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Accelerero Biostructures, Inc., expedited structure determinations and provided rapid, high-quality macromolecular crystallography data collection and processing on crystals of protein-DNA complexes of Hachimoji DNA that double the DNA alphabet with implications for life in the universe and DNA storage. The groundbreaking research was published in Science, February 22nd, 2019.

DNA and RNA are naturally composed of four nucleotide bases that form hydrogen bonds in order to pair. Hoshika et al. added an additional four synthetic nucleotides to produce an eight-letter genetic code and generate so-called Hachimoji DNA. Coupled with an engineered T7 RNA polymerase, this expanded DNA alphabet could be transcribed into RNA. Thus, new forms of DNA that add information density to genetic biopolymers can be generated that may be useful for future synthetic biological applications.

According to the New York Times, Hachimoji DNA could have many applications, including a far more durable way to store digital data that could last for centuries. It also raises a profound question about the nature of life elsewhere in the universe, offering the possibility that the four-base DNA we are familiar with may not be the only chemistry that could support life.

The structure determinations were expedited by Accelerero Biostructures, cofounded by Dr. Debanu Das, a former graduate student of Dr. Georgiadis, and Dr. Ashley Deacon, who provided rapid, high-quality macromolecular crystallography data collection and processing on crystals of the protein-DNA complexes. The crystal structures provided 3D proof that Hachimoji DNA assembles duplex DNA retaining essential features of natural DNA while imparting novel sequence specific features conferred by the novel synthetic base pairs.

Dr. Debanu Das, CEO of Accelerero Biosciences commenting on the company's role said "We were honored to contribute to this monumental discovery and to validate this pioneering work with our platform – it's a powerful tool for structure determination".