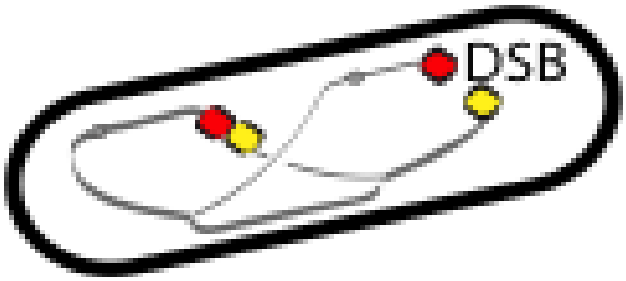
立教大学生命理学研究センター
セミナー

日時　2013年　11月　8日　（金）　17:00～18:00
場所　立教大学(池袋キャンパス)　11号館　A203教室

講演者　Professor David J Sherratt　(University of Oxford)

Visualizing homologous recombination in live *E. coli*

Double-strand break (DSB) repair by homologous recombination (HR) has evolved to maintain genetic integrity in all organisms. Although many reactions that occur during HR are known, understanding of where, when and how they occur in living cells is lacking. By using conventional and super-resolution microscopy we describe the progression of DSB repair in live *Escherichia coli*. In particular, we address the question of whether HR can occur efficiently between distant sister loci that have segregated to opposite halves of an *E. coli* cell. We show that a site-specific DSB in one sister can be repaired efficiently using distant sister homology. After RecBCD processing of the DSB, RecA is recruited to the cut locus, where it nucleates into a bundle that contains many more RecA molecules than can associate with the two ssDNA regions that form at the DSB. Mature bundles extend along the cell long axis in the space between the bulk nucleoid and the inner membrane. Bundle formation is followed by pairing in which the two ends of the cut locus relocate at the periphery of the nucleoid and move rapidly together towards the homology of the uncut sister. After sister locus pairing, RecA bundles disassemble and proteins that act late in HR are recruited to give viable recombinants 1-2 generation time equivalents after formation of the initial DSB. The work reveals an unanticipated role of a RecA bundle in channeling the movement of the DNA DSB ends thus facilitating the long-range homology search that occurs prior to the strand invasion and transfer reactions.



連絡先:理学部生命理学科　塩見　大輔

(03-3985-2401, dshiomi@rikkyo.ac.jp)