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AI-Assisted Science Communication in Agri-Food

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Quick poll

Do you use AI tools in your work?

For what?

How much do you trust the output?

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Why science communication matters in agri-food

1. Bridging science and society
   Making scientific knowledge understandable and accessible beyond academia.
2. Supporting evidence-based decisions
   Helping farmers, food producers, consumers and policymakers make informed choices.
3. Building trust in science
   Addressing misinformation, explaining uncertainties and communicating research transparently.
4. Accelerating innovation and sustainability



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Who are we communicating with?



Researchers



Farmers



Food industry



Consumers



Policymakers and public authorities

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CASE

One finding, three readers

THE FINDING

Fermented oat-based gels can work as a plant-based yoghurt alternative. Texture drove consumer liking, and information about added oat protein raised purchase intention.

Researchers

Focus: mechanism, methods

“ The gels were soft fluid gels structured mainly by heat-induced starch gelation. Total solids had the strongest effect on rheology, and texture drove acceptability.”

Food industry

Focus: product, process

“ Solids and native starch content set firmness and water holding. Sweet, soft and smooth samples were liked most – and a protein claim may help sales.”

Consumers

Focus: taste, health

“ Can oats make a good yoghurt? People liked fermented oat gels best when they were sweet, soft and smooth – and were keener to buy them with extra oat protein.”

Brückner-Gühmann, Banovic & Drusch (2019) Food Hydrocolloids 96, 201–208 · doi:10.1016/j.foodhyd.2019.05.016 · versions drafted with AI

Useful helper, unreliable exprt

Does well

- Adapts text for different readers
- Writes plain-language summaries
- Translates
- Suggests titles, posts and analogies
- Gives a fast first draft

Goes wrong

- Invents references and numbers
- Overstates what the study showed
- Drops limitations and nuance
- Sounds generic – “ AI style”
- Unpublished data may leave your hands

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Check the AI against the source

The prompt

“ Summarise this abstract for consumers in 80 words. Then list each claim you made and the sentence in the abstract it comes from.”



Consumer-friendly summary (80 words)

Proteins from peas and milk can work together to keep foods such as sauces and dressings mixed and stable. Researchers found that combining pea protein with whey or casein proteins produced emulsions that remained stable during 14 days of storage, while some emulsions made with individual proteins showed signs of separation. The study also showed that proteins compete and exchange places at the boundary between oil and water. Understanding these interactions could help develop more stable food products using blended protein ingredients.

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List each claim

Claim in the summary	Supporting sentence(s) in the abstract
Proteins from peas and milk can work together to stabilise emulsions.	Sentence 2: "Here we use blends of pea protein isolate (PPI) with whey protein isolate (WPI) or with sodium caseinate (SC) to physically stabilise emulsions…"
The research concerns foods such as sauces and dressings.	**Not explicitly stated.** These are illustrative examples of emulsions, not products investigated in the study.
Blended proteins produced emulsions that remained stable for 14 days.	Sentence 5: "PPI- and SC-stabilised emulsions showed some physical destabilisation … whereas emulsions stabilised by the blends … remained stable…"
Some emulsions made with individual proteins showed signs of separation.	Sentence 5: "PPI- and SC-stabilised emulsions showed some physical destabilisation (e.g., flocculation and coalescence, respectively) over 14 days of storage…"
Proteins compete and exchange places at the oil–water boundary.	Sentence 7: "More specifically, whey proteins were able to partly displace pea proteins from the interface, which were themselves able to displace SC."
The findings could help develop more stable food products.	Sentence 8: "Such considerations are usually not taken into account in food emulsion formulation, even though they are very relevant, as the interfacial layer protects emulsions droplets against physical destabilisation."

A scientific accuracy note: The study investigated model emulsions, not finished sauces or dressings. The consumer summary therefore uses these products only as familiar examples, not as tested applications.

Check the AI against the source

The prompt

“ Summarise this abstract for consumers in 80 words. Then list each claim you made and the sentence in the abstract it comes from.”

