paper further studies whether the monopoly power of public hospitals has a significant impact on the efficiency of the hospital system. There is a reverse change relationship between the monopoly degree of the public hospitals and the operating efficiency of the hospitals in various regions (the estimated coefficient is  $-0.04$ ,  $-0.18$ ,  $-0.12$ ). This reverse change relationship exists significantly under the significant level of 10 %, that is, the higher the proportion of the public hospitals in the hospital industry, the more monopoly, the lower the operating efficiency of the hospital industry. The influence of monopoly power on hospital efficiency in public hospitals is not significant, which may be due to the strong col-linearity between the three monopolistic indexes, so that the variance expansion and the significant decrease. The coefficient of the per capita GDP growth rate (as a control variable) is negative, and the three regression models are all significant under the significant level of 5 %. It shows that with the increasing level of economic development in China, the operating efficiency of hospitals in various regions has not been promoted but has the opposite trend. In terms of quantity, the monopoly status of public hospitals is not conducive to the improvement of the utilization efficiency of medical system resources. With the continuous development and expansion of private hospitals, the absolute advantages of public hospitals have been broken. The intensification of competition between medical institutions is conducive to the efficiency improvement of the whole hospital system to a certain extent. From the view of the business sector, this study has not drawn a clear conclusion to reflect the influence of the monopoly status of the two core business areas in the public hospitals on the utilization efficiency of the whole hospital system. Although the number of private hospitals has occupied the half of the river, the monopoly pattern of public hospitals in the provision of diagnosis and treatment has not been broken. In a short period of time, it will still be the main body of the market for the supply of medical services such as outpatients and inpatients. The reform of medical system should endeavour for the diversification of public hospitals while paying more attention to public hospitals' position as independent market bodies.

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## **Cost Display Mechanism of Medical Service Pricing in Public Hospitals in China: Analysis Based on Loeb-Magat**

## Model

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After the implementation of the “new health care reform” in China, the pricing of medical services has become the focus of public attention after the abolition of medicine markups. Improper pricing will negatively affect the welfare of consumers and the operation of public hospitals. Therefore, it is necessary and urgent to build a set of incentive compatible pricing mechanism for medical services so that the public hospitals can have the incentive to show the real cost of medical service under asymmetric information, and then make the decision-making department formulate reasonable medical service price. This paper is to establish a cost display mechanism for the pricing of medical services in public hospitals, to estimate the total cost function of medical services in public hospitals, and to make an empirical study on the medical services in the public hospital, and then put forward policy recommendations to promote the rational pricing of medical services in public hospitals in China. Based on the Loeb-Magat model, this paper constructed a theoretical model of the cost display mechanism of medical service pricing in public hospitals after the abolition of medicine markups. The model assumed that the public hospital will report the cost of medical service to the regulatory department independently after the abolition of medicine markups; the department controlling the medical service price determines the price level of the medical service according to the cost of the medical service reported by the public hospital; in order to ensure that the public hospital can truly display the medical service cost information so as to provide basis for medical pricing, the government needs to subsidize medical services accordingly. Based on the exposition of the theoretical model and its economic significance of the pricing mechanism of medical services in public hospitals, this paper makes an empirical analysis on the application of the theoretical model by taking the pricing of the hospitalized medical services in public hospitals as an example. The empirical results show that at present, the price controlling department of medical service should stipulate that the average hospitalization expenses of public hospitals in addition to drug expenses are 625.39 Yuan per hospitalization day. When the lump-sum tax payment is greater than zero and the average cost per hospital day is 625.39 Yuan, the government subsidy should be less than 25031.11 Yuan per capita per hospital day except for the cost of medicine. The pricing mechanism of medical service pricing in public hospitals is essentially a process of incomplete information game between government

departments and public hospitals. The cost display mechanism of medical service pricing in public hospitals actually endows public hospitals with the pricing power of medical services and the complete residual claim. Therefore, public hospitals can maximize the social welfare in the process of pursuing the maximum of their own interests.

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## The Influence of the Philosophy of Traditional Chinese Martial Arts on the Development of Public Health Education

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Public health education as one of the important part of the public health system, also is one of national attention and the development direction, by deepening medical improvement in order to satisfy the demands of citizens to own health, to achieve the “healthy China” dream, eventually establish meet the demand of national and social development needs on the premise of the public health system, the related research is not much is blank. Through literature review, theoretical analysis, summarization and other research methods, related issues were systematically studied. Public health education development along with economic and social progress, improving the quality of traditional Chinese martial arts as a cultural treasure of the China to maintain its unique form in history for people. it is with the underlying philosophy of cultural spirit spread to posterity, promote the in-depth development of public health education work for the development of national health education to provide guidance and direction, and contribute to realize a well-off society in every which way, in this paper, a study on system was done as the main line. Research showed that in the process of the development of public health education, generally along with the development of the national comprehensive strength, the people’s understanding of health also gradually increased, especially in schools and in adult health knowledge education and training, which should be fostered. Especially the elderly were influenced by the past environment re-education work, fully improve basic health education, implementation of the citizen’s health and keeping in good health. The content of public health education is mainly based on physical, physiological and psychological aspects.

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## Influence of Sport on Public Health Development

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With the advent of the Internet era, more and more people began to abandon traditional sports and the development of public health is gradually ignored. Body health index of people generally presented a downward trend, and the development of public health environment has become a research hotspot. On the one hand, government departments urge the improvement of medical policies and medical mechanism. On the other hand, the society calls on the general public to be actively engaged in physical exercise to strengthen the body and get a healthy body essentially. Using the methods of expert interview, questionnaire survey and mathematical statistics, this paper studied and discussed the influence of sports on public health development. The research found that the development of social networks and the emergence of smart mobile devices have led more people to enter the social network circle and the e-sports game circle, and also led most people to give up the exercise of physical health. Many scholars have devoted themselves to positive thinking and research on issues related to sports health education, improving national health education and enhancing national physical fitness. Physical health promotion, health refers to the mental and physical as well as social adaptability in a perfect state. And physical exercise on the body's social adaptation, psychological, physiological all have a positive role in promoting. Health requires physical exercise, regular physical labour and physical exercise to maintain the body in a stable state of health. Sports are for the health service, health is not a single physical exercise can be maintained, a healthy body must be sustained physical exercise to maintain a stable state.

## 80 The Relationship between the Construction of Sports Public Service System and the National Health Development

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In the new era, we will actively promote the national fitness drive and build China into a strong country in sports. Many scholars believe that the construction of sports public service system has become a key factor. We will enhance public health through the development of sport for all, laying the foundation for realizing the Chinese dream of "sports power" and "healthy China" in the future. It is imperative to establish a modern public sports service

system, build basic fitness facilities for the whole people and improve the health of the whole people. The research method of building multiple regression models reflects the relationship between the construction of sports public service system and national health, and feedback the implementation effect to the government as an important reference for the construction of sports infrastructure. Through the significance test, the results are fed back to the government as one of the reference directions of its decision-making. By screening the indicators of the public service system of sports, the corresponding data of the statistical indicators and the data of health indicators were obtained. The data mainly come from urban residential areas, rural activity centers and public hospitals to ensure the authenticity and effectiveness of data sources. Therefore, by building a multiple regression linear model, the index data in the public service system of sports is taken as the independent variable, and the overall evaluation level of health index is taken as the dependent variable to reflect the relationship between the two, which can directly reflect the rationality of the construction of sports facilities in the region. Through comprehensive evaluation of the evaluation indexes of sports public service system and the calculation results of AHP, the construction system of sports public service is improved to better serve the public health development. (1) Guide national fitness, strengthen physical fitness, and install basic sports and fitness equipment in public places. (2) Develop sports undertakings, revitalize the nation, and break the limits in the world sports field. (3) To enhance national strength and highlight China's soft power on the global stage.

## 81 The Impact of the Marathon on Public Health Development

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With the rise of the marathon in China, its impact on public health has become more and more concerned by many scholars. Few scholars have quantified the impact of marathons on public health, and the results of this study will fill the gap in leadership. Analytic hierarchy process (AHP), literature review, logical analysis and inductive summary. Based on the development status of marathon in China, this paper establishes an impact index system and quantitatively analyses the impact degree of various indices of marathon sport on public health development by using AHP. According to the research results, it can be seen that people's income level is closely related to the average number of fitness exercises per week, among which the proportion of people with a monthly income of 3000-5000 Yuan is the highest, while the proportion of people with

lower income is lower. Marathon can effectively relieve people's pressure in work, study and life, and provide a channel for people to vent pressure, release themselves and exercise. The biggest impact of the marathon on public health development is that it sets an example of extreme patience and perseverance. In addition, more attention should be paid to the publicity of marathon spirit in the marathon operation mode to provide theoretical support for the development of marathon in the field of public health.

## 82 Healthy China; Strategic Thinking Development of Jinping Xi

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Health, as an important factor affecting human development, has long been concerned in various fields. Without the national health, there would be no overall well-off society. In 2016, healthy China was promoted as a national strategy. This paper mainly studies the connotation and requirements of healthy China, as well as the health concept of Jinping Xi. Besides, it also analyses the connection between national fitness and healthy China and youth health and healthy China, and conducts a systematic study on the strategic thought of "healthy China" in sports. By using statistical analysis, literature review, induction and summarization, this paper analyses Jinping Xi important speeches and writings, and summarizes his strategic thinking and the requirements of the public health development era. In this paper, the analysis of system requirement and the connotation of the concept of universal health, and from the view of Jinping Xi, general secretary of the sports and health of China's strategic research, found in the healthy concept of China and is integrated many public health development, the national fitness in the "healthy China" has the very high status, social health education needs starting from the cultivation of sports health personnel, at the same time pay attention to regional differences and the development of infrastructure resources, for the subsequent research analyses basic health China strategy. The sports view of Jinping Xi is mainly reflected in his daily speech, which covers his cognition of sports, the value and aesthetic level of sports, and has risen from the level of knowledge to the level of theory. The outline of the "healthy China 2030" lays emphasis on people's health as the centre, while taking into account various aspects such as material, spiritual and behavioural factors, so as to promote people's all-round development. It involves five aspects: health level, healthy life, health service, healthy environment and health industry. This strategy is not only about personal exertion, but also about the national economic and social development. It is closely related to building a moderately prosperous society

in all respects, realizing socialist modernization and promoting the quality development of the Chinese nation.

## 83 The Influence of Citizen Sports Culture Quality on Public Health Development

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With the development of the society, increased incidence of chronic disease and abnormal sudden disease, it has to do with people's life style and habits extremely important relationship, therefore, people gradually pay attention to this idea of health education, through the development of physical exercise and health education knowledge, combined with the constitution and citizens to mentality adjustment to achieve the healthy development of the synchronization state of body and mind, effectively improve the current status of tending to sick society, to reduce due to the unreasonable diet, unhealthy living habits lead to individuals and the produce of all diseases, implement health and physical health and mental health of all-round development is to solve the main problem of this research. Research methods such as literature review, statistical analysis and inductive summary were used to systematically study related problems. In the course of the rapid development of sports, the sports culture accomplishment reflects the comprehensive quality of sports players by combining spirit and character under the interaction of sports and sports humanistic knowledge. There is a close relationship between sports cultural literacy, sports literacy and cultural literacy. Cultural literacy is a bridge between sports cultural literacy promoted in the cultural accumulation of sports literacy education and equipped with certain cultivation quality and moral character. It gives full play to sports cultural spirit and fully shows the role of the country's cultural soft power. Citizen sports culture literacy as a key factor for the development of social undertakings of physical culture and sports, through the analysis of physical quality, cultural quality, and the development of sports culture accomplishment significance and relations, and give full play to the role of its constituent elements to promote the development of the national health education work, and of the citizen's physical exercise and mental training to play an significant role, to a certain extent, accelerate the process of the national sports modernization.

## 84 Citizen's Public Health Development Path Based on the Perspective of Sports

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With the rapid development of economy and science and technology, people's pursuit of health is more and more intense, so the residents' physical fitness activities are carried out rapidly. However, different fitness programs have different impacts on energy consumption. Therefore, this paper is based on the study of fitness behaviours. The guidelines of physical exercise for residents are drawn to provide scientific guidance for promoting the sustainable development of public health. Starting from the perspective of energy consumption, this paper mainly adopts the experimental method to determine the energy consumption of sports items by observing the energy consumption of various fitness behaviours, and USES the fuzzy analytic hierarchy process to determine the set of evaluation indexes. Residents' fitness behaviours can be obtained through literature review and relevant Internet data. By calculating membership in the fuzzy rating model and comparing its size, the results show that it is more beneficial to residents' health, efficiency and popularity. The result is that swimming has the highest degree of membership, that is, the most suitable fitness exercise. Energy consumption is the most important consideration of this result. Therefore, in order to make Chinese residents exercise more efficiently and healthily, they should take part in swimming and exercise more. Besides, they should combine exercise such as running, practicing Taijiquan and skipping according to their own endurance. The conclusion is consistent with the actual situation, and it shows that the model is reasonable.

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## **Influence of Sports Culture Communication Ability on Public Health Development**

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Sports culture is composed of sports morality and various standards and systems and is an important part of culture. Its purpose is to strengthen the body and keep the spirit alive, to seek active lifestyle, and to sum up the physical and spiritual wealth created by sports. Many scholars believe that sports culture, with the continuous development of The Times and society, has great influence on the development of public health and has great research value. Fuzzy comprehensive evaluation method and DEA model were used to evaluate the influence of sports culture communication ability on education development. For sports culture, the influence on the ability of public health development, will be 2012-2016 of sports system as the research object, first of all, the fuzzy comprehensive

evaluation model was established, according to the maximum membership degree principle, the sports culture communication ability with a larger impact on the development of public health evaluation results, and then data envelopment model is established for further evaluation. According to the evaluation results of the fuzzy comprehensive evaluation model, it can be concluded that, according to the principle of maximum membership, the value of 48.26 % is the largest among the five grades of membership, so the influence of sports culture communication ability on public health development is greater. Through data envelopment model of the evaluation results of the 2012-2016 years of sports cultural transmission efficiency between input and output of public health in increase year by year, and in 2016 comprehensive efficiency and technical efficiency are reached 1, scale efficiency reached 0.97, so that with the increase of the year of the sports system between input and output of public health gradually tend to balance, is a further indication of sports culture communication ability has a great influence on public health development.

