

The art of writing 2: Introduction, M&M, & Discussion

노 주 원

동국의대

서론 (Introduction)

서론의 역할

- ▶ 독자의 흥미를 유발
 - Why did you choose *that* subject?
 - Why is it *important*?
- ▶ 독자가 논문을 이해할 수 있게 준비시켜줌
 - To *“introduce”* the paper
 - Definition of the *problem*

서론의 중요성

- ▶ 게재 승낙을 받는데 결정적 역할을 할 수 있다.
- ▶ 출판 후 독자들에게 읽힐지 아닐지를 결정할 수 있다.
- ▶ 논문의 저자로서의 능력을 보일 수 있는 부분
- ▶ 적절한 길이

Reviewer 들은 무엇을 보는가?

- ▶ Is the contribution *new?*
- ▶ Is the contribution *significant?*
- ▶ Is it *suitable* for publication in the journal?

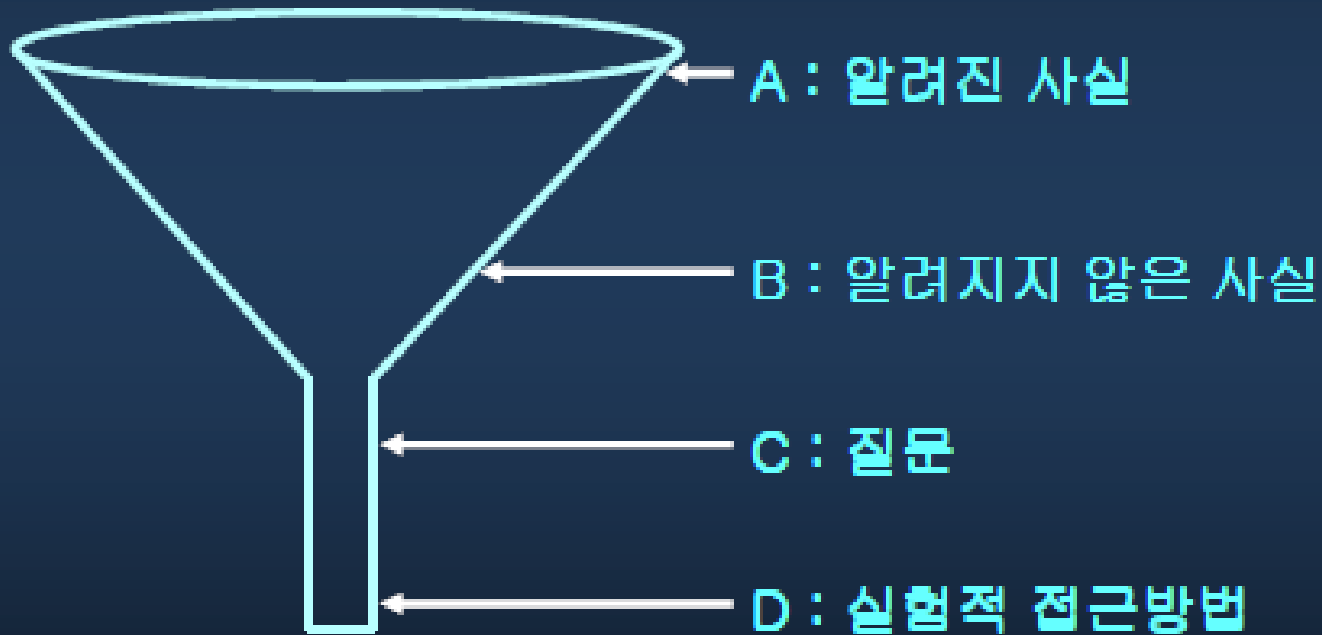
서론에 들어가야 할 내용

Investigative paper	Descriptive paper
Background (Known)	Background (Known)
Unknown	(reason/problem)
Question/Purpose	Discovery statement
Experimental approach	(experimental approach)
(results/conclusion)	Description
(significance)	Implication

서론의 구조: 가설검증논문

“깔때기 구조”

(Funnel Structure)



*Zeiger, Mimi 1999. Essentials of Writing
Biomedical Research Papers*

Optional:
Results/Conclusion/Significance

서론에 포함될 내용

- ▶ 연구주제에 설명하고, 의의, 중요성 등을 서술한다.
- ▶ 참고자료 분석을 통해, 이미 알려진 사실을 기술
- ▶ 그럼에도 불구하고 아직 알려져 있지 않은 사실이나 논쟁의 여지가 있는 사항들을 서술
- ▶ 위의 과정을 통해 실험이나 연구가 추구하는 목적의 필요성을 유도
- ▶ 구체적인 연구과제를 제시하고, 연구범위, 방법들을 간략히 기술
- ▶ 주된 연구목적을 짧게 언급하고 서론 종료

서론 (1): 알려진 사실

Original Article

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Journal of Gynecologic Oncology

JGO

Efficacy and oncologic safety of nerve-sparing radical hysterectomy for cervical cancer: a randomized controlled trial

Radical hysterectomy (RH) is one of the most common surgeries for gynecologic malignancies, especially for early-stage cervical cancer [1]. Although conventional *radical hysterectomy (CRH) is an effective approach for the management of early-stage cervical carcinoma* and it has shown 5-year survival rates of more than 90%, it has been demonstrated that this procedure frequently *causes pelvic organ dysfunction*, especially bladder dysfunction up to 85% of cervical cancer survivors [2]. These complications are believed to be the result of surgical trauma to the sympathetic and parasympathetic branches of the pelvic autonomic nervous system [2–5]. Although these autonomic nerves of the pelvic organs and their origins are well described in anatomic textbooks, *these structures* are rarely visualized and *preserved in operating rooms by surgical oncologists* until the publications by several pioneer surgeons during the last two decades [6–9]. They proposed that preserving the pelvic autonomic nerves with the nerve-sparing surgical techniques may *reduce the incidence of long-term complications following CRH, without reducing the radicality of the operation.*

서론 (2): 주제, 질문, 접근방법

- ▶ However, a conclusion on this subject could not be made because only a few small randomized trials without a long-term follow-up have been reported.

알려지지 않은 사실 (구체적인 주제)

- ▶ To assess the efficacy of NSRH in prevention of bladder dysfunction and its

질문

oncologic safety compared to that of CRH, we designed a prospective

접근방법

randomized controlled trial (RCT). Here, we present the results with a

long-term follow-up.

서론 (3) : 결과소개

Cancer Therapy: Preclinical

Clinical
Cancer
Research

Targeting Src in Mucinous Ovarian Carcinoma

Introduction

In 2010, more than 21,000 women in the United States were diagnosed with ovarian carcinoma and almost 14,000 died from this disease, which ranks as the most common cause of death among gynecologic malignancies (1). The

Here, we show that (i) advanced-stage mucinous ovarian carcinoma was associated with shorter survival time after progression or recurrence of disease than with serous histology in a large cohort study, (ii) Src kinase is highly activated among mucinous ovarian carcinomas, and (iii) targeting Src kinase with a combination of oxaliplatin and dasatinib showed synergistic antitumor effects in mucinous ovarian cancer models.