Consumer-friendly summary (80 words)

Proteins from milk and plants can keep oil and water mixed in foods. Researchers tested pea protein, two milk proteins (whey and caseinate), and 1:1 pea–milk blends. Milk proteins gave the smallest oil droplets, pea protein the largest, and blends fell in between. Over two weeks, pea protein alone and caseinate alone showed some droplet clumping or merging, while the blends stayed stable. At the droplet surface, the proteins partly pushed each other aside within days, which can affect stability.

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#	Claim in summary	Source	Notes
1	Proteins from milk and plants can keep oil and water mixed in foods	S1 ("Proteins from animal and plant sources are known to be able to physically stabilise emulsions…"); "foods" from S9	S1 says "animal". I narrowed it to "milk" because the only animal proteins tested were dairy.
2	Researchers tested pea protein, whey, caseinate, and 1:1 pea–milk blends	S2 ("Here we use blends of pea protein isolate (PPI) with whey protein isolate (WPI) or with sodium caseinate (SC)…"); 1:1 ratio from S4	Single proteins tested as well, per S3.
3	Milk proteins gave the smallest droplets, pea the largest, blends in between	S4 ("The d3,2 and surface load… were the lowest for SC- and WPI-stabilised emulsions, and the highest for PPI-stabilised emulsions… blends (1:1 ratio) had intermediate d3,2 values…")	d3,2 is a mean droplet diameter. I left out surface load.
4	Pea alone and caseinate alone showed some clumping or merging over two weeks	S5 ("PPI- and SC-stabilised emulsions showed some physical destabilisation (e.g., flocculation and coalescence, respectively) over 14 days of storage…")	Clumping = flocculation (pea); merging = coalescence (caseinate).

5	The blends stayed stable	S5 ("…whereas the WPI-PPI or SC-PPI blends formed emulsions that remained stable, suggesting synergistic effects.")	I left out "synergistic", which the authors state as a suggestion, not a demonstrated effect.
6	The proteins partly pushed each other aside at the droplet surface within days	S6 ("…compositional rearrangements at the interface occurred within days."); S7 ("whey proteins were able to partly displace pea proteins… which were themselves able to displace SC.")	Simplified. The summary omits the order (whey > pea > caseinate) and the S8 condition that displacement only happened with a large excess of the displacing protein.
7	This can affect stability	S9 ("…the interfacial layer protects emulsions droplets against physical destabilisation.")	The abstract does not directly link the rearrangements to the stability results. This is an implied connection, so I used "can".

The biggest simplification is claim 6. If you have room to go above 80 words, adding "only when one protein was present in large excess" would make it more accurate.

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When AI gets it wrong

Retracted article 1

frontiers | Frontiers in Cell and Developmental Biology

TYPE Review
PUBLISHED 13 February 2024
DOI 10.3389/fcell.2023.1339390

Check for updates

OPEN ACCESS

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Guo X, Dong L and Hao D (2024). Cellular functions of spermatogonial stem cells in relation to JAK/STAT signaling pathway. *Front. Cell Dev. Biol.* 11:1339390. doi: 10.3389/fcell.2023.1339390

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RETRACTED: Cellular functions of spermatogonial stem cells in relation to JAK/STAT signaling pathway

Xinyu Guo[1], Liang Dong[2] and Dingjun Hao[1]*

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This manuscript comprehensively reviews the interrelationship between spermatogonial stem cells (SSCs) and the JAK/STAT signaling pathway. Spermatogonial stem cells in the testes of male mammals, characterized by their self-renewal and pluripotential differentiation capabilities, are essential for tissue regeneration, immunomodulation, and advancements in regenerative medicine. This review delves into the historical background and biological characteristics of SSCs, with a particular emphasis on the pivotal role of the JAK/STAT signaling pathway in their proliferation, maturation, and differentiation processes. Research indicates that the JAK/STAT pathway extensively influences various functionalities of spermatogonial stem cells, encompassing immunomodulation, tissue differentiation, homing, and adaptation to the microenvironment. Herein, we collate and dissect related studies, shedding light on the intricate dynamics between SSCs and the JAK/STAT signaling pathway, and examine the implications of these interactions on the biological attributes and functionalities of SSCs. Furthermore, the review discusses the profound implications of these findings for preclinical research and the domain of cellular engineering. It is acknowledged that, despite advancements in the research of SSCs and the JAK/STAT signaling pathway, investigations in humans and larger mammals remain inadequate, necessitating more in-depth exploration to establish a comprehensive theoretical framework. Overall, this review offers an invaluable reference for deciphering the mechanisms of the spermatogonial stem cell signaling pathways and establishes a theoretical groundwork for related preclinical research.

