



## Safer Epilepsy Drug for Pregnancy: Rapamycin Breakthrough

### Description

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Sodium valproate is an effective epilepsy drug, but it isn't recommended to take during pregnancy

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The drug rapamycin may offer a solution to the developmental risks posed by the epilepsy medication sodium valproate during pregnancy.

Sodium valproate, commonly used for epilepsy, bipolar disorder, and migraines, carries the potential for birth defects like spina bifida and cognitive impairments if taken during pregnancy.

[Giovanni Pietrogrande](#) from the University of Queensland and his team embarked on a study to unravel the mechanisms behind sodium valproate's adverse effects. They utilized stem cells to engineer miniature spinal cords, known as organoids, resembling fetal spines in early gestation. When exposed to sodium valproate, these organoids exhibited changes indicative of congenital issues.

Further investigation revealed that activity within the mTOR signaling pathway signaled a cellular process called senescence, where cells cease division but stay active, releasing inflammatory substances.

Interestingly, rapamycin, initially developed as an immune modulator with potential anti-aging properties, targets the mTOR pathway as well.

In a subsequent experiment, the researchers treated a new batch of spinal organoids with both sodium valproate and rapamycin, observing a prevention of senescence. This finding was corroborated in zebrafish larvae, where cells exposed to the combination did not exhibit senescence or the alterations seen with sodium valproate exposure alone.

Pietrogrande suggests that rather than discontinuing sodium valproate in pregnant or potentially pregnant women with epilepsy, a combination with rapamycin could mitigate its harmful effects. Human trials are needed to validate this approach.

[Frank Vajda](#) at the University of Melbourne lauds sodium valproate as a crucial treatment for generalized seizures and sees the study as a potential means to restore its importance by mitigating its adverse effects.

Topics:

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## Vocabulary List:

1. **Valproate** /væl'prɒʊ.eɪt/ (noun): A medication used primarily to treat epilepsy and bipolar disorder.
  2. **Epilepsy** /'ɛp.i.lɛp.si/ (noun): A neurological disorder marked by recurrent seizures.
  3. **Senescence** /sɪ'nɛs.əns/ (noun): The process of aging at the cellular level where cells cease to divide.
  4. **Organoid** /'ɔːr.gən.ɔɪd/ (noun): A miniaturized and simplified version of an organ produced in vitro that mimics its structure and function.
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5. **Congenital** /kən'dʒɛn.i.təl/ (adjective): Existing at or dating from birth often referring to conditions developed during fetal development.
6. **Mitigate** /'mɪt.i.geɪt/ (verb): To make less severe serious or painful.

## Comprehension Questions

### Multiple Choice

1. What potential birth defects are associated with taking sodium valproate during pregnancy?
- Option: Heart defects
  - Option: Spina bifida
  - Option: Cleft palate
  - Option: All of the above
2. What cellular process is triggered by activity within the mTOR signaling pathway?
- Option: Apoptosis
  - Option: Senescence
  - Option: Proliferation
  - Option: Differentiation
3. Which drug was suggested to mitigate the harmful effects of sodium valproate during pregnancy?
- Option: Rapamycin
  - Option: Ibuprofen
  - Option: Paracetamol
  - Option: Aspirin
4. What type of organoids were engineered to resemble fetal spines in early gestation for the study?
- Option: Liver organoids
  - Option: Lung organoids
  - Option: Spinal organoids
  - Option: Brain organoids
5. What is the cellular process where cells cease division but stay active, releasing inflammatory substances?
- Option: Senescence
  - Option: Apoptosis
  - Option: Differentiation



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Option: Proliferation

6. What was the significant finding when spinal organoids were treated with both sodium valproate and rapamycin?

Option: Increased senescence

Option: Prevention of senescence

Option: Cell death

Option: No effect

### True-False

7. Sodium valproate is recommended to be taken during pregnancy.

8. Rapamycin targets the mTOR pathway.

9. Human trials have already been conducted to validate the combination of sodium valproate and rapamycin.

10. Ratan Naval Tata was involved in the study at the University of Queensland.

11. Rapamycin was initially developed as an anti-inflammatory drug.

12. Frank Vajda sees the study as a potential means to restore the significance of sodium valproate by mitigating its adverse effects.

### Gap-Fill

13. Sodium valproate is commonly used for epilepsy, bipolar disorder, and migraines, but it is not recommended to take during \_\_\_\_\_.

14. Activity within the mTOR signaling pathway signals a cellular process called \_\_\_\_\_.

15. The researchers treated a new batch of \_\_\_\_\_ with both sodium valproate and rapamycin.

16. According to Pietrogrande, a combination with \_\_\_\_\_ could mitigate the harmful



effects of sodium valproate during pregnancy.

