



DoReMi -
Low Dose Research towards
Multidisciplinary Integration

Publishable Summary

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A summary description of project context and objectives

The aim of the DoReMi consortium has been to promote the sustainable integration of low dose risk research in Europe, in order to facilitate efforts to resolve the key policy questions identified by the 'High Level Expert Group (HLEG) on Low Dose Risk Research' (www.hleg.de). These questions are the shape/s of cancer dose-risk relationship/s, variation in risk between individuals, differences in tissue sensitivities for cancer, effects of radiation quality, risks from internal exposures and the risks of non-cancer effects. The research activities of DoReMi have focused on the research areas identified by the HLEG as being the most promising in terms of resolving the stated key policy questions. DoReMi has provided an operational tool to continue the development of the MELODI platform (Multidisciplinary European Low Dose Risk Research Initiative) that represents the major national bodies and research programmes with a long-term commitment to low dose risk research in Europe. The Joint Programme of Activities (JPA) of DoReMi has included: (i) a Joint Programme of Research (JPR) covering the research priorities (key questions) outlined above and including the sharing and updating of existing infrastructures; (ii) a Joint Programme of Integration (JPI) to promote sustainable integration between the key players in Europe; and (iii) a Joint Programme for the Spreading of Excellence (JPSE), covering in particular knowledge management, training & mobility and the communication of significant DoReMi findings to stakeholders and policymakers. The Joint Programme of Research addressed three main topics: the shape of dose response curve for cancer, effects of individual susceptibilities and the risks of non-cancer effects. Radiation quality, internal exposures and tissue sensitivities were addressed as cross cutting themes within these main research areas. The research activities have taken a multi-disciplinary approach, including interfacing with the broader (i.e. non-radiation) biological, toxicological and epidemiological research communities. A substantial proportion of the activities of DoReMi were dedicated to the joint programme of research as DoReMi took the lead towards sustainable integration of low dose risk research in Europe. In the longer term this will aid the resolution of the key policy questions in radiation protection.

Strategic planning of DoReMi activities were carried out in close collaboration with MELODI. The long term Strategic Research Agenda (SRA) for European low dose radiation risk research has been developed by MELODI. DoReMi formulated research priorities in the Transitional Research Agenda (TRA) that focused on objectives that were feasible to achieve within the 6-year lifetime of the project and that are in areas where stimulus is needed in order to proceed with the longer-term strategic objectives of the SRA.

A description of the work performed since the beginning of the project and the main results achieved so far

Since the beginning of the DoReMi Network of Excellence in January 2010, there has been rapid progress in establishment of a European research platform to focus on questions of low dose risk. DoReMi continued the initial work of HLEG by contributing to the development of the long-term SRA of MELODI, and by establishing the more detailed shorter-term DoReMi TRA. The research agendas provided by MELODI and DoReMi have helped to identify priorities for low dose risk research not only by the organisations involved but also in national, European and global contexts. The planned enhancement of the DoReMi network through the calls for partners with new expertises resulted in the inclusion of 24 new beneficiaries. This enhanced the competence of the consortium in several key areas, by integrating research experts in biomarker identification, immunological/inflammatory pathways, and the effects of chronic low dose exposures, cataractogenesis, vascular effects, stem cells, epigenetics, novel mechanisms of genome

reorganisation, as well as retrospective dosimetry. The three DoReMi competitive calls attracted proposals from 89 different organisations in 25 countries (including 21 European MS).

DoReMi implemented research programs addressing the three key research areas: shape of dose-response curve for cancer, individual radiation sensitivity for cancer and non-cancer effects. All RTD activities also addressed the cross-cutting issues of radiation quality, tissue sensitivity and internal emitters. Several workshops were convened to develop strategies that focused on the most promising lines of research for the three areas. Experimental programs were launched and amended in all three areas and a total of 27 new tasks were amended in the project portfolio via the calls. The RTD approaches have been closely coordinated through discussions on needs for research infrastructures and analytical platforms, as well as targeted stimulation of training and education of next-generation researchers at the European level.

The availability of suitable infrastructures for performing low dose risk research was specifically addressed by DoReMi. Experimental radiation research is highly dependent on the availability of appropriate radiation sources that are reliable, capable of delivering a range of radiations, are robust and accurate. Low dose research also needs access to well-defined epidemiological cohorts, reliable databases and biobanks and as well the appropriate platforms for analysis. After the initial mapping of infrastructures and their availability, DoReMi has provided access to several new infrastructures that will enhance the European capabilities in addressing scientific questions relevant for low dose risk.

Dissemination of information on ongoing low dose risk research to the general public, the scientific community, policy makers and stakeholders has been an important part of DoReMi networking activity. More information on DoReMi activities can be found at the DoReMi's own website (<http://www.doremi-noe.net/>), which is still operational for some time after the end of the project. Through the website, DoReMi has promoted interdisciplinary interaction and increased European integration of research as well as facilitated the spreading of knowledge. The information and materials with sustainable value have been transferred to <http://www.melodi-online.eu/DoReMi/home.html>, which is kept up to date also in the future.

The expected final results and their potential impact and use (including the socio-economic impact and the wider societal implications of the project so far)

Although much is known about the quantitative effects of exposure to ionising radiation, considerable uncertainties and divergent views remain about the health effects at low doses. In 2009, the HLEG identified a series of key policy questions to be addressed by a strategic European research agenda. This resulted in the establishment of the MELODI European Research Platform, to sustain the impetus and continue evolution of the research programme via the SRA. DoReMi acted as an operational tool for the sustained development of the MELODI platform between 2010-2015, creating sustainable integration of European research on low dose risk and providing answers to key policy questions. The DoReMi joint programme for research focused on the areas identified by the HLEG and MELODI as being the most promising in terms of addressing and resolving the key policy questions. By addressing the scientific basis underlying the system of radiation protection DoReMi, contributed directly to strengthening the credibility of scientific evidence relevant to the development of radiation protection policy. Ultimately DoReMi can be expected to contribute more widely to radiation protection through engagement with International Commission on Radiological Protection and other national and international bodies. The High Level and Expert Group pointed out that many EU member states have lost key competences and are no longer capable of independently retaining their current research activities in radiation sciences, with implications for effectively fulfilling operational and policy needs and obligations. Up-to-date research and education and training activities carried out by DoReMi and

MELODI are urgently needed to ensure the European competence in radiation sciences and radiation protection.

In the final DoReMi TRA, the main achievements of DoReMi in low dose health risk research have been stated and the most urgent research needs and priorities in this domain emphasized for the benefit of improved Radiation protection. Now, it will rely on the new wider-ranging European initiatives launched within Horizon 2020 to follow up the low dose research lines. The experiences on integration of research gained by MELODI and DoReMi have been exploited when preparing for the Horizon 2020. By now, Strategic Research Agendas have been prepared not only for low dose risk research but also for radioecology, emergency preparedness and dosimetry. Furthermore, an additional strategic research agenda is currently developed for the use of radiation in medicine. There is hope that low dose research can be further extended and consolidated by MELODI within the European Joint Programme (EJP) for the Integration of Radiation Protection Research (CONCERT). Further improvement of Radiation Protection in Europe remains an important goal.