RETRACTED

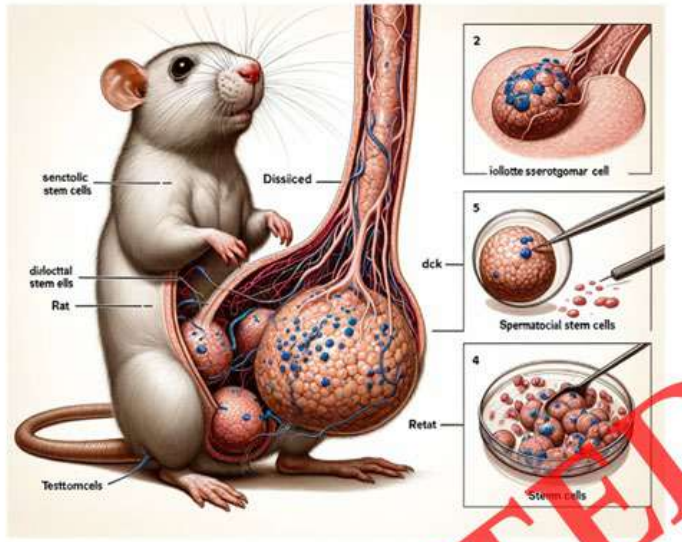
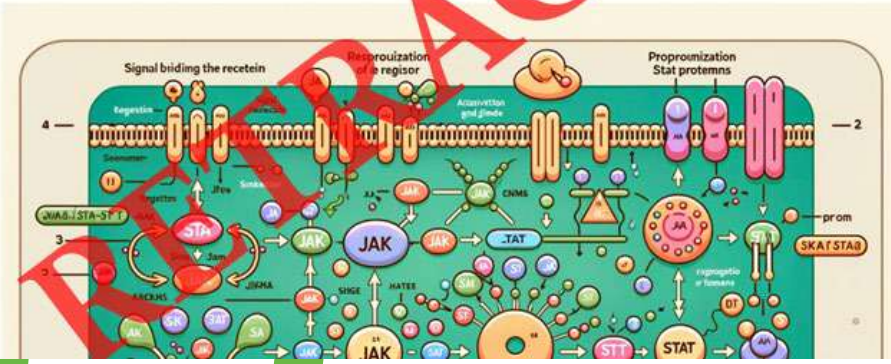


FIGURE 1
Spermatogonial stem cells, isolated, purified and cultured from rat testes.



RETRACTED

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Retracted article 1

This article is a retraction of:

RETRACTED: Cellular functions of spermatogonial stem cells in relation to JAK/STAT signaling pathway

Read original article >

A Retraction of the Review Article

Cellular functions of spermatogonial stem cells in relation to JAK/STAT signaling pathway

by Guo X, Dong L and Hao D (2024). Front. Cell Dev. Biol. 11:1339390. doi: **10.3389/fcell.2023.1339390**

