

# Institute of Aerospace Medicine

## Institute Seminar (virtual), November 16, 2021, *Abstract*

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Genome Maintenance Mechanisms in Health and Disease

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### **The cellular decision of how to repair DNA breaks**

DNA double strand breaks (DSBs), spontaneously occurring or caused by ionizing radiation, are among the most severe forms of DNA damage and threaten the integrity of the genetic information. Intriguingly, DSBs are also a crucial intermediate in genome editing procedures. DSBs can be repaired by two principal cellular mechanisms – recombination-based (such as homologous recombination, HR) and direct ligation-based (such as non-homologous end joining, NHEJ). The cellular decision, which of these mechanisms to use for repair, is made at the step of DNA end resection, a processing of the DNA end.

A major interest of my research group has therefore been to uncover, which molecular mechanisms influence DNA end resection. Notably, nucleosomes, the fundamental component of chromatin inhibit resection by several mechanisms. Here, I will describe our previous and ongoing work showing the discovery of new regulators of resection and the DSB repair decision as well as new methods by which we can study DSB repair. I will discuss implications for genome editing technology and applications in radiation biology.