

Dear readers

Welcome to the official newsletter of the Department of Radiation Sciences of the Helmholtz Zentrum München (DRS). In the first edition we would like to introduce our research mission, the four research teams, and update you on our recent activities.

Prof. Dr. M. J. Atkinson

Prof. (NRNUM) Dr. C. Hoeschen

Dr. P. Jacob
(Speaker of the DRS)

Prof. Dr. H. Zitzelsberger

Research of the DRS

Our goal is to optimize the benefits to society that can be gained from peaceful uses of ionizing radiation, including research for new and improved medical applications of radiation in therapy and diagnosis.

We follow a 50 year tradition of radiation research at the Helmholtz Zentrum München in maintaining national and international competence in the radiation sciences through research, teaching and provision of independent scientific advice to governmental bodies.

HGF-Evaluation of the 3rd round of the Programme Oriented Funding 2014-2018

The current and future research activities of the DRS were reviewed as part of the Helmholtz Research Program Genes and Environment in Common Diseases (GEnCoDe). Our contribution to the Programme Topic 4 (Mechanisms of Genetic and Environmental Impacts in Health and Disease) received an „excellent“ rating.

Research in the DRS focusses on modelling of radiation-induced disease processes and personalized radiation medicine.

Introducing the research teams of the Department of Radiation Sciences

The Institute of Radiation Biology (Director Michael J. Atkinson)

The institute works to prevent cellular damage from medical and environmental radiation sources. We aim to improve cancer treatment by developing new drugs, by recognizing highly radiation-sensitive persons, and by minimizing damaging effects on the heart and brain.
<http://www.helmholtz-muenchen.de/en/isb/index.html>

The Institute of Radiation Protection (Acting Director Peter Jacob)

focuses on the measurement and evaluation of exposure to ionizing radiation from natural and artificial sources, analysis of related risks of cancer and cardiovascular diseases, and the education in radiation protection.
<http://www.helmholtz-muenchen.de/en/institute-of-radiation-protection/index.html>

Research Unit Medical Radiation Physics and Diagnostics (Director Christoph Hoeschen)

Our research unit aims to optimize the benefits of the medical uses of ionizing radiation. We focus on increasing the performance in medical procedures using radiation through the development of individualized imaging and diagnostic technologies and procedures.
<http://www.helmholtz-muenchen.de/amsd/index.html>

Research Unit Radiation Cytogenetics (Director Horst Zitzelsberger)

ZYTO investigates the radiation-induced DNA and chromosome damage in cell systems and human tumors. The focus is on understanding the mechanisms associated with radiation-induced carcinogenesis and the sensitivity of tumor cells to radiation treatment. Our aim is the identification of biomarkers of radiation etiology and responsiveness in order to develop the stratification needed to implement personalized radiation therapy.
<http://www.helmholtz-muenchen.de/zyto/index.html>

Awards: **Kristian Unger** received the 2012 MELODI European research prize for excellence in low dose radiobiology and radiation protection for his studies on radiation-induced thyroid cancer. **Claudia Braun**, a doctoral student, received a poster prize at the 2013 international SPIE conference on Medical Imaging.

Appointments: **Christoph Hoeschen** has been appointed associate editor for the European Journal of Medical Physics. **Michael Atkinson**, **Christoph Hoeschen**, **Peter Jacob**, **Werner Kirchinger** and **Werner Rühm** have all been appointed to various boards of the Federal Commission of Radiation Protection (Strahlenschutz Kommission, SSK). **Peter Jacob** chairs the SSK Committee for Radiation Risk and is member of the German UNSCEAR delegation.

Elections: Three members of the DRS have been re-elected to the International Committee on Radiation Protection (ICRP): **Werner Rühm**, **Nina Petoussi-Henss** and **Alexander Ulanovsky** will all start new four year terms. **Werner Rühm** will chair the Working Party on Dose and Dose Rate Effects.

