

Institute of Aerospace Medicine

Institute Seminar, October 11, 2017, *Abstract*

Boris Hespeels, PhD

Department of Biology (URBE)

Laboratory of Evolutionary Genetics and Ecology (LEGE)

Namur, Belgium

Bdelloid rotifers: new eukaryotic extremophile model organisms to study the impact of radiation and micro-gravity on biological processes?

Bdelloid rotifers are one of the smallest animals found on earth and constitute a major scandal in evolutionary biology due to the putative absence of sexual reproduction for at least 60 million years. Adapted to semi-terrestrial environments they have the ability to survive extreme stress conditions and diverse types of damage that are lethal to most organisms, such as desiccation, high doses of radiation and freezing. Like bacteria *Deinococcus radiodurans*, bdelloid rotifers appear to survive such conditions because of an efficient antioxidant and DNA repair mechanism.

Free radicals and DNA breaks are typically generated during radiation and have been implicated in inflammation, cancer, and aging in higher organisms. It is therefore stimulating to find a metazoan organism that is capable of dealing with these damage.

Here we will present our research focusing on bdelloid *Adineta vaga* in order to introduce our new project, named RISE (Rotifer In Space), that was designed with the intention to use bdelloids as a new model organism for space research. This research project addresses the following questions: 1) How microgravity and space flight are affecting biological processes of *A. vaga*? 2) What are the limits of bdelloids extreme resistance to radiation? 3) What are the molecular mechanisms involved in protection and repair of damage induced by different radiation sources? 4) Are microgravity and space flight affecting protection and repair mechanisms of *A. vaga*?