DoReMi News
Integrating Low Dose Research

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Editorial

Work Package 7 – Non-cancer effects

The current system of radiation protection is based primarily on protection against the risk of cancer from low doses of radiation. A small additional allowance is made for possible hereditary detriment. It is well established that moderate to high doses of radiation can increase the occurrence also of a variety of non-cancer effects in exposed individuals, but for radiation protection purposes it has generally been assumed that there is a threshold of dose below which no significant non-cancer effects (apart from hereditary disease) arise. Recent studies have, however, called into question this assumption, particularly in respect of vascular diseases (i.e. heart diseases and strokes), effects on cognitive functions following radiation exposure in infancy and occurrence of opacities in the lens of the eye (cataract). In each case epidemiological studies have suggested the possibility that these effects may arise after exposure to much lower doses than previously thought and possibly within the range of doses encountered in the use of radiation in industry and diagnostic medicine. The mechanisms behind these non-cancer effects are not well understood and they need to be investigated, including the potential roles of non-targeted effects.

If a linear no-threshold response were to apply (or be assumed to apply) to vascular disease, however, then on the basis of the present epidemiology of the A-bomb survivors this risk factor may be of sufficient magnitude to require explicit incorporation into the radiation protection system, on a comparable basis to that for cancer. This could imply changes to dose limits and constraints, but also structural changes to tissue and radiation weighting factors and other aspects. Exposures in infancy and possible effects on the developing brain need further investigation, particularly in the context of medical exposures.

Well-controlled epidemiological approaches continue to be essential in addressing each of these areas. Besides these epidemiological approaches, it is important to concentrate efforts on the development and implementation of novel approaches in order to explore potential biological and physiological effects of low doses. To advance this objective, new more-suitable animal models, coupled with “ex vivo” experiments, need to be developed for identifying as-yet unknown alterations of physiological systems. The same approach would allow performance of mechanistic studies of the biological responses at low doses, including those such as vascular effects and effects on learning and cognitive functions. Better understanding is also needed of the extent to which some biological modifications observed in animals exposed chronically to low levels of radionuclide contamination could lead to clinical effects. The findings of such experimental approaches may provide new opportunities for epidemiological studies.

The overarching strategic objective of the DoReMi WP7 is to implement a long-term and integrated approach involving several disciplines, namely, epidemiology, radiobiology, immunology and toxicology, for the purpose of risk evaluation for radiation-induced non-cancer effects, with the final objective of challenging the international system of radiation protection robustness regarding so-called deterministic effects.

For more information on all of the 9 tasks of the WP7, see WP7 page on the DoReMi website.

Jean-René Jourdain, WP7 Leader

State of the art in research into the risk of low dose radiation exposure – findings of the 4th MELODI workshop

The findings of the 4th International MELODI Workshop, organised on 12–14 September 2012 in Helsinki, Finland have been published and are available here. The 5th International MELODI Workshop will be organised on 7–10 October in Brussels, Belgium. More information available here.

DoReMi Training courses

The schedule of the DoReMi Training courses for the time period November 2013 – June 2014 is now published. More information available here.

Meetings and events

On the right column of the DoReMi Newsletters, you can find information about the approaching meetings and events organised by and related to DoReMi. On DoReMi website, under Meetings and Events, you can find more details about future and past meetings. In case you are organising a meeting and would like to publish the announcement on DoReMi website, please contact doremi@stuk.fi.

Subscription info

DoReMi Newsletters are published roughly every three months. They are sent to subscribers and published on DoReMi website. If you wish to receive the DoReMi Newsletters directly by email, please subscribe by sending a message to doremi@stuk.fi.

DoReMi and related events

Future events

- ***Workshop on 3D culture models for radiation and cancer research*** *will be organised on 23–24 September 2013 in Rotterdam, The Netherlands.*
- ***2013 German-French DNA Repair Meeting on epigenetics and genome integrity*** *will be organised on 7–10 October 2013 in Strasbourg-Illkirch, France.*
- ***11th International Conference on the Health Effects of Incorporated Radionuclides (HEIR 2013)*** *will be organised on 13–17 October 2013 in Berkeley, California, USA.*
- ***16th International Symposium on Microdosimetry (MICROS 2013)*** *will be organised on 20–25 October 2013 in Treviso, Italy.*

Past events

- ***DoReMi's 2nd Periodic meeting*** *was organised on 22–24 January in Paris, France. Publishable materials related to this meeting are available here.*

Highlights and interesting documents available

Three new peer-reviewed publications are available in the DoReMi Scientific Information Centre:

- *"Differential response to acute low dose radiation in primary and immortalized endothelial cells" by Rombouts C et al, published in International Journal of Radiation Biology.*
- *"Frequency of acute myeloid leukaemia-associated mouse chromosome 2 deletions in X-ray exposed immaturehaematopoietic progenitors and stem cells" by Olme CH et al, published in Mutation Research/Genetic Toxicology and Environmental Mutagenesis.*
- *"Non-targeted effects of ionising radiation – Implications for low dose risk" by Kadhim et al, published in Mutation Research/Reviews in Mutation Research.*

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