

Lower level usage  
But focus of public attention



# Using GenAI to assist academic writing: mindset, how-to, research ethics

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Personal opinions

Helped Greatly by AIs

Learning in progress, Sharing experiences, Limited to writing

Demonstration of **Human in Control** in using GenAI

Use analogies 類比

**For researchers (with core skills)**

PPT is available for sharing

# Outline (Mine)

- Mindset toward GenAI (General)
- How to use AI (General)
  - Avoiding information leakage
  - How to prompt, use paid versions, select models, set personas
- How to use GenAI to assist **academic writings**
- Ethical issues in using GenAI for **academic writings**

# I. Mindset toward GenAI (General)

# Characteristics of Generative AI

- Trained on big data databases via Large Language Models (LLMs, e.g. Transformer).
- Predicts the next most likely word based on the preceding context; Re-creation based on statistical regularities (Mainstream, Averaged, Typical).
- Primarily text-based.
- Hallucinations: Content may be plausible/reasonable but not necessarily true.
- Many GenAIs: Different training databases and algorithms => different strengths.
  - Data Sources: Publicly available web contents, [licensed data](#), [human-generated or annotated data](#), [user interaction data](#).

(Gemini + ChatGPT)

# Early problems with ChatGPT (2022.11.20 public, GPT3)

- Training database only up to 2021 (2026.2.9更新到2025.8.31)
- No citation of information source
- Not reliable. Hallucination.
- Info leakage (info goes into learning database)
  
- All these problems exist before AI (e.g. Google Search)
- Many competitors. Some problems already solved.

# Hallucination by ChatGPT

**ChatGPT:** references on TNBC and EGFR research :

Lehmann BD, Bauer JA, Chen X, Sanders ME, Chakravarthy AB, Shyr Y, Pietenpol JA. Identification of human triple-negative breast cancer subtypes and preclinical models for selection of targeted therapies. *J Clin Invest.* 2011;121(7):2750-2767. doi:10.1172/JCI45014

Ueno NT, Zhang D, Targeting EGFR in Triple Negative Breast Cancer. *J Cancer Sci Ther* 2014; 6(6): 236-243. doi: 10.4172/1948-5956.1000262

 wrong

Baselga J, Albanell J. Mechanism of action of anti-HER2 monoclonal antibodies. *Ann Oncol.* 2001;12 Suppl 1:S35-S41. doi:10.1023/a:1011199018579

Yardley DA, Kaufman PA, Brufsky A, et al. Treatment patterns and clinical outcomes for patients with de novo versus recurrent HER2-positive metastatic breast cancer. *Breast Cancer Res Treat.* 2021;186(1):107-117. doi:10.1007/s10549-021-06105-5

Hynes NE, MacDonald G. ErbB receptors and signaling pathways in cancer. *Curr Opin Cell Biol.* 2009;21(2):177-184. doi:10.1016/j.ceb.2008.12.010

Moulder SL, Yakes FM, Muthuswamy SK, Bianco R, Simpson JF, Arteaga CL. Epidermal growth factor receptor (HER1) tyrosine kinase inhibitor ZD1839 (Iressa) inhibits HER2/neu (erbB2)-overexpressing breast cancer cells in vitro and in vivo. *Cancer Res.* 2001;61(24):8887-8895.

Siddiqui S, Chopra R. EGFR: A Potential Target for the Treatment of Triple-Negative Breast Cancer. *Chemotherapy.* 2017;62(3):177-184. doi:10.1159/000452984

 totally false

# Disruptive Innovations

Energy: Animals, Water/Windmills, Steam Engines, Electricity

Transportation: Wheel, Train, Airplane, Autonomous Vehicles

Communication: Paper, Printing, Telegraph/Telephone, Internet, Mobile Phone, Smartphone

Biomedicine: Antibiotics, Recombinant DNA, PCR, CRISPR/Cas9

★ **Internet Tools: Google Search, Google Map, ChatGPT**

- Free and open for all: Promotes equality, raises the baseline.
- Low barrier to entry: Uses natural language.
- Paid versions are affordable.
- Blocking or restricting is ineffective.

# Competition: Human + AI >> Human

- Using new tools gives advantages (AI enhances efficiency and quality)
- One would not be replaced by AI, but by who masters AI.
- Competition among humans.
- AI is the new selection pressure (**Gemini**)
- AI raises the baseline competence ("floor"), but human input determines the limit of excellence ("ceiling"). (**Gemini**)
- Success depends on using the tool *well*, not just using it.

# AI Aversion

- Algorithm Intolerance: People have lower tolerance for algorithms than for humans.
- Double Standards: A human citation error is a "typo"; an AI error makes it "garbage."
- Romanticizing "Handmade": Believing only manual writing yields deep thought, ignoring AI as a "thinking partner."
- Exaggerating Risks: Fixating on AI hallucinations or leaks while overlooking similar human fallibilities.
- Irrational Gut Reaction: An emotional, non-rational response to new technology.

(Gemini/ChatGPT)

# AI is a tool directed by humans

- AI as a tool or an assistant
- Use AI well, but also know its limitations.
- RA/Tool are not reliable, make mistakes, need verification.
- Boss is responsible for mistakes by RA/Tool.
- AI is passive, only answers when asked.
- AI generated contents can only be presented by human (selection/judgement)
- Human in control of the tools.
- **Agentic AI: execution** in multistep task (human not in control at every step)

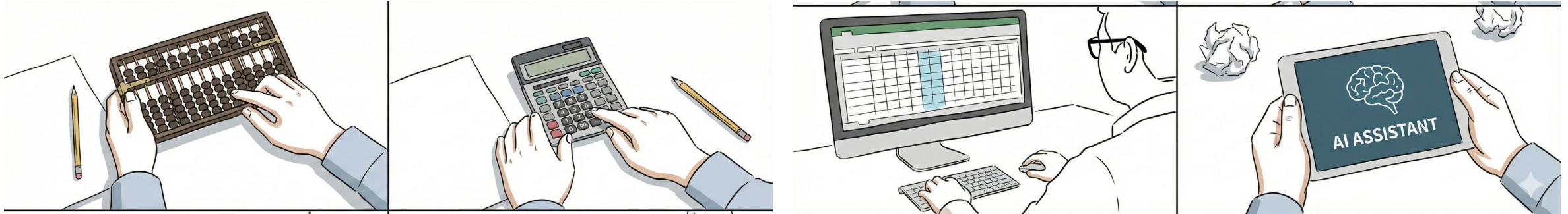


李弘毅: 解剖小龍蝦 — 以 OpenClaw 為例介紹 AI Agent 的運作原理  
<https://www.youtube.com/watch?v=2rcJdFuNbZQ>

Claude Code is safer

# Master your tool

Why stick to the past when new tool is available?



Gemini 3 Pro (Nano Banana Pro)

Using abacus has different levels

Same tool, different performance

Students can use AI for homework, but can have different level of outputs

Comparative: No correct answer. Only better answers.

# 要充分發揮AI 的功能

- 善待問者，如撞鐘，叩之以小者則小鳴，叩之以大者則大鳴 《禮記 學記》
- Make full use of AI. Use it more than just grammar.
- Treat AI as a knowledgeable, impartial senior colleague. Discuss everything with it.
- Discuss with AI from the very beginning of any project.

# To use or not to use AI?

## Individual perspective

- **The Conscientious:** use wisely to improve efficiency and competitiveness; focus mental energy on innovative thinking.
- **The Lazy:** loss of core competitiveness; easily eliminated

## Systemic Concerns

- **Spread of Misinformation:** Proliferation of errors and fake content.
- **Over-reliance:** erosion of skills
- **Verification Inertia:** As AI accuracy surpasses human experts, people become too lazy to verify, leading to deeper dependence.
- **Inequality:** AI amplifies individual differences, widening social stratification.
- **Distortion of Assessment:** Challenges in evaluating true merit in education and academia.

