

Genetic code engineering of green fluorescent protein by unnatural amino acids

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Green fluorescent protein (GFP) from jellyfish is a versatile reporter protein for monitoring gene expression and protein localization in variety of systems. Applications using GFP have expanded greatly due to the availability of mutants with altered spectral prosperities, Such as YFP, BGFP and CFP etc. Generally all these GFP variants were generated through replacement of naturally occurring amino acids by site directed mutation or directed evolution methodology. The main disadvantage of this methodology is laborious, time consuming and importantly limited with 20 naturally occurring side chains. In other hand unnatural amino acid mutagenesis has been used to selectively substitute target amino acid with our interesting side chains to our protein of interest. Current studies have explored the incorporation of unnatural amino acids into green fluorescent protein and modify the characteristic features of the protein. We have selected the tyrosine analogues due to the important role in the chromophore and structure formation. Current study not only demonstrated the importance of unnatural amino acid mutagenesis and also demonstrated new approach to generate tailor-made proteins with interesting and useful spectral properties.