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## **Influence of the Development of National Traditional Sports on the Development of Public Health Education**

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The essence of public health development is to improve and enhance the physique and health level of the general public. Raising the national health index is no longer just about relying on growth in medical standards, but on drugs to maintain health. From the perspective of sports health, it has become a hot topic to explore and discover problems, and to improve people's physique so as to achieve the goal of improving the national health index. Research methods such as questionnaire survey, statistical analysis, expert interview and summarization were used. From the health level of college students according to the survey, at present, more and more students, would you want to social networks, electronic games, e-sports, indulge in the network of the virtual world, health and physical training has gradually abandoned, fewer people are willing to enter the stadium, in addition, colleges and universities stadium it is not open to students free of charge, the experience of high costs for a large part of students and the heavy, the students' physical exercise also kill the ideas and thoughts. Therefore, the overall physical and health level of college students shows a downward trend, and their physical and health conditions are relatively poor. Education is an important part of national sports, and sports are for the better development of

public health. However, with the advent of the Internet era and the development of social networks, more and more people are immersed in online social circle, e-sports circle, online games, mobile game, live broadcasting, etc. At the same time, sports are gradually abandoned and healthy physical exercise is gradually reduced, and the national physical health index shows a downward trend. In order to improve such a bad situation, we can adhere to the sustainable development of national traditional sports and healthy education, inherit and carry forward traditional sports, and open a new look for healthy education.

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## **The Impact of Citizens' Sports Rights on Public Health Development**

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If the public health level wants to develop continuously and rapidly, it must be combined with the law, from the Angle of law, to guarantee the citizen's basic sports rights. With the development of sports and the prevalence of national sport and fitness, sports rights have gradually evolved into an independent right and become a basic right and obligation of citizens. The survey shows that with the advent of the Internet era, more and more people are immersed in the online social circle, the e-sports circle and the online virtual world, and the national health index shows a downward trend. Case analysis method, logic analysis method, interview method and literature method were used to study the issue of civil rights. By studying the content, nature and characteristics of citizens' sports rights, and combining the status quo and existing problems of public health development, the sustainable development strategy of public health was proposed, and the analysis was made from the perspective of health education and the perspective of citizens' sports rights. The essence of public health is to improve and enhance the mass of people's physique, improve the health level. Raising the national health index is no longer just about relying on growth in health care. We must enable the people to take part in physical exercise to strengthen the body and promote physical and mental health. In the process of research, found that the research of our country citizen sports rights, as well as the study of the sports rights have some deficiencies and gaps: first of all, the sports right legalization, from the aspect of law to certain citizens sports rights, adhere to the principle of "people-oriented", and protect the rights of citizens' basic sports is inviolable; We will strengthen the regulatory system to prevent loss or infringement of citizens' sports rights and inequality. While enjoying sports rights, citizens must fulfil corresponding obligations and guarantee the unity of rights and obligations.

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## **The Public Health Service Boundary of the Elderly Mental Health in China Rural Areas and the Governmental Responsibility of the Public Resource Allocation**

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The population of the elderly aged over 60 y accounts for 13.26 % in China, 70 % of which are rural residents. The elderly are the high risk group of various mental illnesses, such as Depression and Alzheimer's disease. The rate of mental disturbance of the elderly in China rural areas is high, but that of treatment is low. Therefore, clarifying the public health service boundary of the elderly mental health and allocating the public resource from the perspective of governmental responsibility will help to complete public health service system of mental health in rural areas. The questionnaire method is used for collecting the data of public health service of the elderly mental health in rural areas and the current status of financial investment in this field, and the ordered Logit model is used in analysing the determinants of the elderly satisfaction with the public health services. The mental health problems of the elderly in rural areas have become the serious social problems. Both the preventive services for the general elderly and treatment and rehabilitation services for the sick elderly are not normalized, whose main reasons are inadequate resources of mental health in total volume, unbalanced spatial allocation and non-professional division of elderly mental health. The problems of mental health of the rural elderly have the attributes of the public health services from the theoretical perspective of public goods and ethics. Therefore, the government has the duty to assign the prevention, treatment and rehabilitation of the elderly mental disorder to the basic public health, and provide systematically, financial and talent guarantees for the resources allocation.

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## **Public Health Problems Caused by Internet take-out Food-Based on Surveying of Netizens and Take-Out Restaurants**

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Through literature analysis and investigation research,



combined with methods of qualitative and quantitative analysis, try to solve the problems of public health concerns which caused by the safety hazards of take-out foods on e-commerce platform, and to propose corresponding solutions by analysing the safety supervision dilemma of Internet take-out foods. Literature analysis method; Questionnaire interview method; Field investigation method. Starting from the emergence of the take-out model under the rapid development of “Internet+”, combined with the security management loopholes in recent years, to elaborate the problems of food safety and regulatory challenges. Identify the root causes of food safety issues in take-out foods by on -spot investigation of the e-commerce take-out platform restaurants; understand the netizens’ awareness of take-out food safety hazards and their willingness to improve these problems through questionnaires. Through further data analysis, we concluded that: inadequate food, early cooking, harmful packing and white pollution from food waste are the root causes of public health threats. The qualifications of e-commerce platform take-out merchants and the health status of fast-delivering people need to be regulated by industry standards. With the increasing consumption on e-commerce take-out foods, the public are paying more and more attention to food safety issues, thus accompanying public health concerns revealed. In order to promote an orderly development of the “Internet+catering” industry, it is necessary to design a superior system to legislating, regulating and standardizing this industry and to urge the standardization and precise management of the e-commerce platform for food safety supervision and consumer rights protection by establishing a unified and comprehensive platform to supervise, manage and evaluate the safety of e-commerce platform food.

#### Acknowledgements

Supported by the following project funding: 1. Institutions of higher learning education teaching reform project of Guangdong province: Under the background of “Internet+” cross-border e-commerce applied talents cultivation mode innovation research-To form a team of “Amazon sellers” as the breakthrough point (2016236). 2. Philosophy and social science project of Zhaoqing: Promote the development of Zhaoqing city commercial Internet+strategy pattern research-to build a virtual industry cluster as the breakthrough point (16QN-04). 3. Project of quality engineer and teaching reform of Zhaoqing University (201663).

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### The Influence of Society, School and Family on Public Health Development

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With the rise of national fitness activities, adolescent health education has entered people’s vision and become a hot spot of research by many scholars. Public health issues education is not just personal, but social and national. Society, schools and families should cooperate with each other to protect public health education. This topic provides a theoretical basis for the research on influencing factors affecting the development of public health education. Literature, induction, statistical analysis and other research methods are adopted. The impact structure of education on health was established, and the impact of education on health was analysed from the perspective of society, school and family. Healthy education relates to family and social schools, and is mutually reinforcing. The society provides the power source for healthy education, the family provides the strong support for the youth sports health education, and the school provides the reliable place and abundant resources for the youth sports health education. Family and social schools are integrated to give play to their advantages and provide a good external environment for teenagers’ physical fitness education. According to the research, society, school and family play different roles in the process of education, which influences public health development from the perspective of society from the perspective of demand and environment. From the perspective of school, it directly influences the development of health education from the aspect of facilities and system construction. From the perspective of family, family economic level and family background have different impacts on education health. Society, school and family should cooperate to protect health.

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### The Influence of Public Sports Health Space on the Development of Healthy Education

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With the continuous implementation of the strategy of “health China”, the people’s growing material and cultural needs and the contradiction between the limited public sports resources increasingly prominent, along with the population aging, youth obesity rates increase, the health problem such as common, the lack of public sports space and unreasonable became one of the main reasons for these problems, how to effectively solve these problems become the focus in the study of this paper, space of public sports demand for energy and problems to be solved. Statistical analysis, literature review, induction and summary were used. Combining with the current status of the development of the national constitution, from two aspects analyses the advantages and disadvantages of the current urban public

sports space, and by using the SPSS space of public sports and sports leisure time and frequency correlation analyses, finally found that the size of the public sports space and layout will affect the health of the residents, according to this conclusion put forward some reference suggestion. Study, the size of the physical space and layout will be in a certain extent affect residents' recreational time and frequency, and a subtle impact on health, should strengthen the government sanction against these problems, build perfect sound space grade evaluation system, promote the diversification of public sports construction and comprehensive set of recommendations, in order to improve the body function, promote the implementation of the strategy of health of China to provide reference and reference.

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## Impact of Adolescent Health Education on Public Health Development

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As the main body of healthy development of education, teenagers' physical quality gradually declines with the development of the information age and the improvement of people's economic living standard. Compared with the initial stage of reform and opening up, teenagers' vital capacity level and other indicators continue to decline. With the improvement of living standards, the importance of physical exercise and healthy lifestyle has been neglected, resulting in the increasingly serious overweight and poor eyesight, and the increasing proportion of urban and rural obesity and poor eyesight. These problems have attracted great attention from experts in the field of public health. Data analysis, induction and summary, SPSS statistical analysis and other methods are adopted to conduct systematic research on related issues. Combining the youth sports development opportunities and challenges, the talent training and studies the problems in the analysis found that adolescent health education and public health development has a very deep contact, need to constantly improve adolescent health education personnel training mode, the implementation of the strategy of promoting public health and improving national quality. Adolescent health education should gradually become diversified and healthy. While ensuring the proportion and quality of cultivation, it should not ignore the health problems of teenagers. Healthy and progressive teenagers have a good role in promoting the development of public health education. Efforts should be made to build a public health service system and a talent training system, to provide a variety of sports venues for young people, to constantly improve the running conditions of various training institutions, to strengthen the personnel

security system, to create good training conditions, and to enable young people to have better feelings of sports health training. The government and society may make continuous efforts to focus on three major tasks in the face of adolescent health development: strengthening the construction of the legal system for youth sports, implementing education culture training, and striving to form a diversified talent training system.

## Track 5: MISCELLANEOUS

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## Extraction and Antibacterial Activity of Passion Fruit Shell Oil

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Passion fruit shell is a by-product or waste of passion fruit processing and consumption. Plenty of passion fruit shell is often directly discarded and is hardly to be fully used. This paper aimed to extract passion fruit shell oil and study its antibacterial activity. Essential oil was extracted from passion fruit shell by the Soxhlet extraction method. With mono-factor and orthogonal experiments, the extraction processing conditions were optimized. At last, antibacterial activity of passion fruit shell oil was measured by the filter paper method. Optimal extraction processing conditions for passion fruit shell oil were as follows: petroleum ether (30-60°) at a temperature of 55°, material-liquid ratio of 1:16 and extraction time of 3 h. Under such conditions, the extraction rate was 1.68%. Passion fruit shell oil had different inhibitory effects on bacteria, mould and yeast. Effect on the whole was not obvious, but on *Staphylococcus aureus* and *Bacillus subtilis*, passion fruit shell oil had an obvious antibacterial effect. Minimal inhibitory concentration (MIC) of passion fruit shell oil was 0.126 mg/ml. Plant essential oils usually contain dozens to hundreds of chemical components. These chemical components are closely related to the antibacterial activity of the oils. For example, phenolic substances have the strongest antibacterial activity, followed by alcohols, aldehydes, ketones and esters. Chemical composition of passion fruit shell oil is yet to be studied.

### Acknowledgments

This work was financially supported by the fund of the Key Laboratory for Processing of Sugar Resources of Guangxi Higher Education Institutes (2016TZYKF01), the fund of the Guangxi Key Laboratory of Green Processing of Sugar

Resources (GXTZY201701).

## 94 The Fermentation of Nisin by Immobilized Lactic Acid Bacteria

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In order to produce the immobilized Nisin, This issue uses the Nisin strains as the starting strain. Sodium alginate, carrageenan and the mixture are used for the studies of cells immobilized. In addition, as a by-product during cheese production, the whey are used to produce Nisin. During preservation process, food is vulnerable to be deteriorated by microbial contamination. An important method in today's food preservation technologies is the use of preservatives. The main findings are as follows, (1) The best conditions for sodium alginate immobilized are as follows: the concentration of sodium alginate is 2.5%, biomass-embedded is 100 ml/100 ml, the concentration of calcium chloride is 2 %, cross-linking time 3 h, 100 ml, pH 6.8, the diameter of the inhibition zone is 18.48 mm. (2) The best conditions for carrageenan immobilized are as follows: the concentration of carrageenan is 2.5%, biomass-embedded is 110 ml/100 ml, cross-linking time 3 h, 100 ml, pH6.8, the diameter of the inhibition zone is 19.00 mm. (3) The best conditions for the mixture of sodium alginate and carrageenan immobilized are as follows: the concentration of sodium alginate is 2%, carrageenan is 0.6%, the cross-linking of CaCl<sub>2</sub>: KCl is 8:1, cross-linking time 3 h, 100 ml, pH 7.0, the diameter of the inhibition zone could get up to 20.30 mm. (4) Comparison of the free and immobilized Nisin under different conditions, the results shows that the immobilized cells have a wider range of adaptability in temperature, they also have a resistant to low pH. It shows an improved environmental tolerance. A number of natural biological preservatives such as Nisin have the advantage of high-performance non-toxic, broad applicability, the advantages of stable performance, they gradually become important in preservatives' research.

### Acknowledgements

This work was supported by the Projects of Young and middle-aged Scientific and Technological Innovation Talents of Shenyang, China (Grant number: RC170235)

## 95 Multi-Factor Correlation Analysis of Electricity Market Price Fluctuation Based on Time Series Feature Representation: Empirical Research on German Electricity Market

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Correlation analysis of relevant factors in the electricity market based on objective data has an important reference value for understanding the operating rules of the market, conducting market maturity evaluation, and formulating relevant policy decisions. Feature representation is widely used in life sciences for high contrast analysis, such as DNA sequence, fetal heart rate, regional blood-oxygenation-level-dependent signal. Due to its excellent ability to describe time series, it is applicable to power market data analysis. German electricity market data, including power generation, load, prediction error, price, are collected for empirical analysis. The time series feature representation method is adopted to study the multi-factor correlation of electricity market price fluctuation. And principal component analysis and greedy forward algorithm are used to select key features. On this basis, the correlation between the factors is measured by calculating the Euclidean distance between key features. The empirical analysis of the German electricity market first proves the effectiveness of the method to describe the characteristics of the time series of different factors. Among the 6796 features considered in this paper, time series trend and prediction related features, the entropy/ Fourier-transform/ wavelet transform related features can reflect the similarity and difference between various factors better. The intraday market electricity price has a strong correlation with the forecast error of wind power generation. Among them, TransnetBW's wind power forecasting error has the greatest impact on price fluctuation. In this paper, a method based on feature representation to analyse the multi-factor correlation analysis of electricity market price fluctuations is proposed. Moreover, an empirical analysis of the German electricity market indicates that the intraday market electricity price has a strong correlation with the wind power forecasting error.

### Acknowledgments

This study is supported by the Natural Science Foundation of China (71671065) and the science and technology project of State Grid Corporation of China "Research and Application of Improving the Accommodation Capacity and Guarantee Technologies of Power Grid in PV Poverty Alleviation Areas" (52182017000W).

