EDITORIAL

New opportunities for European radiation protection research

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New opportunities for European radiation protection research

MELODI (Multidisciplinary European Low Dose Initiative) was founded in 2010 as an international organization governed by the French law on associations. Its aim is to address scientific knowledge gaps and research needs concerning the effects of exposure to low doses of ionizing radiation on humans and the environment, noting that such gaps have the potential to undermine the robustness and effectiveness of the radiation protection regulatory system. Indeed, such knowledge gaps may constitute obstacles to innovation and improvement of techniques needed to ensure adequate protection of people and the environment, and may be one of the causes of the patent lack of consensus in society, in Europe in particular, about the optimal conditions for the use of nuclear technology for energy, medicine, research etc.

In their common search for continuous improvement of the scientific basis for radiation protection, MELODI members, who today represent a large majority of the European research institutions with scientific competencies in this field, have identified several key challenges, which need to be addressed collectively.

1. Four key challenges for radiation protection research in Europe

1.1. Enhance multidisciplinary approaches

There are different scientific disciplines involved in radiation protection research. The issues of the organization of the links between them and across Europe must therefore be addressed. Substantial efforts need to be undertaken to increase the proximity between the diverse disciplines, which must be combined to effectively address the questions raised and to reinforce the European integration of research programs in this field, in order to assemble project teams with a critical level of resources and creativity. To achieve this, an operational plan is needed for integrating scientific expertise and resources in Europe, with the aim to challenging knowledge gaps in radiation protection research. The implementation of this plan will optimize the mobilisation of scientific competence in basic as well as applied research and the use of available resources. The objective is to attract scientists working with new technologies and platforms developed for fundamental or medical sciences, in order to investigate scientific issues of radiation protection and thus stimulate the formation of research teams in different disciplines.

1.2. A holistic strategy with well thought out goals and resources

A holistic scientific strategy based on well-established priorities should be developed in order to rationalize research efforts and to enhance the feasibility and success rate of research projects by ensuring that the resources needed are available. This includes the experimental infrastructure required for radiobiology research in particular, observational data as well as the commitment from highly qualified scientists from the diverse fields of science needed to solve
the knowledge gaps in radiation protection research. These elements have to be gathered in strategic research agendas, which gather sufficient consensus within the scientific communities concerned and gain the support of key stakeholders across Europe.

1.3. Secure a reliable and stable funding system

A coherent, stable and reliable Europe-wide funding system should be established for a significant period of time. This system should be competitive, be based on scientific excellence and act as a driver for the implementation of the recognized strategic priorities across the whole spectrum of radiation protection scientific issues. To achieve this in a sustainable way, the above-mentioned organizations and the researchers and experts themselves must engage in an in-depth consultation process with stakeholders.

1.4. An inclusive approach of radiation protection issues must also address societal aspects

Last, but not least, radiation protection research must also investigate societal aspects of the problem. Radiation protection of workers or of patients is rightly seen as a regulatory matter to be governed by the principles of justification, optimization, limitation and guided by a scientific approach to the risks involved. But the situation can become quite different when the general public feels directly involved, for example after a major accident leading to significant exposure of people, or large releases into the environment, or when the radiological impact of nuclear facilities such as power reactors or waste storage sites are publicly debated. In such circumstances, the public may remain unconvinced by the abstract construct of radiation protection formulae and aspire to understand the nature of radiological risk resulting from ‘low dose exposure’ in particular, and to be directly involved in its management, as they would be for other types of risks invading their everyday life, such as climatic hazards, for example. Such a difficulty cannot be resolved by communication skills only. A true engagement of both experts and researchers with society’s stakeholders on such matters is required, so that science is seen as willing to address society’s questions and able to effectively interact with concerned stakeholders when the need arises, thus providing them with the practical resources to help addressing such risks effectively.