Recent DRS publications

Elimination of Sec22 reduces caesium uptake in plants

Caesium enters cells of food plants by the same transport mechanisms as the essential potassium. This can be problematic, when the environment has been contaminated by radioactive caesium. Researchers of the Helmholtz Zentrum München now discovered a possibility to differentiate the uptake of the two elements. In their recent publication in *Nature Communications* they report that elimination of the membrane protein Sec22 reduces the uptake of caesium while not disturbing the uptake of potassium. **Dräxl, S. et al.** (2013): Caesium accumulation in yeast and plants is selectively repressed by loss of the SNARE Sec22p/SEC22. doi: 10.1038/ncomms3092

Rb1 haploinsufficiency promotes telomere attrition and radiation-induced genomic instability

Individuals with a mutation in the RB1 gene have a greatly increased cancer risk after exposure to ionizing radiation. In a recent publication in *Cancer Research – the Journal of the American Association Cancer Research* we show that RB1 mutation acts in a completely novel way to render cells more sensitive to radiation. Loss of the RB1 gene results in accumulation of genetic damage due to failure of the telomere caps to protect the ends of each chromosome. This study provides the first functional evidence linking genomic instability with an elevated risk of radiation-induced cancer. **Vasconcellos G. et al.** Rb1 haploinsufficiency promotes telomere attrition and radiation-induced genomic instability. *Cancer Res.* 2013 May 16 doi:10.1158/0008-5472

Aichler M. et al. Clinical response to chemotherapy in oesophageal adenocarcinoma patients is linked to defects in mitochondria. *J Pathol.* 2013 Apr 16 doi: 10.1002/path.4199

Eidemüller M. et al. Lung cancer mortality (1950-1999) among Eldorado uranium workers: A comparison of models of carcinogenesis and empirical excess risk models.

PLoS One 2012;7(8):e41431. doi: 10.1371/journal.pone.0041431.

Kaireit T. et al. Use of smartphones for dose alerts. *Fortschr Röntgenstr* 2013; 185(6): 558-562 doi: 10.1055/s-0032-1330705.

Hallmark paper

Celebrating the 50th anniversary the journal "Radiation and Environmental Biophysics" selected a 2011 publication by **Linda Walsh & Kristian Kaiser** as one of 50 hallmark publications of the last half century. This epidemiological study improves the prediction of risk; a key to cost/benefit analysis in radiation therapy. (*Radiat Environ Biophys* 50:21–35).

Diary of upcoming events

August

HERAEUS training course, Bad Honnef, Germany
11-23 August 2013

<http://iss-kurse.helmholtz-muenchen.de/heraeus-school/>

September

40th Annual Meeting of the European Radiation Research Society, Dublin 1-5 September 2013

<http://www.err2013.ie/index.html>

September

Annual Meeting of Deutsche Gesellschaft Medizinische Physik, Cologne Germany, 18-21 September 2013

<http://www.dgmp-kongress.de>

September

GBS Jahrestagung 2013 in Darmstadt,
25-27 September 2013

http://strahlenforschung.de/?page_id=733

October

5th Annual International MELODI workshop, Brussels, Belgium 7-10 October

<http://www.melodi2013.org>

RS2

Research School of Radiation Science



The Research School of Radiation Sciences welcomes the first intake of students

With applications from Bulgaria, China, Egypt, Germany, Greece, Ghana, Hungaria, India, Iran, Malaysia, Namibia, Nepal, Norway, USA, Pakistan, Spain and Tanzania the first year of the school was 8-fold oversubscribed.

We welcome **Mr. S. Trinkl** (Germany), **Mr. D. Topaltzikis** (Greece) and **Ms. E.K. Ghodoosi** (Iran) who will join 13 of our current graduate students. Formal lectures and school activities start in WS 2013/14. Applications for 2014 will open in January. Contact the school coordinator Mandy Birschwilks for details <http://www.helmholtz-muenchen.de/rs2>. The start of the academic year is 14th October 2013.

Legal notice / Editor

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