Prohibition is destined to fail. Society must **adapt**. (internet, mobile phone)

# Using new tool leads to **upgrade** of core capabilities

**Upgrade, not loss.**

## **Writing and Text (Gemini)**

- Socrates strongly opposed "writing." He believed that if people relied on written records, they would stop exercising their memory, eventually leading to "forgetfulness of the soul." Furthermore, text is passive and cannot generate wisdom like live debate.
- We "outsourced" memory to books, freed up the brain for higher-order thinking.

## **The Calculator (Claude)**

- Complex calculation ability declined, but students can now handle more complex application problems.
- Mathematics education shifted towards conceptual understanding and problem modeling.

## **Wikipedia/Google vs. knowledgeable (Gemini)**

- Simple knowledge memorization is elevated to:
  - Information verification and fact-checking.
  - Connecting knowledge

# Worry that some people will be lazy?

There are always lazy people.

Research is not for everyone

- "Revolution is not a dinner party" – Mao Zedong (some will get hurt)
- Inevitably, some will fail to keep up and be **selected out**.
- NSTC has no obligation to “leave no one behind” (grant passing rate ~30-40%)

Education: try to elevate everyone's core capabilities.

# In-depth reading original papers is important

Abstract of classics is like **skeletons**; details are the **flesh (essence)**.

- *Romeo & Juliet*: Boy and girl love each other. Family feud. Double suicide.
- AI excels at summarizing, extracting key points, establishing overall structure/big picture.
- But, "Devil is in the Details": in methodologies, data, interpretations, and uncertainty
- Scrutinizing these details often leads to true insights.
- AI summarization is **convergent** (to condense information)
- Reading original text is **divergent** (stimulating inspiration through association).

(Gemini)

Journal Club/Seminar: Ask students to read a paper carefully. Lead students to discuss how AI views the paper.

# Redefining the concept of writing

## Gemini

- Traditional: Humans think and write word-by-word.
- Generative AI: Writing becomes a process of "Prompting & Editing".
- The fundamental definition of "writing" is disrupted.

## Analogy

<u>Human</u>	<u>AI</u>
PI	PhD students, Postdocs
Architect	Bricklayers
Emperor	Ministers
Conductor	Symphony

Makes contributions, but not in command

(Gemini, ChatGPT)

# Summary I: Mindset facing GenAI

**Core** : Human in control. Use AI to assist.

Human + AI (cooperative, interactive) >> Human

- Human is responsible for AI-generated contents.

**Competitive nature** : human vs. human

- Tools determine advantage. Use tools well.
- AI elevates the baseline. But human determines the ceiling of excellence.

**Risk management** : Be aware of hallucination. Due diligence of verification.

**Transformation of ability** : elevation of core abilities.

(Gemini)

## II. How to use AI (General)

# Strongly recommend to use paid version

- ChatGPT (GPT-5.2)
  - Gemini (3 Pro)
  - Grok (3 Expert )
  - Claude (Sonnet 4.5)
  - Perplexity (研究)
  - DeepSeek v3.2
- } \$20 = NT650/month
- } Free version

- Use >1 paid AIs.
- Best CP value for your research.

All GenAI are progressing fast.

Rapid roll out of new models.

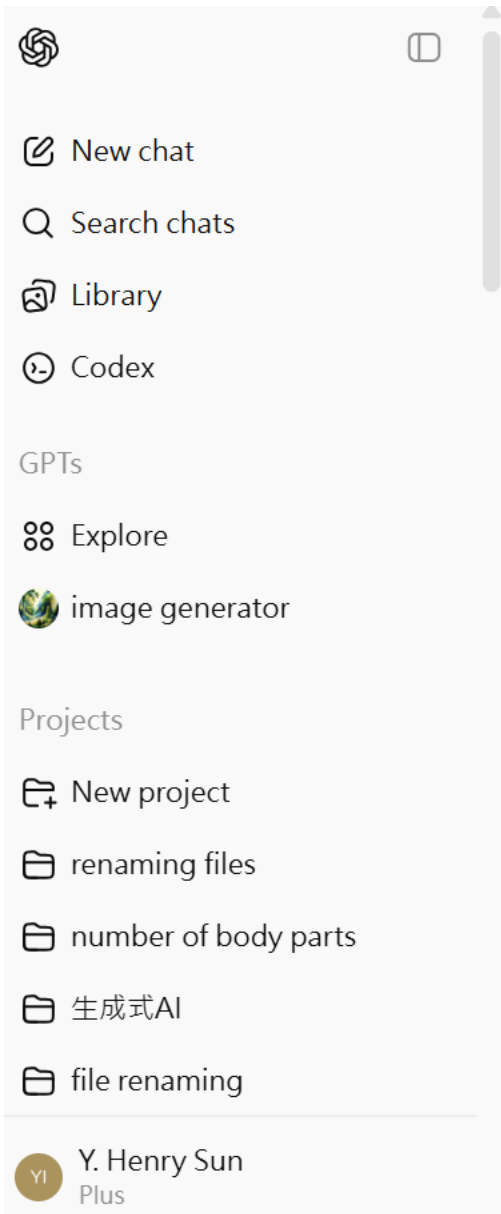
2026.2.5

- Anthropic released Claude Opus 4.6
- OpenAI released GPT-5.3-Codex



Mythos (Capybara)

# Keep chats out of training (ChatGPT)



The sidebar navigation menu includes the following items:

- New chat
- Search chats
- Library
- Codex
- GPTs
- Explore
- image generator
- Projects
  - New project
  - renaming files
  - number of body parts
  - 生成式AI
  - file renaming
- Y. Henry Sun Plus (highlighted with a red arrow)

ChatGPT 5 Thinking 5.2

Share

## How to keep our chats out of training

- Turn off training for your account: ChatGPT → Settings → Data Controls → Improve the model for everyone → Off. New chats won't be used to train models. [OpenAI Help Ce... +1](#)
- (Optional) Turn off Chat history in the same menu. When history is off, new conversations also aren't used for training and won't appear in your sidebar.

[OpenAI Help Ce... +1](#)

## What OpenAI says about your data

- Consumer ChatGPT (Free/Plus/Pro): You can opt out of training via Data Controls; you can export or delete your data at any time. [OpenAI Help Ce... +1](#)
- Business/Enterprise/EDU & API: By default, OpenAI does not use your inputs/outputs to train. You own your data; enterprise plans add retention controls. [OpenAI Help Ce... +2](#)
- Privacy Policy basics: It covers what is collected and your choices, and it



Ask anything

+ Thinking 5.2



ChatGPT can make mistakes. Check important info.

