



Unlocking Protein Structures: Chemistry Nobel Prize Win

Description

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NOBELPRISET I KEMI 2024
THE NOBEL PRIZE IN CHEMISTRY 2024

 Photo: University of Washington

David Baker
University of Washington
USA

 Photo: The Royal Society

Demis Hassabis
Google DeepMind
United Kingdom

"för datorbaserad proteindesign"
"for computational protein design"

HEINER LINKE

HANS ELLEGREN

The Nobel prize committee announce the chemistry prize winners at the Royal Swedish Academy of Sciences in Stockholm

JONATHAN NACKSTRAND/AFP via Getty Images

The 2024 Nobel Prize in Chemistry has been awarded to David Baker, Demis Hassabis and John Jumper for their groundbreaking research on protein structure, essential for all living organisms. Hassabis and Jumper, from Google DeepMind, developed an artificial intelligence system, AlphaFold, capable of predicting protein structures with remarkable accuracy. Meanwhile, Baker, from the University of Washington, has been acknowledged for his innovative work in designing novel proteins.

Proteins are the building blocks of life, crucial for various biological functions. Understanding their structures is key to comprehending the mechanisms of life itself, as highlighted by Heiner Linke, the chair of the Nobel committee for chemistry.

For decades, predicting protein structures was deemed impossible until the development of AlphaFold by Hassabis and Jumper, a significant advancement in the field. By 2022, AlphaFold had successfully predicted the structures of nearly all known proteins, providing a valuable resource for scientific research.

Baker's contributions have unlocked vast possibilities in protein design, potentially revolutionizing fields from medicine to nanotechnology. His software, Rosetta, enables the design of proteins with specific functions, a groundbreaking achievement recognized by Johan Åqvist of the Nobel committee for chemistry.

This prestigious recognition comes as a delightful surprise to Baker, underscoring the transformative impact of his work on biological research. The chemistry prize adds to the list of remarkable achievements in scientific discovery, following recent awards in physics and physiology.

Vocabulary List:

1. **Groundbreaking** /'graʊnd,brɛɪ.kɪŋ/ (adjective): Innovative; involving new ideas or methods.
2. **Mechanisms** /'mɛkənɪzəmz/ (noun): Processes or systems that are designed to operate in a certain way.
3. **Crucial** /'kru:ʃəl/ (adjective): Extremely important or necessary.
4. **Artificial** /,a:rti'fɪʃəl/ (adjective): Made or produced by human beings rather than occurring naturally.
5. **Innovative** /'ɪnə,vɛtɪv/ (adjective): Featuring new methods; advanced and original.
6. **Revolutionizing** /,rɛvə'lū:ʃə,næzɪzɪŋ/ (verb): Causing a complete change in the way something is done.

Comprehension Questions

Multiple Choice

1. Who were awarded the 2024 Nobel Prize in Chemistry?

- Option: David Baker
- Option: Demis Hassabis and John Jumper
- Option: David Baker and Demis Hassabis
- Option: Demis Hassabis and David Jumper

2. What is the name of the artificial intelligence system developed by Hassabis and Jumper?

- Option: Rosetta
- Option: AlphaFold
- Option: DeepMind AI
- Option: ProteinPredict

3. Which university is David Baker affiliated with?

- Option: Harvard University
- Option: University of Washington
- Option: Stanford University
- Option: MIT

4. What is the name of Baker's software for protein design?

- Option: ProteinCraft
- Option: Rosetta
- Option: DesignPro
- Option: BioBuild

5. Who highlighted the importance of understanding protein structures for comprehending life mechanisms?

- Option: Johan Åqvist
- Option: David Baker
- Option: Heiner Linke
- Option: Demis Hassabis

6. When did AlphaFold successfully predict the structures of nearly all known proteins?

- Option: 2020
- Option: 2021
- Option: 2022
- Option: 2023

True-False

7. Proteins are essential for all living organisms.
8. AlphaFold was developed by David Baker.
9. Baker's software Rosetta enables the design of proteins with specific functions.
10. The 2024 Nobel Prize in Chemistry recognized work in nanotechnology.
11. AlphaFold has been a valuable resource for scientific research.
12. The chemistry prize is the first award received by David Baker.