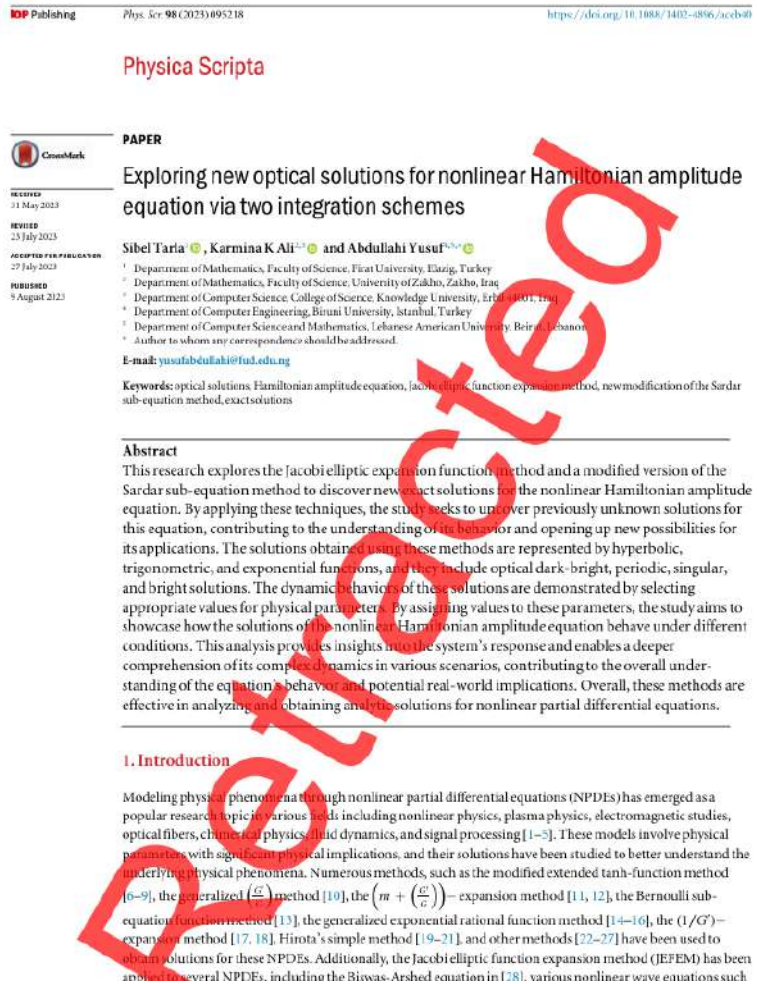
Following publication, concerns were raised regarding the nature of its AI-generated figures. The article does not meet the standards of editorial and scientific rigor for Frontiers in Cell and Developmental Biology; therefore, the article has been retracted.

This retraction was approved by the Chief Executive Editor of Frontiers. Frontiers would like to thank the concerned readers who contacted us regarding the published article.

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Retracted article 2



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Physica Scripta

PAPER

Exploring new optical solutions for nonlinear Hamiltonian amplitude equation via two integration schemes

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Keywords: optical solutions, Hamiltonian amplitude equation, Jacobi elliptic function expansion method, new modification of the Sardar sub-equation method, exact solutions

Abstract

This research explores the Jacobi elliptic expansion function method and a modified version of the Sardar sub-equation method to discover new exact solutions for the nonlinear Hamiltonian amplitude equation. By applying these techniques, the study seeks to uncover previously unknown solutions for this equation, contributing to the understanding of its behavior and opening up new possibilities for its applications. The solutions obtained using these methods are represented by hyperbolic, trigonometric, and exponential functions, and they include optical dark-bright, periodic, singular, and bright solutions. The dynamic behaviors of these solutions are demonstrated by selecting appropriate values for physical parameters. By assigning values to these parameters, the study aims to showcase how the solutions of the nonlinear Hamiltonian amplitude equation behave under different conditions. This analysis provides insights into the system's response and enables a deeper comprehension of its complex dynamics in various scenarios, contributing to the overall understanding of the equation's behavior and potential real-world implications. Overall, these methods are effective in analyzing and obtaining analytic solutions for nonlinear partial differential equations.

1. Introduction

Modeling physical phenomena through nonlinear partial differential equations (NPDEs) has emerged as a popular research topic in various fields including nonlinear physics, plasma physics, electromagnetic studies, optical fibers, chemical physics, fluid dynamics, and signal processing [1–5]. These models involve physical parameters with significant physical implications, and their solutions have been studied to better understand the underlying physical phenomena. Numerous methods, such as the modified extended tanh-function method [6–9], the generalized $\left(\frac{G'}{G}\right)$ method [10], the $\left(m+\left(\frac{G'}{G}\right)\right)$− expansion method [11, 12], the Bernoulli sub-equation function method [13], the generalized exponential rational function method [14–16], the $(1/G')$− expansion method [17, 18], Hirota's simple method [19–21], and other methods [22–27] have been used to obtain solutions for these NPDEs. Additionally, the Jacobi elliptic function expansion method (JEFEM) has been applied to several NPDEs, including the Biswas-Arshed equation in [28], various nonlinear wave equations such

