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What can radiobiology and radioecology learn from each other?

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Although traditionally separate disciplines, radiobiology and radioecology are closely interlinked, and a closer collaboration between them would be of great benefit to both fields. This talk will give a personal view on what the two disciplines can learn from each other, giving examples from current research.

The most obvious area of overlap is radiation effects at the cellular and molecular level. Radioecology has adapted many molecular methods from radiobiology and other 'white' biology disciplines to examine radiation effects such as DNA damage and oxidative stress on non-human organisms. However, there is much more to be learnt, both in the use of novel methods but also in the understanding of the linkages between molecular or cellular level effects and what they mean for individuals, populations and even ecosystems. For radiobiologists, radioecology can offer a wide range of new model organisms (and knowledge of their biology) which can help answer questions about, for example, underlying mechanisms of radiosensitivity and adaptation to radiation. When it comes to the fate of radioactive substances in ecosystems, radioecology has traditionally focussed on transfer of radionuclides from the environment (e.g., water, soil) to organisms, and also between organisms in a foodchain (particularly to humans). It has also examined how properties of environmental chemistry affect bioavailability and uptake. Far less has been done on the cellular mechanisms of uptake, and those that may be radionuclide-specific. Here there may be much to learn from radiobiology and cell biology with their more in depth understanding of cellular mechanisms.

Lastly, I will give a short introduction to STAR, an EU Network of Excellence in Radioecology, and highlight some of the planned research at the border between radioecology and radiobiology. Some of these cross-disciplinary issues are also included in a draft Strategic Research Agenda for Radioecology, on which feedback is welcomed.

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