

CTMI 301 – Current Topics in Microbiology and Immunology

What for many years seemed to be the almost-forgotten fifth nucleotide in DNA, 5-methyldeoxycytidine (5-mC), has now been generally recognized as one of the topological genetic signals with considerable significance in molecular biology. In an intricate way and in conjunction with histone modifications, 5-mC residues in highly specific locations in a nucleotide sequence play crucial roles in long-term gene silencing and influencing chromatin structure. Likely, the two mechanisms are inextricably intertwined. Moreover, it has become apparent that the genomes of many organisms are characterized by unique patterns of DNA methylation which can differ from genome segment to genome segment and cell type to cell type. These patterns can be instrumental in determining cell type and function. Thus, it is not surprising that studies on the role of DNA methylation now occupy center stage in many fields of biology and medicine such as developmental biology, genetic imprinting, genetic disease, tumor biology, gene therapy, cloning of organisms, and others. Once again, basic research in molecular biology has provided the essential foundation for investigations of biomedical problems.

Continuing the tradition of making this series equally useful to the novice and the expert in many different fields of biology and medicine, this volume of *Current Topics in Microbiology and Immunology* is written by experts in the realm of research on basic mechanisms of DNA methylation and its role in biology and pathogenesis.