17. Frank Vajda lauds sodium valproate as a crucial treatment for \_\_\_\_\_ seizures.

18. Rather than discontinuing sodium valproate in pregnant women, a combination with rapamycin could mitigate its harmful effects. Human trials are needed to validate this \_\_\_\_\_.

## Answer

**Multiple Choice:** 1. All of the above 2. Senescence 3. Rapamycin 4. Spinal organoids 6. Prevention of senescence

**True-False:** 7. False 8. True 9. False 10. False 11. False 12. True

**Gap-Fill:** 13. pregnancy 14. senescence 15. spinal organoids 16. rapamycin 17. generalized 18. approach

## Vocabulary quizzes

### Multiple Choice ( Select the Correct answer for each question. )

1. Which term describes a significant disturbance in an industry or market often leading to innovation?

Option: Disruption

Option: Senescence

Option: Mitigate

Option: Espionage

2. What is a medication used to treat epilepsy?

Option: Quartz

Option: Valproate

Option: Organoid

Option: Congenital

3. Which term describes a society characterized by human misery and oppression?

Option: Chilling

Option: Dystopian

Option: Vibrant

Option: Proficiency

4. What term relates to the enforcement of rules and regulations within an industry?

Option: Evolution



- Option: Espionage
- Option: Regulatory
- Option: Compelling

5. Which term means attractive or tempting?

- Option: Disturbance
- Option: Enticing
- Option: Distinctiveness
- Option: Intriguing

6. What term describes lacking a moral sense or ignoring moral considerations?

- Option: Mitigate
- Option: Amoral
- Option: Contemplation
- Option: Senescence

7. Which term refers to producing or intensifying a sound by vibration?

- Option: Mitigate
- Option: Resonating
- Option: Intrigue
- Option: Valproate

8. What term refers to the condition or process of deterioration with age?

- Option: Critical
- Option: Senescence
- Option: Mitigate
- Option: Vibrant

9. Which term describes evoking interest attention or admiration in a powerfully irresistible way?

- Option: Chilling
- Option: Compelling
- Option: Entanglement
- Option: Dystopian

10. What term describes the gradual development of something into a more complex or advanced state?

- Option: Quartz
- Option: Essential
- Option: Espionage
- Option: Evolution

**Gap-Fill ( Fill in the blanks with the correct word from the vocabulary list. )**



11. \_\_\_\_\_ is the process of making products on a large scale using machinery.
12. Efforts to \_\_\_\_\_ the impact of climate change are crucial for the future of the planet.
13. The spy novel was filled with mystery and \_\_\_\_\_ keeping readers on the edge of their seats.
14. Moments of quiet \_\_\_\_\_ often lead to insightful decisions and realizations.
15. The marketplaces in the city were always bustling with energy and \_\_\_\_\_ colors.
16. \_\_\_\_\_ heart defects are present at birth and may require medical intervention.
17. The art exhibition aimed to engage not only the visual sense but also the \_\_\_\_\_ experiences of the audience.
18. Proper planning and decision-making are \_\_\_\_\_ in high-pressure situations.
19. Good nutrition is \_\_\_\_\_ for overall health and well-being.
20. The diplomat found himself in a complicated \_\_\_\_\_ of political alliances and personal interests.

**Matching Sentences ( Match each definition to the correct word from the vocabulary list. )**

21. The watch was made with precision and contained a small piece of mineral often used in timekeeping devices.
22. The scientists grew a miniature version of a brain structure in the lab for research purposes.
23. The horror movie had a effect on the audience leaving them with a sense of unease.
24. The temperatures in the mountains warned hikers of potential danger.
25. The author presented a argument that convinced many to reconsider their positions.
26. The government agency was responsible for overseeing and enforcing policies within the industry.





27. The novel depicted a future society where oppressive control and deprivation were the norm.
28. Efforts to the environmental impact of industrial activities are crucial for sustainability.
29. The artist's unique take on classical themes involved traditional myths and legends.
30. Higher levels of in a skill often lead to better performance and results.

## Answer

**Multiple Choice:** 1. Disruption 2. Valproate 3. Dystopian 4. Regulatory 5. Enticing 6. Amoral 7. Resonating 8. Senescence 9. Compelling 10. Evolution

**Gap-Fill:** 11. Manufacturing 12. Mitigate 13. Intrigue 14. Contemplation 15. Vibrant 16. Congenital 17. Sensory 18. Critical 19. Essential 20. Entanglement

**Matching sentence:** 1. Quartz 2. Organoid 3. Chilling 4. Chilling 5. Compelling 6. Regulatory 7. Dystopian 8. Mitigate 9. Reimagining 10. Proficiency

## CATEGORY

1. Sci/Tech - LEVEL4

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