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TEMASEK LIFESCIENCES LABORATORY

13 September 2016 (Tuesday), 11am
The Auditorium (Level 1)

Butelase-Mediated Ligation: An Emerging Biotechnology Tool for Protein Engineering, Drug Design, and Synthetic Biology

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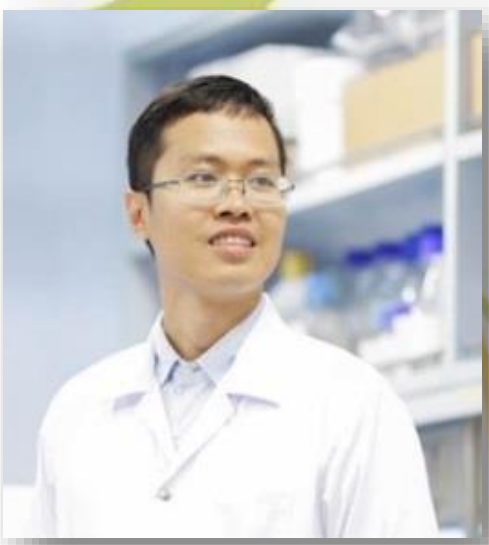

Giang Nguyen obtained his Bachelor of Sciences (1st Class Honours, Accelerated Program) and PhD degrees from NTU. He has published 14 papers in prestigious journals such as Nature Chemical Biology, Nature Protocol, JACS and Angewandte Chemie. He is also the inventor of 2 PCT patents. His research has been highlighted by multiples local and international commentaries.

Peptide ligases, enzymes that form peptide bonds with site specificity and substrate selectivity, are highly desirable tools for drug design, protein engineering, and synthetic biology. However, they are exceedingly rare with most of the known ligases exhibiting slow kinetics, which limits their applications. Recently, we discovered the fastest known ligase called butelase 1 from butterfly pea, a common herb in Singapore. The enzyme was named according to its local Malay name (Butelase = Bunga Telang Ligase). Butelase 1 exhibits unmatched kinetics that are >10,000 times faster than the currently known ligases. It can cyclize various peptides and proteins of up to 50 kDa. Importantly, butelase 1 mediates protein ligations, allowing the incorporation of novel functional groups, fluorophores and biochemical probes into proteins. Its unique ability to make new peptide bonds and allow posttranslational modifications of proteins will push forward the landscape of protein research to a new frontier.

Recent Publications:

1. **Nguyen, G. K.,** Wang, S., Qiu, Y., Hemu, X., Lian, Y. & Tam, J. P. (2014) Butelase 1 is an Asx-specific ligase enabling peptide macrocyclization and synthesis, ***Nat. Chem. Biol. 10,*** 732-8.
2. **Nguyen, G. K.**, Cao, Y., Wang, W., Liu, C. F. & Tam, J. P. (2015) Site-Specific N-Terminal Labeling of Peptides and Proteins using Butelase 1 and Thiodepsipeptide, ***Angew. Chem. Int. Ed. 54***, 15694-8.
3. **Nguyen, G. K.,** Kam, A., Loo, S., Jansson, A. E., Pan, L. X. & Tam, J. P. (2015) Butelase 1: A Versatile Ligase for Peptide and Protein Macrocyclization, ***J. Am. Chem. Soc. 137***, 15398-401.