결과의 요약

Signals of Introduction

Background	Unknown	Question, Purpose, Discovery	Experimental Approach	Results	Implication
X is...	... is unknown	We hypothesized that ...	To test this hypothesis, we...	We found...	... consistent with
X affects...	.. has not been determined	To determine...		...was found	...indicating that
X is component of Y	The question remains whether ...	To study..., To examine..., To assess..., To analyze..., In this study we examined...	We... We analyzed... For this purpose, we...	We determined...	...make it possible to ...may be used to...
X is observed when Y happens	... is unclear	Here we describe... Here we report...	... by/using...	Our findings were...	...is important for...
X is considered to be does not exist ... is not known	This report describes... We examined whether X is... We assessed if... We determined if... We analyzed Y...	For this study we... To answer this question we...	We observed that... Based on our observation...	Our analysis implies/suggest s... Our findings indicate that...

서론의 내용과 문체

- ▶ 해당 분야의 전문가가 아니더라도
- ▶ 다른 논문을 읽지 않아도 이해하도록
- ▶ 읽기 쉬운 문체로
- ▶ 이 연구의 새로운 점을 꼭 명시
- ▶ 시제
 - 현재 옳다고 믿는 사실, 아직 모르고 있는 사실은 현재형
 - 발표된 바 있으나, 아직 확정적이지 않은 사실은 과거형
 - 연구의 목적은 과거형 또는 현재형
- ▶ 이전 논문의 인용 : 가능한 직접 저자의 이름을 언급하지 않는다. (참고문헌만 표기)

Biologic Effects of Platelet-Derived Growth Factor Receptor α Blockade in Uterine Cancer

Platelet-derived growth factor receptor α (PDGFR α) is a type III receptor tyrosine kinase that can be activated by PDGF-AA, PDGF-AB, PDGF-BB, and PDGF-CC (4, 5). These growth factors are dimeric molecules composed of disulfide-linked polypeptide chains that bind to 2 receptors simultaneously and induce receptor dimerization, autophosphorylation, and intracellular signaling. Activated receptors induce a variety of cellular signals that act to prevent apoptosis, stimulate mitogenesis, and promote cellular chemotaxis (6, 7). These effects are mediated through several

toma (22). However, in uterine cancer, the role of PDGFR α and the effect of its blockade have not yet been determined. The purpose of our study was to determine the biologic and therapeutic effects of PDGFR α blockade in uterine cancer models.

서론의 내용과 문체

- ▶ Roh, et al. published.... (X)
- ▶ Investigators have reported that.... (Ref) (O)
- ▶ Some clinicians still question whether.... (Ref) (O)

Describe Unknown/Problem: Don't Do & Do

- ▶ 본인의 판단이 아닌 사실을 객관적으로 표현

Don't Do	Do
... does not seem to understand ...	The results of study X have been questioned.
... failed to	One study found A, another study found B.
... made the mistake of...	Findings on X are controversial.
... used improper methods ...	Although A showed X, our results do not agree ...

- *There is a controversy as to whether*
- *Controversy still exists in the literature regarding the choice....*

연구목적

- ▶ 명확하게
- ▶ 가설논문을 기술논문으로 만들지 말자.
 - To determine which site in the vagal motor pathway to the bronchioles is most sensitive to depression by barbiturates,
 - To report (describe) the vagal motor pathway to the bronchioles sensitive to depression by barbiturates ... (X)
- ▶ 시제는 과거 또는 현재
 - The aim of the present study *is* to determine clinical...
 - The aim of our study *was* to identify one or more....
 - To confirm the benefit...., we *conducted* a randomized, controlled...

실험적 접근방법

- ▶ 실험적 접근방법을 질문 뒤에 기술.
 - “우리의 질문은 이렇다. 그리고 우리는 이 질문에 답하기 위해 이러한 방법을 사용할 것이다.”
- ▶ Example
 - *We conducted a randomized...., to confirm the benefit..... (X)*
 - *To confirm the benefit of a vancomycin-containing..., we conducted a randomized, controlled.... (O)*

서론 작성 요약

1. 깔때기 구조를 사용한다.
2. 충분한 배경 설명을 하되 과도한 문헌 고찰을 하지 않는다.
3. 알려지지 않은 사실을 분명하게 적는다.
4. 연구 목적을 분명히 한다.
5. 실험적 접근 방법을 간략히 소개한다.
6. **새롭고 중요한 점**을 분명하게 하여 독자의 관심을 끈다.
8. 되도록 간략하게 쓴다.

재료 및 방법 (Material & Methods)

재료(대상) 및 방법

▶ 목적

- 결론에 이르기 위하여 실험을 어떻게 하였나.
- 독자가 연구의 타당성을 판단할 수 있게.

▶ 독자는 안 읽어도, reviewer는 세심하게 읽는다!

- 실험이 잘못되었거나, 불충분하거나, 비전문적이라고 생각하면 reject 할 가능성이 높다.

자료(대상) 및 방법

- ▶ “아무리 자세해도 지나치지 않다”
 - 다른 연구자가 이 연구를 평가하고 재현할 수 있도록 자세하게
- ▶ 포함될 내용
 - 연구디자인
 - 연구상태나 조건의 정의 (질병, 생리학적 상태..)
 - 연구대상의 정의 (환자, 정상인, 동물, 식물, 세포주..)
 - 연구대상 선정방법 계획
 - 구체적인 실험방법 결정
 - 모든 관찰항목과 관찰방법의 구체적인 결정
 - 자료평가를 위한 통계학적 분석법 선택과 기술

연구의 궁극적 대상

- ▶ 목표로 하는 질환이나 상태
 - 난소암
 - 난소암 중 mucinous type 만...
 - 난소암 중 advanced stage 만?
 - 자궁경부암?
 - 수술대상의 초기...
 - Recurrent ?

▶ Example

1. Study subjects

This study was conducted prospectively in patients with cervical cancer the International Federation of Gynecology and Obstetrics (FIGO) stage IB1–IIA.

재료(대상)의 채택기준 및 제외기준

▶ Inclusion criteria

the cervical smear collected before radiotherapy in 169 patients with stage IB1 through stage IVB cervical cancer (International Federation of Gynecology and Obstetrics [FIGO]) between July 2003 and December 2006, at the National Cancer Center, Goyang, Gyeonggi, Korea.

▶ Exclusion criteria

Exclusion criteria included neuroendocrine histology, pathologically proven distant metastasis, history of psychiatric disease, preoperative urinary dysfunction, and another coexisting malignancy.

▶ Control

Control animals remained naive until tissue collection or they received 0.3 mL of intracolonic saline (0.9% NaCl) under anesthesia.

