Breakthrough Protein May Outperform Ozempic with Reduced Side Effects

Description

Scientists have stumbled upon a naturally-occurring molecule, BRP (BRINP2-related peptide), that could potentially rival the well-known GLP-1 agonists like Ozempic in controlling appetite and promoting weight loss. This tiny peptide, composed of just 12 amino acids, functions by stimulating specific neurons in the brain, but it takes a different metabolic route compared to GLP-1 agonists.

Laetitia Coassolo, a pathology researcher at Stanford University, spearheaded a team that developed an AI-powered drug discovery tool called 'Peptide Predictor'. This tool identified 373 proteins to explore from a vast sea of possibilities. After screening 100 peptides for their ability to influence brain activity, they zeroed in on BRP.

In laboratory tests, BRP surpassed the performance of traditional GLP-1 peptides, enhancing activity in both neuronal and insulin-producing cells over tenfold. When injected into lean male mice, BRP cut their food intake in half within just an hour, a result paralleled in minipigs, whose metabolic patterns closely resemble those of humans.

During a two-week experiment with obese mice, BRP injections led to an average weight loss of 4 grams, attributed mainly to a reduction in body fat. Unlike semaglutide treatments, which may cause muscle and bone loss, BRP showed no adverse effects like nausea or constipation during animal trials. This might be because it engages different brain receptors.

Stanford researcher Katrin Svensson notes, "Semaglutide engages receptors in both the brain and other organs, causing widespread effects like slowed digestion and decreased blood sugar levels." Conversely, BRP appears to exclusively target the hypothalamus, the area of the brain that governs appetite and metabolism.

Svensson's company will soon embark on clinical trials to understand how BRP performs in humans. If it proves to be both safe and effective, it could join the fierce competition among peptide-based weight loss drugs like Ozempic, Wegovy, and Tirzepatide. Svensson concludes, "Obesity treatment has long sought effective solutions. We're eager to see if BRP can rise to the occasion."

Vocabulary List:

1. **Molecule** /ˈmɒlɪˌkjuːl/ (noun): The smallest particle in a chemical element or compound that has the properties of that element or compound.
2. **Peptide** /ˈpɛp.taɪd/ (noun): A compound of two or more amino acids linked in a chain.
3. **Stimulating** /ˈstɪm.jʊ.leɪ.tɪŋ/ (adjective): Causing an increase in activity or excitement; encouraging a response.

4. **Agonists** /ˈægənɪsts/ (noun): Substances that activate a receptor to produce a biological response.
5. **Adverse** /ædˈvɜrs/ (adjective): Preventing success or development; harmful or unfavorable.
6. **Metabolism** /məˈtæb.ə.lɪ.zəm/ (noun): The chemical processes that occur within a living organism in order to maintain life.

Comprehension Questions

Multiple Choice

1. How does BRP differ from GLP-1 agonists in terms of its metabolic route?

   Option: It takes a different metabolic route
   Option: It functions by stimulating specific neurons in the brain
   Option: It enhances activity in both neuronal and insulin-producing cells
   Option: It causes widespread effects like slowed digestion and decreased blood sugar levels

2. What is the main area of the brain targeted by BRP according to the research?

   Option: Brain stem
   Option: Cerebellum
   Option: Hypothalamus
   Option: Frontal lobe

3. What is the potential of BRP in weight loss treatment based on animal trials?

   Option: It may cause muscle and bone loss
   Option: It showed no adverse effects like nausea or constipation
   Option: It is not effective in reducing body fat
   Option: It engages receptors in both the brain and other organs

4. Who developed the AI-powered drug discovery tool called

   Option: Katrin Svensson
   Option: Stanford researcher
   Option: Laetitia Coassolo
   Option: Ratan Naval Tata

5. Which peptide-based weight loss drug is NOT mentioned in the research?

   Option: Ozempic
   Option: Wegovy
   Option: Tirzepatide

Option: Semaglutide

6. What was the average weight loss observed in obese mice during the two-week experiment with BRP injections?

Option: 2 grams
Option: 4 grams
Option: 6 grams
Option: 8 grams

True-False

7. BRP engages receptors in both the brain and other organs.

8. BRP mainly targets the cerebellum in the brain.

9. Semaglutide treatments cause nausea and constipation during animal trials.

10. The Peptide Predictor tool identified 373 proteins for exploration.

11. Obesity treatment has not yet found effective solutions according to the research.

12. BRP surpasses the performance of GLP-1 peptides in all aspects.

Gap-Fill

13. BRP is composed of just _____ amino acids.

14. In laboratory tests, BRP enhanced activity in both neuronal and _____-producing cells.

15. Svensson's company will soon start clinical trials to understand how BRP performs in _____.

16. BRP injections led to an average weight loss of _____ grams in obese mice.

17. BRP might not cause adverse effects like nausea or constipation due to engaging different

_____ receptors.

18. Semaglutide engages receptors in both the brain and other organs, causing widespread effects like

slowed digestion and decreased _____ levels.

