



DoReMi LD-Radstats: Workshop for statisticians interested in contributing to EU low dose radiation research

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CREAL, Barcelona; 26th – 28th October 2015



DoReMi Integrating Low Dose Research

Introduction

- DoReMi Network of Excellence: Integrating low dose research
- What are the open research questions?
- How can you / we help?

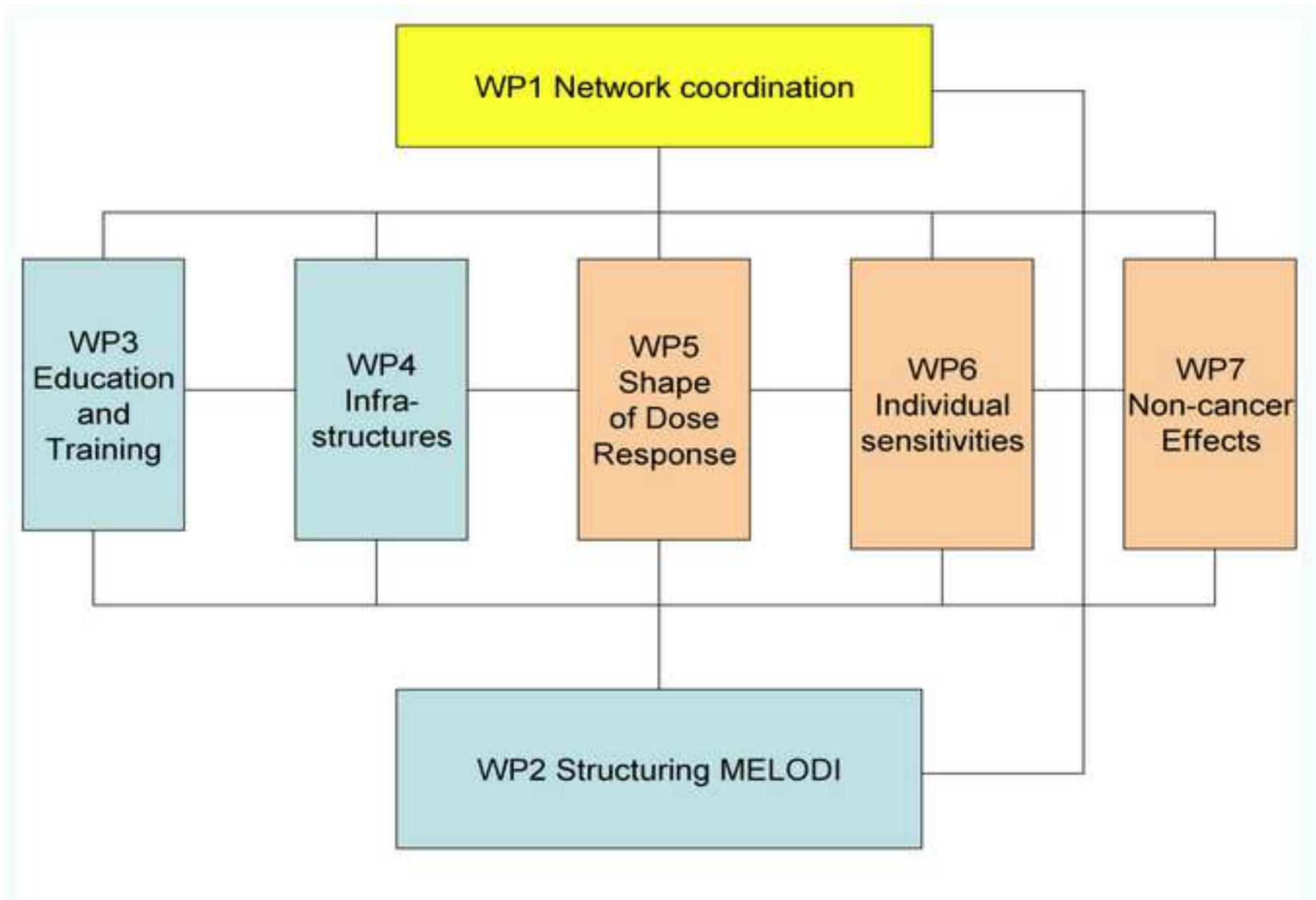
DoReMi

“Low Dose Research towards Multidisciplinary Integration”