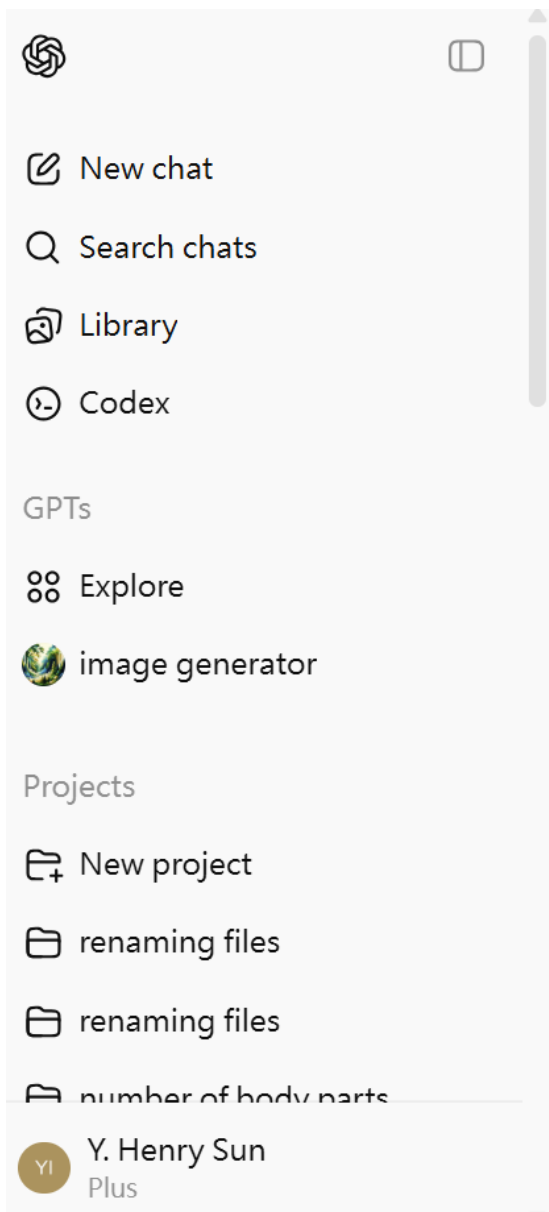
# Keep chats out of training (ChatGPT)













Also Gemini, Claude, Perplexity, Co-Pilot

The image shows a screenshot of the ChatGPT settings interface. On the left, a sidebar menu is visible with a red arrow pointing to the 'Settings' option. The 'Settings' menu includes 'Explore', 'image generator', 'yihenrysun@gmail.com', 'Upgrade plan', 'Personalization', 'Settings', 'Help', and 'Log out'. The user's profile 'Y. Henry Sun Plus' is shown at the bottom of the sidebar. The main content area displays the 'Data controls' settings. A red arrow points to the 'Data controls' option in the sidebar. The 'Data controls' section includes a toggle for 'Improve the model for everyone' which is currently set to 'Off'. Other options include 'Remote browser data' (On), 'Shared links' (Manage), 'Archived chats' (Manage), 'Archive all chats' (Archive all), 'Delete all chats' (Delete all), and 'Export data' (Export).

Setting	Value
Improve the model for everyone	Off
Remote browser data	On
Shared links	Manage
Archived chats	Manage
Archive all chats	Archive all
Delete all chats	Delete all
Export data	Export

# Temporary chat



- 
-  New chat
-  Search chats
-  Library
-  Codex
- GPTs
  -  Explore
  -  image generator
- Projects
  -  New project
  -  renaming files
  -  renaming files
  -  number of body parts
-  Y. Henry Sun  
Plus

ChatGPT 5 Thinking ▾




ChatGPT 5 Thinking ▾



## Temporary Chat

This chat won't appear in history, use or update ChatGPT's memory, or be used to train our models. For safety purposes, we may keep a copy of this chat for up to 30 days.

Ask anything

+  Thinking ▾



# How reliable is zero-retention and not-use-for-training?

Corporate promise is reliable (business reputation)

**But still has risks**

- Software bugs
- Human access for safety/abuse/legal issues
- Hackers

Avoid uploading sensitive/confidential information.

# Choice of different models of ChatGPT

The screenshot displays the ChatGPT interface with the model selection dropdown menu open. The current model is "ChatGPT 5.1 Thinking", indicated by a red arrow and the text "Model in use". The dropdown menu lists several options:

- ChatGPT 5.1 Thinking (selected, marked with a checkmark)
- GPT-5.1
- Auto (決定要思考多久)
- Instant (立即回答)
- Thinking (思考較長時間以取得更好的回答)
- 舊版模型 (Older models, indicated by a right arrow and a red arrow)

The "舊版模型" section includes the following models:

- GPT-5 Instant
- GPT-5 Thinking mini
- GPT-5 Thinking
- GPT-4o
- GPT-4.1
- o3
- o4-mini

The left sidebar contains navigation options: 新對話, 搜尋對話, 圖庫, Codex, GPT, 探索, image generator, 專案, 新增專案, renaming files, number of body parts, and Y. Henry Sun Plus.

# Selecting mode

ChatGPT 5 Thinking ▾



What's on the agenda today?

The image shows a sequence of three screenshots illustrating how to select the 'Thinking' mode in ChatGPT. The first screenshot shows the 'Ask anything' input field with a plus sign icon and a 'Thinking' dropdown menu. Red arrows point to the plus sign and the 'Thinking' dropdown. Below this is the label 'Upload files'. The second screenshot shows the 'Thinking' dropdown menu expanded, displaying 'Thinking time' options: 'Standard' (selected with a checkmark) and 'Extended'. The third screenshot shows the bottom right of the input field with a microphone icon and a 'Dictate' button. Red arrows point to the microphone icon and the 'Dictate' button. Below this is the label 'Voice input 語音交談'. The text 'Dictate 語音轉文字' is also present below the microphone icon.

Ask anything

+ × Thinking ▾

Thinking time

- Standard ✓
- Extended

Dictate 語音轉文字

Voice input 語音交談

# NotebookLM by Google

The screenshot displays the NotebookLM interface. On the left is the 'Sources' panel, in the center is the 'Dialogue' area, and on the right is the 'Studio' panel.

**Dialogue Area (Center):**

- Establish new notebook: self defined, specific, reliable domain knowledge)
- Search web to download
- up to 500 papers per notebook

新增來源即可開始使用

上傳來源

上傳來源即可開始使用 0 個來源

**Sources Panel (Left):**

來源

+ 新增來源

試用 Deep Research 取得深度報告和新聞來源!

在網路上搜尋新來源

已儲存的來源會顯示在這裡  
點選上方的「新增來源」即可新增 PDF、網站、文字、影片或音訊檔案。你也可以直接從 Google 雲端硬碟匯入檔案。

**Studio Panel (Right):**

工作室

語音... 影片...  
心智圖 報告  
學習卡 測驗  
資訊... 簡報  
資料表

工作室輸出內容會儲存在這裡。  
加入來源後，可生成音摘要、研讀指南、心智圖等內容!

新增記事

NotebookLM 提供的資訊未必正確，請查證回覆內容。

# NotebookLM by Google

→  
Info source  
Validation

The screenshot displays the NotebookLM interface. At the top, the document title is "Mammary Gland Evolution and MPSUs". The interface is divided into two main sections: "來源" (Sources) on the left and "對話" (Conversation) on the right. The "來源" section shows a source titled "Castano Leon 2010 Bilateral Familial ...". The "對話" section contains a conversation about the prevalence of supernumerary mammae (polythelia and polymastia) in humans, with a red arrow pointing to the word "Incidence" in the text. The interface also includes a search bar, a "重新整理" (Reorganize) button, and a sidebar with various tool icons.

來源

### Castano Leon 2010 Bilateral Familial ...

來源導覽

reported refer to the relationship between polythelia and

#### 454 CASE AND RESEARCH LETTERS

congenital renal and urinary tract malformations, such as adult autosomal dominant polycystic disease, unilateral renal agenesis, ectopic kidney, cystic renal dysplasia, and congenital dysplasia of the pelviureteric junction.4,6,8-10

The case of our patient is notable for the presence of bilateral familial supernumerary nipples at a distance from the typical location and apparently with no associated

systemic disease or congenital malformation. Nevertheless, when polythelia is detected, a detailed family history should be taken, a careful physical

對話

重新整理

The sources provide extensive data regarding the prevalence of supernumerary mammae (polythelia and polymastia) in humans, but note that the occurrence rates vary significantly depending on the study, ethnicity, and sex 1 ...