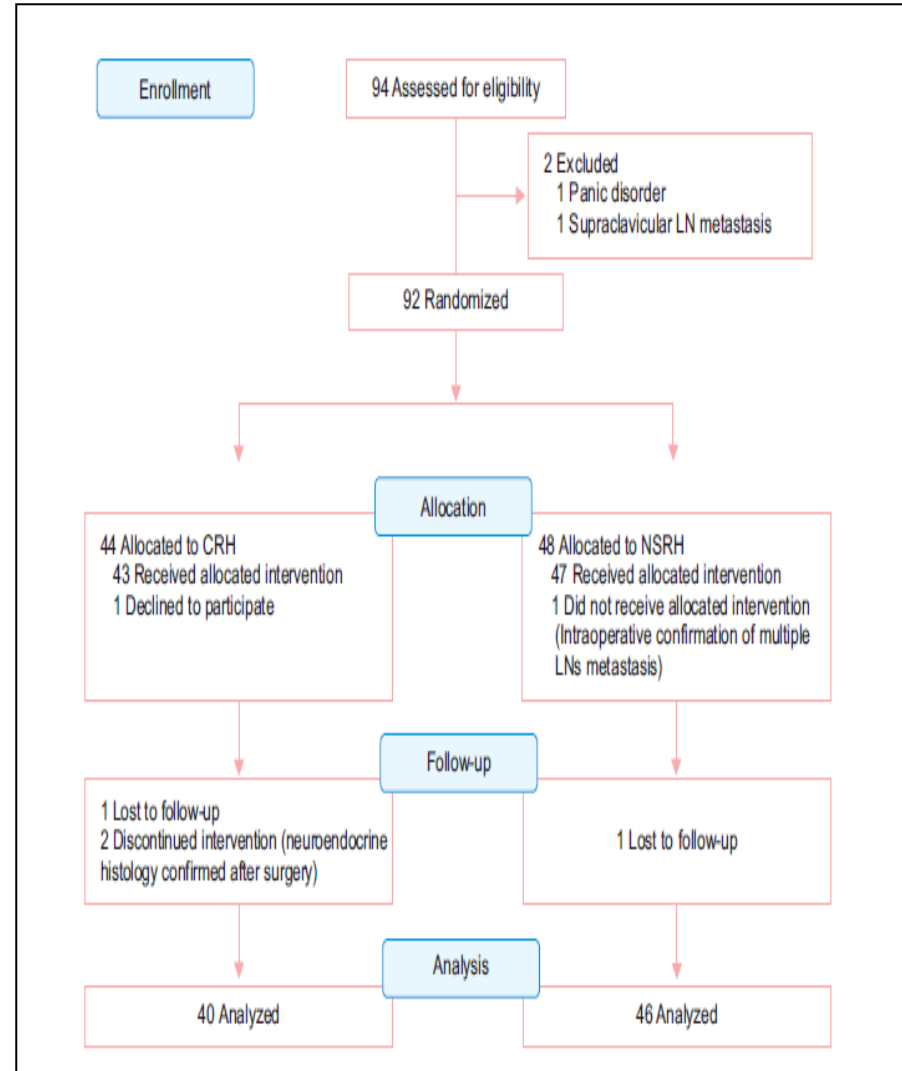
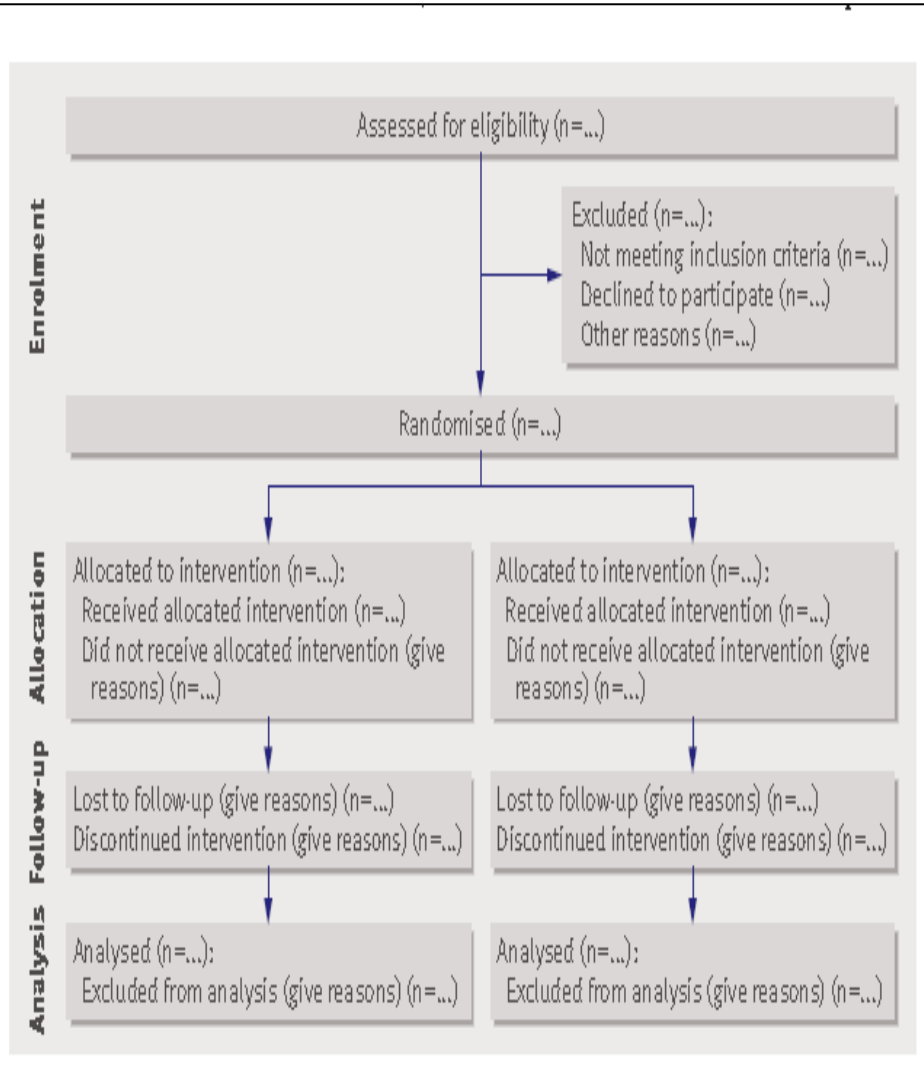
자료(대상) 선정방법, 규모 및 과정

- ▶ 연구에 사용한 개체 수(n)는 정확히 기록
- ▶ 시제는 과거를 주로 사용
 - “연구결과가 논문 중에 어떻게 기술되어 있다.”라고 할 때는 현재 시제

... Data are summarized as mean \pm SD in Table 1.....