Answer

Multiple Choice: 1. It takes a different metabolic route 2. Hypothalamus 3. It showed no adverse effects like nausea or constipation 4. Laetitia Coassolo 5. Semaglutide 6. 4 grams
True-False: 7. False 8. False 9. True 10. True 11. False 12. False
Gap-Fill: 13. 12 14. insulin 15. humans 16. 4 17. brain 18. blood sugar

Vocabulary quizzes

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

1. Which compound is commonly used in skincare products for its moisturizing properties?
   Option: Intoxication
   Option: Hypoglycemia
   Option: Glycerol
   Option: Peptide

2. What is the medical procedure called to administer a vaccine?
   Option: Outbreak
   Option: Exposures
   Option: Herd Immunity
   Option: Vaccinate

3. Which process in the body converts food and drinks into energy?
   Option: Alleviating
   Option: Metabolism
   Option: Affliction
   Option: Recommending

4. Which term is used to describe unintended or harmful effects of a medication or treatment?
   Option: Abundant

Option: Critical
Option: Adverse
Option: Mitigates

5. What type of drugs mimic the action of naturally occurring substances such as hormones?

Option: Agonists
Option: Peptide
Option: Stimulating
Option: Vigilant

6. What is the body's ability to resist a particular pathogen or toxin?

Option: Contagious
Option: Immunity
Option: Isolation
Option: Exposures

7. Which term describes something that is widespread or common in a particular area or among a particular group?

Option: Confirmed
Option: Critical
Option: Prevalent
Option: Outbreak

8. What term is used to describe someone who has regained their health after an illness or injury?

Option: Hospitalization
Option: Confirmed
Option: Recuperated
Option: Vaccination

9. What quality is needed to actively watch for possible danger or difficulties?

Option: Vigilance
Option: Herd Immunity
Option: Intoxication
Option: Alleviating

10. Which term describes a sudden increase in the occurrence of a disease in a specific time and place?

Option: Abundant
Option: Vaccination
Option: Isolation
Option: Outbreak

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

11. _____ refers to the state of being poisoned by a substance.

12. Severe cases of the illness may require _____ for proper treatment.

13. Low blood sugar levels can lead to _____ causing symptoms like dizziness and confusion.

14. A _____ is a short chain of amino acids that can serve as a building block for proteins.

15. Cancer is a serious _____ that can have a significant impact on a person's life.

16. Once the diagnosis was _____ the appropriate treatment plan could be implemented.

17. Painkillers are often used for _____ discomfort and reducing pain.

18. Regular exercise and a healthy diet can help prevent disease and _____ its effects.

19. Doctors may be responsible for _____ appropriate treatments based on a patient's condition.

20. In tropical regions fresh fruit is _____ throughout the year due to the favorable climate.

21. Healthcare workers face multiple _____ to infectious diseases in their line of work.

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

22. Measles is a highly disease that can spread rapidly among unvaccinated individuals.
23. Constant is necessary to prevent security breaches in sensitive information systems.
24. When a large portion of a community is vaccinated it provides protecting those who cannot be immunized.

25. The process of administering a vaccine to stimulate the immune system is known as .
26. Patients with highly contagious diseases are often placed in to prevent the spread of the illness.
27. The patient's condition was requiring immediate intervention and monitoring.
28. The sudden of flu cases in the region prompted public health officials to issue warnings.
29. plays a crucial role in protecting vulnerable populations from infectious diseases by limiting transmission.
30. Pain relief medications focus on symptoms of discomfort to improve a patient's quality of life.
31. After a period of rest and treatment the patient from the illness and was able to return to normal activities.

Answer

Multiple Choice: 1. Glycerol 2. Vaccinate 3. Metabolism 4. Adverse 5. Stimulating 6. Immunity 7. Prevalent 8. Recuperated 9. Vigilance 10. Outbreak
Gap-Fill: 11. Intoxication 12. Hospitalization 13. Hypoglycemia 14. Peptide 15. Affliction 16. Confirmed 17. Alleviating 18. Mitigates 19. Recommending 20. Abundant 21. Exposures
Matching sentence: 1. Contagious 2. Vigilance 3. Herd Immunity 4. Vaccination 5. Isolation 6. Critical 7. Outbreak 8. Herd Immunity 9. Alleviating 10. Recuperated

CATEGORY

1. Health - LEVEL4

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