#### Incidence of Supernumerary Mammae (Polythelia/Polymastia)

Supernumerary nipples (polythelia) or accessory breast tissue (polymastia) are relatively common developmental abnormalities, resulting from the failure of the embryonic mammary ridge (or "milk line") to fully regress 2 ...

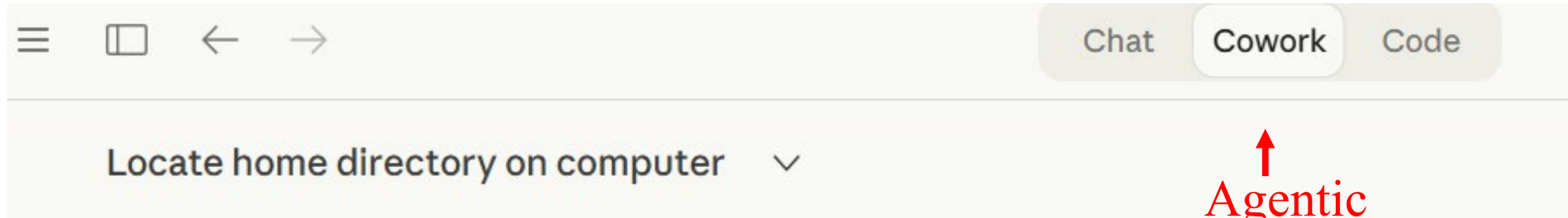
The reported incidence of these condit in humans generally ranges from **0.2% to 6%** of the population, depending on the cohort studied:

開始輸入... 151 個來源

Define polythelia and polymastia. What is the "one-half rule"? Which mammals show nipple number asymme

# Claude Pro

Download the Claude app => run on computer, not on mobile phone



↑  
Agentic  
(executions)

# Personalization (role playing)

ChatGPT 5 Thinking Share

## Personalization

Enable customization

Customize how ChatGPT responds to you. [Learn more](#)

ChatGPT personality Default

Set the style and tone ChatGPT uses when responding.

Custom instructions

Please be a scientist with rigor, providing only reliable answers with source information.

Chatty Witty Straight shooting Encouraging Gen Z

About you

researcher in biology (developmental biology, neuroscience, molecular biology)

ChatGPT can make mistakes. Check important info.

# Query and Response

Q: Which version of ChatGPT is free?



As of November 30, 2024, OpenAI offers a free version of ChatGPT that utilizes the GPT-4o model. This version provides access to advanced features, including web browsing, image analysis, and data insights. However, free users may encounter usage limits, such as a restricted number of messages within a specific timeframe. [OPENAI 帮助中心](#)

For those seeking enhanced capabilities, OpenAI offers subscription plans like ChatGPT Plus, which provide higher usage limits and priority access to new features. [OPENAI 帮助中心](#)

In summary, the free version of ChatGPT utilizes the GPT-4o model and includes various advanced features, but it does have certain usage limitations.

- Branch in new chat
- Read aloud
- Report message



Copy

Share Try again

References

# Techniques for Using AI

- Prompting: Ask the right questions; try different phrasing.
- Specify the attitude or persona AI should adopt.
- Evaluate the response, adjust the prompt, and ask follow-up questions.
- Don't be afraid to ask: AI doesn't judge; you can ask repeatedly.
- Consult multiple AIs to compare, critique, and debate their answers.
- Hallucinations rarely repeat - verify by asking again or asking different AIs.
- Always request source links for easy fact-checking.
- Provide context

# Context is more important than prompts

## Prompts

- Chain-of-Thoughts (think step-by-step)
- Now embedded in generative AIs

## Provide contexts (情境/脈絡)

- Feed relevant files, chat history, examples

## Key technologies

- Long Context Window
- RAG; Retrieval-Augmentation-Generation
  - Let AI go through references before answering
  - Solved two critical weakness: hallucinations, not up-to-date

# Many New AI tools for research

- SciSpace
- Jenni AI
- PaperPal
- AvidNote
- ResearchRabbit
- NotebookLM
- , , ,

## Summary II. How to use AI (general)

- Use paid version.
- Do not upload sensitive information.
- Ask. Follow up to ask more.
- Compare among AIs. Debate among AIs.
- Self-specified domain-specific knowledge: NotebookLM
- Provide context.

### III. How to use GenAI to assist **academic writings**

# Acceptable and un-acceptable human/AI contributions

Simple prompt. **Copy, paste and submit.**

- Please generate a research grant proposal on cancer biology.



Prompt with explicit and clear instructions. **Copy, paste and submit.**

- Based on my recent publications and CV, please follow the same line of thoughts to write a one-year research proposal with novelty and significance, following these guidelines.



Prompt with explicit and clear instructions. **Discuss with AI multiple rounds to revise** until **satisfaction**. Submit. **Human inputs and decisions**



**Analogy:** The Postdoc (AI) writes the draft based on the PI's research context. They discuss and revise back and forth. The PI (Human) reviews, approves, and submits under his name.

# Common weakness in research grants

## **Theme & Significance (Core Concept Issues)** Modified by Gemini/ChatGPT

- Insufficient breadth or depth in the literature review.
- Lack of a testable/falsifiable core scientific hypothesis.
- Unfocused: Scattered aims with weak logical connections.
- Inadequate explanation of scientific and clinical significance.
- Unclear competitive advantage; ignoring international competition.

AI can help at every step!

## **Research Design & Strategy (Methodological Issues)**

- Failure to justify the chosen method among available alternatives.
- Lack of proper control experiments.
- Experimental design is insufficient to yield clear answers.
- Inappropriate statistical methods.
- Missing justification for statistical power and sample size.

## **Feasibility & Management (Execution Issues)**

- Unrealistic timeline and resource estimates.
- Lack of risk assessments and alternative plans (Plan B).

# Examples of useful prompts (by ChatGPT)

You are a grants editor. Summarize the last 5 years of {topic}: (i) problem, (ii) mechanisms/tech, (iii) **resolvable gaps in 3–5y**, (iv) 5 fundable angles aligned to {FOA}, **each with a one-sentence hypothesis and measurable endpoint**. Return bullets with citation placeholders.”

Act as a **hostile reviewer**. List **top 10 criticisms** by category (Significance, Innovation, Approach, Investigators, Environment). For each, **propose fixes** (experiment, control, analysis, prelim data).

Rewrite these aims to (i) **one-sentence objective**, (ii) **2–3 aims each with hypothesis, rationale, innovation, approach, go/no-go, outcomes**, (iii) a **convergence statement**. Max 1 page.  
收斂、結語

Audit this Approach for blinding, randomization, inclusion/exclusion, sample-size justification, replication, key biological variables, authentication, data sharing. Output a table of gaps + suggested text.

Convert Abstract to **lay level (grade 8)** without changing claims; keep 150–200 words.

