Biology 3 and 5

Sessions for Institute for Protein Research (IPR)

Institute HP: http://www.protein.osaka-u.ac.jp/en

In this session, we will introduce the research topics conducted by four scientists at the Institute for Protein Research (IPR), Osaka University. The IPR was founded in 1958. Since then, IPR has conducted basic research on protein structure and function, with the aim of elucidating various functions, order, and the formation of life from the perspective of protein science. Proteins are essential to life because they play a major role in all processes of life, including morphogenesis, physiological function, and environmental sensing. IPR research areas are very diverse, from the protein structures of small organisms to higher human diseases.

Biology 3 (IPR 1)

Day 3, July 15, 10am - 12pm

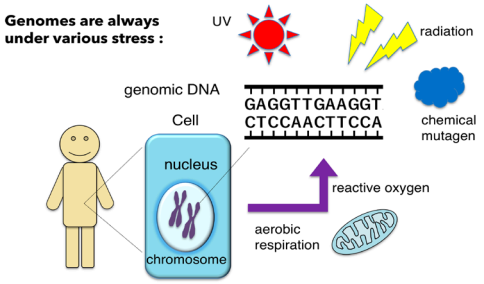
1. Asako Furukohri, Associate Professor, Laboratory for Genome-Chromosome Functions

Lab HP: http://www.bio.sci.osaka-u.ac.jp/en/dbs01/re-paper-temp.php?id=15

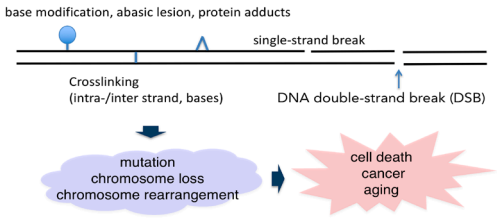
Understanding the molecular mechanisms to maintain human genome integrity

Our genomic DNA is under the constant threat from both endogenous and exogenous factors, such as UV, radiation and reactive oxygen species. To maintain our genome integrity, cells develop various DNA repair mechanisms. Homologous recombination is one of the key mechanisms to maintain the genome integrity in cells. Mitotic recombination mainly participates in DNA repair process for DNA damages such as double-strand breaks. It is well known that recombination process also plays essential roles during meiosis; it provides a mechanism to ensure proper chromosome segregation and also increases genetic diversity. Homologous recombination is also essential for genome editing technology so it is intentionally studied in both biological and medical fields. We

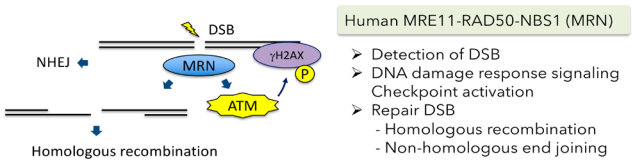
study cellular factors working in DNA recombination pathways by both genetic and biochemical approaches. Here, studies about human proteins, such as MRE11/RAD50/NBS1 complex and RAD51, central players in repair DNA double-strand breaks (DSB) by homologous recombination, will be introduced.



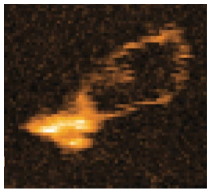
Various endogenous/exogenous factors continuously attack our genomic DNA



DNA damages on genomic DNA cause a potentially harmful mutation that induces cell death/cancer



Human MRE11-RAD50-NBS1 (MRN) complex is a key player to repair DNA double strand breaks



Atomic force microscopy image of human MRN

Biology 3 (IPR 1)

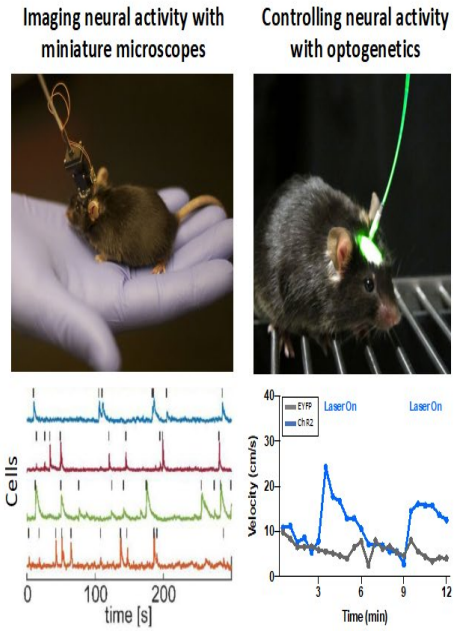
Day 3, July 15, 10am - 12pm

2. Tom Macpherson

Assistant Professor, Laboratory for Advanced Brain Functions

Lab HP: http://www.bio.sci.osaka-u.ac.jp/en/dbs01/re-paper-temp.php?id=86

My research uses neural imaging and optogenetic techniques to elucidate the molecular, cellular, and genetic mechanisms underlying learning, decision making, and psychiatric disorders.



Biology 5 (IPR 2)

Day 4, July 16, 3:10-4:40pm

3. Masato Nakai, Associate Professor, Laboratory for Organelle Biology

Lab HP: http://www.bio.sci.osaka-u.ac.jp/en/dbs01/re-paper-temp.php?id=84

What makes plants green?

Biology 5 (IPR 2)

Day 4, July 16, 3:10-4:40pm

4. Ulrike Münzner

Project Assistant Professor, Laboratory for Cell Systems

Lab HP: http://www.bio.sci.osaka-u.ac.jp/en/dbs01/re-paper-temp.php?id=82

In my current research, I am using RNA sequencing data to better understand why some patients infected with COVID-19 develop moderate symptoms, and other patients develop severe symptoms.