BIOCHEMISTRY SEMINAR SERIES

Midstream Presentation - Fall 2020

Troy Lucas Lowe

S. Clarke Group

"Responses of a Protein Arginine Methyltransferase (PRMT7) to Intracellular Stress"

Arginine residue methylation is a ubiquitous posttranslational modification that can modulate transcriptional activation and repression. Protein arginine methyltransferase 7 (PRMT7), one of the nine mammalian PRMT family members, catalyzes only monomethylation of the terminal guanidine nitrogen atom on substrates, and previous research has identified optimal enzyme activity at sub-physiological body temperatures. In an effort to understand how PRMT7 activity is regulated within the body, I utilized recombinant human PRMT7 expressed in a bacterial system with a synthetic histone peptide, H2B (23-37), that had previously been identified to contain a major *in vitro* monomethylation motif specific to PRMT7. Under initial rate conditions, it was confirmed that PRMT7 has 59% less activity at 37°C than at 20°C. I have also extended the identification of unique characteristics of PRMT7 and show that the enzyme has suboptimal activity at physiological pH and ionic strength. Additionally I observed inhibition of PRMT7 activity with physiological concentrations of magnesium ion. Taken together, these results open the possibility that PRMT7 can respond to cells undergoing stress. These findings demonstrate a potential mechanism for the *in vivo* regulation of protein arginine methylation by PRMT7 and provide clues for the pleiotropic effects observed in mutations of the PRMT7 gene in mice and humans.

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via Zoom

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More information: marla@chem.ucla.edu

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