# Example: How to ask for critical comments

王介立醫師 FB 2026.2.9 FB (文長，僅摘要，請看原文，順便點讚追蹤) 批判文獻是否可靠 (自我檢驗)

批判性評估 (四大面向；每點都用「問題 → 文內證據 → 風險/影響 → 我需要看到什麼才放心」)

## (1) 假說與理論邏輯

- 問題：假說是否「事後補寫」？是否存在撒網式測量、再回頭挑顯著結果？
- 檢查：是否預先註冊主要終點？是否明確界定 primary vs secondary？是否大量生物標記/多終點？
- 你必須輸出：「最可能的合理機轉」與「最可疑的敘事跳躍」各 1-3 點 (各自附文內依據)。

## (2) 受試者與外推性

- 問題：受試者是否與宣稱對象一致？(健康人 vs 病患；一般人 vs 運動員；訓練程度、性別比例、年齡)

## (3) 研究設計與安慰劑

- 問題：隨機化與分派隱藏是否充分？

## (4) 測量工具與實務/臨床意義

- 問題：測量工具的信度/變異度如何？(test-retest reliability、CV、最小可偵測差異)

## 統計與資料完整性

- 樣本數與 power：是否事前估算？是否明顯 underpowered？
- 多重比較：有沒有校正？若沒有，哪些結果最像假陽性？

## 紅旗清單 (Red Flags, 越短越尖銳越好)

- 以條列列出所有你認為會讓可信度下降的點 (設計/統計/敘事/COI/外推)。

## 反向解釋

- 請提出 2-4 個「不需要補充品也能解釋結果」的替代解釋 (例如：期待效應、訓練/飲食控制差、學習效應、測試日狀態差、回歸平均等)，並指出文內有哪些線索支持/反對。

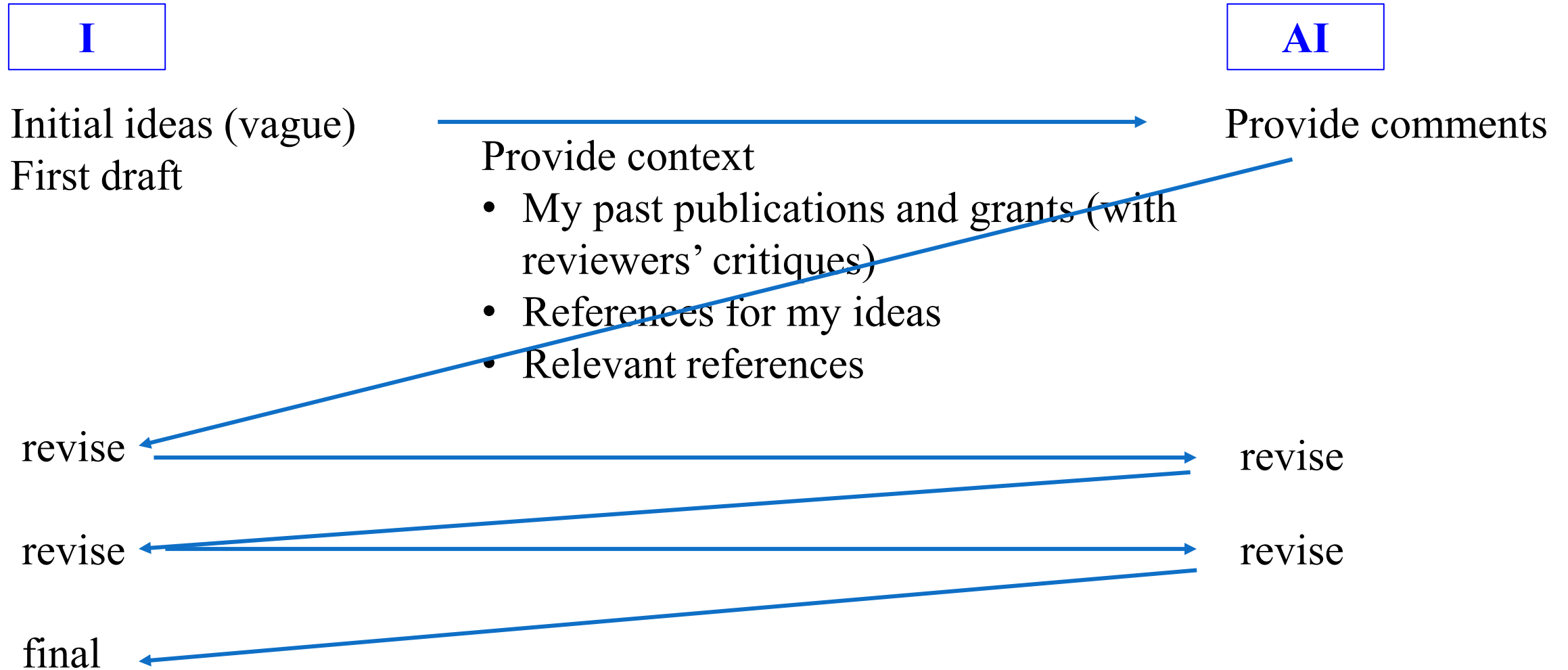
# How AI can help in academic writings

- Survey the literature, identify knowledge gaps, and assess significance and novelty
- Clarify thinking, organize structure, and distill key points
- Fill in missing pieces and strengthen the research routine (standard strategies, necessary experiments, required controls, sample sizes, common reviewer concerns)
- Improve writing and expression
- Spark cross-disciplinary connections and associations
- **Steady path, but not exciting/innovative.**
- Follow AI (routines) => 80分 (but **everyone** gets 80分) (raising the floor)
- To get to 90分 (ahead of others), need **human innovations** (determining the ceiling).

**Similar viewpoints (簡立峰):**

<https://www.youtube.com/watch?v=XHTfeCk0GwQ>

# Reciprocal interactions between AI and human



Requires multiple rounds of interactions.

# Commercial AI tools for academic writings

## AI Paper Mills

- “Use my **58-page ChatGPT prompt** — a complete, automated AI academic writing tool — **to generate entire research papers**, from Chapter 1 to Chapter 5, in just a few hours.”
- ThesisAI: “**One-prompt drafting** → generates structure, sections, and inline citations in seconds”
- There will always be people who cut corners/
- If fabricating data or citations => risk of research misconduct
- Some will inevitably get away with it.
- AI may help to detect in the future

# Acknowledging AI's help

## AI's Role Beyond a Tool or Assistant

- In grant/paper writing, AI acts more like a **senior colleague (mentor)** than a mere tool/RA.
- It engages in back-and-forth debate, detects blind spots, clarifies structure, summarizes key points, offers advice, polishes writing, and even proposes new ideas.

However:

- AI only **passively responds** to prompts and **lacks research intent or accountability**.
- A mentor advises but **does not ask for credit**.
- Ultimately, I make the final judgments, finalize the text, and bear full responsibility.
- If a human contributed this much, they would be listed as a co-author.
- Since **AI cannot be a co-author**, we can only disclose its contribution and acknowledge it.

# Guidelines for using GenAI

- AI cannot be an author: GenAI cannot assume legal responsibility for a work.
- **Disclosure**: The use of GenAI must be stated in the **Methods/Acknowledgments** section.
- No AI-generated **images/videos**: AI-created schematics or graphical abstracts are prone to errors. **Exception**: if the article specifically discusses generative AI and has editorial permission.
- Statistical charts (e.g., line or bar graphs) generated for data analysis must be strictly verified for accuracy.
- **Prohibited for peer review**: violates confidentiality agreements.
- Do not upload sensitive data: e.g. confidential data from industry-academia partnerships; unpublished data from collaborators; clinical data involving patient personal information.

## **Non-generative** AI (e.g. AlphaFold)

- As tool/method, should describe conditions/parameters in detail (Reproducibility)

# Disclosure of GenAI usage

Use of GenAI should be disclosed in Methods (tool) or Acknowledgment (assistant)

## *Elsevier: Generative AI policies for journals*

‘Declaration of Generative AI and AI-assisted technologies in the writing process’ (above References section)

*“During the preparation of this work the author(s) used [NAME TOOL / SERVICE] in order to [REASON]. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.”*

My suggestion:

The **conception and writing** of this grant/paper is **assisted** by AI (Gemini 3 Pro and ChatGPT 5.2 Thinking). Reiterative discussions with AIs helped the author to clarify logical structure and identify blind spots. ***The author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.*** **Our complete discussion history with AIs demonstrating my commanding role is available upon request.**

# Some journals require listing the full prompts

*Science Journals* (not required by all journals)

*“**The full prompt** used in the production of the work, as well as the AI tool and its version, should be disclosed.”*

Thorp and Vinson (2023) Change to policy on the use of generative AI and large language models

<https://www.science.org/content/blog-post/change-policy-use-generative-ai-and-large-language-models>

“For transparency and reproducibility, the full prompt used to steer GPT-4.1 is provided in Appendix A.”

