

## 2019 MELODI Statement

The purpose of the MELODI Association is to define priority scientific goals and to encourage the implementation research in the field of low dose rate radiation research. The Strategic Research Agenda of MELODI identifies these priority goals and the specific resources, infrastructures and training capabilities needed to further develop low-dose risk research within a time frame of 20 years.

Planning for the next EU research framework, Horizon Europe, is underway and this Statement strongly recommends the continuation of EU-funded radiation protection research to ensure that citizens are adequately and appropriately protected from radiation health risks. This is at a time when exposures are increasing in the medical area, will continue to be a concern for members of the public in areas surrounding nuclear installations, and when terrorist threats remain a concern for many.

The key priority for radiation protection research is to improve health risk estimates for low dose and dose-rates exposures encountered in occupational, medical and public/emergency situations. The approaches will need to be multidisciplinary and innovative. The integration of expertise outside of the conventional fields of radiation research will widen the possibilities to integrate modern technologies in health research in the assessment of health risk relevant to radiation protection.

The ongoing MEDIRAD EU project has a specific focus on cardiovascular effects and diseases from radiotherapy in breast cancer patients and cancer following CT-scan among children, which constitute very specific exposure situations in specific populations. The HARMONIC project focuses on paediatric patients, undergoing interventional cardiology or proton therapy. As proton therapy applications in the clinic are relatively recent, this 5-year project will focus on short to medium term non-cancer outcomes (endocrine dysfunctions, cardiovascular toxicities and neurovascular damages) and will not assess cancer or cardiovascular risk directly. The objective of the WP on interventional cardiology, however, will be to assess risk of cancer.

The ongoing LDLensRad, LEU-TRACK and SEPARATE projects, respectively focusing on dose and dose-rate effects on lens opacity, role of exosomes in radiation-induced leukaemogenesis and out-of-field effects in normal tissues, are the only CONCERT-funded projects covering topics relevant to MELODI related to basic mechanistic investigations.

While no specific EU- or EU-funded project calls for proposals are currently anticipated, the priorities may be used by national funding agencies, and are suitable for longer-term planning

Priorities for 2020 – 2025 period:

- To explore and define the shape of the dose-response relationships for radiation-induced health effects (cancer and non-cancer outcomes, in particular cognitive and neurodevelopmental effects and immunological effects) (Overall priority)
- To identify, explore and define adverse outcome pathways (AOPs) for radiation-induced health effects, and determine if those operating at low doses and dose-rates are the same as those operating at higher levels of exposure, and when the triggering of an AOP is sufficient to disrupt normal homeostasis
- To explore and define the role of epigenetic modifications in radiation-induced health effects

- To identify, develop, validate and implement the use of biomarkers for exposure, and for early and late effects for cancer or/and non-cancer diseases.
- To understand the potential impact of individual susceptibility on radiation-induced health effects.
- To understand the health effects of inhomogeneous dose distributions, radiation quality and internal emitters.
- To identify and enumerate the specific target cells for radiation-induced late developing health effects

The current and previous MELODI statements can be found on the MELODI website. They generally provide information about short-term research priorities for specific calls. The definition of research priorities for the medium and long-term (“roadmap”) is currently under development.

MELODI encourages, where appropriate, (1) the use of archived biological materials from prior EU funded research, (2) the integration of experienced laboratory networks (such as e.g. RENEB), (3) the consolidation and use of important epidemiological studies (both radiological and non-radiological) where feasible, (4) the integration of expertise from outside the conventional fields of radiation research.