

Seminar Announcement

Peptide Ligases: Molecular Gluer of Proteins

Date: 17 June 2016 Friday

Time: 4pm

Venue: Classroom 1, SBS



Speaker: Prof. James Tam
School of Biological Sciences, NTU

Abstract

Proteases are ubiquitous in nature whereas peptide ligases, enzymes catalyzing the reverse reactions of proteases, are exceedingly rare. Because of their special ability to make new peptide bonds efficiently and with exquisite specificity, peptide ligases have been long sought after by industry, particularly pharmaceutical and biotechnology industries for engineering, chemoselective labeling and macrocyclization of proteins.

Thus far, only four ligases have been discovered and all exhibit slow kinetics, and which limits their practical applications. Recently, we discovered a novel Asn/Asp (Asx)-specific ligase from butterfly pea, a local medicinal plant found in our very own NTU campus. We have named the newly discovered enzyme butelase 1 in accordance to the plant's local name (Bunga Telang Ligase).

Butelase 1 exhibits unmatched kinetics. To our knowledge, it is the fastest known peptide ligase, nearly >10,000 times faster than the other known ligases such as PatG, PCY1 and sortase A. Butelase 1 efficiently cyclizes various peptides and proteins up to 50 kDa with high yields. Importantly, butelase 1 mediates protein ligations, allowing the incorporation of novel functional groups, unnatural amino acids, stable isotopes, fluorophores, biotin tag and other biochemical and biophysical probes into recombinantly expressed proteins. We anticipate that the use of butelase for protein synthesis is scalable at the industrial level and holds promising potentials in laboratory as tools for protein engineering, macromolecule labeling, protein cyclization, and food processing.

We hope that our seminar could be of interest to you scientifically and also sufficient to get you interested as potential collaborators to form a center in discovering, engineering and exploiting peptide ligase technology.