# Directly quoting GenAI-generated text

“As an artificial intelligence language model, ChatGPT does not have legal ownership or copyright over the generated text or figures it produces.” (ChatGPT, personal communication, April 21, 2023) 或

<sup>1</sup> Text generated by ChatGPT, April 21, 2023, OpenAI, <https://chat.openai.com/chat>.

<sup>2</sup> ChatGPT.

# Why do we worry about **others** using GenAI?

## If Researchers Follow the Guidelines:

- Ensure the accuracy, authenticity, and completeness of AI-generated content.
- Take full responsibility for the content.
- Prevent the leakage of confidential or sensitive information.
- Avoid research misconduct (e.g., fabrication, falsification, or plagiarism).
- Disclose the use of AI.

## Then, what is the problem with using AI?

Why do I believe **I** can use it responsibly, yet worry that **others** will use it irresponsibly?

## **Gemini**: Asymmetry of Trust

I know I am the "Executive Chef", but others may just microwave the food.

## **The key of our worry: Is human in control?**

**Proof that you are in control: save all record of interactions with AIs, with timestamp.**

# Writing a grant by simple command?

Please write a 5-page 3-yr research grant proposal on cancer biology.

**Format:** NIH R01 Style (Specific Aims + Research Strategy).

**PROJECT TITLE:** Enforcing Differentiation: Reactivating Embryonic Robustness Checkpoints to Suppress Metastatic Plasticity in Pancreatic Ductal Adenocarcinoma

Our **central premise** is that PDAC progression is not merely a loss of growth control, but a **loss of developmental robustness**.

Therefore, we **propose a paradigm shift**: rather than killing the cancer cell, we aim to **force it to grow up**.

**Our Central Hypothesis:**

We will test this hypothesis through three specific aims:

Aim 1: Map the divergence between embryonic plasticity and malignant plasticity.

We will perform comparative single-cell multi-omics (scRNA-seq + scATAC-seq) on murine embryonic pancreatic buds (E12.5–E15.5) and KPC mouse tumor organoids. We aim to identify the specific cis-regulatory elements that are open in the embryo to enforce differentiation but closed in the tumor, creating a "Differentiation Blockade Map."

# Writing a grant by simple command?

Lacking experimental details (**similar to many grants**)

**Follow-up:** This is very nice. Please provide the experimental details on how to identify the specific cis-regulatory elements that are open in the embryo to enforce differentiation but closed in the tumor.

## Experimental Design : Approach for Aim 1

### 1. Platform & Sampling Strategy

To directly link chromatin state (cause) with gene expression (effect), we will not perform scRNA-seq and scATAC-seq separately. Instead, we will use the Single-cell Multiome ATAC + Gene Expression (10x Genomics) technology . This allows simultaneous measurement of both parameters within the same nucleus, eliminating artifacts caused by the computational integration of two independent datasets.

- Group 1 (Physiological Baseline): Embryonic Pancreas (E12.5, E13.5, E14.5, E15.5). These time points cover the critical window from progenitor expansion to endocrine/exocrine lineage commitment.
- Group 2 (Pathological Blockade): KPC Organoids (derived from early-stage and advanced-stage tumors).
- Data Scale: We expect to collect 5,000–8,000 high-quality nuclei per time point/condition

**Follow-up:** how to judge whether a chromatin region is highly accessible or closed?

Require multiple rounds of follow-up prompts and revision to get a decent grant proposal.  
Human always in command.

# Commercial AI tools for academic writings

## AI Paper Mills

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# When everyone uses AI to assist in writing grants

- Serious & Good => Better (85分 => 90分)
- Serious & Poor => Improved (75-80 => 80-85分)
- Lazy & Poor => Improved (60-70 => 70-80分)

## Gemini

From excellent to perfect.

From mediocre to excellent.

Raising the baseline (floor).

} Worth encouraging  
← Troubles

## Score inflation and homogenization (Gemini)

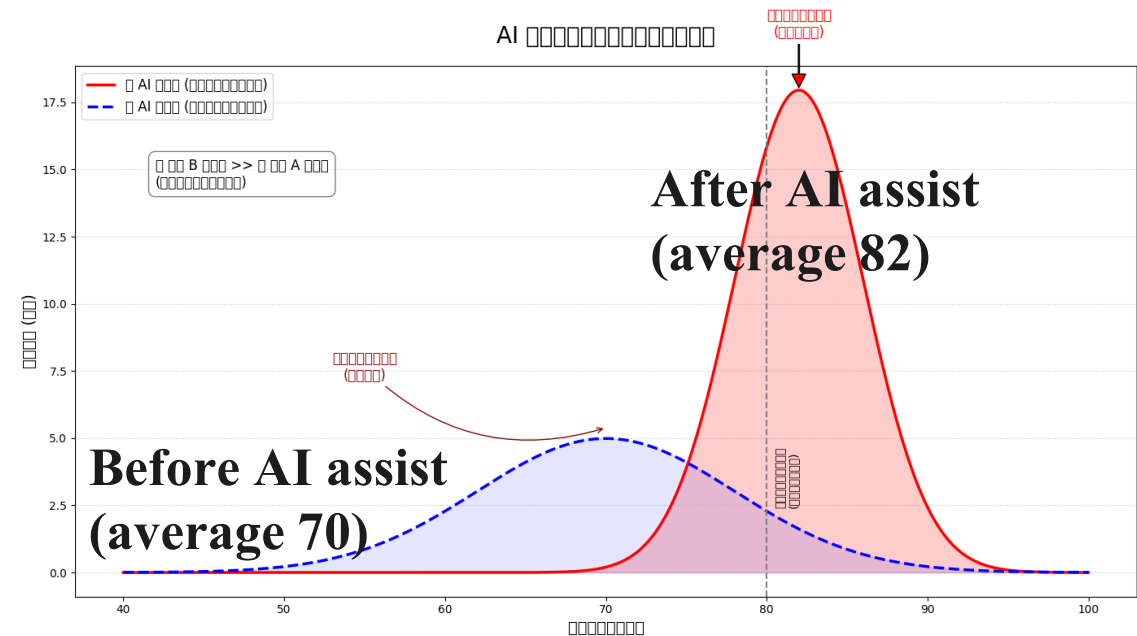
### For Serious Researchers:

- Increased competition demands true innovation to lead, stimulating creativity.
- Heavy burden of verification (errors are unacceptable).

### For Lazy Researchers:

- Relying on AI ghostwriting without critical judgment.
- Proposals lack necessary research details => low score => Eliminated.
- Caught with AI-generated errors => Eliminated.

Gemini => Python code => Google Colab



# Summary 3 How to use GenAI to assist academic writings

- **Clarify thinking, identify key points, and organize structure**
- **Iterative back-and-forth discussion**
- **AI as a critical reviewer**
- **Different AI tools offer diverse perspectives**
- **The researcher must judge the accuracy, structure, logic, and selection of AI-generated content**
- **Follow guidelines and regulations**
- **Disclose AI use**
- **Keep records of all AI interactions (to demonstrate your own substantive creative contribution)**

## IV. Ethical issues in using GenAI for **academic writings**

# Research ethics issues AI may involve

- Plagiarism (stealing?)
  - Authenticity of Results (cheating?)
    - AI hallucination
    - Fake references
    - Directly use GenAI-generated figure (error-prone)
- } Human take responsibility
- Regular ethics guidelines
  - Tools are neutral: can be used for good or ill.
  - Humans are the operators and bear the ultimate responsibility, not the tool.
  - AI makes detecting misconduct much harder.
  - Don't risk it! May be detectable in the future!