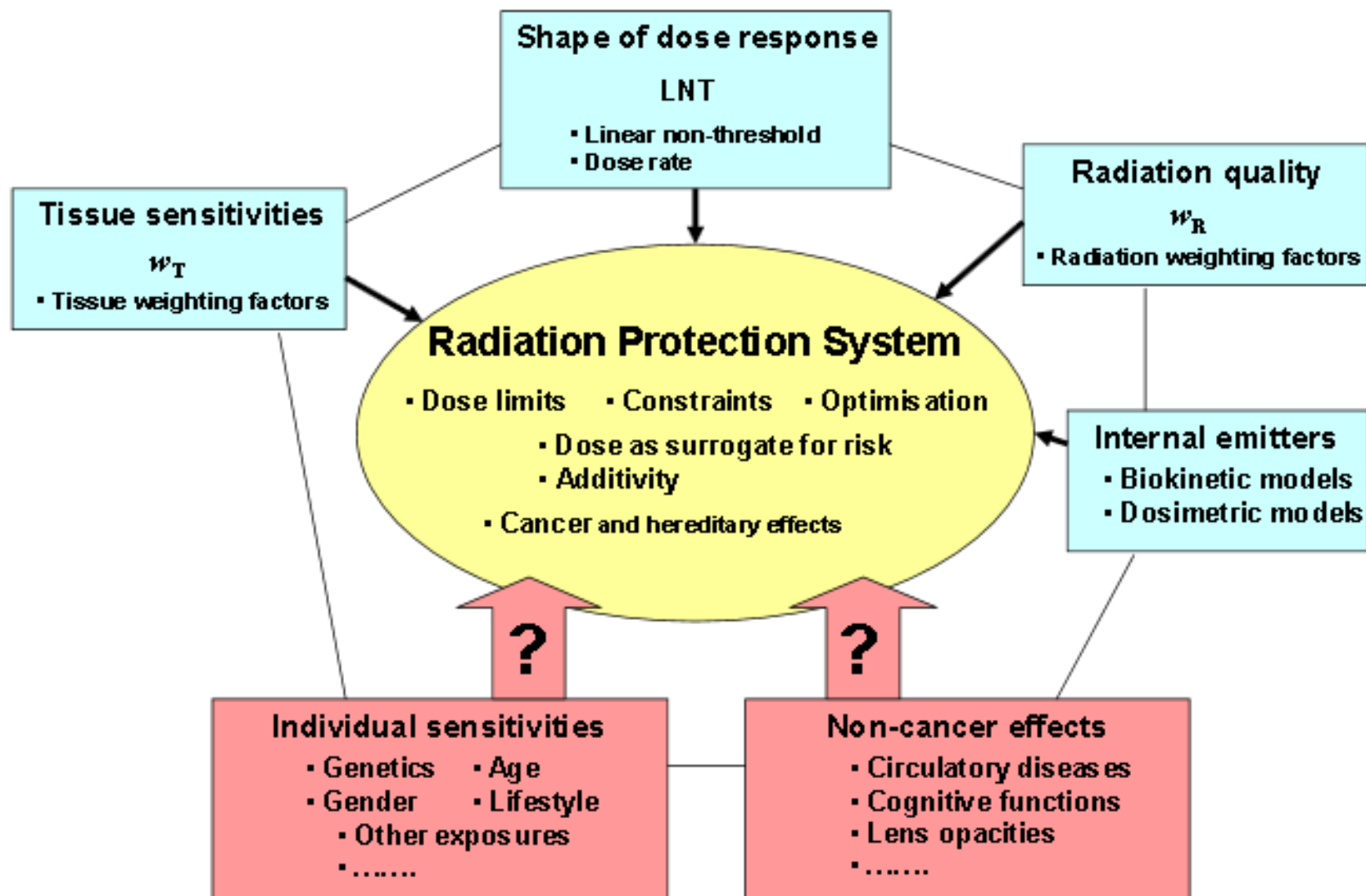
- Network of Excellence -> Operational research
- Address the health risks associated with low dose ionising radiation...
- January 2010 – December 2015
- 12 -> 36 EU partners : Major national bodies and research programmes

Key aims:

- Promote the sustainable integration of low dose risk research in Europe
- Resolve policy research questions identified by HLEG (www.hleg.de)
- MELODI platform : Multidisciplinary European Low Dose Risk Research Initiative (www.melodi-online.eu)



How robust is the system of radiation protection and risk assessment?



Current system of radiation protection:

ICRP – recommendations based on scientific evidence:

- Human population studies, relatively high doses
- LNT model for cancer risk ($\sim 5\% \text{ Sv}^{-1}$)
- Mechanisms span dose range
- Weighting factors for type of radiation
- Weighting factors for dose to differentially sensitive tissues
- Dose rates: DDREF = 2

But, little direct human evidence for these RP assumptions!

What don't we know?

Key research questions:

1. What is the dependence on energy deposition?
2. What is the dependence on dose rate?
3. What are the tissue sensitivities?
4. What is the modification of risk by genetic and epigenetic factors and gender?
5. What is the effect of age on risk?
6. What is the effect of lifestyle and/or other exposures on risk?
7. What is the effect of physiological state?
8. Is there a hereditary component in risk?
9. What is the role of non-targeted effects in health risk?

