Integrative chemical biology approaches to examine histone posttranslational modifications

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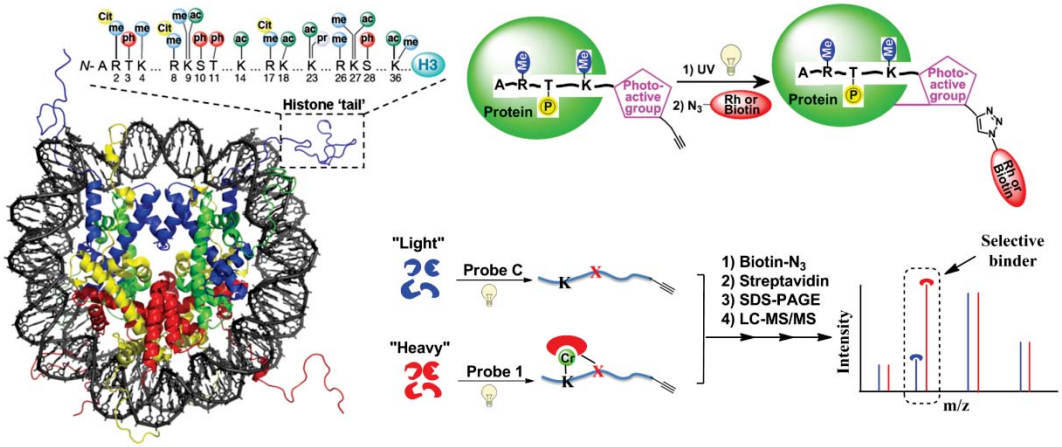
Histone posttranslational modifications (PTMs), such as phosphorylation, methylation and acetylation, play crucial roles in regulating many fundamental cellular processes, such as gene transcription, DNA replication, DNA damage repair, chromosome segregation and cell differentiation. Increasing evidences have indicated that PTMs of histones can serve as a heritable 'code' (so-called 'histone code'), which provides epigenetic information that a mother cell can pass to its daughters. Histone code is 'written' or 'erased' by enzymes that generate or remove the modifications of histones. Meanwhile, 'readers' of histone code recognize specific histone modifications and 'translate' the code by executing distinct cellular programs necessary to establish the diverse cell phenotypes, while the genetic code (DNA) is unaltered.

While a large number of PTMs have been identified on various sites of histones, so far only a handful of them have been extensively studied. The cellular mechanisms and functions of many other PTMs, particularly those newly identified ones, remain essentially obscure. In this talk, I will present our chemical biology approaches to unravel biological significance of histone PTMs by identifying their substrates, 'writers', 'erasers' and 'readers'.



Xiang David Li, born 1981 in Kunming, China, received his B.Sc. in Chemistry at Fudan University in 2003, and Ph.D. in 2008 from The University of Hong Kong under the guidance of Professor Dan Yang. He has then spent three years as a postdoctoral fellow with Professor Tarun Kapoor at Rockefeller University. In 2011, he joined the University of Hong Kong as an Assistant Professor of Chemistry. His research interest is to develop chemical approaches to study protein posttranslational modifications.