## 96 Extraction and Antioxidant Activity of Luo Han Guo Flavonoids

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*Luo Han Guo* (monk fruit) can be used both as medicine and in food processing. This paper aimed to extract flavonoids from monk fruit and study their antibacterial activity. Flavonoids were extracted by the Soxhlet extraction method from fresh monk fruit. With mono-factor and orthogonal experiments, the extraction processing parameters were optimized. By high performance liquid chromatography (HPLC), the flavonoids were analysed and examined. At last, antioxidant capacity of flavonoids from monk fruit was studied with the phosphorus molybdenum complex method. Optimal processing conditions for monk fruit flavonoids were as follows: extracting solution of ethanol of 70 % volume fraction at a temperature of 55°, material-liquid ratio of 1:15 (g/ml) and extraction time of 3 hours. Under such conditions, the average content of monk fruit flavonoids was 8.840 mg/g. HPLC analysis results of monk fruit flavonoids showed that major components of monk fruit flavonoids were kaempferol and quercetin. Analysis results of antioxidant activity of monk fruit flavonoids showed that monk fruit flavonoids had strong antioxidant capacity which was about 8 times that of BHT (2,6-di-tert-butyl-4-methylphenol). Flavonoids can usually scavenge some oxygen free radicals and therefore, antioxidant activity of flavonoids is widely studied and concerned. Kaempferol and quercetin, major components of monk fruit flavonoids, have strong capacity to scavenge oxygen free radicals, which bring monk fruit strong antioxidant activity.

#### Acknowledgments

This work was financially supported by the fund of the Guangxi Key Laboratory of Green Processing of Sugar Resources (GXTZY201701), the fund of the Key Laboratory for Processing of Sugar Resources of Guangxi Higher Education Institutes (2016TZYKF01), and the high levels of innovation team and excellence Scholars Program in colleges of GuangXi.

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### Middle-Long Term Load Forecasting Based on Dynamic Architecture for Artificial Neural Network

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Accurate middle-long term load forecasting of the future electricity demand is the most important role of the power system investment distribution, electricity load planning and management strategies, however, the intelligence load forecasting method such as artificial neural networks have been employed in load forecasting; however, it is inconvenient to decide the ANN's structure parameters by experience. This paper proposed a novel dynamic architecture for artificial neural network (DAN2) method was used in load forecasting and intended to improve the accuracy of the middle-long term forecasting. The DAN2 network structure of dynamic architecture for artificial neural network is different from the traditional artificial neural networks, it contains a input layer and several hidden layer, and the number of hidden layers are dynamic increasing until a level of performance accuracy is reached. There are four fixed nodes in each hidden layer, the fixed nodes are one "CAKE" node, two "CURNOLE" nodes and one constant "C" node, in which, the "CAKE" is the linear fitting nodes, it captures the four nodes ( $F_{i-1}, G_i, H_i, C(i=1 \dots k)$ ) multiple linear regression values of previous hidden layer. The purpose of two "CURNOLE" nodes is capturing the non-linear influence, the fitting function employs the trigonometric function. In order to prove the effectiveness of the proposed model, an application of annual electricity loads of four regions of Taiwan was applied. The experiment results show that the proposed model gets the minimum mean absolute percentage error (MAPE) value 0.59 %, which is better than the results of each single forecasting model such as SVM 2.32 %, BPNN 2.08 %, regression 2.19 %, respectively. In this paper, DAN2 model is adopted to forecast annual electricity loads of four regions of Taiwan. DAN2 model uses "CAKE" nodes to capture the linear elements and uses "CURNOLE" nodes to capture non-linear elements, so it has a good linear and non-linear fitting ability of the forecasting.

#### Acknowledgements

The research is supported by National Natural Science Foundation of China; Project Number: 71401054, Beijing Planning Project of Philosophy and Social Science; Project Number: 14JGC108, and the Fundamental research funds for the central universities.

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### Prediction of Operational Risk in Smart Grid Components with K-Prototypes Clustering Algorithm and LSTM Recurrent Neural Networks

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Information Communications Technology (ICT) enables smart grid to realize state monitoring, data collection, and analysis on various components and lines of the power system. Using the data collected by sensing devices to predict the operational risk of the grid components can greatly improve the efficiency of risk warning, and also provide decision support for smart grid security defense resources allocation. Due to the large number of smart grid components and the collected data belongs to the time series type, this paper proposes a smart grid components operational risk prediction method based on K-prototypes clustering algorithm and LSTM Recurrent Neural Networks (RNN). According to the categorical and numerical features of smart grid components including geographical location, function type, aging rate and historical maintenance times, the K-prototypes clustering algorithm is used to cluster the components of the original time series data, so as to reduce numbers of output variables in RNN. The processed time series data set is divided into a training data set and a test data set, both of them are input to a recurrent neural network for training. The training data set variables include smart grid power generation ( $x_1$ ), load ( $x_2$ ), maximum temperature ( $x_3$ ), and minimum temperature ( $x_4$ ) and humidity ( $x_5$ ), the test data set variable is components cluster ( $y$ ). In addition to the default settings, the recurrent neural network uses a single layer of hidden layers to avoid overfitting. As a comparison, the proposed method in the paper and an artificial neural network model with default settings are applied to the components risk prediction problem of a micro-grid in China. The experimental results show that the mean absolute percentage error (MAPE) of the method mentioned above values 1.273 %, while the MAPE of the artificial neural network values 4.471 %. Additionally, if the raw data is directly input into the RNN without using the clustering algorithm to cluster the components, a large training error or even an unexpected termination of the program may be obtained. The RNN introduces the concept of timing into the network structure, which makes it more adaptable in time series data analysis. Combined with the K-prototypes algorithm for classification and numerical variable clustering that can reduce the output variables, the paper ultimately achieve the goal of improving the accuracy of components risk prediction.

### Acknowledgments

This study is funded by the National Natural Science Foundation of China (Grant number: 71671065) and a Science-technology project of State Grid Corporation of China (Grant number: 5204BB1600CN).

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## Speech Emotion Recognition Using Hybrid GBO Algorithm-based ANFIS Classifier

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Affective computing is one of the most active areas of study for mental health screening. Although several kinds of signals, including electroencephalography and facial expressions, have been studied for recognizing speaker emotions, speech acoustic signals continue being one of the most used due to the feasibility of implementing end-user systems that only requires a microphone for capturing the input signals. Emotion recognition concerns to describing the high-level affective content of an utterance from the low-level acoustic signal produced by a speaker. Therefore, speech-based emotion recognition is still a challenging task, due to the natural intra and inter-variability of subject voices. The use of adaptive network-based fuzzy inference system had shown increasing use due to the development of dedicated and high-performance processors which make faster training neural network based algorithms. This paper proposes such a system for the speech emotion recognition. The proposed architecture is divided broadly into four different phases. These are pre-processing, signal decomposition, feature extraction and classification. The steps involved for this implementation are as follows. Initially, the audio signals are obtained from the dataset. This signal undergoes pre-processing using Kalman filter. Next, signal decomposition is carried out by the variable mode decomposition (VMD). This is followed by feature extraction. These features are classified using hybrid GBO algorithm with adaptive-network-based fuzzy inference system (ANFIS) classifier (HGA-ANFIS). The HGA is a combination of the traditional GBO algorithm with the genetic operators that is mutation and crossover. These features are then used as input to a recurrent ANFIS, which is trained for deciding the emotion content of the evaluated utterance. ANFIS classifier is trained and optimized with HGA to ameliorate the classification accuracy. The classified output is the emotion content of the evaluated utterance. The proposed HGA-ANFIS performance is contrasted with the prevailing methods, say, PSO-ANFIS, ANFIS, GRNN, KNN and neural system. Performance evaluation was conducted by two experiments: a gender independent and a gender-dependent classification. Experimental results show that the proposed approach achieves 91.6% emotion recognition accuracy in the gender independent experiment, which outperforms previous works using the same experimental data. In the gender-dependent experiment, accuracy was 82.5 and 93.4 % for women and men, respectively. This result indicates that the proposed HGA-ANFIS has a higher classification recognition rate, which may be due to the use of hybrid GBO algorithm to train and optimize the ANFIS classifier. As future study, we suggest combining the proposed approach with video analysis techniques in order to improve emotion recognition accuracy from bimodal signals.

**Acknowledgements**

This work is partially supported by Natural Science Foundation of China under grant 5147509, the Science and technology project of Henan Province under grant 172102310249 and Key scientific research projects in Henan colleges and Universities under grant 17B520030.

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**Changes in COR and Thyroid Hormone in Students with Anxiety Disorder under Ideological Education**

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The anxiety disorder of students is a kind of psychological disorder caused by the pressure of examination. The reasons are both internal factors of the individual and external factors of the society. This article explores the impact of ideological education on COR and thyroid hormones in patients with anxiety disorders. One hundred and twenty patients with anxiety disorder admitted to a city hospital were selected and divided into two groups. Each group had 60 anxiety patients, one group was the experimental group and one group was the control group. For the anxiety group of the experimental group, the drug was taken every day. The treatment also educated them, while the anxiety patients in the control group only received medication. This kind of contrast treatment was maintained for 6 months. The changes of COR and thyroid hormone were observed in the anxiety patients. Determination of COR, TSH, T3, T4 and HRV detection. Compared with the control group, the changes of COR and TSH in the experimental group were smaller, and the HRV indexes were lower ( $P < 0.05$ ). Compared with GAD patients, PD patients had higher COR and TSH and lower HRV index ( $P < 0.05$ ); males with lower COR and TSH and higher HRV scores than women with anxiety disorders ( $P < 0.05$ ); patients with less than 50 years of age had lower COR and TSH than 50 or above years old, HRV the index was higher ( $P < 0.05$ ). Ideological education has an effect on the changes of COR and thyroid hormones in anxiety students, and has certain therapeutic effects on anxiety disorders.

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**Experimental Study on Alleviation Effect of Sports on Children with Tic Disorder**

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The objective of the work was to observe the therapeutic

effect of sports on children with tic disorder. Eighty-four children with tic disorder were randomly divided into observation group and control group with 42 cases in each group. Children with tic disorder who participated in sports training were selected as treatment group. The control group of tic children did not participate in any sports training during the trial, and observed the treatment for 4 months. Yale Comprehensive Tourette Severity Scale (YGTSS) was used to evaluate the movement and vocal tic activity of the two groups before and after treatment, and the curative effects were compared before and after treatment. The total effective rate of the observation group and the control group were 91.6% and 68.5%, respectively. The difference between the two groups was statistically significant ( $p < 0.05$ ). YGTSS score of the patients before treatment: observation group ( $14.79 \pm 1.96$ ) points, control group ( $14.54 \pm 1.87$ ) points; before treatment, YGTSS score: observation group ( $9.78 \pm 3.12$ ) points, control group ( $9.47 \pm 3.03$ ) points, the difference was not statistically significant. The YGTSS score of the patients in the observation group was ( $4.85 \pm 2.37$ ) and that of the control group was ( $7.63 \pm 2.89$ ). The YGTSS score of the patients in the observation group was ( $3.17 \pm 1.33$ ) and that of the control group was ( $4.96 \pm 1.68$ ). The YGTSS score of the patients in the observation group was significantly lower than that of the control group ( $p < 0.05$ ). Sports training method can effectively alleviate the symptoms of tic disorder in children, and the curative effect is better than that of the children who do not participate in sports.

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**Extraction and Antibacterial Activity of Carambola Polyphenols**H. CHENG, JINGJING FAN, S. ZHANG<sup>1\*</sup>

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Carambola is a fruit rich in polyphenols. This paper aimed to extract carambola polyphenols and study their antibacterial activity. Carambola polyphenols were extracted from carambola fruit by the ultrasonic-assisted alcohol extraction method. With mono-factor and orthogonal experiments, the extraction and processing conditions were optimized. At last, antibacterial activity of carambola polyphenols was measured using the filter paper method. Optimal extraction processing parameters of carambola polyphenols were as follows, material-liquid ratio of 1:25 (g/ml), extraction time of 35 min and 60% ethanol. Under these conditions, the extraction yield of carambola polyphenols was 6.25 mg/g. Carambola

polyphenols had some inhibitory effects on the tested bacterial strains, especially on *Escherichia coli*, *staphylococcus aureus*, *Bacillus subtilis* (minimal inhibitory concentration i.e. MIC:  $1.18 \times 10^{-2}$  mg/ml). Antimicrobial effect of carambola polyphenols on yeast was relatively obvious (MIC:  $1.18 \times 10^{-1}$  mg/ml) and that on mould was not obvious (MIC: 1.18 mg/ml). Cavitation and thermal action of ultrasonic waves can easily damage plant cell walls so that inner components of cells like polyphenols can be effectively dissolved, which greatly increases the polyphenols extraction ratio. As a secondary metabolite of plants, polyphenols exert inhibitory effects on bacteria, fungi and viruses. The strong antibacterial activity of carambola polyphenols may be related to their own molecular structure.

#### Acknowledgments

This work was financially supported by the fund of the Key Laboratory for Processing of Sugar Resources of Guangxi Higher Education Institutes (2016TZYKF01), the fund of the Guangxi Key Laboratory of Green Processing of Sugar Resources (GXTZY201701), and the high levels of innovation team and excellence Scholars Program in colleges of Guangxi.

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### Recovery Effect of Hippocampal Neuron Injury in College Students with Anxiety under the Guidance of Ideological and Political Education

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To explore the effect of Ideological and political education on the recovery of hippocampal neuron damage in college students. One hundred students suffering from anxiety disorder were randomly divided into two groups, the observation group and the control group, 50 cases in each group. The two groups of patients were treated with the same combination of traditional Chinese and Western medicine anti-anxiety treatment. The control group was given routine nursing during the experiment. The observation group was given ideological and Political Education on the basis of the control group. Hamilton Anxiety Scale (HAMA) and Depression Scale (HAMD) were used to evaluate the efficacy of the two groups of patients. The total effective rate of the observation group (98.2 %) was significantly higher than that of the control group (62.3 %,  $p < 0.05$ ). The scores of somatization, depression, anxiety, interpersonal sensitivity and psychosis in the observation group were significantly lower than those in the control group ( $p < 0.05$ ). Ideological and political education is conducive to improve college students' awareness of anxiety disorders, enhance their ability of self-regulation, improve bad

mood, and improve the treatment effect.

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### Analysis of the Influence of Ideological Guidance on the Influence of Gamma Aminobutyric Acid Receptor on Anxiety Disorders in Students

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To solve the problem of frequent occurrence of anxiety disorders among students caused by social stress, the change of the indicators of mental counselling on gamma amino butyric acid (GABA) receptors in anxiety disorders of students was analysed. Studies have confirmed that anxiety disorders are directly related to GABA receptors. In this study, 40 students with anxiety disorder of the same grade in a university were randomly divided into two groups: experimental group and control group, with 20 students in each group. For students in the control group, conventional treatment and nursing were only carried out with the solution of Anshen Decoction. In the experimental group, besides receiving the routine treatment and nursing of Jielu Anshen Decoction, the students in the experimental group were also given daily mental counselling by psychologists. The experimental period was set at 6 weeks. After 6 weeks, the activity of GABA receptor in nerve cells of anxiety students in both groups was measured. The activity of GABA receptor in the control group was only slightly higher than that in the control group, but the activity of GABA receptor in the experimental group was significantly higher than that in the control group. The activity of GABA receptor can inhibit the anxiety behaviour of students. Ideological counselling can effectively help students with anxiety disorders to alleviate anxiety, inhibit anxiety behaviour, and play a good role in promoting the recovery of the disease.

