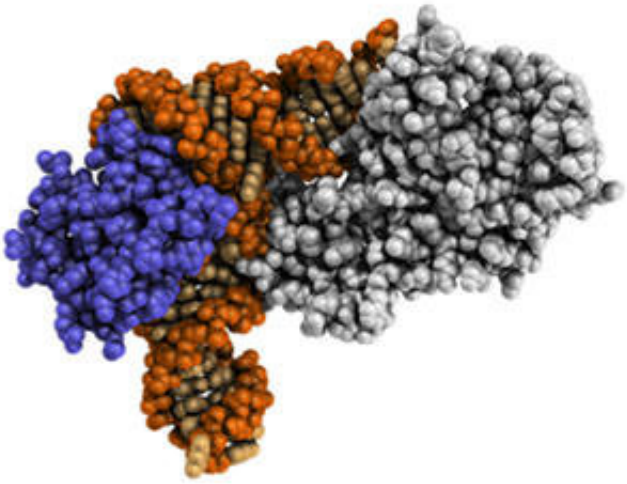
Key to expanding genetic code described

October 17 2017, by Bill Hathaway



An illustration of biochemical make up of pyrrolysyl-tRNA synthetase (PylRS) complex, one of the keys to expanding the genetic code. Credit: Yale University

Yale scientists have described the atomic structure of a protein that is the key tool in efforts by synthetic biologists to expand the genetic code.

Understanding the biochemical make up of pyrrolysyl-tRNA synthetase (PylRS) should speed up efforts to incorporate novel amino acids into proteins that could carry out a wide variety of functions in health, medicine and the environment.

For instance, "Incorporating synthetic amino acids into the genetic code holds the exciting prospect of synthesizing new drugs inside living cells," said senior author Dieter Söll, professor of molecular biophysics and biochemistry, and of chemistry at Yale.

In bacteria and single-cell organisms of the archaea domain, the protein is responsible for the incorporation of pyrrolysine, known as the 22nd amino acid. Efforts of researchers to use the protein to incorporate novel amino acids into organisms have been hampered by lack of knowledge of its structure, the authors say.

Yale's Tateki Suzuki and Corwin Miller, now of DS Therapeutics in Houston, are co-first authors of the paper. Researchers from Harvard contributed to the study, which was published Oct. 16 in the journal *Nature Chemical Biology*.

More information: Tateki Suzuki et al. Crystal structures reveal an elusive functional domain of pyrrolysyl-tRNA synthetase, *Nature Chemical Biology* (2017). DOI: 10.1038/nchembio.2497

Provided by Yale University