Gandeeva Therapeutics and Moderna Join Forces to Explore AI-Enabled Cryo-EM Technology

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Gandeeva Therapeutics, a precision medicine company specializing in designing and developing novel therapeutics guided by cryogenic electron microscopy (cryo-EM) and machine learning, has announced a new research collaboration with Moderna Inc. The partnership aims to explore the potential applications of Gandeeva's cutting-edge technology platform for one of Moderna's undisclosed programs.

Cryo-EM has emerged as a promising technique in structural biology in recent years. It encompasses three related methods that share the same principle of imaging molecules at extremely low temperatures to "freeze and fix" them in a stable position. Single-particle cryo-EM, in particular, has piqued the interest of structural biologists and become the focal point for several biotech start-ups.

The mechanism of cryo-EM involves flash-freezing solutions of proteins and other biomolecules to form vitreous ice, followed by bombarding the sample with electrons and processing the data computationally. Cryo-EM's advantages over alternative methods include the elimination of chemical fixation, dehydration, and staining steps, which helps preserve the native hydrated state of the molecules. It also resolves the issue of crystallization-resistant molecules, such as membrane proteins, by bypassing the need for crystallization.

Another exciting aspect of cryo-EM is its potential to capture molecules in near-native states, providing valuable insights into molecular processes as they occur in living cells. Although the technique's ability to create fully representative "snapshots" of physiological processes remains unproven, it has already demonstrated the capacity to capture multiple conformational states that are inaccessible through other methods.

While X-ray crystallography has served the structural biology field for over a century, it has limitations compared to cryo-EM, such as the inability to reveal certain conformational details for biomolecules. Cryo-EM and X-ray crystallography cater to different research needs rather than competing directly. However, it is likely that the number of protein structures determined by cryo-EM will soon surpass those determined by X-ray crystallography.

In recent years, rapid advancements in cryo-EM, combined with AI technologies, have given rise to a new breed of biotech start-ups such as Gandeeva Therapeutics, Septerna, and MOMA Therapeutics. These companies harness the power of cryo-EM and artificial intelligence to drive innovation in the field of structural biology, drug discovery, and precision medicine.

Sriram Subramaniam, Ph.D., Founder and CEO of Gandeeva Therapeutics, expressed enthusiasm for the collaboration, stating that the company is "aggressively pursuing the development of first-in-class modalities in targeting difficult-to-drug protein-protein interactions." The partnership will investigate and validate the application of Gandeeva's proprietary cryo-EM platform approach for Moderna's selected target. In return, Gandeeva will receive research payments from Moderna, although the specific terms of the agreement have not been disclosed.

Gandeeva Therapeutics is a trailblazer in precision medicine, merging the power of cryo-EM and machine learning to develop differentiated therapeutics by targeting and modulating key protein-protein interactions. Gandeeva's structure-guided drug discovery platform includes target prediction and validation (SPOTLIGHT™), hit identification by screening virtual and fragment libraries (HYPERFOCUS™), and lead optimization (CRYO-CADD™). The company boasts a robust preclinical oncology pipeline that targets difficult-to-treat cancers with novel protein interaction modulators, such as interfacial glues (iGlues™) and allosteric inhibitors. Gandeeva is based in the Greater Vancouver area, Canada.

This collaboration highlights the continuous advancements and potential of AI-driven technologies in revolutionizing drug discovery and development.