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### Development Path of Education for College Sports Health in the New Era

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With the advent of the big data era, colleges and universities in the new era urgently need an efficient, high-speed and high-quality method to lead the development of sports education, and the improvement of intelligent sports education level has always been a research hotspot. A new

era of colleges and universities sports curriculum requires college students to strengthen physique, improve their health and improve sports accomplishment as the main target, to cultivate the innovative ability and social practice ability as the fundamental purpose, to create high-quality innovative talents, the development of sports health education in colleges and universities of the era of large data with data explosion, knowledge update quickly, in a wide range of content features. Based on this, reasonable application of modern scientific and technological means to solve the development problems of sports health education has a broad prospect and adapts to the trend of the Times. In this paper, students' perception of education service quality in the process of sports education is regarded as an important indicator in the process of sports education. The standard of "students' perception of education quality" is determined by the degree of difference between students' feelings and expectations of students in the teaching process. Assuming 5 gaps in education evaluation of physical education in colleges and universities, 1 index is randomly selected from 5 gaps to be used as the physical education quality test of students, so that the satisfaction of this student to physical education is the largest, the difference between the expected service and the actual service is the smallest, and the total score of physical education evaluation of this student is no more than 100. By applying the method of particle swarm multi-objective search coupled gap analysis, some development problems are reasonably solved, and a "student-oriented" education model of sports is proposed, which provides direction and approach for the new era of higher education sports education. Gap analysis theory effectively finds out the key indicator of students' satisfaction with education service quality, solves the shortage of single education teaching research, and puts forward new requirements on curriculum setting and other aspects in a more comprehensive way. Particle swarm multi-target search to gap analysis theory and carry out reasonable optimization, improve efficiency. Education concept of "student-oriented" has truly become the mainstream idea of university sports education and promoted the reform of university sports education.

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## **Design of Cardiac Emergency Disease Relief Platform Based on Big Data Network**

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This paper multi-source heterogeneous information in a heart attack disease relief services is difficult to effective integration, disease early warning, and the imbalance of the distribution of medical resources, in number of incidence

and long incubation period, high mortality rate and significant influence on the economic life of chronic diseases such as heart cerebrovascular disease as the research object, the design is based on big data network technology and data application platform for the heart attack disease relief, the platform is composed of mobile client and PC server. With data, information and knowledge management as the main line, using big data, intelligent information processing and knowledge management theory, based on the collaborative optimization of multi-source heterogeneous health information intelligence fusion method, and constructs a model of heart disease early warning based on short- and long-term memory network, the design is based on relative attributes, personalized doctor recommended way to learn and develop the disease rescue platform service system of cloud, mobile end users by focusing on WeChat public access to the client application, fill in the patient's basic information and check the data submitted to the server, after the application of big data technology to predict seizures in patients with heart disease, and to give guidance and self-help. The application of this system can effectively alleviate the problem of incomplete medical equipment and tight beds in general hospitals, and resolve the contradiction between the idle beds in nursing homes and community medical institutions and the lack of medical equipment. The national hierarchical medical system is well implemented.

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## **Optimal Design of Visual Communication for Preventing Human Eye Diseases**

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Nowadays, the coverage of visual communication design is expanding, and people's visual world is full of various terminal media. The existing visual communication design method is easy to cause various eye diseases such as human eye visual fatigue and macular disease. To this end, this paper proposes an electroretinogram (ERG)-based visual communication optimization design method. Analyse the ERG signal acquisition system and design the hardware acquisition circuit to realize the acquisition of the ERG analogue signal; apply the 24-bit high-precision ADC to A/D conversion of the analogue signal to reduce the noise of the analogue device and obtain a higher signal-to-noise ratio. The signal was subjected to multi-sample acquisition under dark adaptation conditions, and the data obtained by A/D conversion was digitally processed to obtain a final communication signal. The experimental results showed that the proposed method could effectively reduce the amplification of the analogue front end, so that a higher



signal-to-noise ratio can be obtained. The hardware acquisition circuit frequency designed by the ERG signal acquisition system is equivalent to the skin electrode, effectively reducing the terminal media to the human eye. The proposed visual communication optimization design method could greatly reduce the damage to the human eye when using the mobile terminal, and effectively prevent human eye diseases.

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## **Mental Guidance of Depressive Students and Analysis of Medical Characteristics of Visual Perception of Human Brain**

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The objective of the work was to analyse the medical characteristics of students' human brain perception system, depressive symptoms and related influencing factors from the point of view of ideological guidance behaviour of students with depression, so as to provide evidence for the prevention and treatment of students' mental diseases and health education. The behaviour of students with depression was analysed, and the visual perception of human brain was detected by related instruments. The medical characteristics of students' perception of human brain were analysed and classified. The results showed that the behaviour of ideological guidance of depressive students was highly correlated with human brain perception. Although there were some differences in the behaviour characteristics of students with different personal and social experiences, they also showed common medical characteristics. This paper divides the medical characteristics of the brain visual perception of depressive students into several parts, which opens up a new way for the treatment of depressive students and has certain reference value. Based on the behavioural characteristics of depression, the medical characteristics of human visual perception were analysed, and the importance of shaping the healthy psychology of depressive students was put forward.

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## **Surface Reconstruction Method of 3D Multimodal Medical Image**

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Reconstructing 3D multimodal medical images with good display and high realism can provide a more accurate

diagnosis for clinical observation. Aiming at the problem that the reconstruction method is slow and the display effect is not ideal in the traditional reconstruction method, a three-dimensional multi-modal medical image surface reconstruction method based on MITK is proposed. The contour plane optimization is performed by using the Marching Cubes algorithm, and the medical surface reconstruction image under the optimization algorithm is implemented according to the design criteria of the MITK platform. Considering the image interaction efficiency, the mesh folding method using the edge folding is performed on the MITK platform. The image is reconstructed for mesh simplification, and the surface reconstruction of the 3D multimodal medical image body is realized by ray casting and surface rendering. The experimental results show that the reconstruction time of the proposed method is 12.48 seconds, which is about 1/5 of the time of the traditional reconstruction method, and the reconstruction speed is obviously accelerated. The image is simplified by the pixel angle vector and the optimal angle of the light and the mesh. 3D contour clarity and realism are much higher than traditional methods. The experimental results show that the proposed method for surface reconstruction of 3D multimodal medical images is fast, the image clarity and realism are better, and the display effect is more ideal. It has high practical value in the medical diagnosis process.

### **Acknowledgements**

This work is supported by the Programs for Science and Technology Development of Henan (172102210565).

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## **An Empirical Method to Explore the Relationship between the Comfort of Medical Disposable Close Clothing and its Fabric Handle**

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Medical disposable clothing plays an important role in medical staff and brings great convenience. People not only depend on the physical characteristics of medical disposable close-fitting, but also pay attention to the interaction between medical disposable close-fitting and medical staff. Through the examination of subjective contact comfort and handle of medical disposable close-fitting fabric, and the measurement of objective physical and mechanical properties of the fabric, the correlation between them and the contact comfort of medical disposable close-fitting clothing is comprehensively evaluated. In the field of disposable personal clothing for medical treatment, from the aspects of warm and cold feeling, contact itch feeling and local pressure feeling, the comfortable perception of

medical disposable personal clothing can be predicted as a whole, and the overall contact comfort can be predicted. Subjective evaluation can test the wearer's true reaction in a more realistic dress state. In this paper, the relationship between the fabric handle and the clothing contact comfort was studied, and the sensory and mechanical properties of the close-fitting fabric were systematically discussed. The viewpoint of this paper provides a good theoretical basis for the selection of disposable personal clothing for medical cause and has a high practical application.

### 111 **Design of Fast Data Collection System for Terminal Kidney Disease in Cloud Computing**

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The traditional method has the problem of inaccurate data collection and easy to be lost when collecting the terminal kidney disease data set. Therefore, a fast data collection system for terminal kidney disease data set under cloud computing is designed. The hardware design and analysis of a data acquisition system based on ADC converter (EP1C6Q240C8) and USB interface chip (CY7C68013A-56, FX2) are presented, and the corresponding schematic diagram is given on the basis of the design. According to the requirement of the system, the logic control and timing of the computer bus interface are designed and programmed. The fast correlation algorithm of the digital signal processor (DSP) is programmed by software, and the fast collection flow of the terminal kidney disease data set is obtained. The design of the system is realized. The software and hardware of the system are debugged and the experimental results show that the system has high accuracy and effectiveness. In the aspect of collecting terminal kidney disease data sets, the precision of collecting data is 26 and 76 % higher than that of the traditional system, and the system has better data aggregation effect. The fast collection of terminal kidney disease data set under cloud computing can improve the accuracy and effectiveness of the data, and the safety factor is high, the flexibility is strong, the search is simple, and the storage is convenient.

#### **Acknowledgements**

The research is supported by Henan Key Research and Development and Promotion Project, the design and development of the Moodle scientific support system based on cloud computing (182102210131); Henan Higher Education Teaching Reform Research and Practice Project, big data-driven high education management and

decision-making reform and practice (2017SJGLX389).

### 112 **Modelling and Analysis of Relationship between Aquaculture Environment Change and Outbreak of Enteritis in Aquatic Animals**

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In view of the fact that the traditional modelling methods will quickly fall into non-convergence when the parameters change irregularly, and cannot effectively complete the modelling process, a new modelling method for the relationship between aquaculture environment changes and aquatic animal sudden enteritis disease is proposed. Based on the physiology of aquaculture animals, the relationship between the changes of aquaculture environment and the sudden enteritis of aquatic animals was modelled by particle swarm optimization (PSO). The influence model of the changes of aquaculture environment on the sudden intestinal function of aquatic animals was established. The intestine of aquaculture animals was further analysed by the model. Heart rate and blood pressure variability (HRV) associated with respiratory response were optimized as constraints for analysis. The experimental results show that the proposed model has good convergence when the parameters change irregularly, and can accurately reflect the impact of aquaculture environment changes on aquatic animals suffering from sudden enteritis disease. The establishment of the model provides supervision and guidance for aquaculture industry, avoids the waste of resources and funds caused by the technical problems of fish breeding, ensures the quality and safety of aquaculture varieties, and promotes the rapid development of aquaculture industry.

### 113 **Intelligent Selection Method of Cold Chain Logistics Distribution Path of Refrigerated Medicine**

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According to the special requirements of cold chain logistics distribution for drug refrigeration, the research project of selecting the intelligent distribution path of cold

chain logistics was further proposed. Under the condition of ensuring that the delivery business meets the time window limit of customers, the impact of uncertain factors, such as the perishability of the delivered medicine, the possibility of road traffic congestion, should also be taken into account to achieve the purpose of minimizing the delivery cost. On the premise of ensuring that the refrigerated drugs are not overloaded, a cold chain distribution centre is established to analyse the mathematical model of cold chain logistics distribution of several refrigerated drugs, and the improved genetic algorithm is used to analyse and solve the problem. Of the genetic algorithm by Matlab software programming, according to the actual situation, to the shortest path between any two PeiSongDian planning, and to study the key technology of logistics distribution system integration, integration of data collection and function carried on the thorough discussion, realized the unification of the spatial and attribute database storage management, basic operating function, electronic map vehicle shortest path search function components, finally USES case to verify the optimal path in the process of delivery. The optimal distribution route of intelligent selection method is obtained by using improved genetic algorithm, which is superior to the result of standard genetic algorithm.

#### Acknowledgements

The research is supported by National Natural Science Foundation of China, Research on Robust Optimization of Dangerous Goods Transportation Network Based on Alternative Transport Sections Screening, (51408288); Strategic Research Project of Gansu Education Department (2018F-08), Study on the development strategy of logistics node advantage and competitiveness of Gansu province.

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### Segmentation Method of 3D Human Brain Image Sequence based on Deformable Model

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Human brain image sequence segmentation is the key to human brain image analysis and understanding, providing a more accurate diagnosis for clinical observation. Aiming at the problems of large computational complexity, numerical instability and over-segmentation of traditional segmentation methods, a three-dimensional human brain image segmentation method based on deformation model is proposed. The potential energy function is used to complete the image structure detection under the constraint of the inherent continuity and smoothness of the model. Based on the FC-mean segmentation technique, the deformation

model is combined with the membership function to define a fuzzy constraint force, which is attached to the external constraint of the deformation model. Force; using the composite external binding force, the deformation model can better shrink to the segmentation structure, and obtain a more ideal segmentation image. The experimental results show that the calculated amount of the proposed method is reduced by 1/2 compared with the traditional method, and the segmentation speed is obviously accelerated. The composite external binding force makes the segmentation accuracy reach 9.83%, and the model solution value tends to be stable. The proposed method is used to segment the three-dimensional human brain image sequence, the calculation amount is obviously reduced, the model solution value tends to be stable, and the segmentation precision is higher, the overall effect is more ideal, and it has high practical value in the medical diagnosis process.

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### Optimal Qu Bo Coefficient Selection for Medical Image Enhancement in Different Scales

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In order to satisfy the needs of clinical diagnosis and to distinguish different scales of medical images, a medical image enhancement method based on optimal curve coefficients is proposed. Optimal curvilinear forward transform is used to obtain the curvilinear coefficients of various scales and directions. The generalized cross-validation criterion and genetic algorithm are used to select the optimal threshold adaptively for threshold denoising. The processed data are widened by frequency band, and the data are reconstructed by inverse curvilinear transform. Like. Ten groups of medical brain CT and chest images were selected respectively. After the medical data are processed by this algorithm, the signal-to-noise ratio (SNR) increases from 3 dB - 4 dB to 5 dB - 6 dB. This method not only has high SNR, but also eliminates the visual distortion of medical images of different scales. The resolution of the processed image is obviously improved. Theoretical analysis and simulation results show that the new method makes the level division of focus more clear, effectively enhances the edge details, and provides a clearer and more accurate basis for medical workers to diagnose the disease.

#### Acknowledgements

The research is supported by key laboratory project of microwave light wave application technology in Guangxi

(No. MLLAB2016004); doctoral foundation project of Jiamusi University (No. 22Zb201516).