Retracted

#1 Guillaume Cabanac comment accepted August 2023

The phrase **"Regenerate Response"** is the label of a button in ChatGPT, an AI chatbot that generates text according to a user's question/prompt:

Regenerate response

This IOP article contains the unexpected phrase **"Regenerate Response"** on page 3:

Step1 : The solution of the **nonlinear ordinary differential equation** (NODE)

$$U(\chi) = g_0 + \sum_{i=1}^{L}\left(\frac{\mathcal{Z}(\chi)}{1+\mathcal{Z}(\chi)^2}\right)^{i-1}\left(g_i\frac{\mathcal{Z}(\chi)}{1+\mathcal{Z}(\chi)^2} + f_i\frac{1-\mathcal{Z}(\chi)^2}{1+\mathcal{Z}(\chi)^2}\right), \quad (5)$$

is taken. Here g_i, and f_i are constants ($g_L \neq 0$ or $f_L \neq 0$) to be found later. The following equation exists for the $\mathcal{Z}(\chi)$ function:

$$\mathcal{Z}'(\chi) = \sqrt{s + c\mathcal{Z}^2(\chi) + r\mathcal{Z}^4(\chi)}, \quad (6)$$

also, s, c and r constants are depend m.

Step2 : The value of L is found by the principle of balance.
Step3 : Substituting Eq. (5), with Eq. (6) into Eq. (4), wee 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

uscript

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Retracted article 2

#3 IOP Publishing comment accepted September 2023

This article has been retracted by IOP Publishing following the discovery that the Large Language Model (LLM) tool ChatGPT was used to write a portion of this paper without its use being declared by the authors.

The authors have now confirmed that ChatGPT was used in the drafting of this work but have stated that this did not impact the validity or authenticity of their findings.

As 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 which states that 'Authors using LLMs to assist in generating ideas and/or aiding drafting of the paper should declare this fact and provide full transparency of the LLM used (name, version, model, source) within the paper they are submitting', IOP Publishing has decided to retract this article following an investigation in line with COPE guidelines.

IOP Publishing wishes to credit PubPeer commenters [1] for bringing the issue to our attention.

The authors disagree with this retraction.

[1] https://pubpeer.com/publications/2BA0ED692A31818BE66AAB637BB3BE

Report this comment Permalink Reply

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Take home message

Always read your final text

If you use AI, say so.

Check the journal's policy, and write it in your methods or acknowledgements

Check before others do

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Top attractions in Ottawa

…
…
Ottawa Food Bank

“Life is already difficult enough. Consider going into it on an empty stomach.”



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MoneyWatch | Managing Your Money CBS News Price Tracker

MoneyWatch

Microsoft pulls computer-generated article that recommended tourists visit the Ottawa Food Bank

By Elizabeth Napolitano

Updated on: August 21, 2023 / 10:11 AM EDT / MoneyWatch

Add CBS News on Google

Microsoft has pulled a computer-generated travel article on Ottawa, Canada, that included an eyebrow-raising recommendation. Along with popular tourist spots like Parliament Hill, the piece endorsed visiting the Ottawa Food Bank.

The now-deleted article, published this week on Microsoft's MSN website, is the latest in a long list of flubs from various online news sites that employ technology using algorithms and AI for creating content. The MSN article included the food bank as one of Ottawa's "cannot miss" tourist destinations, prompting a backlash from some