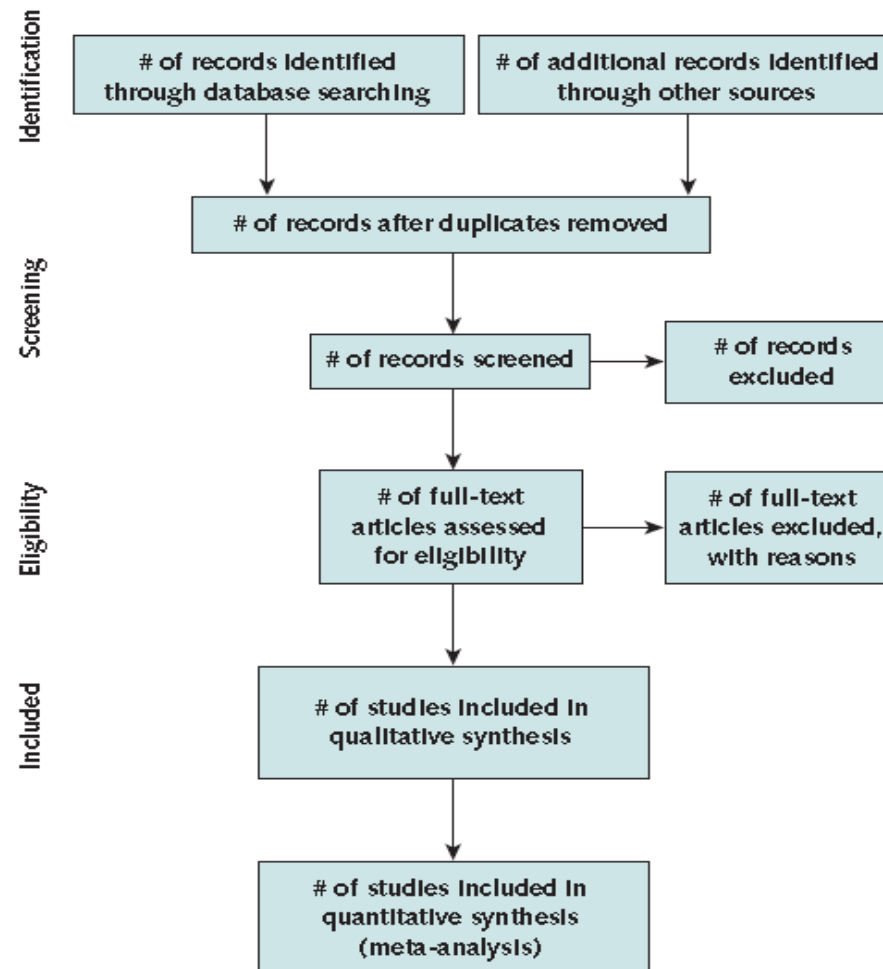
- ▶ 이용된 대조군 기술
- ▶ 환자를 표현할 때는 patient A, B... 등으로 표현
- ▶ CONSORT statement : for RCT
 - Consolidated Standards of Reporting Trials
 - Checklist of essential item and flow diagram
- ▶ PRISMA statement : for systematic review and meta-analysis
 - Checklist and flow chart

CONSORT



PRISMA

Figure 1. Flow of information through the different phases of a systematic review.



동물, 약제, 시료, 기구 등의 기술

▶ Generic name 사용

- Paclitaxel, dopamine HCl
- 시약은 화학명
- 괄호
 - 상품명, 제조회사명, 제조일시, 제조번호
 - 기계, Kit : 회사이름, 소재도시명, 나라이름
 - 체중, 농도, 용량 등은 괄호로 넣거나, 앞으로 가면 괄호 없이 기술

DMEM culture medium (Gibco BRL, Long Islands, NY)

10 mg nitoglycerine , nitroglycerine (10 mg)

▶ 동물을 사용할 경우, 어떤 실험동물과 연령을 정확히 기술

- Animal (X)
- Six weeks old female athymic nude mouse....

▶ 측정단위 : SI Unit

방법(Methods)

- ▶ 무엇을?
- ▶ 어떻게?
- ▶ 왜 ?

Methods: 무엇을 했는가?

- ▶ 질문 (목적)
- ▶ 독립변수와 측정값 (종속변수)
- ▶ 대조군(controls)
- ▶ 각 실험의 구성, 순서(개입, 측정, 실험), 기간, 샘플 규모, ***반복실험 (repeats for reproducibility)***

예문: 연구디자인(1-1)

- ▶ A; 질문, n, 기다린 기간
 - ▶ B; 기다리는 기간을 둔 이유
 - ▶ C; 대조상태 (control)
 - ▶ D; 독립변수
- ▶ ^A **To determine whether** increases in fetal breathing movements cause sustained increases in pulmonary artery blood flow, we studied the **six fetal sheep \geq 6 days** postoperatively (gestation age, 129–138 days). ^B **This waiting period allowed** fetal breathing movements and pulmonary artery blood flow to return to normal after the stress of surgery. Immediately after a ^C **control period of 60 min** [109 ± 36 (SD) min], we rapidly infused meclofenamate (19.1 mg) into a jugular vein over 10 min followed by a constant infusion of meclofenamate (1.15 mg/h) for 240 min to induce increases in fetal breathing movements. In all six fetal sheep, ^D **we started the meclofenamate infusion** during high-voltage slow-wave electrocortical activity, when no fetal breathing movements were present.

예문: 연구디자인(1-2)

- ▶ E-H. 측정
- ▶ E. 종속변수 (dependent variables)
- ▶ F. 독립변수(independent v.)
- ▶ G. 대조변수 (control v.)
- ▶ H. Postinfusion data가 없는 이유
- ▶ (E) During both the control period and the meclofenamate infusion, we
- ▶ continuously recorded phasic and mean blood flows through the left
- ▶ pulmonary artery in the fetal sheep. (F) We also continuously recorded tracheal
- ▶ pressure as an indicator of fetal breathing movements, amniotic pressure as a
- ▶ zero reference point, and electrocortical activity. (G) In addition, to ensure that
- ▶ the fetus was in stable condition, we continuously recorded heart rate and
- ▶ systemic and pulmonary artery blood pressures, and we sampled arterial
- ▶ blood every 30 min for determination of pH and blood gas tensions. (H)The
- ▶ effects of meclofenamate on the fetal sheep continued for several hours after
- ▶ discontinuation of the infusion, so we did not collect postinfusion data.

예문: 연구디자인(1-3)

- ▶ I~L. 측정의 정확성에 대한 확인
- ▶ (I) After completion of the experiment, the ewe and fetus were killed with separate injections of barbiturate. (J) At postmortem examination, each fetus was carefully weighed and examined for proper placement of the electromagnetic flow transducer and catheters and patency of the left pulmonary artery. (K) In addition, the flow transducer and the tracheal and vascular catheters were confirmed to be in proper position in all fetuses. (L) There was no fibrosis or constriction of the pulmonary artery present at the postmortem examination for any fetal sheep.

Question (sentence A)
Independent variable (C, D, F)
Dependent variables (E, H)
Controls (C, E-G, J-L).

One experiment = one fetal sheep 임을 분명히.
측정순서 (E-G).
개입과 측정시간 (C, E-G).
실험 기간 (C, E-H)
샘플 크기 (A, D).

실험실 연구에서 반복실험의 기술

Cancer Therapy: Preclinical

Clinical
Cancer
Research

Biologic Effects of Platelet-Derived Growth Factor Receptor α Blockade in Uterine Cancer

Ju-Won Roh^{1,5}, Jie Huang¹, Wei Hu¹, XiaoYun Yang¹, Nicholas B. Jennings¹, Vasudha Sehgal⁶, Bo Hwa Sohn⁶.