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## The Management of Medical Prevention and Control System for College Students with Cervical Spondylosis

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Cervical spondylosis is a syndrome that mainly refers to a series of clinical symptoms caused by cervical spinal cord, cervical spinal cord, vertebral artery and sympathetic nerves being stimulated or oppressed due to cervical disc degeneration. The incidence of cervical spondylosis in college students also showed a significant upward trend. The incidence of cervical spondylosis has become increasingly serious, which has caused a certain burden on college students' psychology. As a result, some students have experienced nervousness, tired of learning, and even more have lost their lives. Confidence, it is necessary to conduct management research on the medical prevention and control system of cervical spondylosis in college students. In this paper, the medical prevention and control system for cervical spondylosis of college students mainly includes medical treatment and prevention. In order to study the prevention and treatment of cervical spondylosis in college students due to medical and nursing interventions, 60 college students enrolled in 2016 were selected into the study and their clinical data reviewed the cervical spondylosis. The students were divided into study groups and experimental groups, 30 in each group. Two groups of college students implemented different medical prevention and control systems for cervical spondylosis. Patients in the control group did not receive medical and nursing interventions, and the experimental group received traditional health care and nursing interventions. Medical and nursing interventions are applied to college students using the medical prevention and control system. After comparing the therapeutic effects of cervical spondylosis between the two groups of students, the control group did not have a complete medical prevention and control system, which led to the unsatisfactory treatment of cervical spondylosis. Although the symptoms were relieved, the problem of cervical spondylosis could not be solved. Under the treatment of the medical prevention and control system, the students in the experimental group showed a significant decrease in cervical pain compared with that before treatment. The cervical spondylosis medical prevention and control system can effectively solve the cervical vertebrae problem of college students. The management of this system plays an important role in the health of the cervical spine.

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## Measures To Prevent Infectious Diseases of Tourists in Tropical Tourism

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The special geographical conditions of tropical regions, tourists are easily infected by infectious insects, and the prevalence of global insect-borne diseases presents three major trends: The prevalence of some existing diseases continues to expand, new diseases are constantly being discovered, the frequency of disease epidemics continues to increase, need to achieve early detection, early reporting, early isolation, early treatment, early treatment. Monitor the symptoms between the tourism service practitioners and the units, conduct professional screenings with nearby medical institutions and major prevention departments, timely diagnose and discover suspected vector-borne diseases, strengthen public health management, control animal hosts, eliminate vector insects, and protect tourists. Through symptom monitoring and professional monitoring, early detection of the epidemic situation and proper treatment can be achieved in the daily and major infectious diseases of the insect-borne diseases, and the personal safety of the tourists is guaranteed to the greatest extent, and the protection measures are effective and feasible. This method can protect the health of tourists and reduce social harm in tourism in the tropical region to the greatest extent, and can effectively reduce the incidence of insect-borne diseases.

### Acknowledgements

The research is supported by a study for smart tour-based tourist experience modelling and optimization regulation-a case analysis of Hengshan Mountain (ZK17); tourist experience based smart management platform research and construction (2016SK2042); study for influencing factor of tourist experience perception and internet oral spreading-a case analysis of Hengshan Mountain (16C0119); Hunan province philosophy and social science planning fund project (17YBA033).

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## Modelling Analysis of Bridge Structure Vibration Control on Stimulation of Meniere's Disease

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The effect of bridge structure vibration on Meniere's

disease was observed, and the effect of bridge structure vibration on Meniere's disease was modelled and analysed. Ninety patients with Meniere's patients were selected as subjects, and patients were divided into group A and group B. Patients in group A underwent routine drug therapy observation and recorded experimental data. In addition to routine treatment of patients in group B, simulated bridges were used. The structural vibration environment intervened in the treatment of the two groups of patients. The duration of the experiment was 3 months. The therapeutic effects of the two groups of patients were observed and the data of the patients were recorded in time. According to the results of the comparative experiments, the vibration of the bridge structure was under the influence of Meniere. By analysing the experimental data, it can be seen that the patient's condition recovered well in the A group, indicating that the drug treatment of Meniere's disease has a certain effect. In contrast, patients in group B did not get better results, and some patients experienced aggravation, indicating that the vibration of the bridge structure had a significant stimulating effect on Meniere. During the routine treatment and nursing of Meniere's disease patients, attention should be paid to the effect of bridge structure vibration on the stimulation of Meniere's disease, so as to reduce the negative effect of the treatment of Meniere's disease patients, which provides a new idea for the prevention and treatment of Meniere's disease.

#### Acknowledgements

The research is supported by the foundation of Guizhou Natural Science Foundation, its code is [2015] 2062: Research and application of bridge structure finite element model restoration based on probability statistical analysis.

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## Extraction and Antibacterial Activity of Purple Sweet Potato Pigment

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Natural pigment of purple sweet potato is anthocyanin and plenty of anthocyanins are reported to have antibacterial activity. This study aimed to extract purple sweet potato pigment and test its antibacterial activity. Pigment was extracted from purple sweet potato by the microwave-assisted method. With mono-factor and orthogonal tests, the extraction processing conditions were optimized. By the filter paper method, the study centered on the antibacterial activity of purple sweet potato pigment

against staphylococcus aureus, *Escherichia coli*, yeast and *Bacillus subtilis*. Optimal extraction conditions were as follows: 7 minutes' microwave heating extraction at liquid-solid ratio of 15:1 in 1.5% citric acid solution at pH 2.0. The results showed that purple sweet potato pigment had inhibitory effects on staphylococcus aureus, *Escherichia coli* and yeast, and the effects were positively correlated with the concentration of the pigment, but on *Bacillus subtilis*, *Mucor*, *Rhizopus* and *Aspergillus*, purple sweet potato pigment had no inhibitory effect. Instant permeability of microwave heating makes plant cells be easily damaged so that extraction ratio of purple sweet potato pigment can be greatly improved and yield of the pigment can be effectively increased.

#### Acknowledgments

This work was financially supported by the fund of the Key Laboratory for Processing of Sugar Resources of Guangxi Higher Education Institutes (2016TZYKF01), the fund of the Guangxi Key Laboratory of Green Processing of Sugar Resources (GXTZY201701), and the high levels of innovation team and excellence Scholars Program in colleges of Guangxi.

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## Analysis of Patient Protection Policy for Rural Medical Insurance for Coronary Heart Disease

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Taking the rural patients with coronary heart disease in China as the research object, through analysing the rural medical insurance patient protection policy and its influencing factors, the medical insurance patient protection policy for rural patients with coronary heart disease is analysed, thus providing better guarantee for the treatment of rural coronary heart disease patients. This paper starts from the new rural cooperative medical care and major illness medical insurance and other patient protection policies, and uses relevant statistical methods to analyse the status quo and related influencing factors of rural coronary heart disease patients' protection policies, and interview rural patients with coronary heart disease to understand the medical care of patients with coronary heart disease. The problems and improvement suggestions of the insurance patient protection policy are analysed by using the framework analysis method. According to statistics, the number of hospitalizations for patients with coronary heart disease is long, the hospitalization is high, and the medical insurance policy for rural patients with coronary heart disease is still not perfect. Many rural patients with coronary heart disease are not guaranteed. The

compensation effect of medical insurance for patients with coronary heart disease in rural areas is insufficient, the patient's disease economic burden is heavy, and patients with low-income coronary heart disease are more conspicuous. A reasonable rural patient care policy for coronary heart disease medical insurance should be formulated. The state should increase investment in this area and strengthen to provide better medical care for rural patients with coronary heart disease.

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## Design Platform of Special School Safety Identification for Children with Mental Retardation

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Children with mental retardation have to face great difficulties in their daily life and study. An effective marking system can help children with mental retardation integrate into school more independently and freely, and improve the proximity and utilization of school environment. However, the current specification and design of marking is far from meeting the needs of children with mental retardation. The design platform of special school safety identification for children with mental retardation was constructed. According to the overall framework of the platform, the platform was divided into two hardware and software parts. In the hardware part, the hardware circuit of the card reader and the identification card was analysed emphatically. In the software part, the cognitive and action characteristics of children with mental retardation were analysed, and the design process of safety identification in special schools was described according to the special needs of children with mental retardation. The design platform of special school safety identification for children with mental retardation was completed. The experimental results show that the safety marking platform has good indicative function. Before and after the use of the platform, the safety degree of children with mental retardation is increased by 30 %, and there are obvious differences. The platform can bring great convenience to children with mental retardation, help them better integrate into the school environment.

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## Multi-Modal Medical Image Elastic Registration Algorithm

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The main purpose of medical image registration is to suppress and remove geometric inconsistencies between the image to be registered and the reference image. Image registration is an important prerequisite for image comparison, data fusion, and change analysis and target recognition. In the medical field, registration is mainly applied to information fusion of medical images such as CT, MRI, PET, comparison of actual medical images, surgical navigation, cardiac motion estimation and many other aspects. The scale invariant feature transform algorithm is used to extract and match the image features. The TPS algorithm is used to pre-process the feature point pairs as input to reduce the deformation scale of the floating image, thus improving the speed and accuracy of the lower registration. The gradient mutual information is used as the similarity metric. The global affine transformation is used to establish the mathematical model. The nonlinearity and multi-resolution characteristics of the morphological pyramid are used to multi-modally process the medical images. The QPSO and Powell algorithms are combined. The layer gets the parameter solution. Substituting the obtained parameter into the high-order B-spline function completes the multimodal medical image elastic registration. Using 50 actual medical images for image registration experiments, the traditional multimodal medical image elastic registration algorithm was used as the control experiment group in the experiment, and the advantages and disadvantages of the algorithm were evaluated from the aspects of image registration accuracy and efficiency. The experimental results show that the improved algorithm has higher accuracy in medical image registration than the traditional image registration algorithm, and the highest precision is up to 97 %, and the accuracy can be maintained stably. For the registration efficiency of medical images, the improved algorithm has higher registration speed, which meets the key requirements of image registration technology in modern medical field, and greatly improves the practicability of the algorithm. The improved multi-modal medical image elastic registration algorithm based on QPSO and Powell algorithm can effectively achieve the registration of high-precision and high-efficiency medical images, and solve the problems that traditional algorithms have been difficult to solve for a long time. The clinical application effect of medical image registration has a good application prospect.

### Acknowledgments

Key laboratory project of microwave light wave application technology in Guangxi (No. MLLAB2016004); Doctoral foundation project of Jiamusi University (No. 22Zb201516).

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## Optimization of Regional Integrated

## Energy System from an Economic Perspective

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The regional integrated energy system (RIES) is becoming increasingly significant in the era of high energy consumption and the environmental issues brought by conventional energy. Since the reform and improvement of energy market and the progressing of related technology of energy, RIES indicates the prospective developing direction and establishes a bridge between the field of demand response and energy supply. In addition, Chinese government also contribute to regulating the energy industry and the sustainable development. In that case, the objective of the paper, based on the factor of response of energy price, is to establish an optimization model for the RIES. Firstly, the paper elaborated the structure of integrated energy system in detail, demonstrating the merits of the system, such as the combination of power, heat and cold supply. In addition, demand response, as an efficient way of adjustment of demand for energy, was also employed in the system. Then, the model of operation cost, model of environment cost and model of system reliability collectively constituted the optimization model with the consideration of constraint conditions, and model solving method was proposed to improve and perfect the model, finally, conducting the simulation to examine the efficiency and feasibility of the model. According to the model, different energy price corresponds to different energy supply, that is, 25 % fluctuation of system cost may be caused by 10 % change of energy price. The paper considered different kinds of factors collectively for operation optimization, according to the results, it shows that the optimization could minimize the operation cost and meanwhile reduce pollutant emissions.

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### Development of Rural PE Teachers in Primary and Middle Schools from the Perspective of General Teacher's Education

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Due to the weak infrastructure of education in rural areas, there have been problems such as unreasonable teacher structure and shortage of education resources. Common

performance is: sports, music, information technology and other subject teacher resource shortage and other problems. Based on this phenomenon, the concept of general subject teachers is gradually implemented. General subject teachers can provide comprehensive courses, and no longer need to be specially staffed, so as to avoid the premature "scientific and technological" problems in primary and secondary schools and improve the comprehensive development and understanding of students. It can be seen that how to improve the physical education of rural primary and secondary schools and the development orientation of physical education teachers are of vital importance in the perspective of general subject education. This paper makes a systematic study on the development of physical education teachers in rural primary and middle schools by using the methods of literature, statistical analysis and summarization. Combined with the general background of the teacher, the increase in policy changes in the physical education teachers in our country were analysed and the development of physical education teachers, and the bottleneck in the development of rural physical education teachers at present stage were analysed, and made some development suggestions to solve these problems, and points out that the rural primary and secondary school physical education teachers should constantly improve their academic skills and good at range, to the direction of "pluripotent one only". The implementation of general teachers is mainly in the rural areas with insufficient teacher resources, and the main target is primary and middle school students. It is because of the lack of resources that disciplines such as sports music art are often neglected, so it is necessary to study this problem. Based on the analysis of the implementation of all the teachers' background, from two aspects of policy development and quantity scale trends are analysed about the present situation of P.E. teachers today, found that the problem of rural primary and secondary school physical education teachers should be: after set up the big sports view, common development, pay attention to professional skills and basic subject theory with practice, strengthen the literary accomplishment, enhance classroom appeal, to achieve "a", better into the ranks of the rural primary and middle school sports teaching.

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### Macroscopic Analysis and Research on the Economic Burden of Acute Myocardial Infarction

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The objective of present study was to investigate the economic burden of acute myocardial infarction disease in China, and to analyse the significance of second-line

prevention of acute myocardial infarction disease, in order to provide reliable information and evidence support for the prevention and control of acute myocardial infarction disease in China. The government statistical report was consulted and the relevant Chinese literature was searched. One hundred patients with acute myocardial infarction in a city hospital were selected as group A, and one hundred patients with acute myocardial infarction in another city hospital were selected as group B, through interviews and the form of the questionnaire was used to investigate the patients with acute myocardial infarction who met the enrolment conditions, and the annual direct medical expenses, direct non-medical expenses, indirect costs and total expenses of patients with acute myocardial infarction in the two places were obtained and compared. Using literature analysis, actual investigation and other means to analyse the economic burden of patients with acute myocardial infarction disease, analyse the impact of various factors on the economic burden, and analyse the most significant factors affecting the economic burden from the macro aspect and pointed out ways to reduce the economic burden of acute myocardial infarction. The economic burden of acute myocardial infarction disease is heavier. The state should take corresponding measures in time to further explore more scientific and effective prevention and control policies suitable for China's national conditions and reduce the economic burden of myocardial infarction diseases.

#### **Acknowledgements**

The research was supported by "the Fundamental Research Funds for the Central Universities of China" (No. 13MS81).

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### **Therapeutic Effect of Piano Music Therapy on Mild Psychiatric Patients**

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Piano music can regulate the nervous system, endocrine system and biochemical metabolism in the body to achieve the effect of treating diseases. The objective was to study the therapeutic effect of piano music therapy on mild psychotic patients and explore new psychotherapy methods. A total of 600 patients with mild psychosis diagnosed by clinicians from 2016 to 2018 were randomly divided into non-music group and music group. 300 patients of non-music group were treated with antipsychotic drugs, 300 patients of music group were treated with antipsychotic drugs and accompanied by piano music therapy for 8 weeks. The patients in the music group and the non-music group were tested with the mental symptom Checklist. The recovery rates of the two groups were compared by T test

and  $\chi^2$  test respectively. The results showed that the scores of the nine factors in the music group are lower than those in the non-music group, and there is a significant difference between the two groups. The recovery rates of music group and non-music group are 60.5 and 30.2 %, respectively. The difference of recovery results is statistically significant ( $p < 0.05$ ). Piano music therapy can effectively improve and relieve the symptoms of mental illness and relieve the emotion of the patients. It has obvious therapeutic effect on the patients with mild mental illness.