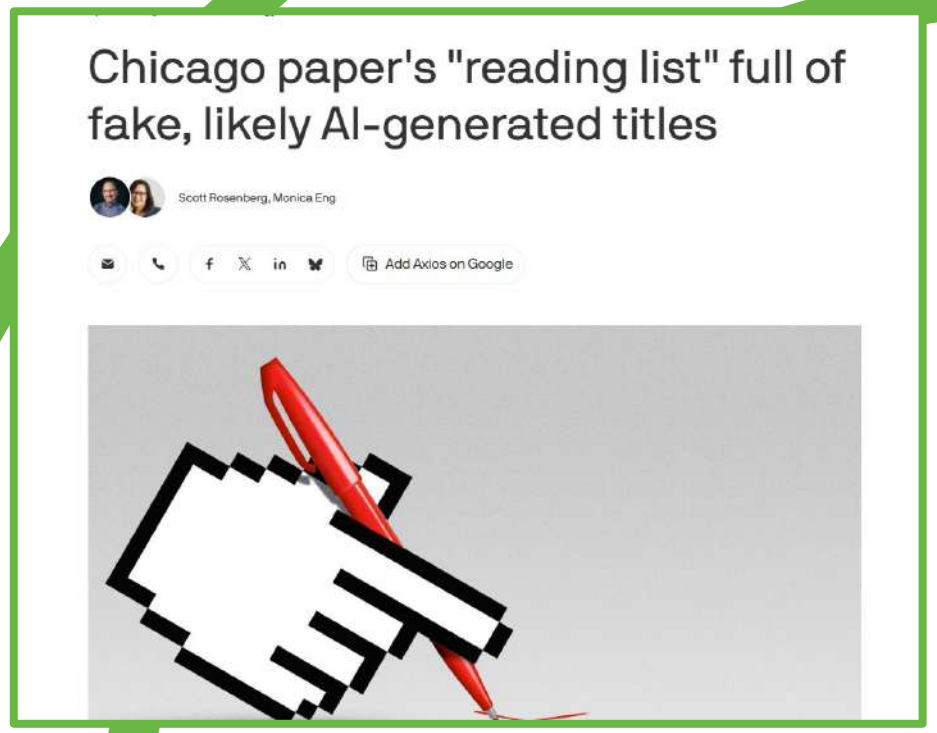
ge Cookies

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Chicago paper's "reading list"

A print supplement to the Chicago Sun-Times published a "summer reading list for 2025" Sunday citing multiple nonexistent titles by real authors — a goof that readers on social media quickly attributed to AI.



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Write a better prompt

Tell the AI

- **Who reads it:** "shoppers", not "the public"
- **Why:** what should they do with it?
- **What must stay:** numbers, conditions, "partly"
- **What to avoid:** jargon, promises, untested examples
- **Proof:** each claim + its source sentence

Before and after

Before

"Summarise this abstract for consumers."

After

"Write 80 words for supermarket shoppers with no science background. Keep the condition "only in large excess". Do not add examples the study did not test. Then list each claim and its source sentence."

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The 5-minute check

✓ Ask every time

1. Did it do what I asked?
2. Is it right for this reader?
3. Is every number in the source?
4. Was this actually tested?
5. What is missing?

⚠ How strong is the claim?

"showed" = a result

"suggests" = an interpretation

"could" = a hope

Keep the small words: partly, some, may

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THE LANDSCAPE OF AI TOOLS

Presented by
AI & Human



CONTENT CREATION

- ChatGPT
- Jasper
- Copy.ai
- Writesonic
- Claude

VISUAL ART

- Midjourney
- DALL·E 3
- Stable Diffusion
- Canva AI
- Firefly

CODING & DEVELOPMENT

- GitHub Copilot
- ChatGPT
- Tabnine
- Replit
- Claude

AUDIO & VIDEO GENERATION

- Runway
- Synthesia
- Murf AI
- ElevenLabs
- Sora

The landscape of AI tools

Writing and editing

- ChatGPT
- Claude
- Microsoft
- Google Gemini
- DeepL Translator / Write

Reading and research

- Perplexity
- Gemini notebook
- Elicit
- Consensus

Images and design

- ChatGPT
- Midjourney
- Canva AI
- Adobe Firefly

Video and audio

- Runway
- Google Veo
- Synthesia
- ElevenLabs

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Tolls change fast! Categories overlap. Use university-approved tools and accounts, and follow institutional guidance on data protection and assessment