# AI-generated figures are erroneous

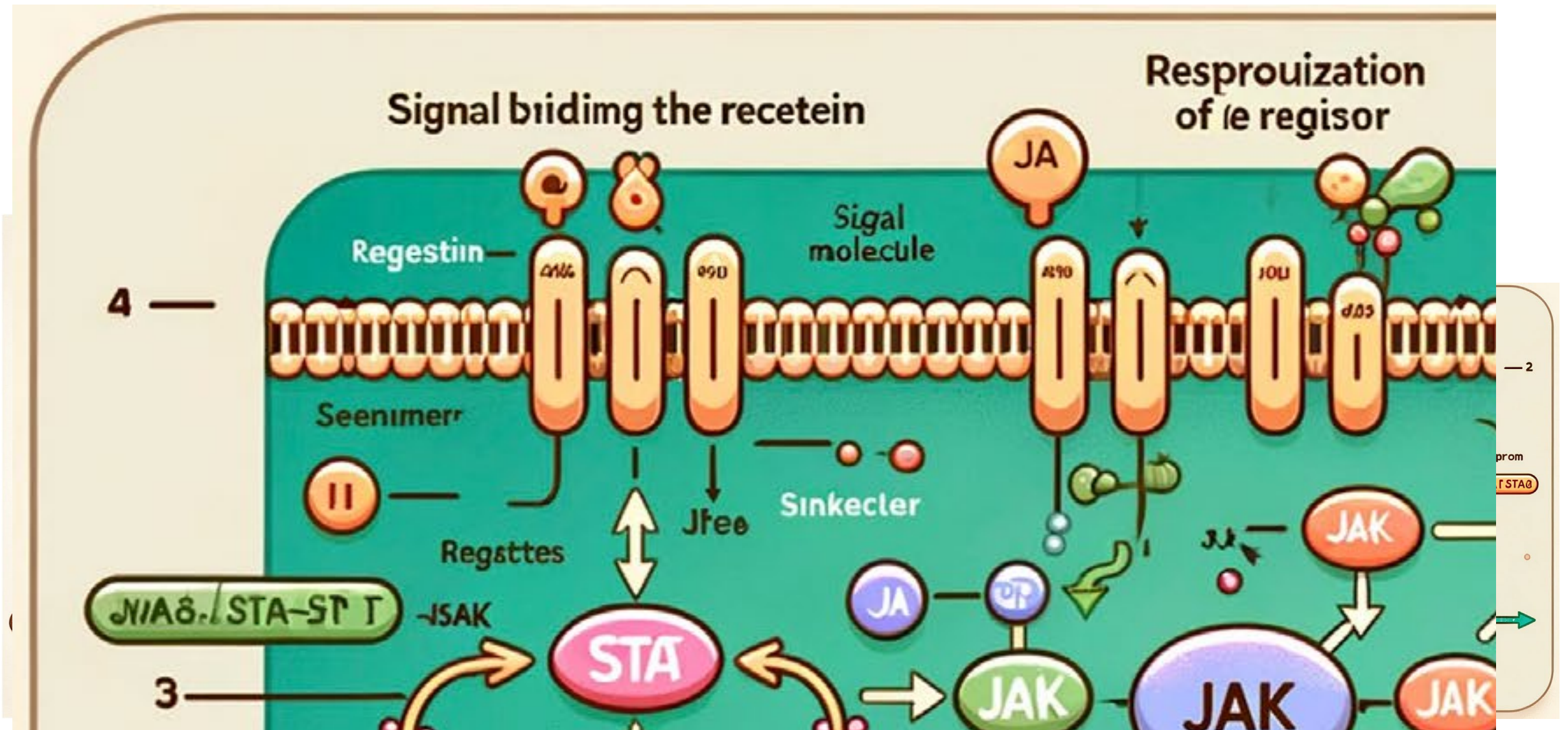


FIGURE 1 Spermatogonial stem cells, isolated, purified and cultured from rat testes.

FIGURE 2 Diagram of the JAK-STAT signaling pathway

# Fake references

**University of Hong Kong professor steps down from associate deanship after AI-generated references scandal**

*used **non-existent publications** generated by AI in its **references***

(Kelly Ho, HK Free Press, 2025.12.18)

**Resigned from administrative position**

**Fake references in Ph.D. thesis**

**論文虛構書目、引用錯漏 政大博士生認錯**

2026/03/14 05:30 記者林曉雲

校方已先行將該論文自資料庫下架，並啟動學術倫理審議程序進行調查。

No cases of research misconducts due to fake references.

# How to Avoid Fabricated References and Graphics?

## How to Avoid Fabricated References

- Ask the AI to provide sources with links and DOIs for easy verification.
- Ask AI (or a second AI) to verify the references — e.g., "Please confirm whether the cited references in this paper are real, and whether their content matches the context in which they are cited."
- Always manually double-check using tools such as Google Scholar, PubMed, Consensus, and Scite.
- Provide the AI with a real reference database to work from.
- Example prompt (Gemini):
  - Each reference must include title, author(s), year, journal name, and a valid DOI. If you cannot find a matching reference in a real database, simply say 'not found' — fabrication is strictly prohibited.
  - Prioritize sources indexed in Google Scholar or PubMed.

## How to Avoid Fabricated Images

- Zoom in and carefully inspect the image — pay particular attention to any text within it.
- If errors are found, correct them, but disclose in your submission that AI-generated content was involved and edits were made.

# How to handle fake contents generated by AI?

**Fake results: undermine research conclusions; fabrication or falsification; misconduct**

**Fake references and graphics:**

- Essential citations or graphics:
  - serious academic misconduct — even if unintentional
- Non-essential citations or graphics:
  - No serious damage, but the paper's credibility is compromised
- GenAI is a new tool and clear guidelines in using GenAI is not widely known.
- I recommend **administrative handling: revision, rejection, or retraction, but not misconduct.**
- Analogy: A new instrument that has not been properly calibrated produces erroneous data that ends up in a published paper. The researcher bears responsibility for the error — but no deliberate intent to deceive.

# Is AI plagiarizing?

- **Not direct copying:** ChatGPT generates text based on common syntax from its training database, not by directly copying text. (still, be cautious)
- Synthesizing general concepts and expressing them in your own words, not considered plagiarism.
- **Deliberate paraphrasing (entire paragraph or article) is plagiarism:**
  - Hard to detect now, but maybe in the future. Don't risk it!.

# Can we distinguish AI and human-generated contents?

AI generated contents seem to have some style. Possible to distinguish?

- Detection is speculative: cannot provide 100% proof. (not reliable in court)
- OpenAI's Classifier was permanently taken down in 2023—"Even the maker of the spear cannot forge the shield". (矛盾)
- An arms race.
- I do not expect effective and reliable detection tools to be developed (ever).