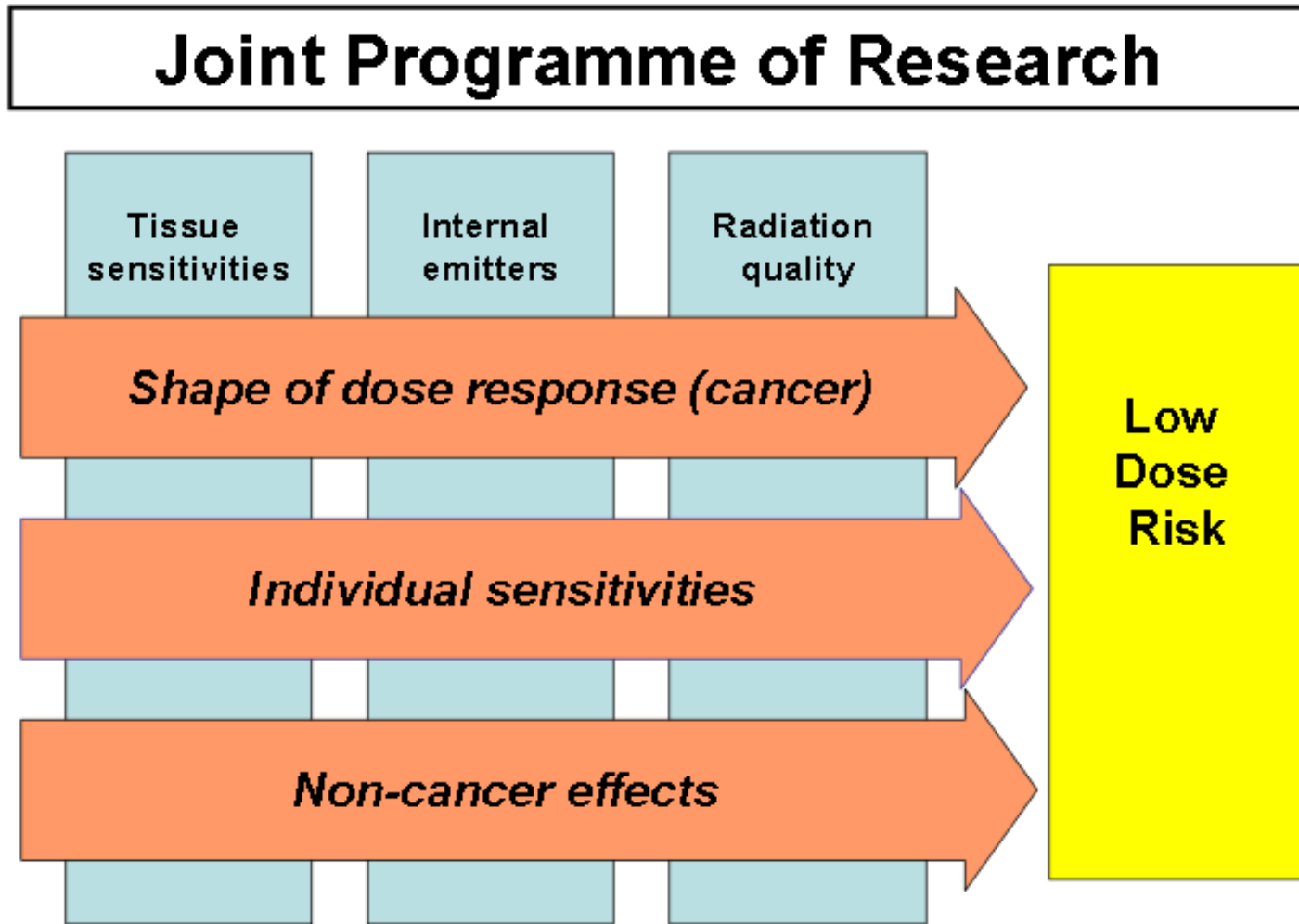
Cancer

Non-cancer effects

Epidemiology

Mechanisms

Transitional Research Agenda



DoReMi TRA / MELODI SRA

- Focus on societal needs
- Low (< 100 mGy) and very low (< 10 mGy) doses
- Need for both epidemiology and mechanistic studies -> fundamental understanding of health risks
- Need for a well coordinated, multidisciplinary, integrative, research approach to inform RP including:
 - **Mathematical modelling**
 - **Integrated research**
 - **Assessment of uncertainties**
- Considerations of cost, feasibility, education, infrastructure, etc...

How can you help?

HLEG: Need to reduce uncertainties to demonstrate scientific basis for RP assumptions:

- Understanding of interaction of radiation with biological targets
- Molecular mechanisms of carcinogenesis and other diseases
- Influence of genetic variability

TRA Research topics:

- Link epidemiological and mechanistic studies to increase power at low doses (biomarkers for molecular epidemiology)
- Modelling to support risk estimation -> stochastic or deterministic?
- Validation of molecular biomarkers for individual variation
- Integration of research across disciplines

How will the workshop work?

- Presentations on current work in DoReMi / associated projects
- Information from external experts on their own current interests
- Discussion on how to go forward!

Potential outcomes

- Highlight interesting topics to people that can help solve remaining research questions
- Special issue of extended abstracts in “Research Perspectives CRM Barcelona”
- Further training courses / focused workshops
- An informal or even formal network of statisticians working on low dose radiation research
- A formal application to CONCERT...?