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### **Research on Adolescent Health Promotion Mechanism**

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The number of adolescents' students accounts for more than 20% of the national population, and if the youngsters are strong, the nation will get strong. Physical exercise plays a most important role in promoting physical health. The development of physical exercise habits of adolescents' students is crucial. Their healthy growth is directly related to the real realization of the healthy Chinese strategic goals and of the goal of sports powerful nation. By using literature, field research, statistical analysis and other research methods to research both the training of adolescents' physical exercise habits and the guarantee of school sports mechanism Review relevant information at home and abroad, comprehensively analyse the situation of Chinese adolescents' physical health, to learn from the American adolescents' physical exercise habits training mechanism, then conduct an argumentation and analysis on the school physical education to promote the physical health mechanism of adolescents, we finally propose the reform direction of the school sports mechanism in China at this stage. As to increase the time of adolescent physical exercise activities and cultivating their sports habits, the school has unique advantages. American sports culture plays a vital role in the development of adolescent sports habits. The extracurricular time is mainly participated in sports activities, which cultivates children's sports interests and discovers children's sports talents. The learning task of adolescent in China is very heavy. Schools and families are both very concerned about their children's academic performance, which seriously affects their physical and mental health. The adolescent health promotion mechanism needs to be further improved, and the related researching and guidance of school sports, social sports and competitive sports should be strengthened to provide a broad space for the development of adolescent sports.



## Detection Technology of Pathogenic Bacteria in Middle-aged and Elderly Smog Weather Respiratory Tract Infection based on Meteorological Data Analysis

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The haze weather is very likely to cause respiratory diseases in the human body. Cough, sneezing and runny nose are the main symptoms. At the same time, respiratory tract infection is a common and frequently-occurring disease in middle-aged and elderly people. To understand the common pathogens of respiratory infection in middle-aged and elderly people, it is based on meteorological data analysis, the detection technology of pathogenic bacteria in respiratory tract infection in middle-aged and old smog weather. Through the analysis of the five-year measured meteorological data of a typical city, DesignBuilder software and EnergyPlus software were used to study the smog levels of different cities in different heating periods, such as different heating and air-conditioning calculation periods, and the total experiment under different smog levels. The time lasted for 1 year. At different times, the sputum and respiratory secretions of 70 middle-aged and elderly patients with respiratory tract infections affected by smog weather were selected, and bacterial culture was carried out. The bacteria were identified by VITEK-60 automatic bacteria identification instrument. 367 cases of sputum or pharyngeal secretions were collected. A total of 213 strains of pathogens were isolated from 367 cases of sputum or pharyngeal secretions, and 198 strains were more severely smog. The most common pathogens of respiratory infections are *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa* and *Acinetobacter baumannii*, accounting for 66.5 %. At the same time, 12 strains of fungi were isolated. The different pathogens detected are related to the inhalable particles and sulphur dioxide in the haze. *Staphylococcus epidermidis*, group A *Streptococci*, *Streptococcus pneumoniae*, *Staphylococcus aureus*, *Klebsiella pneumoniae* and *Escherichia coli* are common pathogens in elderly respiratory infections. Pollutants such as respirable particles and sulphur dioxide in foggy days are the main factors that induce respiratory infections such as asthma and chronic bronchitis.

### Acknowledgments

Shandong Provincial Natural Science Foundation, China (Project No. ZR2015FL032); Project of Shandong Province Higher Educational Science and Technology Program, China (Project No. J13LN84); PhD research foundation of

Linyi University, China (Project No. LYDX2015BS022).

## Lewis Lung Carcinoma Allograft Efficacy Test Outcomes may be Confounded by Variable Inoculum Viability

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Lewis lung carcinoma (LLC) is a tumor discovered by Margaret R. Lewis of the Wistar Institute in 1951. This tumor originated spontaneously as a carcinoma of the lung of a C57BL mouse. The LLC line is a well-established mouse cancer model that is commonly used as a transplantable malignancy model in syngeneic C57BL/6 mice for economical preclinical anti-cancer efficacy testing. The allograft model has been used in over 1000 studies by PubMed searching. However, in our recent work, LLC cells harvested by trypsinization and resuspended in PBS and held on ice rapidly lost viability before inoculation to mice. Our objective in this work is to determine best possible preparation procedures of LLC cells for the mouse tumor model. The LLC cell line was purchased from the ATCC (CRL-1642TM) and cultured in DMEM supplemented with 10% FBS. Female C57BL/6 mice (14 weeks of age) from our breeding colony in TTUHSC Animal Facility with IACUC approved protocol. For allograft assay,  $2 \times 10^4$  LLC cells (collected by trypsinization or mechanical detachment) were inoculated subcutaneously in 100  $\mu$ l PBS into the right flank (dorsal side) of each mouse. We found that the viability of LLC cells was highest in complete medium, followed by serum-free medium+Matrigel and lowest in PBS in a time-dependent manner. The average viability of LLC cells was about 80% at 1 h after re-suspension in PBS, 70% after 2 h and 48% after 3 h. PBS from 3 vendors showed the same viability loss. Cells collected without trypsinization stayed as aggregates but with improved viability in PBS. However, it is difficult to count the accurate cell numbers for consistent inoculation. Animal experiments with  $2 \times 10^4$  cells confirmed that cells harvested without trypsin had higher tumor take than those with trypsin. LLC cells harvested without trypsin improved viability in PBS. Re-suspension in serum-free medium+Matrigel (1:1) of LLC cells harvested by trypsin

(37°C for 2.5 min) slowed viability loss. Our data highlight the importance of cell harvesting details in assuring reliable efficacy testing.

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## Multi-Emotional Medicine Colour Design Expert System Based On GT and NSGA-II

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Colour is one of the important indicators for patients to choose medicine, different medicine colour can bring different emotional experiences to patients. So, how to accurately grasp patients' multi-emotional demands and effectively convert them into medicine colour is especially important. Therefore, this paper develops a multi-emotional medicine colour design expert system. Patients' image perception space was collected, which exist in different emotional dimensions, by using factor analysis (FA) and semantic differential (SD). And then use grey theory (GT) to establish a multi-dimensional emotional medicine colour image evaluation model. Non-dominated sorting genetic algorithm-II (NSGA-II) was used to optimize and design the multi-emotional medicine colour schemes. Furthermore, according to actual condition, a multi-emotional medicine colour design system is established based on the proposed method. The results of the case shows that the proposed method effectively avoids the problem that it is easy to lose the optimal solution caused by the transforming multi-objective functions into a single objective function, which makes it difficult to meet the real emotional requirements of patients. A multi-emotional medicine colour design system that can meet the complex and varied emotional requirements of patients has been established, which greatly improves the theoretical significance and the applicability of practical engineering design of medicine colour design.

### Acknowledgements

This research is supported by the National Natural Science Foundation of China (Grand No. 51575158) and Hebei province natural science foundation of China (Grand No. E2016202058).

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## Reconstruction of Chinese Compulsory Health and Physical Education Curriculum System in Primary School from the Perspective of Humanism

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The promotion of adolescent physical health has always been the focus topic of the country and the public. Since entering the 21st century, in China's comprehensive national strength increasing, improve people's living standard, under the historical background of Chinese children and adolescents' health has gone from bad to worse, the reason is the Chinese compulsory education stage primary schools to implement the health and physical education curriculum, as a school principal means to promote the development of children and adolescents to fitness, failed to play a proper role, so layered classification science, systematic reconstruction stage of compulsory education of health and physical education curriculum content is particularly important, and finally accelerate the development of the child and adolescent health of body and mind. This study adopted the methods of literature, expert interview, mathematical statistics and questionnaire survey. This paper makes a mathematical analysis of the disadvantages of the curriculum setting of health and physical education courses in the stage of education in China in four aspects: the number of weekly periods, the single teaching content, the unreasonable distribution of time periods and the poor teaching organization. Five provincial capital in central China in China 25 key primary school health and physical education curriculum teaching situation in within the scope of the questionnaire, questionnaires to the teachers and students groups respectively, recycling effective questionnaire to 91 % of the total number of questionnaires, the questionnaire covered the survey in more than 50 % of the total number of school physical education teachers and students, through the content validity and heavy test, inspection, questionnaire is reliable and effective. To influence Chinese compulsory education of primary school children and adolescents of physical development, cognitive development, social interaction, psychological feelings and a detailed analysis of the related factors for the development of motor skills, to rebuild China's compulsory education elementary school health and physical education curriculum system provides the theory basis for the pyramid structure model, promote the physical health coordination, scientific and sustainable development. China compulsory education elementary school health and physical education curriculum system of pyramid structure model is a stable triangular pyramid structure, the structure within the movement patterns, motor skills, physical health three modules of platform, the platform internal coordination between all the elements or not will directly influence the development of adolescent physical health sustained, comprehensive. Establish student movement ability oriented teaching mode, promote their active participation in physical activity, sets up the concept

of lifelong physical training, guide the elementary school health and physical education curriculum value concept from utilitarian functionalism, and change from education standards to the flexible teaching, so as to improve Chinese children and adolescents' health.

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## Ultrasonic-Assisted Extraction of Pectin from Pitaya Peels

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Pectin can be used as both a food additive for food processing and an excipient for pharmaceutical preparations for pharmaceutical use. This study aimed to extract pectin from pitaya peel and optimize the extraction process. Pectin was extracted from pitaya peel by ultrasonic-assisted method. With mono-factor and orthogonal experiments, the extraction processing conditions were optimized. Optimal extraction conditions of pectin from pitaya peel were as follows: pH 2.5, liquid-material ratio of 8:1, heating time of 6 minutes and ethanol of 60% volume fraction. Under such conditions, the extraction rate of pitaya peel pectin was 2.15 %. Pitaya peel is rich in pectin. Under ultrasonic cavitation and thermal action, pericarpic cells are damaged, which greatly improves the pectin extraction rate. Pectin methyl esterification of pitaya peel needs to be further analysed.

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## The Dilemma and Dissolution of the Implementation of National Fitness Strategy

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The national fitness strategy is an effective guarantee for achieving the goal of healthy China. In 2014, the national fitness program was upgraded to a national strategy, aiming to strengthen the national fitness awareness and promote the health of the whole people. As China's public sports facilities are still in the process of further improvement, the basic conditions such as the national fitness venue cannot meet the fitness needs of people, and the scientific orientation of fitness guidance needs to be further improved. To provide suggestions for the dilemma of the national fitness, in order to provide a theoretical reference for the

implementation of the national fitness strategy. With using literature, field investigation, discussion and analysis and other research methods, that comprehensively analyses and evaluates the current national fitness situation in China. Review the national fitness materials released by various provinces and cities, visit the status quo of the national fitness development in the economically underdeveloped areas, and analyse the basic situation of the national fitness since the national fitness program in China has risen to the national strategy. Understand the needs and conditions of the national fitness, and provide suggestions and countermeasures for people's fitness needs. Due to China's vast territory and uneven economic development, the pace of implementation of the national fitness program is not uniform. In the economically developed areas, the national fitness is better developed, and fitness guidance and fitness venues can basically guarantee the fitness needs of people in the region. People in economically underdeveloped areas are still relatively backward, and their fitness awareness is relatively weak. Local governments have limited investment in sports and fitness, and various propaganda and people's ability to accept them are not equal, which limits the development of national fitness in economically underdeveloped areas. The state should pay attention to the investment of national fitness funds in economically underdeveloped areas, strengthen publicity, focus on enhancing people's fitness awareness, and take measures to promote balanced development in all regions. The improvement of the national people's fitness awareness is the basic condition of the national fitness strategy. The health of all people is an important embodiment of healthy China.

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## Citizen's Physical Health Evaluation under the Background of "Healthy China 2030"

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Citizens' physical health problem gradually become one of the important factors that influence the national comprehensive strength in the future, under the circumstances of current social development, realize the comprehensive well-off and accelerating socialist modernization construction, should first will be involved in the process of social development and the industrial development of urbanization, the aging of the population health issues as an important direction of research and solve. By using the analytic hierarchy process (AHP), a comprehensive evaluation model for the monitoring of citizens' physique was constructed to evaluate the citizens'

physique before and after the social organization reform of sports in the new era. Based on the evaluation of citizens' physical health, this paper puts forward corresponding Suggestions on the management and operation mode of sports social organizations, and promotes the development concept of national fitness and "sports power". The analytic hierarchy process (AHP) combines expert evaluation opinion and traditional rational cognition, and determines the weight value through scientific calculation model, and multiplies the final weight value with corresponding data to determine the final evaluation value. Taking the above index system as the influencing factor of the evaluation model, the judgment matrix of mutual comparison is constructed according to the value corresponding to its importance and the eigenvector and the maximum eigenvalue are calculated. Through to the "healthy China 2030" strategic goal for this paper, combined with the citizen health development goal and the significance, in the world recognized in the strategic planning of health suggests that the health level and the influencing factors of health, a sound service system, and citizens' health care four aspects, for the social, personal, and sports undertakings in the economic and political construction makes the corresponding guiding suggestion, citizen's health and perfect the system of sports key task.

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## College Sports Service Complex Supply Platform Planning Report

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Nowadays, most universities, especially those with sports majors, have their own sports centers or gymnasiums. With the continuous improvement of China's national fitness social demand, the social service function of college physical fitness needs to be further improved and optimized. On the one hand, this research can solve the demand of innovation and entrepreneurship of college students and improve the third class. On the other hand, it can also improve the service function of the sports venues on campus, and alleviate the shortage of human resources and fund input in the stadiums. In order to do a good job in the project, we have collected a large amount of literature and materials related to the study in the early stage, and conducted field research in Wuhan, Shanghai and other places to have an in-depth understanding of the development history, development status and local and surrounding social needs of college sports venues. To establish an operation and management mode that is suitable for the characteristics of college sports service complex, in line with the development law of the industry and the level of local economic and social development, and

can give full play to the efficiency of sports service complex. Sports complex services to highlight the service function of colleges and universities, earnestly implement the national, provincial and the school sports facilities open, service, security and security management rules, actively carry out site open, health services, competition performance, sports training, physical fitness monitoring, exercise guidance, sports management services such as health management. College sports service complex should plan the business structure, service project and business model as a whole to improve the ability of sustainable management. Build an intelligent sports service complex platform and gradually form an ecological chain of sports service complex development. "College sports complex supply service platform" project is the undergraduate student team under the guidance of tutor, for entrepreneurial training, team of students in the process of project implementation and different role, through the preparation of a business plan, feasibility study, simulation enterprise operation, to a certain degree of validation test, writing a business report. This project result has the extension and the demonstration.

### Acknowledgements

2018 national college Students' innovation and entrepreneurship training program project: college sports service complex supply platform. (Grand No. 201810514027).

