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## Health risks of low doses of ionizing radiation: Looking for the undetectable?

*Monday, 15 October 2012 18:00 (1 hour)*

Some parts from my winding path in the field of radiation biology and radiation protection research will be summarized. My initial focus was on high doses, where the target of interest, most often was DNA but in recent years it has moved to doses in the mGy range, where emphasis has been on changes in cellular metabolic pathways. Our special interest has been to search for biomarkers of exposure and of radiosensitivity which may help to understand the mechanisms of responses. A mechanistic understanding of the cellular responses to doses in the mGy range will be needed to bridge the lack of hard facts for risk estimates for cancer and non-cancer diseases obtained from epidemiological investigations to the mGy range and the requirement to come up with practical risk estimates. A challenge of similar magnitude is to grasp the importance of the dose rate effect. We are presently exploring in cellular model systems, the possibilities to reduce the dose rates from the commonly used Gy/min to a few  $\mu\text{Gy}/\text{min}$ . The goals here are to look for dose rates where we can see transitions in the cellular responses at the level of proteomics and epigenetics and possibly relate these changes to a mechanistic view on the cellular responses. Keeping in mind that a dose rate of  $\mu\text{Gy}/\text{min}$  is about 5 105 times higher than the normal background is indicative of the nature of the problem.

Although the challenge for radiation biology research to provide more precise knowledge about health risks of low doses and dose rates is great, the new tools in molecular biology and the application of system biology approaches will have significant impact on our understanding of risks to humans and the environment.

**Primary author:** Dr HARMS-RINGDAHL, Mats (Stockholm University, Sweden)

**Presenter:** Dr HARMS-RINGDAHL, Mats (Stockholm University, Sweden)

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