AlphaFold 3: The future of AI in biotechnology is here

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Key Takeaways

- AlphaFold 3 is a groundbreaking new AI tool which will help discover better drugs at faster speeds.
- The bio revolution extends beyond healthcare into many different sectors.
- Markets get excited about the biotech sector when there is a breakthrough. The AlphaFold 3 announcement could start a new wave.

Google DeepMind and Isomorphic Labs have recently unveiled an exciting new breakthrough, AlphaFold 3, set to transform our understanding of molecular biology and drug discovery. This artificial intelligence (AI) powered software goes beyond predicting protein folding – a process that laid the groundwork for understanding protein structure, a key aspect in drug design – now revealing how proteins interact with DNA, RNA, and other molecules, facilitating much better drug design[1]. AlphaFold 3, building on AlphaFold 2's success, employs advanced AI algorithms to accurately model molecular structures and interactions. Its predictions surpass existing methods in accuracy, accelerating scientific research by enabling faster hypothesis testing and drug target exploration[2].

A standout feature of AlphaFold 3 is its precise prediction of interactions between proteins and small molecules, holding immense potential for drug discovery. To facilitate its adoption, Google DeepMind has launched the AlphaFold Server, offering free access to researchers worldwide. This democratisation of cutting-edge computational tools empowers scientists to accelerate discoveries and advancements.

Beyond drug discovery, AlphaFold 3's predictions illuminate the molecular basis of diseases, incorporating biochemical modifications into its models to understand their impact on protein function. This insight could lead to novel therapies targeting disease-causing molecular alterations.

AlphaFold 3 represents a leap forward in understanding and manipulating the molecular machinery of life. With unparalleled accuracy and accessibility, it promises to revolutionise drug discovery and deepen our understanding of biological processes. It also sheds light on how AI will create a tectonic shift in the world of biotechnology, creating an exciting new megatrend for investors seeking long-term growth.

Healthcare and beyond

The revolution is broad and spans many different sectors. Within healthcare, AlphaFold 3 is a promising new advancement in drug discovery. However, AI is also being used in many other areas, such as how Illumina uses it to predict disease-causing genetic mutations.

The bio revolution also has numerous applications beyond healthcare. In agriculture, Bayer is using smart drones and in-field sensors to collect data about the soil and plants, which is then monitored in digital farming platforms using AI tools. This endeavour is aimed at maximising the yield of agricultural production.

In materials, Schrodinger is employing AI to model and develop synthetic materials that can add sustainability to the manufacturing of products in numerous industries ranging from automobiles to consumer-packaged goods.

In biological machines, DNA data storage is an awe-inspiring new field. According to an article in Scientific American, humanity will generate an estimated 33 zettabytes of data by 2025—that's 3.3 followed by 22 zeroes. DNA storage can squeeze all that information into a ping-pong ball, with room to spare[3].

The revolution has exciting applications across many sectors

Healthcare	Agriculture and food	Materials, chemicals and energy	Biological machines and interfaces
• Drug discovery • Diagnostics and surveillance • Precision health/Gene therapies • Regenerative medicine • Vaccines	• Prescision agriculture • Plant-based meats • Cellular agriculture	• Synthetic manufacturing • Precision fermentation • Biofuels	• DNA data storage • Biological computers • Brain machine interfaces

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Source: WisdomTree, Jamie Metzl.

An underappreciated story

Markets get excited about the biotechnology sector when a breakthrough is announced. 2021 was an especially strong year for the sector when COVID-19 vaccines saved the world. AlphaFold 3 could usher in a new wave of interest in the sector. With AI, the sector will likely make more breakthrough announcements for tackling diseases, hunger, and potentially even climate change – things that will certainly get markets very excited.

[1] Deoxyribonucleic acid (abbreviated DNA) is the molecule that carries genetic information for the development and functioning of an organism. Ribonucleic acid (RNA) is a molecule that is present in the majority of living organisms and viruses.
[2] Google Blog, AlphaFold 3 predicts the structure and interactions of all of life's molecules, May 2024.
[3] DNA: The Ultimate Data-Storage Solution, BY LATCHESAR IONKOV & BRADLEY SETTLEMYER, Scientific American, May 2021.

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