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## Public Health Status and Strategies in the Internet Era

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With the rapid development of computer and communication technology and people's extensive use of the Internet, the network has gradually become the sign and feature of The Times, and the network has increasingly deepened its influence on social culture and people's way of life. At the same time, it has also exerted a profound influence on the realization of the public health in healthy China. The youth of contemporary China grew up in the network environment, and our previous generation is catching up with the pace of this era, and our next generation will continue to be branded as the era. It is worth thinking about how to perform our public health in the Internet age, and how to find the scientific and best way to exercise and realize the public health of the whole people in the Internet age. This paper makes a systematic study of related problems by using research methods such as literature, experience summary and logical analysis. In the study, the basic characteristics of the Internet age were

summarized and sorted out, and the current situation of national fitness in contemporary society was analysed. It also analyses the present situation of the public health and the ways of national fitness in the Internet era. From the perspective of physical fitness, this paper explains how to make full use of the favourable conditions in the Internet era to promote national health, and proposes the following strategies for this. In modern society, people's fitness mode is traditionally single, the fitness space is limited, and the fitness effect is not significant. Main strategies: establish a database, collect various domestic and foreign information on healthy diet and exercise methods, and establish a relatively complete sports database; Standardize network management and effectively classify websites; Establish an Internet platform to comprehensively monitor health conditions; Give full play to the role of fitness APP, and timely feedback of their physical conditions. It is hoped that the above strategies can effectively improve the current status of national fitness and promote national health.

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### **Clinical Study on Treatment of Cerebral Hemorrhages with Chinese Herbs for Promoting Blood Circulation**

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To study the clinical effect of Chinese herbs for promoting blood circulation and removing blood stasis in treating cerebral haemorrhage. A total of 126 patients with cerebral haemorrhage who were treated between October 2016 and October 2018 were enrolled. The patients with cerebral haemorrhage were randomly divided into two groups, the observation group and the comparison group. Each group is with 63 patients. No additional treatment was given to the comparison group, but only regular Western medicine treatment and care. The observation group was treated with traditional Chinese medicine soup for promoting blood circulation and removing blood stasis on the basis of conventional western medicine treatment and nursing. Among them, Traditional Chinese medicine ingredients mainly include *Panax notoginseng* 12 g, *Rheum palmatum* 12 g, *Ligusticum chuanxiong* hort 10 g, *Radix Paeoniae Rubra* 12 g, *Carthamus tinctorius* 10 g, Cattail pollen 10 g, Water ox horn 30 g, borneol 0.1 g, and made the Chinese herbs into medicinal soup for treatment in patients in the observation group. The treatment cycle was set to two weeks. After two weeks, the clinical effects, neurological deficits and survival skills of the observation group and the comparison group were scored, and the scores were analysed. According to the results analysis, the scores of

brain neurological deficits in the observation group were much lower than those in the comparison group. The recovery efficiency of the observation group patients was much higher than that of the comparison group, and the recovery of life ability was faster. In the treatment of patients with cerebral haemorrhage, adding Chinese herbs for promoting blood circulation and removing blood stasis can effectively alleviate the patient's condition and reduce the incidence rate, and can greatly improve their recovery rate, strengthen the therapeutic effect. It has significant clinical effects.

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### **Evaluation of Pricing for Hepatitis C Virus Infection Drugs Based On Factor Analysis**

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The pricing of hepatitis C virus infection drugs is affected by market fluctuations and drug cost variations. In order to improve the rationality of pricing, drug pricing rationality assessment modelling is carried out. A rationality assessment model for pricing of hepatitis C virus infection drugs was proposed based on factor analysis. With pharmaceutical cost of hepatitis C virus infection drugs, profitability of market sales, demand on the supply side, and medical insurance policy as the constraint indexes, fuzzy decision-making model for pricing rationality assessment was constructed. Quantitative regression analysis method was adopted for decision-making optimization control of pricing for hepatitis C virus infection drugs to obtain quantitative decision-making correlation factor of rational drug pricing. Rationality assessment of pricing for hepatitis C virus infection drug was made using factor comprehensive analysis method and binary Hausman test statistical model was built for robustness test of pricing rationality. With SPSS19.0 statistical analysis software as a tool, empirical analysis of drug pricing rationality was made by combining measured sample data. The model can effectively predict the reasonable confidence interval of pricing, pricing rationality assessment carries high significance, and the robustness test output has a significant correlation level of 10%, so the pricing prediction accuracy is higher than that of traditional method. This model can effectively implement rationality assessment of drug pricing and provide data reference for the pricing of hepatitis C virus infection drugs.

#### **Acknowledgements**

Humanities and Social Sciences Foundation of the Ministry

of Education “Long-term executive compensation incentive in non-listed state-owned enterprises in China: based on multi-objective principal-agent model” (project number: 13YJA630053).

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## **Influence of Cartoon Image Design on the Emotion of Autistic Children**

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The primary objective is to improve therapeutic effect on autistic children, the influence of cartoon image design on the emotion of autistic children was analysed by combining statistical analysis methods. A quantitative analysis model on the intervention effect of cartoon image design on the emotion of autistic children was proposed based on statistical analysis of group sample detection. The autistic children received phased group test using cartoon image design intervention method. After the intervention, analysis of the intervention effect was made on the collected data using statistical regression analysis and computer simulation, and linear fitting was carried out on the statistical data of emotional impact on autistic children using least square fitting method to construct sample statistical regression analysis model. The sample data of the intervention was subjected to group test and clustering fusion using support vector machine learning method. The association rule characteristic quantity was extracted for the influence of cartoon image design on the emotion of autistic children. The extracted characteristic quantity was adaptively learned by group sample detection statistical method to make quantitative assessment of the influence of cartoon image design on the emotion of autistic children. Using SPSS 13.0 statistical software, intervention effect was analysed with significant difference characteristics as statistical quantity. The research shows that cartoon image design exerts significant intervention effect on the emotion of autistic children. Through staged cartoon image design intervention, autistic children's emotions can be effectively adjusted to improve treatment effect.

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## **Microwave-assisted Extraction of Radix Puerariae Flavonoids**

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*Radix puerariae* (Pueraria root) is a food rich in starch. Pueraria root is also rich in flavonoids and is a type of traditional Chinese medicine. This paper aimed to study the extraction processing of blueberry flavonoids so as to lay a foundation for the future study on biological activity of Pueraria root flavonoids. Pueraria root flavonoids were extracted by the microwave-assisted alcohol extraction method and the flavonoids content was measured by UV/Vis spectrophotometry. With mono-factor and orthogonal experiments, the extraction processing conditions of Pueraria root flavonoids were optimized. Optimal extraction processing parameters of Pueraria root flavonoids were as follows: extraction temperature of 80°, ethanol of 60% volume fraction, microwave (power: 200 W) assisted extraction time of 15 minutes and material-liquid ratio of 1:40. Under such extraction processing conditions, extraction rate of Pueraria root flavonoids was up to 3.56%. The microwave-assisted method is an effective method for extracting flavonoids. Microwave treatment results in destruction of parenchyma cells and increase in specific surface area and water absorbing capacity of cells, so that flavonoid extraction can be in sufficient reaction, which can largely shorten the extraction time and improve the extraction rate of flavonoids.

### **Acknowledgments**

This work is financially supported by the Guangxi Natural Science Fund (Grant No.2016GXNSFBA380073) and the research program of science at universities of Guangxi autonomous region (NO. 2016YB250).

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## **Feature Extraction Method for Retinopathy Fundus Image Based on Random Forest**

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The objective of the present work is to improve the treatment effect of retinopathy, image feature extraction method was employed to analyse retinopathy fundus image and guide the treatment of retinopathy. Feature extraction method for retinopathy fundus image was proposed based on random forest. Wavelet analysis was used to filter fundus image of blurred retinopathy, and edge contour feature points of fundus image of blurred retinopathy were extracted. Information enhancement processing of retinopathy fundus image was performed using edge contour detection method. Combining template matching technology, similarity feature extraction of retinopathy

fundus image was performed. The grey histogram of the image was constructed with the extracted similarity feature as training sample set. The random forest learning method was adopted for image feature extraction and classification recognition to realize classification detection of retinal fundus image and automatic recognition of the lesion feature. The simulation test shows that feature extraction of retinopathy fundus image using this method demonstrates good automatic matching, and image feature extraction demonstrates strong learning convergence, which improves classification and diagnosis of retinopathy information. Combining computer vision analysis technology, application of the algorithm to the diagnosis of retinopathy means good medical diagnosis significance.

#### Acknowledgements

The Third Period of Jiangsu Province Vocational Education Teaching Reform Research Topics (ZYB276).

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### Nutrition and Exercise Intervention in Health Promotion of College Students in Pearl River Delta

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The pearl river delta is China's relatively developed areas such as economy, society and culture, study the pearl river delta region college students health and life behaviour, nutrition and extracurricular physical exercise, and their influence on health and physical fitness, subsequently for exercise with the diet intervention experiment, to investigate the effect of exercise and nutrition intervention, has a strong theoretical and practical significance. Questionnaire survey, intervention experiment, statistics and analysis were used in this study. Five comprehensive universities in the pearl river delta region (Guangdong university of finance and economics, Huizhou college, Zhaoqing college, Beijing normal university, Zhuhai campus and Shenzhen university) were selected to conduct questionnaire survey and physical fitness test on 2,640 college students, and 267 college students in Zhuhai campus of Beijing normal university were selected for the intervention experiment during the intervention stage. The standardized score of "exercise" dimension was the lowest in the standardized score of college students' health lifestyle self-assessment. Nutrition K, A and P score every time, exercise intensity, think that physical exercise on the importance of the person's overall health, during the period of school each week except (PE) often take part in physical exercise, the more willing to take part in physical exercise, now attitude towards extracurricular physical exercise and A healthy lifestyle since the total score of evaluation as well

as physique health score was positively related to the indicators. Healthy lifestyle self-assessment indicators score before and after intervention in comparison analysis found that after intervention group (movement+nutrition) except the dimension of health risk behaviour, the rest each dimension scores are statistically significant in the control group (nutrition) behaviour in addition to health risk behaviours, health responsibility and law life behaviour dimensions outside the rest each dimension score, are statistically significant in the control group (movement) in addition to appreciate life behaviour, health risk behaviours, health responsibility behaviour, diet behaviour and life behaviour rule dimensions outside the rest each dimension scores were statistically significant. In addition to the dimension of regular life behaviour, there were statistically significant differences between the intervention group (exercise+nutrition) and the control group (nutrition), the control group (exercise) and the blank group. After intervention and before intervention, the control analysis was conducted. The scores of all indexes except BMI were statistically different in the intervention group (exercise+nutrition), while the scores of vital capacity and body mass index and standing long jump were statistically different in the control group (exercise). After the intervention experiment, the physical fitness evaluation indexes of each group were compared, and the scores of other indexes were statistically different among all groups except the vital capacity body mass index score. The difference between the weight index score of grip strength and the score of standing long jump was found between the intervention group and the control group (nutrition) and the blank group. The score of the intervention group was higher than that of the control group (nutrition) and the blank group, but there was no significant difference from the control group (exercise). College students had lower scores in self-evaluation of healthy lifestyle, among which exercise score was the lowest. The scores of nutrition knowledge of college students are relatively low, and most students have good nutrition attitudes, but the motivation of behaviour is insufficient, resulting in the lowest scores of nutrition behaviour. College students with good status of extracurricular physical exercise have higher self-evaluation of healthy lifestyle. In addition to the health hazard behaviour dimension, the intervention measures combining exercise and nutrition have a positive effect on the healthy life style of college students, and the effect of improving step experiment, vital capacity BMI, grip strength BMI and standing long jump is more significant.

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### Optical fibre Ultrasonic Acoustic Sensing Technology for Medical Ultrasonic Equipment Detection

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The acoustic field change of medical ultrasonic equipment can be measured by optical fibre ultrasonic sensing technology, which can improve the monitoring quality of medical ultrasonic equipment. The designed fibre optic ultrasonic sensor is of a small volume, flexible installation, high sensitivity, non-contact monitoring, antielectron magnetic interference and so on. The temperature stable fibre optic ultrasonic sensor can effectively avoid the impact of temperature variation on the measurement accuracy of medical ultrasonic equipment. To ensure the quality of medical ultrasonic equipment, the phase-adjustable phase plane structure of optical fibre ultrasonic sensor is designed, the ultrasonic temperature stability mechanism is established, the ultrasonic information is detected by two-dimensional spatial light modulation principle and then the acoustic intensity, frequency and other characteristic parameters of medical equipment are determined in the working process. Experimental results show that the sensitivity of the sensor is 196 mV/MPa. Due to the low temperature cross interference of the designed fibre optic ultrasonic sensor, it can be widely used in ultrasonic measurement of medical devices in the future.

#### Acknowledgements

This research was supported by the national project cultivating fund (GJJKTPY2018K3) and the campus science and technology innovation team (CXTD2017K3).

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### Efficiency Evaluation of Chinese Digital Game Design Art Enterprises Based on Three-stage DEA Model

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In the age of knowledge economy, digital game design art industry plays a significant role in GDP contribution, production scale and international trade cooperation. According to Wind, 40.15 % of the listed enterprises in China's digital game design and art industry suffer negative net margin growth. The most probable reason is the low input-output efficiency of the industry. The three-stage DEA model was proposed by Fried (2002). This method has

been widely used in many fields, for instance, bank efficiency, regional innovation efficiency, resource and environmental efficiency. The paper takes the listed companies of digital game design art in China as the research object, among which 63 enterprises were finally chosen as the research sample. The paper evaluates the operating performance of listed companies through three-stage Meta-Frontier DEA model, and eliminates environmental variables and random errors with the help of common boundary model. In the selection of variables, the paper chooses input indicators such as the employment, total assets and main business cost, output indicators such as main business income, return on net assets and total profit, as well as environmental variables including the listing time of enterprises, the level of regional economic development, the support of regional government and the education level of regional population. The study found that in the first stage, the overall operating performance of listed companies was at a relatively good level, and there was no significant difference among the three efficiency values, which are comprehensive technical efficiency, pure technical efficiency and scale efficiency. In the second stage, the time of listing has a significant negative correlation with the slack value of employees' salary, and weakly positive correlation with the total assets slack value. Per capita GDP presents a notable positive correlation with salaries payable and total assets relaxation. In the third stage, the comprehensive technical efficiency value is reduced by 0.013, the pure technical efficiency value is increased by 0.028, and the scale efficiency is reduced by 0.056. Therefore, environmental factors and random errors do have a notable impact on the performance of digital game design art enterprises. The main reasons are as follows: a large amount of resources are injected in the early stage of industrial development, leading to redundancy of investment and waste of resources; lagging of prophase R&D investment results in low technical efficiency in the current period; lack of long-term strategic vision, blindly follow-up imitation, absence of creativity in products, bringing about low overall efficiency; be short of advanced technology and high-end creative talents.

