

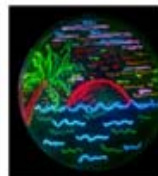
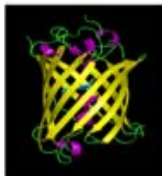


China Pharmaceutical University(CPU), originally the National Pharmaceutical School founded in 1936, is one of the "211 project" key universities affiliated with Ministry of Education. CPU was China's first independent school of pharmacy and one of the biggest multi-speciality university of pharmacy with the complete pharmaceutical subjects in China. It is located in Nanjing, the ancient capital city for six dynasties in China.

Project 1: Adding New Notes to Life's Song

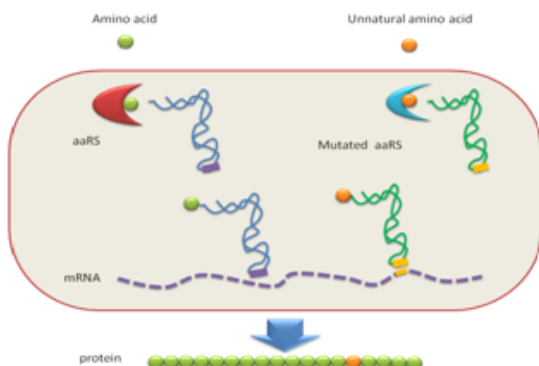
Inspiration

Expanding the Genetic Code



Here, we show you a new technology: expanding the genetic code, which allows for the site-specific incorporation of unnatural amino acids into GFP directly in living cells. We hope this method will further expand the color palette.

Methodolog



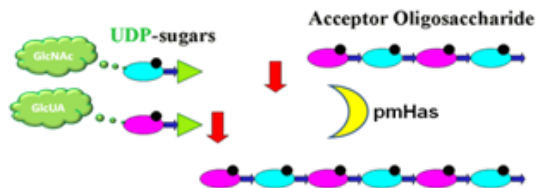
Using a strategy that mimics the way that the common amino acids are encoded, we expand the genetic code to accommodate unnatural amino acids. A new set of components is added to the biosynthetic machinery, which contains a novel tRNA-codon pair, an amino acyl-tRNA synthetase (aaRS) and an unnatural amino acid.

Project 2: Customizing a biomacromolecule

Inspiration

Model of pmHas-catalyzed hyaluronan elongation

pmHas adds single sugars to NONREDUCING end in an alternating fashion

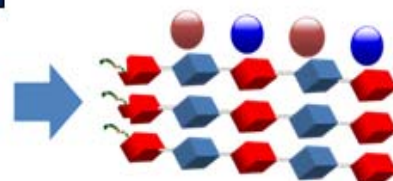


This figure presents a method to produce synthetic HA with very narrow size distributions. The Pasteurella HA synthase enzyme, pmHAS, catalyzes the synthesis of HA polymer utilizing monosaccharides from UDP-sugar precursors.

Single monosaccharides (GlcUA, magenta; GlcNAc, blue) donated by UDP-sugar precursors are added in a step-wise fashion to the non-reducing terminus of the acceptor hyaluronan chain. The alternating sugar-repeat structure of hyaluronan is generated by the sequential action of the two selective glycosyltransferase activities of pmHas.

Design

Step-wise fashion



calculagraph



The figure above motivates us to design a device which can synthesize a biomacromolecule with a desired size. First of all, step-wise fashion is needed. In this part, two kinds of glycosyltransferases are alternatively expressed. The alternating sugar-repeat structure of biomacromolecule is generated by the sequential action of the two selective glycosyltransferase activities. What's more, we need a calculagraph to control the reaction time. As a result, the elongation process is synchronized and all of polymer products are very similar in length.