Figure 3

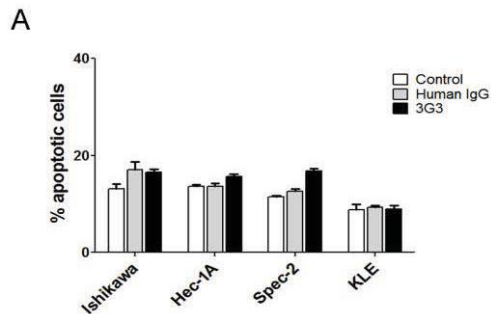
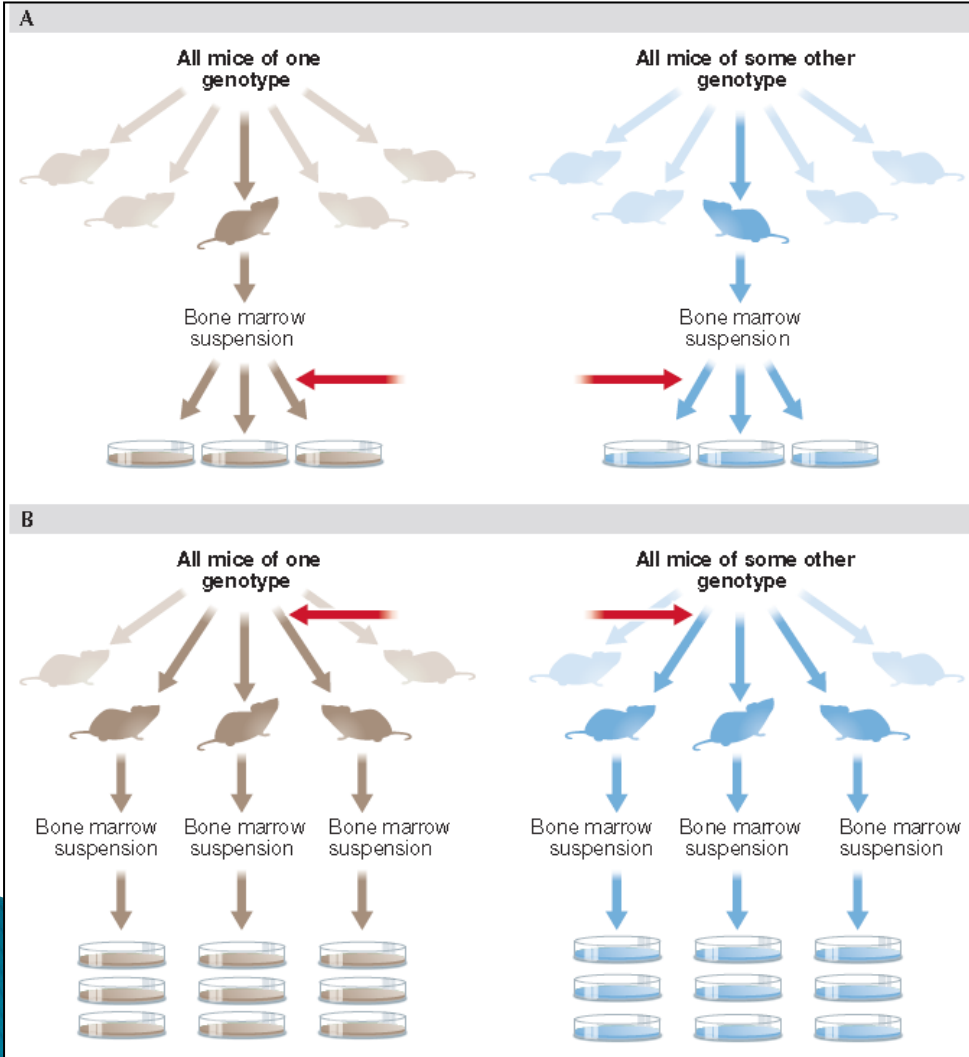


Fig. 3. Effect of 3G3 on tumor cell apoptosis. A, the apoptotic rate of cultured cell lines with treatment of 3G3 alone at 20 μ g/mL, and B, the apoptotic rate after 3G3 treatment combined with cytotoxic chemotherapy in Ishikawa, Hec-1A, Spec-2, and KLE cells. Apoptosis was measured by determining the percentage of PE Annexin V/7-AAD-positive cells at 72 hours after treatment. Results were confirmed with triplicate experiments. Error bars, SEM. *, $P < 0.05$.

▶ Reviewer #2 (Reviewer Comments to the Author):

3. It is **unclear** from the figure legends whether experiments shown in Figs. 2, 3, and 4 reflect **independent experiments or triplicate aliquots from the same experiments**. This is an important issue (D.L. Vaux, *EMBO Rep.* 13:291, 2012). If independent experiments were performed, this must be explicitly stated. If a "representative" experiment is provided, this should also be stated.

Replicates and repeats—what is the difference and is it significant?



uptake assay as described previously (24). Cells were plated on 96-well plates (7,000 per well for Ishikawa, Hec-1A, and KLE; 10,000 per well for Spec-2) in triplicate and incubated overnight at 37°C and 5% CO₂. After incubation, cells were

본문 : “Cells were plated on 96-well plates in triplicate~ “

Figure 3. Effect of 3G3 or the combination of 3G3 and chemotherapy on apoptosis. A, apoptosis of Hec-1A and RL95-2 cells was measured after treatment with 3G3 and PDGF-AA. “3G3 + PDGF-AA” means pretreatment with 3G3 before PDGF-AA stimulation, and “PDGF-AA + 3G3” means cotreatment with PDGF-AA and 3G3 at the same time. B, apoptosis of Ishikawa, Hec-1A, Spec-2, and KLE cells after pretreatment with 3G3 followed by cytotoxic chemotherapy. Apoptosis was measured by determining the percentage of PE Annexin V/7-AAD-positive cells at 72 hours after treatment. Statistical analysis was performed on the basis of 3 repeated experiments. Error bars, SEM. *, $P < 0.05$.

Legend :
“~Statistical analysis was performed on the basis of 3 repeated experiments. ~”

실험방법

- ▶ 잘 알려진 방법
 - 설명 없이 참고문헌 제시
- ▶ 잘 알려지지 않은 방법
 - 핵심적인 특징 기술, 참고문헌 제시
- ▶ 개량한 방법
 - 개량한 것의 근본적인 특성과 목적 기술
- ▶ 새로운 방법
 - 완벽하게 설명필요 -> 독자들이 평가하고 재현 가능하도록

데이터분석

- ▶ 어떻게 변수를 계산하였는지
- ▶ 데이터를 어떻게 요약하였는지
 - 정규분포: 평균값과 표준편차
 - 비정규분포
 - 중앙값(median)과 범위(range)
 - 중앙값(median)과 사분위수범위(range between the 25th and the 75th percentiles)

통계 분석

- ▶ 잘 알려진 방법: 통계 방법만 기술.
 - Student t-test, Chi-square, ANOVA, linear regression, correlation, Wilcoxon
- ▶ 잘 알려지지 않은 통계 방법:
 - 논문이나 책을 참고문헌으로 제시.
- ▶ 사용한 프로그램 (version, release number 포함)
- ▶ 각 통계 방법마다 샘플 크기가 다른 경우, 분명하게.
- ▶ 유의한 p 값 또는 95% 신뢰구간

예문: 데이터분석

5. Statistical analysis

Continuous variables were assessed for normal distribution (Kolmogorov-Smirnov test) and expressed as appropriate (mean with SD or median with range). Categorical variables were evaluated with the use of t Fisher exact test. For paired data, such as postoperative changes in UDS or IPSS score compared with preoperative baseline, Wilcoxon signed rank test was used for analysis. p<0.05 was considered statistically significant. DFS and OS were evaluated by Kaplan-Meier analysis. IBM SPSS ver. 20.0 (IBM Co., Armonk, NY, USA) was used for all statistical analyses.