Keep your own voice

1
Cut AI words

- “highlights”
- “underscores”
- “delve”
- “plays a crucial role”
- “groundbreaking”

2
Add your own

- a real number
- your own example
- why it matters

3
Read it aloud

- Would you say it at dinner?
- If not – rewrite it

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AI Chatbots might be helping to write more than 1 in 10 biomedical abstracts

SCIENCE ADVANCES | RESEARCH ARTICLE

COMPUTER SCIENCE

Delving into LLM-assisted writing in biomedical publications through excess vocabulary

Dmitry Kobak[1]*, Rita González-Márquez[1]†, Emőke-Ágnes Horvát[2]†, Jan Lause[1]†

Large language models (LLMs) like ChatGPT can generate and revise text with human-level performance. These models come with clear limitations, can produce inaccurate information, and reinforce existing biases. Yet, many scientists use them for their scholarly writing. But how widespread is such LLM usage in the academic literature? To answer this question for the field of biomedical research, we present an unbiased, large-scale approach: We study vocabulary changes in more than 15 million biomedical abstracts from 2010 to 2024 indexed by PubMed and show how the appearance of LLMs led to an abrupt increase in the frequency of certain style words. This excess word analysis suggests that at least 13.5% of 2024 abstracts were processed with LLMs. This lower bound differed across disciplines, countries, and journals, reaching 40% for some subcorpora. We show that LLMs have had an unprecedented impact on scientific writing in biomedical research, surpassing the effect of major world events such as the COVID pandemic.

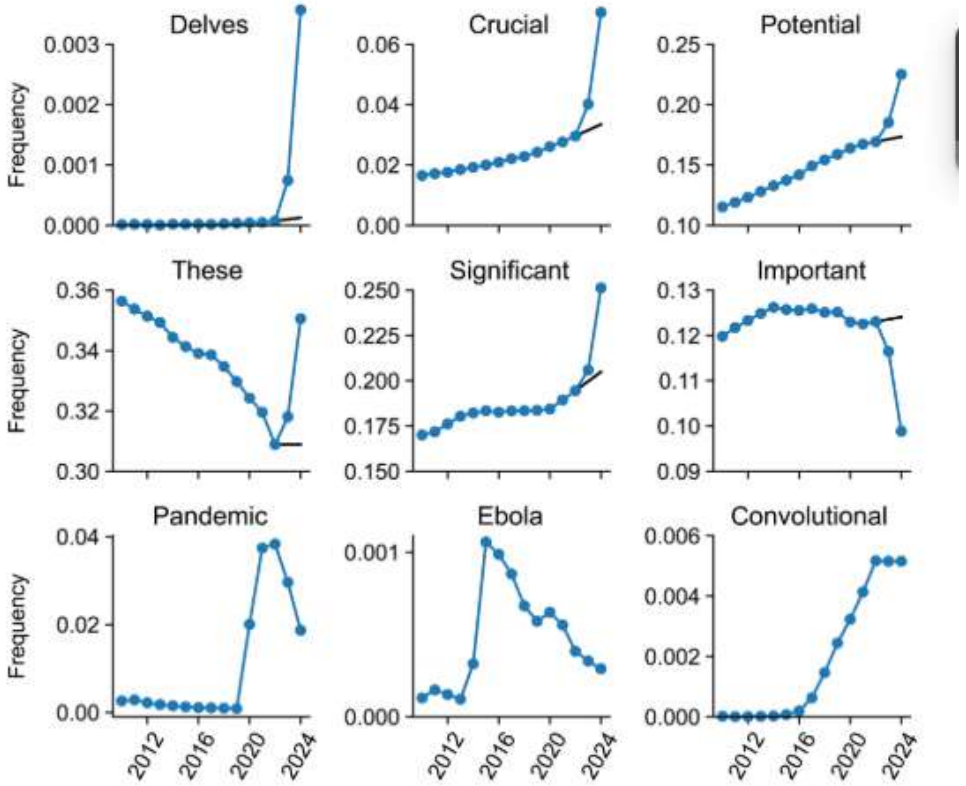


Fig. 1. Frequencies of PubMed abstracts containing several example words. Black lines show counterfactual extrapolations from 2021–2022 to 2023–2024. We manually selected words to illustrate the diversity of frequency time courses. The first six words are affected by LLMs; the last three relate to major events that influenced scientific writing and are shown for comparison.