Gap-Fill

13. Hassabis and Jumper developed AlphaFold, an artificial intelligence system capable of predicting protein structures with remarkable accuracy by _____.
14. Proteins are the _____ of life, crucial for various biological functions.
15. Baker's contributions have unlocked vast possibilities in protein design, potentially revolutionizing fields from medicine to _____.
16. Understanding protein structures is key to comprehending the mechanisms of _____ itself.
17. The 2024 Nobel Prize in Chemistry was awarded to David Baker, Demis Hassabis, and John Jumper for their groundbreaking research on protein _____, essential for all living organisms.
18. Baker's software, _____, enables the design of proteins with specific functions, a groundbreaking achievement.

Answer

Multiple Choice: 1. David Baker, Demis Hassabis and John Jumper 2. AlphaFold 3. University of Washington 4. Rosetta 5. Heiner Linke 6. 2022

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

Gap-Fill: 13. 2022 14. building blocks 15. nanotechnology 16. life 17. structure 18. Rosetta

Vocabulary quizzes

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

1. What term is used to describe a significant development or discovery?

- Option: Congestion
- Option: Revolutionizing
- Option: Breakthrough
- Option: Innovative

2. What are the objects or instruments carried aboard a vehicle such as a spacecraft?

- Option: Payloads
- Option: Multiplex
- Option: Integration
- Option: Mechanisms

3. Which term refers to something made or produced by human beings rather than occurring naturally?

- Option: Artificial
- Option: Atmospheric
- Option: Self-sufficiency
- Option: Tapering

4. What is the point or level at which something begins or changes?

- Option: Implications
- Option: Threshold
- Option: Disaster
- Option: Calamities

5. What term refers to the action or process of combining different elements into a whole?

Option: Groundbreaking

Option: Reusability

Option: Integration

Option: Harvesting

6. Which term describes the possibility or likelihood of future success or something happening?

Option: Criticism

Option: Prospect

Option: Approvals

Option: Guidelines

7. What term describes introducing new ideas methods or products?

Option: Innovative

Option: Revolutionizing

Option: Deceleration

Option: Zenith

8. What word describes events causing great and often sudden damage or distress?

Option: Innovative

Option: Calamities

Option: Self-sufficiency

Option: Breakthrough

9. What term refers to the maximum data transfer rate of a network or internet connection?

Option: Deceleration

Option: Bandwidth

Option: Zenith

Option: Multiplex

10. Which term describes something innovative or pioneering?

Option: Threshold

Option: Atmospheric

Option: Groundbreaking

Option: Harvesting

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

11. The new _____ cinema is equipped with multiple screens for simultaneous screenings.

12. The earthquake resulted in a humanitarian _____ with widespread destruction and

loss of lives.

13. The community aimed for _____ by growing their own food and generating electricity.

14. The project cannot proceed without the necessary permits and _____ from the authorities.

15. Employees are required to follow the safety _____ to prevent accidents in the workplace.

16. The new technology is _____ the way we communicate and access information.

17. The medication dosage should be gradually reduced in a process known as _____.

18. The company reached the _____ of success with record profits and global recognition.

19. Farmers began _____ crops as soon as they ripened to ensure a good yield.

20. The new design received mixed _____ from experts in the field.

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

21. The decision to cut costs had significant consequences for the company's workforce.

22. The introduction of new technology led to improved efficiency and customer satisfaction.

23. Effective communication is for the success of any team or organization.

24. The in place ensure the safety and security of the building occupants.

25. The internet speed test measures the available for data transfer.

26. The driver had to apply brakes to slow down the car's on the sharp curve.

27. The company was at the of a major breakthrough in renewable energy technology.



28. His career included becoming a top executive in the industry.

29. The innovative product is the way consumers interact with technology.

30. The new cinema offers a variety of movie genres for viewers to choose from.

Answer

Multiple Choice: 1. Breakthrough 2. Payloads 3. Artificial 4. Threshold 5. Integration 6. Prospect 7. Innovative 8. Calamities 9. Bandwidth 10. Groundbreaking

Gap-Fill: 11. Multiplex 12. Disaster 13. Self-sufficiency 14. Approvals 15. Guidelines 16. Revolutionizing 17. Tapering 18. Zenith 19. Harvesting 20. Critical

Matching sentence: 1. Implications 2. Innovation 3. Crucial 4. Mechanisms 5. Bandwidth 6. Deceleration 7. Threshold 8. Aspirations 9. Revolutionizing 10. Multiplex

CATEGORY

1. Sci/Tech - LEVEL4

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