1. How the data were summarized
2. Statistical test used (well known; no reference needed)
3. P value at which differences
4. Statistical program used

예문: 데이터분석

Statistical analyses

Continuous variables were assessed for normal distribution (Kolmogorov–Smirnov test) and expressed as appropriate **1** mean with SEM or median with range. **2** one-way ANOVA test with *post hoc* (Bonferroni adjustment) comparison or Kruskal–Wallis test with multiple comparisons (Wilcoxon rank-sum test with Bonferroni correction) was performed to determine the statistical significance as appropriate. Categorical variables were evaluated with use of the Fisher exact test. **3** Three replicates were taken to monitor the performance of each experiment. We repeated experiments independently at least 3 times for statistical analysis. **4** $P < 0.05$ was considered statistically significant. IBM SPSS Statistics 21.0 (IBM SPSS, Inc) **5** was used for all statistical analyses.

Clin Cancer Res; 20(10) May 15, 2014

1. How the data were summarized
2. Statistical test used
3. Measurements that were compared
4. P value at which differences
5. Statistical program used

구성 (Organization)

- ▶ 주제 별로 구분하고 소제목을 붙임.

Animal Studies	Clinical Studies
Materials	Study subjects
Animals	Inclusion criteria
Preparation	Exclusion criteria
Study design	Study design
Interventions	Interventions
Methods of measurement	Methods of measurement
Calculations	Calculations
Analysis of data	Analysis of data

정확한 어휘 선택

- ▶ Measure, calculate, estimate의 용어 구분
 - “We measured heart rate and ventricular pressure and calculated maximal positive dP/dt .”
- ▶ Determine; measurement and calculation
 - “We determined heart rate, ventricular pressure, and maximal positive dP/dt .”
- ▶ Study, experiment, series, group의 용어 구분
 - Study: 현상이나 발달, 질문에 대한 지속적이고 체계적인 조사
 - Experiment: 가설의 타당성을 조사하기 위한 시험 (대상이 인간일 경우 study라고 함)
 - Series: 서로 연관된 2개 이상의 실험
 - Group: 같은 특성을 갖는 실험동물 또는 인간

관점(Point of view)

▶ 수동태가 많이 쓰임

- Materials & methods 강조하기 위해
- 글의 활력을 주기 위해 능동태를 한 번 정도 사용하기도 한다.

We collected the different fungal species from various tepuis in Venezuela.

Different fungal species were collected from various tepuis in Venezuela.

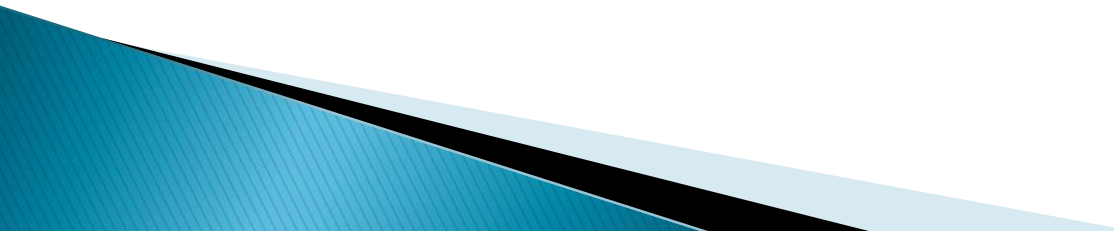
▶ 이유 없이 관점을 바꾸지 마라.

- The assays were performed for 10 min at room temperature. We then added 10 ml of 95% ethanol. The assays were performed for 10 min at room temperature. The 10 ml of 95% ethanol were added.

관점(Point of view)

- ▶ We로 시작하는 문장이 너무 많아지지 않게
 - 하나의 실험의 단계를 한 문장에 넣음.
 - We dehydrated the pellets, cleared them with propylene oxide, and embedded small pieces of each pellet in blocks of Spurr's resin.
- ▶ 앞 부분에 변화를 주는 방법.
 - After 30 s, we centrifuged the samples.
 - Then we centrifuged the suspension as before.
 - To prepare isolated surface layers for electron microscopy, we resuspended the 0.1–ml pellets of packed, ...

재료 및 방법에서 흔히 보이는 오류

- ▶ 필요한 내용이 빠짐.
 - ▶ 특정 실험을 왜 했는지 알 수 없는 경우.
 - ▶ 특별한 이유 없이 수동태에서 능동태로.
 - ▶ 특별한 이유 없이 과거시제에서 현재시제로.
- 

자료 및 방법 지침

1. 훈련된 연구자라면 연구를 재현하기에 충분한 내용과 참고문헌을 기술하되, 불필요한 세부사항을 포함하지 않는다.
2. 자료 및 방법 이외에 결과를 포함하지 않는다.
3. 긴 설명이 필요한 세부사항은 부록을 활용한다.
4. 적절한 주제 또는 소주제 별로 내용을 정렬한다.
5. 새로운 주제는 적절한 신호를 사용하여 연결한다.
6. 기능이 명확하지 않은 실험절차는 그 목적을 설명한다.
7. 수동태가 바람직하다.
8. 뚜렷한 이유 없이 관점을 바꾸지 않는다.
9. 정확한 단어를 사용한다.
10. 윤리 지침을 따르고 기술한다.

Discussion

고찰의 3단 구성

시작

- 연구목적에 대한 답을 제시
- 연구결과로부터 도출된 중심내용을 간략히 언급

전개

- 결과에 대한 해석과 추론
- 기존 연구와의 비교
- 연구의 제한점에 대한 기술
- 예기치 못한 발견에 대한 설명
- 가설 또는 모델 제시

마무리

- 요약과 주장
- 중요성과 전망

고찰의 시작

- ▶ 서론에서 제시한 질문에 대한 대답으로 이야기를 시작.
- ▶ 연구결과로부터 도출된 결론을 간략히 언급
- ▶ 막연한 추측, 주관적 선입견은 금물

질문에 대한 대답

- ▶ 질문한 그대로 각 질문에 대답하라.
 - 질문과 동일한 핵심용어, 동사, 관점, 방식으로 대답.
 - 질문 : “Dose sympathetic stimulation increase norepinephrine synthesis in an superior cervical ganglia in vivo?”
 - 대답 : “ This study shows that sympathetic stimulation increases(dose not increase) norepinephrine synthesis in an superior cervical ganglia in vivo”
- ▶ 질문에 대한 해답은 현재를, 연구결과는 과거를 사용
 - show, indicate, describe 등은 현재 시제를
 - find 는 주로 과거시제를 사용