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Use AI – but follow the rules

1. **Say it!**

which tool, and for what; in methods or acknowledgements; AI is never an author

2. **Protect data**

no unpublished results in free tools; no personal data; use your university's licensed tool

3. **Own it**

you answer for every word; AI images are usually not allowed; check the journal and course rules

4. An example disclosure statement:

ChatGPT was used to improve the
The authors checked the text and take responsibility for ***it.***

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AI in science podcasting

1

Prepare

- Paper into talking points
- Questions for your guest
- A plain-language intro

2

Produce

- Clean the sound
- Edit the text, the audio follows
- Transcripts and subtitles

3

Watch out

- AI hosts make errors
- No cloned voices without consent
- Tell listeners what AI made

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Study: AI podcasts made from 3 papers on Mars, all 3 contained some level of inaccuracy or “hallucinations”.. Flynn & Peters (2025), doi:10.1029/2025CN000282

Life on Mars? Not in the paper

Perspectives of Earth and Space Scientists

PERSPECTIVE
10.1029/2025CN000282

Key Points:

- We evaluate audio summaries generated by the artificial intelligence tool NotebookLM for three planetary science manuscripts
- The audio summaries contain useful and creative analogies for complex scientific concepts, but contained some "hallucinations."
- These audio summaries of manuscripts may have use to educators and science communicators seeking to engage non-subject matter experts

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Citation:
Flynn, I. T. W., & Peters, S. I. (2025). The usefulness of NotebookLM's audio overview for planetary scientists. *Perspectives of Earth and Space Scientists*, *6*, e2025CN000282. https://doi.org/10.1029/2025CN000282

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The Usefulness of NotebookLM's Audio Overview for Planetary Scientists

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Abstract The availability and use of artificial intelligence (AI) tools has increased substantially in recent years. NotebookLM was released in 2023 and is an AI tool with the capability to generate text summaries of input material. In 2024, an "Audio Overviews" feature was released that can generate podcast-style audio files of the summarized material. We qualitatively assess the usefulness of the NotebookLM Audio Overviews feature for planetary scientists using three journal articles. The three articles tested were: Evidence of a Martian spatter cone south of Pavonis Mons by Flynn and Rader (2024), https://doi.org/10.1016/j.icarus.2024.116286; Lava flow eruption conditions in the Tharsis volcanic province on Mars by Peters et al. (2021), https://doi.org/10.1029/2020je006791; and Martian volcanism: Current state of knowledge and known unknowns by Mouginis-Mark et al. (2022), https://doi.org/10.1016/j.chemer.2022.125886. Overall, the generated Audio Overviews did an excellent job summarizing the manuscripts and providing unique analogies for complex scientific topics. However, each summary contained some level of inaccuracy or "hallucinations." This highlights the need to verify the audio summaries against the source material before it is shared with a broader audience. We see potential uses of the Audio Overviews as a pedagogical tool for students in planetary science courses and degree programs, and for professional planetary scientists to obtain a broad overview of published peer reviewed manuscripts. Nevertheless, the Audio Overviews should not replace reading the original material when a detailed understanding of the topic is required.

Plain Language Summary NotebookLM is an artificial intelligence (AI) tool that can summarize written content. In 2024, a new feature called "Audio Overviews" was released that creates podcast-style audio summaries. This study assessed the usefulness of this feature for planetary scientists by summarizing three journal articles about martian volcanism. The AI-generated summaries were generally well-structured and

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BACK TO THE START

Has your answer changed?

Question 3 – again

How much do you trust the output?

- Fully
- Mostly
- Only after checking
- Not at all

Homework

1. PICK an abstract from paper you like
2. PROMPT 80 words for one reader plus each claim and its source
3. CHECK run the 5-min check
4. REWRITE make it sounds like you



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Growing innovation

Thank you!



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Any questions? You can reach out to

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