GCOE Program, The University of Tokyo

Center of Education and Research for the Advanced Genome-Based Medicine
For personalized medicine and the control of worldwide infectious diseases

IMSUT & RCAST GCOE SEMINAR

Professor Tasuku Honjo

Department of Immunology and Genomic Medicine,
Kyoto University Graduate School of Medicine
Executive Member of the Council for Science and Technology Policy

"A unified view of the mechanism for the immune and genome diversity"

Wednesday December 7th, 2011　16:40 - 17:40
Venue: Auditorium of The Institute of Medical Science,
The University of Tokyo
(Free Admission. No advance registration required.)

Abstract :
The orthologue of activation-induced cytidine deaminase (AID) is evolutionally the first enzyme that generates acquired immune diversity. Originally, the AID orthologue catalyzed gene conversion (GC) and probably somatic hypermutation (SHM). AID began to mediate class switch recombination (CSR) only after evolution of frogs. Recent studies revealed that the mechanisms for generation of immune and genetic diversity share several critical features. Meiotic recombination, VDJ recombination, CSR, and SHM all require H3K4 trimethyl histone modification for the target specificity. Genetic instability related with dinucleotide or triplet repeats depends on DNA cleavage by topoisomerase 1 (Top1) which also initiates DNA cleavage in both SHM and CSR. Such common features between AID-induced immune diversification and genome instability suggest that AID hijacked the basic mechanism for genome instability when AID evolved in jawless fish. It is thus difficult for AID to make absolute target specificity to the antigen receptor gene. Nonetheless, the risk to introduce genome instability in non-Ig loci is tolerable compared to the advantage of protection against pathogens by enormous Ig diversification by AID.

Hosts: Professor Hiroshi Kiyono, Division of Mucosal Immunology
Professor Kensuke Miyake, Division of Infectious Genetics

Contact: GCOE Management Office, The Institute of Medical Science, The University of Tokyo (IMSUT)
E-mail: gcoe@ims.u-tokyo.ac.jp　TEL：03-6409-2028
Direction to the venue: the Auditorium of the first building, Shirokane Campus
Shirokanedai Station (Subway Namboku Line & Mita Line), Exit 2; about 3 minutes walk
http://www.ims.u-tokyo.ac.jp/imsut/en/access/access/