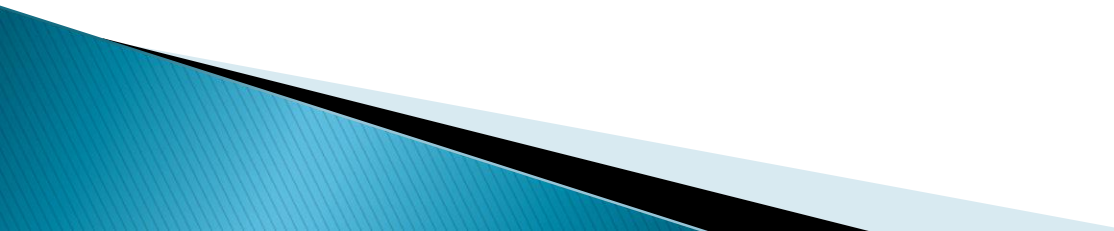
대답과 관련된 신호

- ▶ 대답을 기술하기 전에 신호를 보내어 독자들에게 대답이 등장한다는 사실을 알림.
 - This study *shows* that ... (present)
 - This paper *describes* ... (present)
 - Our results *indicate* that ... (present)
 - In this study, we *provide* evidence that ... (present)
 - In this study, we *have shown* that (present perfect)
 - In this study, we *have found* that (present perfect)
 - In this study, we *found* that (past)

고찰의 시작 부분의 주의사항

- ▶ 서론의 내용을 반복하지 말 것
- ▶ 결과를 전부 요약하지 말 것
- ▶ 서론에서 제시했던 질문이 아닌 부가적인 내용으로 시작하지 말 것
- ▶ 대답은 해당되는 실험군으로 제한되어야 한다.
 - 확대해석은 금물
 - 동물실험의 경우 사람의 일부 또는 전체에 적용될 수 있는지 명시

대답에서 결과로의 이행

- ▶ “because” 또는 “연결구” 사용
 - ▶ Because / ... can be attributed to ...
 - ▶ In our experiment ...
 - ▶ The evidence is that.../ Evidence that ... is that ...
 - ▶ We found that.../Our data shows that ...
 - ▶ has been demonstrated by ...
- 

고찰의 시작: 예문

▶ (Question/Purpose)

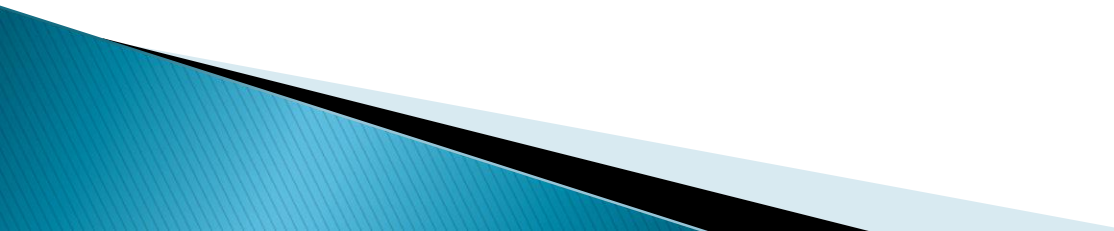
- Our goal was to determine what part of the binding polypeptide is responsible for the species-specific egg agglutination activities of the protein.

- ▶ (질문에 대한 대답) Our results suggest that the part of binding responsible for species-specific egg agglutination lies in the region of residues 75–121. (뒷받침하는 근거) We showed that residues 18–74 and 122–236 can be deleted without loss of egg agglutination activity. All of the biologically active binding deletion analogs were found to be species-specific by their ability to agglutinate exclusively *S. purpuratus* eggs. Deletion analogs that had any residues of region 75–121 deleted exhibited no significant activity above the bacterial control protein.

대답을 뒷받침하기

- ▶ 답을 뒷받침하는 자신의 결과 제시.
- ▶ 다른 사람의 연구결과와 어떻게 부합하는가?
- ▶ 다른 사람의 연구가 내 답을 뒷받침하는가?
- ▶ 내 연구가 과거의 상이한 결과를 모아주는가?
- ▶ 그림과 표 인용
- ▶ 독자는 앞에 나온 결과나 그림, 표를 모두 잊었을 것이라고 생각하라.

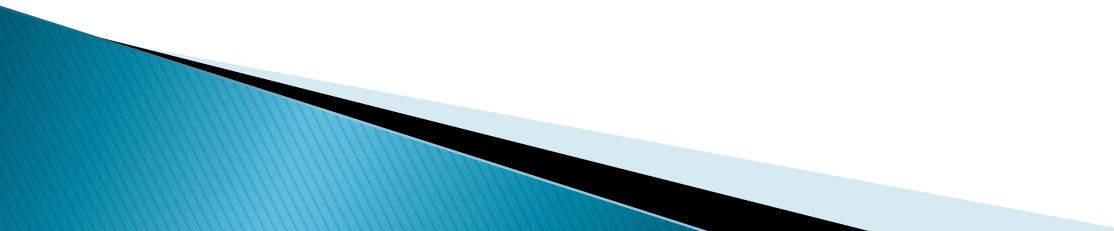
주요결과(Key Findings)를 제시하는 신호

- ▶ In our experiments ...
 - ▶ ... can be attributed to ...
 - ▶ We determined by ...
 - ▶ We found that ...
 - ▶ Our data shows that ...
 - ▶ ... has been demonstrated by ...
- 

대답에 대한 강화 및 방어

- ▶ 내 대답이 더 만족스러운 이유
- ▶ 다른 가능성에 대한 반박이유
- ▶ 모순되는 결과에 대한 설명

비교(comparison) 의 신호

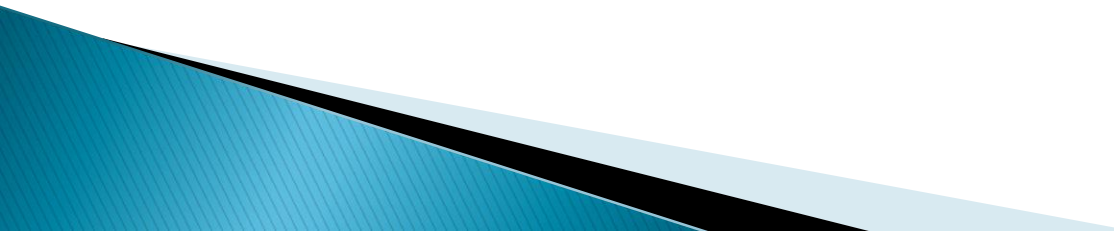
- ▶ consistent with ... (ref)
 - ▶ . Similar to ... (ref)
 - ▶ has also been observed by ... (ref)
 - ▶ . X has been demonstrated ... (ref)
- 

기존의 결과와 상반되는 주장 설명

Apparent discrepancies between our human growth hormone values and those of earlier studies may be due to differences in study design. In our study, ... Earlier studies

....

Conflicting results의 신호

- ▶ However, other studies found that ... (ref)
 - ▶ is controversial ... (ref)
 - ▶ does not agree with ... (ref)
 - ▶ has also been reported ... (ref)
- 

참신성의 강조

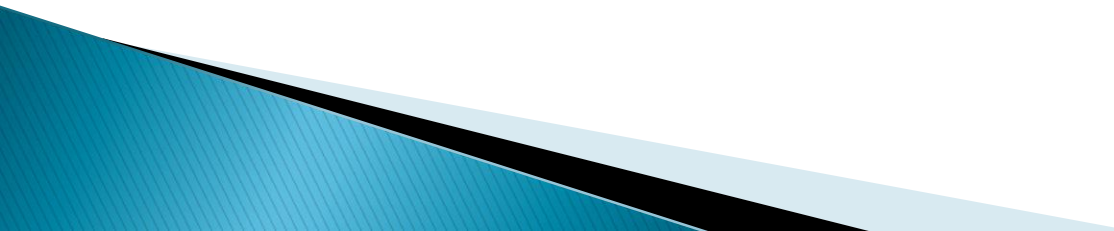
- ▶ 참신성은 서론에서 알려지지 않은 사실을 기술할 때 제시됨.
- ▶ 고찰에서 연구의 참신성을 상기시키려면 자신의 논점을 이미 알려진 사실과 대조.

