Nobel Prize in Chemistry

Posted at: 10/10/2024

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Context : In 2024, the Nobel Prize in Chemistry will be shared by American scientist **David Baker**, recognized for his work in computational protein design, and **Briton Demis Hassabis** and **American John Jumper,** honored for their contributions to protein structure prediction.

Why is Protein Research Important?

The role of proteins:

- Proteins are essential for life, playing a part in almost all biological processes. For instance, haemoglobin carries oxygen in the blood, while insulin helps the body absorb glucose. Disruptions in protein production can lead to significant health issues.

Understanding protein structure:

- Proteins are made from long chains of 20 different amino acids, with their sequence determining their structure and function. Understanding a protein's structure is crucial for grasping how it works.

Challenges in protein structure determination:

- Historically, identifying protein structures has been a lengthy and complex process, often taking months or even years through methods like x-ray crystallography.

What Was the 2024 Chemistry Nobel Awarded For?

Development of AlphaFold:

- Hassabis and Jumper developed AlphaFold, an AI tool that predicts protein structures with high accuracy in a fraction of the time. By analyzing amino acid sequences, AlphaFold can make fast and reliable predictions.

Designing new proteins:

- David Baker's Rosetta software was created to predict protein structures and design new proteins by reverse-engineering their structures. This led to the creation of synthetic proteins that don't naturally exist. His methods are more efficient, enabling the rapid development of proteins for specific tasks, such as breaking down plastics.

What Makes the 2024 Chemistry Nobel Significant?

Simplifying protein understanding:

- AlphaFold and Baker's contributions make it easier to visualize and understand protein structures, shedding light on key biological functions and disease mechanisms like antibiotic resistance and microbial plastic degradation.

Unlocking new possibilities:

- The ability to design proteins with unique functions opens up opportunities in fields such as nanomaterials, targeted drug development, rapid vaccine creation, and environmental solutions.

Curing diseases:

- These innovations have the potential to revolutionize the development of treatments for protein-related diseases, pushing the boundaries of modern medicine.

AI recognition:

- This Nobel Prize underscores the growing influence of AI in biological research and its transformative impact on science.