DoReMi News
Integrating Low Dose Research

Issue 2
2012

Editorial

Work package 6 – Sensitivity of the individual to cancer following exposures at low doses and low dose rates

In his version of Thomas Jefferson's Declaration of Independence the satirist George Orwell wrote *"All animals are equal, but some are more equal than others"*. Although intended as a commentary upon society, it rather elegantly demonstrates the Darwinian concept of the biological inequality that is inherent within a single biological species, including man. This concept can be best recognised in our children, who share many phenotypic features with their parents, but are nevertheless recognisable as unique individuals. Medicine has long recognised the role individual differences play in shaping both the occurrence of a disease and the response to healing efforts.

In the special situation of susceptibility to cancer a number of Mendelian traits influence the extent to which the external environment is able to influence the risk of developing cancer. There is a second, more complex, mode of genetic inheritance that can determine individual susceptibility to an environmentally caused cancer. Here the additive contribution from numerous genes, each of which only makes a small contribution to overall risk, determines susceptibility. The biological targets of these non-Mendelian traits range from simple cellular processes right through to determinants of behaviour and lifestyle.

In terms of radiation protection it is evident that a very small subset of the human population is disproportionately sensitive to the damaging effects of radiation. This may lead to them having a far greater risk of developing cancer after exposure to radiation than most members of the population However, the scarcity of these genetically predisposed individuals is not considered sufficient to raise concerns for the effective radiological protection of populations.

The relevance of the more common, but poorly understood, non-Mendelian inheritance for our current system of radiation protection is uncertain. WP6 is conceived to determine whether or not genetic factors influence individual susceptibility to such an extent that changes in the concepts of radiation protection are needed.

Understanding the scientific questions that need to be asked is one thing, developing appropriate experimental tools to answer the question is another. Especially in the case of radiation carcinogenesis at low doses we are faced with the twin problems of determining which individuals received exposures, and which malignancies amongst the myriad of cancers that arise are those that were induced by radiation. The scientific roadmap developed by WP6 to address these problems has been developed using the recommendations of the High Level Expert Group, the MELODI organisation, and our own DoReMi Transitional Research Agenda.

Our efforts focus on developing appropriate human and technological resources, on creating a portfolio of molecular and biophysical markers of exposure and cancer, and on establishing model systems to experimentally evaluate the contribution of individual differences in sensitivity.

For more information on these tasks, see WP6 page on the DoReMi website.

Prof. Michael J. Atkinson

DoReMi stretches beyond Europe!

Did you know that DoReMi is not merely a European project, but it has a Japanese partner Institute of Environmental Sciences (IES)? IES joined the DoReMi consortium as a result of the 1st DoReMi competitive call organised in 2010.

TRA commenting possibility and the Questionnaire

The DoReMi Transitional Research Agenda (TRA) needs your input! Send a comment. Are you interested in DoReMi? Let us know who you are and fill the Questionnaire.

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.

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DoReMi and related events

Future events

- ***4th International MELODI Workshop*** *will be organised on 12–14 September 2012 in Helsinki, Finland. Abstract submission is open until 30 June and registration until 31 July or until max. amount of participants has been reached. There are also* ***DoReMi / MELODI Training and Education Forum*** *organised on 11 September and* ***Training event on Risk models*** *jointly organised by MELODI and the Finnish Doctoral Programme in Environmental Health on 14 September. See www.melodi2012.org for more information.*
- ***Systems Radiation Biology Training course*** *on 2 September 2012 in Oxford, UK, preceding the 5th International Systems Radiation Biology Workshop. Deadline for applications is 31 July. See more information here.*

Past events

- ***Kick-off meeting of INT-Thyr (Task 6.9 within DoReMi)*** *was held in Barcelona, Spain, on 17–18 May, 2012. More information here.*

Highlights and interesting documents available

- *A review article entitled "****Ionizing radiation biomarkers for potential use in epidemiological studies****" is published in Mutation Research and available online.*

The DoReMi consortium wishes you **nice summer**

DoReMi has received funding from the European Atomic Energy Communitys's Seventh Framework Programme (FP7/2007–2011) under grant agreement n° 249689.