Partial cDNA clones have been reported for mouse(38-41), rat(41,42), and human(24) β -glucuronidase. **In this study**, we report the **complete** sequence of the full-length cDNA for human β -glucuronidase.

연구의 한계

- ▶ 방법상의 한계
- ▶ 연구 디자인의 결함
- ▶ 연구의 근거가 된 가정의 한계와 결함
- ▶ 설명이 간결하면(한두 문장) 방법에서 기술
- ▶ 설명이 길거나(한두 단락), 연구 결과에
- ▶ 심각한 영향을 미칠 수 있다면 고찰에서 기술.

제한점의 신호

- ▶ ... was not possible ...
 - ▶ ... could not be measured ...
 - ▶ ... was limited by ...
 - ▶ Further observations are needed to ...
- 

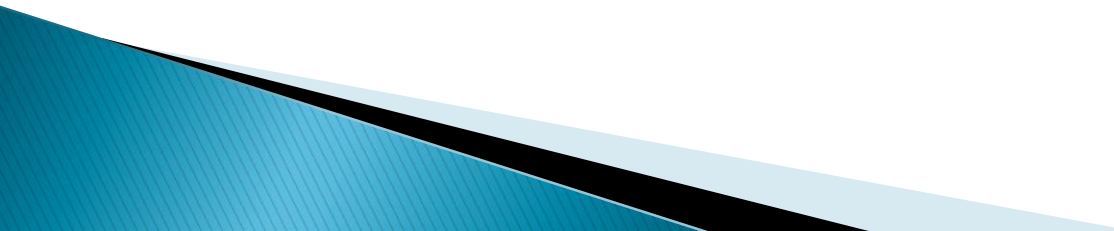
제한점 설명 예문

- ▶ ***Our study had limitations.*** First, this was a retrospective study with the use of a single index lesion. Second, the selection of the volumetric functional MR imaging cutoffs (a 25% increase in ADC and a 65% decrease in PVP enhancement) was based on our study population and not on prior data. As such, the cutoff values to designate “response” using volumetric, functional MR imaging will require validation and optimization in future studies. **Another limitation** involved our use of only the index lesion to classify the response, even though some patients had a large disease burden that may have required response assessment of the entire intrahepatic tumor volume. ...

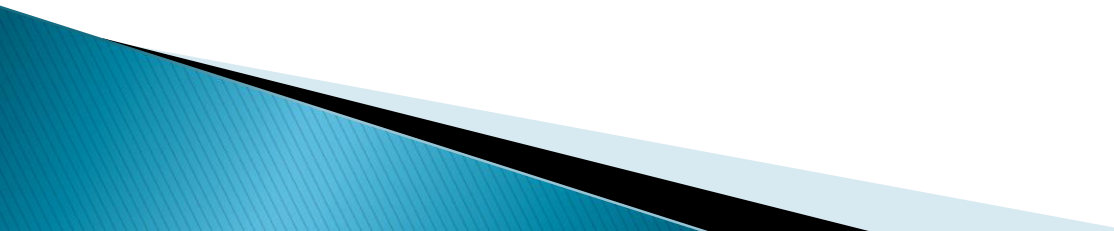
예기치 못한 발견의 설명

- ▶ 사소한 것에서 매우 흥미로운 것까지 다양.
- ▶ 너무나 흥미로워 처음 제기된 질문을 뛰어넘어 논문의 주인이 되기도
- ▶ 예기치 못한 발견을 기술할 때에는 단락의 도입부에 그 발견이 예기치 않았던, 또는 놀라운 것이라는 점을 기술하고 나서 그 발견을 최대한 설명해야 한다.
- ▶ A surprising finding was that ...

Unexpected findings의 신호

- ▶ . Surprisingly ...
 - ▶ . To our surprise ...
 - ▶ . A surprising finding was that ...
 - ▶ was not expected.
- 

가설 제시의 신호

- ▶ Our results lead to the conclusion that ...
 - ▶ . From these data we hypothesize that ...
 - ▶ . We propose the following new principle ...
- 

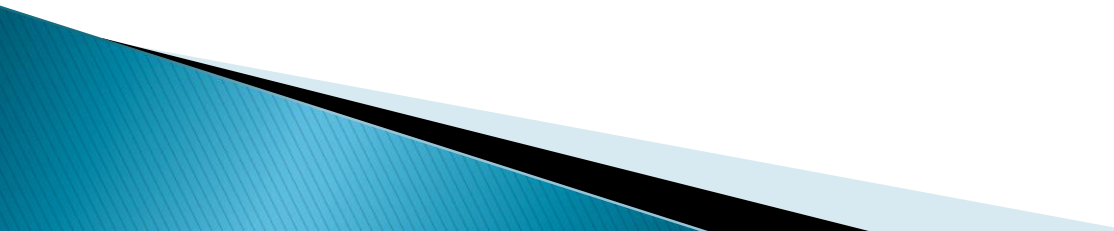
가설제시 예문

- ▶ We found that the substrate 3H-[9R]iP moves into the cells where it does not accumulate to concentrations higher than in the medium. However, the mechanism of 3H-[9R] iP uptake is unclear. Because no extracellular activities for the deribolisation of 3H-[9R]iP could be detected, we hypothesize that it is metabolized intracellularly to 3H-iP and that the bidirectional transport of IP is based on passive diffusion.

고찰의 마무리

- ▶ 요약하라.
- ▶ 강조하라 (중요성과 차별성)
- ▶ 주장하라.

요약의 신호

- ▶ In summary ...
 - ▶ In conclusion, ...
 - ▶ Finally, ...
 - ▶ Taken together ...
 - ▶ To summarize our results, ...
 - ▶ We conclude that ...
 - ▶ Overall, ...
- 

Level of Confidence

can : 90% 이상의 가능성

will: 상당한 확실성

would : 다소 강한 확실성, 강한
추론

may, could, might :
보다 적은 확실성
(50%)

고찰의 마무리: 예문

- ▶ (질문에 대한 답) *In summary*, our work reveals the functional interactions involved in the binding of antibiotics to the peptidyl transferase cavity of the bacterial ribosome. (주요 결과) None of the antibiotics examined *show* any direct interaction with ribosomal proteins. Chloramphenicol targets mainly the A site, where it interferes directly with substrate binding. Clindamycin interferes with the A site and P site substrate binding and physically hinders the path of the growing peptide chain. Macrolides bind at the entrance to the tunnel where they sterically block the progression of the nascent chain. (응용가능성 제시를 통한 중요성기술) The structural model of the peptidyl transferase center in complex with the examined antibiotics *can* not only enable a rational approach for antibiotic development and therapy strategies but *can* also be used to identify new target sites on the eubacterial ribosome.