

Ph. D. Open Seminar

Department of Chemistry, IISER Bhopal

Title of Thesis: **Single-site labeling of native proteins**

Speaker: **Mr. Srinivasa Rao Adusumalli**

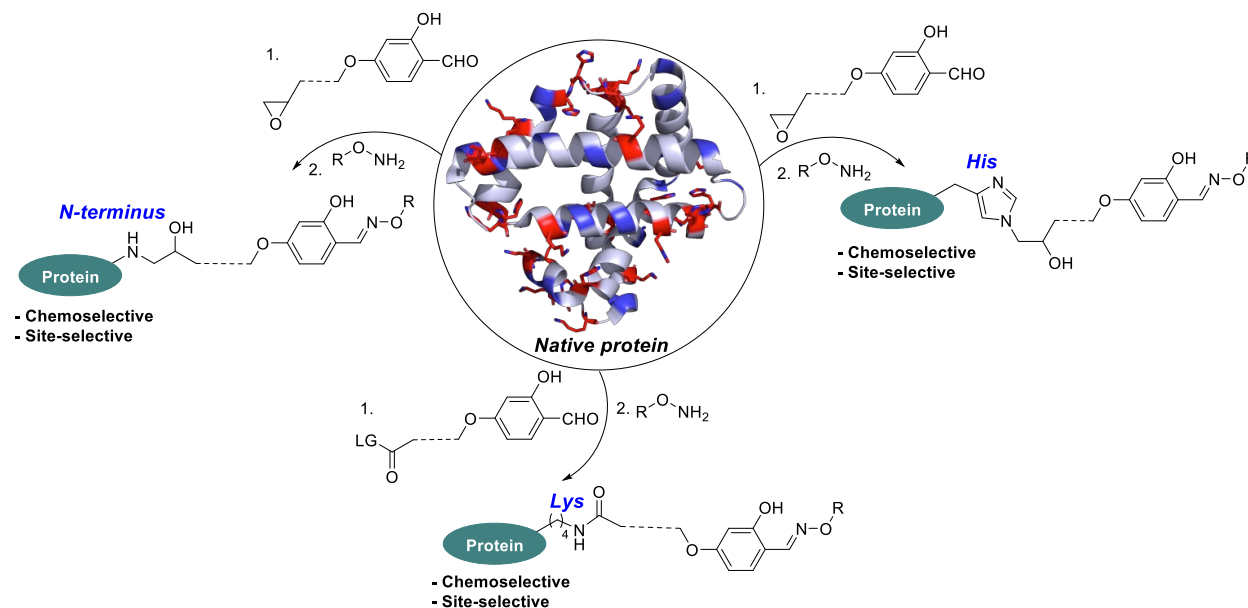
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Time: **5:15 PM**

Venue: **L3, LHC**

The interest in site-selective labeling of protein has emerged from the necessity to understand and regulate their structure and function.¹ The proteins expressed with unnatural amino acid(s) or fragment(s) offered the glimpse of success in this direction.² However, these methods do not extend to the native or endogenous proteins. An enabling chemical platform to label such natural proteins can initiate a research front with immense possibilities. Over the last few years, we have investigated and unraveled physical organic chemistry principles that allow identification of reactivity hotspots on the protein surface.³ We also developed principles to modulate the chemoselectivity of an electrophilic functional group during the protein labeling.⁴ Eventually, we were able to develop a chemical technology that operates under the confinement of desired reactivity, chemoselectivity, and site-selectivity for protein modification.^{4,5} This modular approach allows the labeling of distinct Lys and His residues on the surface of protein. The single-site modification allows late-stage attachment of tags, protein stapling, and purification. The mild reaction conditions keep the structure and activity of proteins intact post-labeling.



References

1. Krall, N.; da Cruz, F. P.; Boutourelira, O.; Bernardes, G. J. L. *Nat. Chem.* **2016**, *8*, 103.
2. Cornish, V. W.; Hahn, K. M.; Schultz, P. G. *J. Am. Chem. Soc.* **1996**, *118*, 8150.
3. (a) Singudas, R.; Adusumalli, S. R.; Joshi, P. N.; Rai, V. *Chem. Commun.* **2015**, *51*, 473. (b) Purushottam, L.; Adusumalli, S. R.; Chilamari, M.; Rai, V. *Chem. Commun.* **2017**, *53*, 959.
4. Rai, V.; Adusumalli, S. R. Patent application 201611009537, Nov 15, 2016; PCT/IN2016/050408, Nov 17, 2016.
5. (a) Adusumalli, S. R.; Rawale, D. G.; Tripathi, P.; Paul, R.; Rai, V. *Manuscript under preparation*. (b) Adusumalli, S. R.; Rawale, D. G.; Purushottam, L.; Thakur, K.; Rai, V. *Manuscript under preparation*.