同济大学生命科学论坛 （第十四期）

主办单位：生命科学与技术学院

报告人：徐国良 教授 （中国科学院院士）

中国科学院上海生化与细胞研究所/复旦大学医学院

主持人：岳 锐 教授

时 间： 2019年1月2日（周三），10:00-11:00 am

地 点： 医学楼二楼报告厅

报告题目: Enzymatic DNA Oxidation in the Control of Mammalian Development

报告人简介：

1985年于浙江大学生物系获学士学位，1988年于中科院遗传研究所完成硕士阶段的学习，1993年于德国马普分子遗传研究所及柏林技术大学获博士学位。2001年在美国哥伦比亚大学完成博士后研究回国，任中国科学院上海生命科学研究院生物化学与细胞生物学研究所研究员、博士生导师。在解决表观遗传学重大科学问题，即DNA去甲基化发生的分子机制及其在哺乳动物中的功能研究上取得了一些成果，发现甲基化胞嘧啶上的酶促氧化作用与碱基切除修复相耦联，调节生物体发育与细胞重编程。

Abstract：

Mammalian development begins with a zygote resulted from the fertilization of a sperm and an oocyte. The zygotic genome undergoes profound epigenetic reprogramming to prepare for development. The biological significance and mechanisms of reprogramming are poorly understood. We and others found that 5-methylcytosine (5mC), a prominent base modification present in genomic DNA, is selectively oxidized and demethylated in mouse zygotes by the Ten-Eleven-Translocation (Tet) family of dioxygenases. Deficiency in Tet enzymes impedes demethylation and reactivation of developmental genes such as Oct4 and Nanog in the early embryo, leading to embryonic lethality. Interestingly, oocytes lacking Tet appear to be unable to reprogram injected somatic cell nuclei. Additionally, mouse embryonic fibroblasts (MEFs) deficient in Tet are unable to be reprogrammed into iPSCs by Yamanaka factors. We conclude that Tet-mediated oxidative demethylation is required for the erasure of epigenetic barrier in embryonic development as well as in cell reprogramming in vitro. Recent advances in the understanding of DNA modifications in postimplantational embryo development will be discussed. Findings from the research with Tet homologs in lower eukaryotes will also be presented.