

Molecular mechanisms for the regulation of meiosis

Masayuki Yamamoto

(The University of Tokyo, Graduate School of Science, Professor)

【 Outline of survey 】

Sexual reproduction enables progeny to bear a novel combination of genes, and is supposed to have been a driving force to generate variations and complexity of lives. Understanding the molecular mechanisms of sexual reproduction will allow us to visualize the evolutionary paths of lives, and also help us comprehend how malformation of germ cells or missegregation of chromosomes occurs. This study is going to investigate ' meiosis ', which is a crucial step of sexual reproduction to generate gametes, i.e., eggs and sperm. During meiosis, homologous chromosomes derived from parents undergo recombination and then re-segregate to produce haploid gametes. We aim to clarify fundamental mechanisms driving meiosis, through analysis of fission yeast, a unicellular microbe belonging to the most primitive organisms to perform meiosis. Our preliminary study has shown that mRNAs of certain meiosis-specific genes are stable only during meiosis, and we will pay special efforts to identify the mechanism regulating this stability, in addition to clarifying other mechanisms responsible for the progression of meiosis.

【 Expected results 】

We can expect in the long run to invent new therapeutic methods for infertility, or to generate useful cultivar, if molecular mechanisms of meiosis are fully understood. However, this study is a typical basic research and is not aiming a direct practical benefit so much as a scientific merit. This may be rationalized by the fact that investigation of meiosis has not been developed much at the molecular level, especially in animals and plants, in which experimental systems to study meiosis in vitro are yet to be established. Under these circumstances, it will be greatly beneficial for the study of meiosis in higher organisms, if we can present molecular mechanisms clearly that regulate meiosis in fission yeast.

【 References by the principal researcher 】

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【 Term of project 】 FY 2004 - 2008

【 Budget allocation 】 80,400,000 yen

【 Homepage address 】 <http://www.biochem.s.u-tokyo.ac.jp/yamamoto-lab/>