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### Dynamic Vehicle Routing Problem with Stochastic Requirements Based on Quantum Ant Colony Algorithm

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The mathematical model of DVRP with stochastic demand can be described as consisting of 1 distribution centre and L known customer points, dispatched K vehicles to serve L customer points, K vehicles start from the distribution



centre, and then return to the distribution centre after the delivery task. K vehicles are all the same type, with the same capacity of vehicle Q. This paper studies the problem of dynamic vehicle routing based with stochastic demand, two-stage modelling is adopted to minimize the cost and maximize customer satisfaction and a quantum ant colony algorithm is proposed to solve the dynamic vehicle routing problem with stochastic demand. Meanwhile, two phase model is built to transform the DVRP into a static VRP. Considering the satisfaction of customers to logistics distribution, the fuzzy membership function is introduced in this paper. During the pheromone update, there are more and more quantum pheromone on the path that the ant passes through, as the ant has not passed the path as the quantum pheromone volatilized, the quantum pheromone left on the path will be less and less, it will lead to the increasing difference between the different edge quantum pheromones, which can easily fall into local optimum. The quantum pheromone updating strategy designed in this paper will increase with the path constructed by ants, and the amount of quantum pheromones will gradually decrease, so as to avoid the problem of too much pheromone accumulating on one edge leading to a local optimum. Quantum algorithm is a hot spot of research in recent years. Because of its superior coding method, the algorithm can simultaneously express the superposition of multiple states, it has been proved that the algorithm has obvious advantages in solving combinatorial optimization problems. In this paper, we combine the quantum algorithm with the ant colony algorithm and use the improved quantum ant colony algorithm (QACO) to solve the DVRP with the stochastic demand. The quantum theory is combined with the ant colony algorithm, Quantum Gate is instead of the traditional quantum revolving door to update the ant colony. Using MATLAB to simulate the data, it is proved that the improved quantum ant colony algorithm is one of the effective methods to solve this problem. The simulation experiment is used to verify the feasibility and effectiveness of the improved quantum ant colony algorithm with the help of Matlab7.0. In this paper, a distribution centre coordinates (300,270), 14 static customer points, 4 dynamic customer points as an example, the distribution area is a square area of 450x450 (square kilometer). Re-scheduling cycle is 1 h. The simulation of dynamic vehicle routing problem with random demand is carried out. Conclusions: In this paper, we propose to combine quantum computation with ant colony algorithm to solve the DVRP problem with stochastic demand. The pheromone on each path is encoded by qubit, adopt gate to update the quantum ant colony. In order to avoid the local optimization of the search, the pheromone updating equation is improved. Using the re-scheduling judgment formula to deal with the new customer point problem. Finally, the MATLAB simulation experiment is carried out, the effectiveness of the algorithm in solving the dynamic vehicle routing problem with stochastic demand is verified.

## Acknowledgements

This work is partially supported by Project supported by the Social Science planning fund of Dalian City (2018dlskyb101), China Postdoctoral Science Foundation funded Project (2017M611231) and the Natural scientific research fund of Liaoning Province (20180550499).

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## Health Scoring Model Based on Mathematical Model

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As the pace of life in modern society speeds up and the pressure of life and work increases, it is particularly important to have a healthy body. But there are many criteria to judge health. Which criteria should we use to judge whether a body is healthy or not, and how? The world health organization gives the following ten health criteria. Moreover, health standards have different requirements for people of different ages and genders. Therefore, how to quantify these criteria to evaluate a person's health status is a difficult problem. Therefore, we use mathematical knowledge to build the relevant mathematical model to try to solve the following three problems: problem 1: according to different age groups, the corresponding health scoring model is established. A reasonable evaluation index system can be obtained according to the 10 health standards given by the world health organization, and then some questionnaires are conducted for health experts to obtain the data needed for the study. Then we preliminarily determine the rough weight of 10 indicators by the expert ranking method, and finally obtain the weight of 10 indicators in different age groups by the three-step method of logarithmic weighting and matrix setting. Next, we establish detailed scoring rules for these 10 indicators so that each indicator can be scored. The weighted total score of body states can be obtained by using the health scoring model we established. So by weighting the total score, get their own state of health. Problem 2: according to the model, make a reasonable schedule for each age stage. As these 10 indicators have grey correlation, they can be divided into mental health and physical health by analytic hierarchy process (ahp). Then, according to the model established in question 1, the weight of each health standard for people of different age groups is different. We designed reasonable health plans for each age group from aspects of exercise, diet, life and rest, etc. Question 3: according to the model, the health of members of a specific group and their families are graded, and the actual situation is combined to explain whether the health plan is appropriate and feasible. First, the health score model derived from question 1 was converted into a simple questionnaire, which was then distributed to a specific group of members and their

families for filling. Through the analysis of the recovered questionnaires, it is concluded that the health model of the group is effective and the health plan is feasible. Through to solve three problems, health evaluation model is established, and the reference model of each index score below details to give oneself grade, and then combined with the weight of corresponding age calculate a score, it is concluded that their health status, to adjust their schedules and improve your life habit, improve the efficiency of the work quality of life.

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## **Internet Plus Is an Innovative Model for the Healthy Development of the Elderly**

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In 2015, China's population aged 60 and above reached 222 million, accounting for 16.15 percent of the total population. It is estimated that by 2020, the aging level will reach 17.17%. By 2025, the number of people over the age of 60 will reach 300 million, making China a super aged country. By 2035, China will have 400 million elderly people, or one in three. The phenomenon of population aging is becoming more and more serious. The aging of the population is becoming more and more serious, which not only brings serious financial burden to the government, but also makes the children face the double pressure of work and life. With the aging and senility, the supply and demand of the aged are badly mismatched. In old age, the physiological function declines, the organ reserve ability gradually weakens, the ability to adapt to the environment declines, and various chronic degenerative diseases are easy to appear. In addition, the elderly have an urgent need for medical rehabilitation products and services due to their large psychological fluctuations and instability. 2017 national ministries and points out that assistive devices transformation of scientific and technological achievements to promote rehabilitation and sharing application as the breakthrough point, take full advantage of the mobile Internet, cloud computing, big data and a series of the development of emerging technologies, build "assistive devices" Internet + rehabilitation service mode, in the family, the community, pension institutions, welfare institutions to carry out application demonstration, realizes the rehabilitation auxiliary equipment service mode innovation and technology innovation, product innovation, industrial innovation, the coordinated development of management innovation, make innovation resources and elements together effectively and the depth of cooperation. Through in-depth investigation and comprehensive evaluation, this paper studies how to use B2B and O2H modes to realize the combined chain cooperation mode of

brick-store - online platform - storage base point - accurate adaptation. AISAS model in the Internet era fits the personalized needs of the elderly. Through the optimization of the platform function system and the network research of technology construction, simplify the management and service workflow, improve the efficiency of the management of auxiliary tools, and improve the quality of service. The results show that compensation can improve the elderly's activity function and social participation ability. Promote the development of healthy aging industry and realize recycling+sharing for the aged; Enhance the life safety of the elderly, to create a good atmosphere of respect for the elderly; the operation mode of the innovative social enterprise, promote the development of the elderly services. Project aiming at solving social problems, both business and non-profit, to achieve the elderly can increase empowerment, in addition to restore the old body function for, pay more attention to the dignity and well-being of the elderly, with a more humanized idea, promote the development of the elderly services. While spreading the spirit of public welfare, it also drives the development of employment and promotes sustainable economic growth.

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## **Fitness for All, under the Internet+Sharing Fitness Model**

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As the traditional growth model cannot be sustained, new areas of growth need to be fostered. The sharing economy is an area that deserves our attention. Make full use of the huge market demand of the Internet + national fitness craze, make full use of the economic effect of supply and demand, and meet the customers' prohibitive demand for fitness. At the same time, help people make full use of resources and realize multi-benefits. Convenient service public life, advocate the new era of national fitness. "Internet+Shared health" is a brand new fitness solution. At the present stage, China's fitness and entertainment market presents diversified characteristics, mainly including national fitness and sports venues, special leisure sports and entertainment department, aerobic sports and fitness centre, etc. Using the analysis method of micro-market economy, from the perspective of quantity, the market is in short supply due to the dramatic expansion of people's demand for fitness, which will stimulate the growth and development of this industry market. In the society, 60 percent of people accept the gym, which is a high proportion, but most people are discouraged because of their financial ability. It can be seen that Shared fitness is a potential market in the society. And because of busy work, most people who have already signed up for a gym membership do not have time to go to

the gym every day. The consumption frequency of most student gyms is about 3 times a week, or even less. The consumption time is generally in 30-60 minutes. Gyms are hard to manage their members and difficult to expand their profit margins in the consumer market. Potential customers suffer from capital problems; Cardholders suffer from wasting too much money to get a card and not making full use of the resulting economic losses. "Internet + Shared health" turns disadvantages into market advantages and builds a platform for potential customers, cardholders and gyms to maximize their benefits. "Internet + health" is a new fitness solution. This project adopts the method of combination of qualitative and quantitative analysis, takes the health personnel who often participate in the student groups and communities as the objects, makes scientific statistics on the collected data, demonstrates the feasibility and necessity of the project, Bridges the fitness resources and fitness needs in the mobile terminal, and tries to establish an Internet+sharing national fitness model. "Internet+health" aims to realize the infinite cycle of supply and demand on the platform, take credit limit as a new breakthrough, solve the drawbacks of bundling Shared deposit, and realize the maximization of multiple interests. Set up Internet+sharing fitness card replacement service in gyms around the school; In each gym has opened a Shared fitness card replacement service, expand the market, so that the Internet + Shared fitness become a synonym for the new concept; Radiate the whole country and create new fitness solutions. In recent years, we will take sharing bicycle as the blueprint of development, establish an Internet + sharing national fitness service for college students, and better meet people's growing fitness needs. "Internet + health" Shared fitness, based on the background of The Times, hopes to create a "zero burden" Shared fitness for all. To provide a platform for college students and demand customers, so that fitness is no longer prohibited by high annual costs, tight clothing and food, so that fitness really achieve "zero burden, great enjoyment", create a new era of integrity fitness sharing.

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## Mathematical Model Construction of Mental Health Assessment

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Mathematization is the trend of all scientific development. In the field of modern psychology, there are more and more mathematical elements and more and more mathematical ideas and methods have been used. Mathematical psychology is psychology branch of applied mathematics model to describe the psychological phenomenon. This study mainly focused on neurons and the perceptron model

and its algorithm, using the multilayer neural network model based on BP algorithm, the single polarity Sigmoid function application design and algorithm design of perceptron model, through the network of self-study of subordinate function organization, through the simulation experiments show that this scheme makes the algorithm more simple, convergence, make the network structure more simple, reduce the computing complexity; At the same time, considering that the psychological status of each independent mental health assessment object is a multidimensional information system, its basic characteristics are multivariable, multilevel, strong coupling, and the complex nonlinear interaction of various factors within the system, more accurate assessment results can be obtained by means of system analysis. This study firstly discusses the feasibility of establishing psychological evaluation model based on artificial neural network by analysing the factors and methods of psychological evaluation and summarizing the theoretical knowledge of neural network. The goal is based on the knowledge of psychological assessment, based on the neural network model of theoretical knowledge, the evaluation model, and set up scientific evaluation system, through the establishment of the psychological assessment model based on neural network, in order to further establish a scientific and reasonable qualitative methods provide basis for psychological condition and help people aware of their psychological status as early as possible, prevent the happening of the mental illness, make neural network knowledge and evaluation model has a certain theoretical level and use value. To establish mathematical models in psychological research, the first step is to separate the psychological phenomena to be studied, such as perception, learning, decision-making and so on, from the complex psychological activities and form a specific set to process the original data into objects and relationships in the set. Then, in the form of algebra, geometry, probability and axiom, or in the form of computer programs and equations, they are expressed to determine the empirical system in the field of study, and the corresponding relationship between the formal systems to express it. After the mathematical model is established, certain results can be derived through logical reasoning or mathematical operations. If certain explanations are given to the model, the derived results can be regarded as some kind of prediction of the empirical system. The advantage of using mathematical model to describe psychological phenomenon is not only that it is more general, accurate, deductive and predictive than the description of natural language, but more importantly, it is convenient for computer simulation and creates conditions for the development of artificial intelligence.

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## A Study on the Quantification of Physiological Indices of Chinese Youth Sports Health

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Adolescent physical quality is a matter of personal growth, social stability and national future. While many of us think that along with the economic development, material life level enhancement, teenagers of the constitution is on the decline. The current rate of juvenile myopia and obesity rate increased year by year, strength, endurance, and speed indicators such as growth slowly. Teenagers in physiological functions, physical quality and form a drop in the phenomenon. In this situation, this paper study of Asian teenager's physical quality, first of all relevant data statistics, using the quantitative analysis of the main factors of concept to get down, and then by using hierarchical analysis model to study the sports promote adolescent health, and analyses its regular physical exercise research, puts forward some Suggestions of exercise effect is a good sport. For adolescent physique and health study, combined with the height of 2014 teenagers, vital capacity, weight, standing long jump, grip strength and so on research results are analysed. The results of the survey showed that urban and rural adolescents, such as height, weight, growth continues to rise; It is an important index reflecting the physiological function of human body -- lung level. Compared with 2010, the standing long jump performance, an indicator reflecting the explosive power of lower limbs, increased in the age group of 7-18 years and decreased in the age group of 19-22 years. Compared with 2010, 7 to 18 years old age group reflected power quality improve in grip strength, and 19-22 year old age group had lower scores, but not significant. The analysis, the college students in endurance, speed, strength and explosive force on the main body quality indexes such as presents downward trend year by year. Need some sports school or personal development and implementation, to improve their physical quality. The results show that college students increase rate of obesity and overweight. City boys, boys, girls, the city or the country the country girl's obesity rate respectively, respectively increase percentage than in 2010. The overweight rate respectively, respectively, up from 2010 Percentage. Need some sports school or personal development and implementation, to improve their physical quality. The factors influencing adolescent's constitution mainly living environment, the day after tomorrow factors such as physical activity. Nutrition, health, mainly through the material living conditions and the impact on the body, on human health, the development constraints between the fragile social economic levels. And take an active part in physical exercise can strengthen people's physique, and this

way is restricted by social and economic development level, less easy, easy to lasting. Again so the sports activities for the following research, let teenagers in the shortest time, for the most effective exercise, from The formula is as follows: the maximum heart rate for men = 205-age; the maximum heart rate for women = 220-age. And effective exercise heart rate range: regular exercise maximum heart rate is appropriate and effective exercise heart rate range. Whether aerobic or anaerobic. Only suitable heart rate can achieve better effect. Commonly used formula is: (maximum heart rate - before exercise heart rate) / 2 + before exercise heart rate. The formula can reflect the different gender, age, heart rate. This formula is suitable for the aerobic and anaerobic exercise, although aerobic and anaerobic exercise movement form is different, but can improve their heart rate during exercise. So, whatever you are doing aerobic exercise, anaerobic exercise, can use the above formula, luck Work out your best heart rate while moving to control their heart rate and get the best results.