2. Progress in evidence

The 6th MELODI public workshop organized in Barcelona in October 2014 evidenced significant progress made in Europe in the last few years on all four above-mentioned perspectives:

2.1. Fast growing synergies between scientific communities

Over the last 12 months, the signing of a Memorandum of Understanding (MoU) between MELODI and sister platforms dedicated to other scientific areas of radiation protection (radioecology with ALLIANCE; dosimetry with EURADOS; emergency preparedness with NERIS) has brought together the respective communities, not to merge them, but to identify how common actions could benefit them all. In practice, this aims to identify common objectives and work processes, particularly for the implementation of the EURATOM R and D policy for radiation protection. Similarly, a few months ago, another MoU was signed between MELODI, EURADOS and the five main European medical associations which gather health professionals directly connected to the use of ionizing radiation for medical purposes:
EANM (nuclear medicine), ESTRO (radiotherapy), ESR and EFRS (radiology), EFOMP (medical physicists). This scientific cooperation will facilitate the elaboration of radiation protection strategies addressing the issues of medical exposure of patients, which is now the main source of exposure of members of the public to ionizing radiation. Radiation protection research may benefit from innovative approaches to medical applications of ionizing radiation and conversely. Medical exposure of patients can also provide a highly valuable source of information to enhance the understanding of low dose effects, inspiring innovative research projects associating the medical community with radiobiologists, dosimetry specialists and epidemiologists. Thus, gradually, a complementary strategic research agenda centered on the beneficial use of medical exposure could emerge, with its own priorities consistent with those of MELODI and EURADOS.

2.2. Consensus on the fifth version of MELODI's strategic research agenda

A key aspect of the research strategies to be developed hinges around the development of a good consensus on research priorities and on needs for access to experimental infrastructures or other scientific data (biobanks, cohorts), as well as training and education resources needed to provide radiation protection research with highly qualified scientists. MELODI now has a unique experience in identifying such priorities, and assembling them in strategic research agenda (SRA) proposals, which are then discussed and tested in open workshops gathering representative portions of the scientific communities concerned. Thus in Barcelona, the fifth version of the MELODI SRA was presented, in a shorter format compared to the precedent editions, highlighting the main priority topics and the relevant modes of research proposed for addressing these topics.

This strategic research agenda (SRA), available on MELODI website (www.melodi-online.eu) proposes to concentrate efforts on three key research questions:

• What is the dose and dose rate dependence of cancer risk for low-level protracted or acute exposure?
• Which threshold exposure levels are appropriate for radiological protection to take into account public health risks other than cancer?
• Can reliable methods be developed to identify and address additional risks resulting from individual radiation sensitivity, including related ethical and radiological protection policy issues?

The SRA further documents the consensus which has been formed on the need to address these questions through a consistent scientific approach based on three complementary research paths:

• Research to improve understanding of the mechanisms contributing to radiation risk at low dose and dose rate exposure.
• Epidemiological research that integrates—where possible and informative—biological indicators for radiation risk evaluation.
• Research to address the specific effects of and risks associated with internal exposures, exposures of different radiation qualities and inhomogeneous exposures.

2.3. Towards an integrated European funding system for radiation protection research

The evolution of EURATOM calls within the H2020 framework program aims for a broader approach to the scientific aspects of radiation protection research and invites a strategic
perspective to future funding of radiation protection research in Europe. In particular, this will encourage the integration of research policy aspects in this field, co-funding mechanisms with member states, SRA development and road mapping of priorities for the planning of open calls, common approaches of the issues of education and training and access to infrastructure. It will also provide reliable and attractive competitive call programs that are open to the whole scientific community, including non EU countries having arrangements with the EU allowing them to participate to EURATOM research programs. The progression from the network of excellence instruments (e.g. DoReMi and STAR) to the OPERRA project which tests new avenues for multidisciplinary open calls, and lately to the European joint program CONCERT, provides a strong signal to the research communities about the consistent effort currently deployed under the H2020 banner to enhance radiation protection research in Europe over the years ahead. CONCERT will thus gather a majority of European research institutions and universities with a high interest in radiation protection research.

2.4. First steps for a social sciences agenda in support to radiation protection science

Finally, a social sciences agenda must also be developed to address the above-mentioned societal aspects of the problem. This should not be the realm of social sciences specialists alone, since in this field as in others of low dose effects research, multidisciplinary approaches are needed, bringing together teams comprising dosimetry specialists, biologists, physicians, epidemiologist, etc. Within the CONCERT project, resources are foreseen to address the need to interface these different specialists, in order to design an action plan in this important area.

3. Conclusion

MELODI and the other European platforms work together to deliver a bright future for the research communities concerned with radiation protection science, facilitating advanced research programs addressing important and highly complex issues with a good chance of success. However, these platforms only reflect the strength and expertise of their own members. This strength should also be enhanced, through sustained efforts to increase their representativeness and visibility across Europe and beyond and to provide a privileged forum, through their working groups in particular, for high level multidisciplinary strategy making and operational planning. These associations are open for membership. Please join them to strengthen their action and benefit in return from the influential network they already represent today.

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