## Need to distinguish?

- The Bottom Line: **Authors** are solely responsible for the authenticity of the content.
- Who actually wrote it is unimportant (discussed in the next chapter)

# Tortured phrases: suspected AI-usage

Cabanac et al. (2021) Tortured phrases: A dubious writing style emerging in science: Evidence of critical issues affecting established journals [arXiv:2107.06751](https://arxiv.org/abs/2107.06751) [cs.DL]

Tortured phrase found in publications	Correct wording expected
profound neural organization (fake   counterfeit) neural organization versatile organization organization (ambush   assault) organization association	deep neural network artificial neural network mobile network network attack network connection
(enormous   huge   immense   colossal) information information (stockroom   distribution center)	big data data warehouse
(counterfeit   human-made) consciousness	artificial intelligence (AI)
elite figuring haze figuring	high performance computing fog/mist/cloud computing
designs preparing unit focal preparing unit	graphics processing unit (GPU) central processing unit (CPU)
work process motor	workflow engine
facial acknowledgement discourse acknowledgement	face recognition voice recognition
mean square (mistake   blunder) mean (outright   supreme) (mistake   blunder)	mean square error mean absolute error
(motion   flag   indicator   sign   signal) to (clamor   commotion   noise)	signal to noise
worldwide parameters	global parameters
(arbitrary   irregular) get right of passage to (arbitrary   irregular) (backwoods   timberland   lush territory) (arbitrary   irregular) esteem	random access random forest random value

# How to tell the use of AI?

**Step2** : The value of  $L$  is found by the principle of balance.

**Step3** : Substituting Eq. (5), with Eq. (6) into Eq. (4), we obtain a polynomial expression that depends on the Jacobi elliptic function  $\mathcal{Z}(\chi)$ . By equating the coefficients of  $\mathcal{Z}^l(\chi)$ ,  $\{l = 0 - 7\}$  equal to zero, we obtain a system of equations. We solve this system to find the unknown parameters. The solutions of Eq. (5) are represented in Table [1] based on the values of the parameters  $s$ ,  $c$  and  $r$ :

→ Regenerate response

→ As an AI language model, there is no access to the specific database details of any particular research study. However, in general, a well-designed database for a hydroponics system should include the following:

**Retracted:** “the use of an LLM in the drafting of this work was **not declared** by the authors upon submission, **in violation of IOP Publishing’s ethical policy**”

<https://iopscience.iop.org/article/10.1088/1402-4896/aceb40>

# Is Disclosure Meaningful?

- A temporary "**Gut Reaction**": an urge to simply "**do something**" when facing a disruptive new technology.
- **Pacification Ritual**: Institutions (journals, funders) establish the rule not to solve the problem (which they don't know how to do yet), but to signal: "We noticed this, and we are in control".
- Disclosure assumes we can cleanly distinguish between "human-written" and "AI-written" text, but this assumption does not stand.
- **Punishing the Honest**: creates moral dilemma for researchers: whether disclosure results in bad image; to disclose or not?
- **Shift from "Process" to "Accountability"**: academia ultimately cares about the accuracy of the output, not the writing process.
- The only declaration truly needed is: "**I take full responsibility for the accuracy of all data and arguments herein**".

(Gemini)

# Historical Evolution of Disclosing Methods/Tools

## Gemini

### Polymerase Chain Reaction (PCR)

- Past: Researchers had to detail temperatures and times for every step (denaturation, annealing, extension) in the "Materials and Methods", justify using Taq polymerase, and cite Kary Mullis's original paper to prove reliability.
- Present: "Genotyping was performed by PCR." Simply listing the primer sequences is sufficient.

### Basic Local Alignment Search Tool (BLAST)

- Past: Required detailed explanations of the algorithm, gap penalties, and citations of the classic paper to justify the statistical significance of the alignment.
- Present: "We BLASTed the sequence...". Typically, only the database version is mentioned.

"Must prove validity" => "Implicitly accepted validity" (no disclosure needed)

10% usage

Defensive Mindset

Disclosure Required

=>

=>

100% usage

Acceptance & Default

Disclosure Not Required

# Is undisclosed AI use a research misconduct?

## Undisclosed AI Use (**Without Fabrication or Plagiarism**)

- **Violation of agreements** between researchers and journals or funding agencies
- **Transparency & reproducibility:**
  - For AI-generated or simulated data, schematics, or code
  - an issue of the "data source," not the "form of expression".
  - tools, methods, and parameters used should be fully detailed
- Failure to disclose => revision, rejection, retraction (**administrative actions**)
- **Analogy:** Failing to specify the source of a cell line leads to rejection, not an ethics investigation.

# Requiring disclosure creates ethical dilemmas

Users:

- Will disclosure make reviewers think I am lazy? Could it work against me?

Reviewers:

- If a submission appears to have used AI assistance, should this be investigated?
- Should I use AI to help with peer review? “

53% reviewers already using AI to assist reviewing (Frontiers, 2025)

NSTC

- Many (applicants, reviewers) probably used AI without disclosure. Should we investigate?
- Pursuing such cases would create a significant administrative burden

**My view:** Mandatory disclosure is of limited value, largely unverifiable, and creates unnecessary burden for all parties involved. I recommend against pursuing it too rigorously.

# Research misconducts caused by AI

- Fake data
  - Fake references
  - Plagiarism
  - **Non-disclosure of AI use: administrative measures**
- } Following regular research ethics guidelines

# Why do funding agency worry?

If researchers follow all AI guidelines, why do funding agencies worry?

- Overloading the review system
- Originality comes from human or AI?
  - PI should have substantial innovative contributions (**Is human in control?**)
- Judgement on execution ability

# Reviewers should focus on the merit, rather than the person

- Government-funded research is **outcome-driven**.
- Reviewers should only evaluate whether the content is reliable, feasible, executable, and worthy of funding. Not worry about who wrote it.
- In highly collaborative and division-of-labor research: ideas, execution, and writing may come from different contributors — students, postdocs, assistants, collaborators, vendors, or AI.
- PI oversees the process, coordinates all parties, integrates, makes trade-offs, decides, and controls quality. The PI is the driving force.
- AI is a new member of the research team — carries neither credit nor responsibility.
- Any finding of false content (fake references, information, or data) constitutes fabrication/falsification (an academic ethics violation).
- PI takes full responsibility.

# Impact on the Review Process

- **Lower Writing Costs (Time & Effort):**
  - Increase in grant submissions => heavier burden on reviewers => limiting number of allowed submissions
- **Reduced Discriminability:**
  - Both relief and concern for the reviewers
  - "In the past, bad grammar and disorganized logic were useful 'signals' for a bad grant. Now AI removes these signals." (Gemini)
  - Much harder to verify authenticity and identify true innovation.
  - Reviewers should emphasize more on the PI's execution ability, assess logical rigor, value and innovation.

Should we use AI to assist in the review process?

# Using AI to help in reviewing

*Frontiers* journals: AIRA (Artificial Intelligence Review Assistant)

- To reduce reviewers' burden on administrative and verification
- Detecting misconduct and fraud:
- Conflict of interest screening
- Compliance and ethics checks
- Language and basic quality assessment:
- **Does not make Accept or Reject decisions**

(Gemini)

Internal, within-firewall, AI

# SUMMARY

- AI is a disruptive innovation — unstoppable.
- Human + AI >> Human alone.
- Failing to leverage AI will be left behind. (harsh reality)
- AI can assist at every stage of the research process. Use from the beginning.
- AI raises the floor; raising the ceiling depends on human creativity.
- Tools are neutral. Researcher bears full responsibility for AI-generated content.
- Research is collaborative and multidisciplinary — AI is a new member of the team.
- Reviewers should focus on innovation, feasibility, and chance of success — not who (or what) wrote the proposal.
- Mandatory disclosure of AI use are largely ineffective and create unnecessary friction.
- AI is currently prohibited from peer review, though this may be relaxed in the future.

While  
**INTELLIGENCE**  
is becoming  
artificial,  
**STUPIDITY** will  
always remain  
**ORIGINAL**

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感謝聆聽，歡迎指教討論

