OncoRay – National Center for
Radiation Research in Oncology, Dresden

The Master course Medical Radiation Sciences and the new profile Medical Radiobiology

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About OncoRay

The institute

- multidisciplinary center, founded in 2005 as a part of an “excellence“ program of the German government, since 2010 “National Center of Radiation Research in Oncology“ together with HIRO Heidelberg
- supported by Technical University Dresden, Helmholtz Center Dresden Rossendorf and University Hospital C. G. Carus

Research at OncoRay

- radiation research in oncology in 15 working groups with physical, biological and medical background; some have cooperating status

Teaching at OncoRay - Postgraduate School

- Master course Medical Radiation Sciences
- OncoRay PhD program

Medical Radiation Sciences course

Framework of program

- consecutive Master course (M. Sc.), 2 years, 120 credit points (ECTS)
  (1 credit point $\widehat{=}$ 25-30 hrs. workload)
- 20 students, selected via admission procedure
- no study fees

Profiles:

- Medical Radiation Physics (combined with MPE training)
- Medical Radiation Biology (new profile, starting in 2012)

Target group:

- young scientists and engineers after their first degree (Bachelor) with good knowledge in physics, mathematics and biology

Profile Medical Radiation Physics

OncoRay
National Center for Radiation Research in Oncology Dresden

Education of Medical Physics Experts in Germany

- Studies in a scientific/technical subject (Master or diploma)
- 2 years practical clinical training
- radioprotection courses

Our concept (unique in Germany):

- well customized academic education of MPEs by an accompanying Master course, radioprotection courses included
- time for lectures and thesis accepted by the authorities as a part of clinical education time $\Rightarrow$ shorter education times

Short information about curriculum

- 15 modules in 3 semesters, last semester for Master thesis
- instruction language: mainly in German

Profile Medical Radiation Biology

New profile, starting in October 2012

Main intentions

- education of radiobiologists for radiotherapy centers with research profile
- students of this profile should be trained for work on the international market

Framework

- 13 modules (90 CP) in 3 semesters, last semester for Master thesis
- capacity of profile: 12 students per year
- profile has stronger academic and research focus, no parallel MPE education possible
- instruction language: completely in English

First Semester

Modules and Credit Points:

1. Anatomy and Physiology (6 CP)
2. Radiation Physics for Radiobiologists (8 CP)
3. Molecular Biology and Tumor Genetics (8 CP)
4. Biology and Physiology of Cells and Tumors (9 CP, duration 2 semesters)
5. Radiation Risk and Tumor Epidemiology (6 CP, duration 2 semesters)

Main objectives:

- setting of physical, biological and experimental basics
- homogenization of the previous knowledge and basics in this subjects
- setting of preconditions for special courses in the following semesters

Second Semester

Modules and Credit Points:

1. Biology and Physiology of Cells and Tumors (9 CP, second part)
2. Radiation Risk and Tumor Epidemiology (6 CP, second part)
3. Experimental Radiation Biology and Imaging (8 CP, duration 2 semesters)
4. Experimental Animal Techniques (5 CP)
5. Biostatistics (5 CP)
6. Radiopharmacy for Radiobiologists (8 CP, duration 2 semesters)
7. Pathology and Histology (5 CP)

Main objectives:

- learning advanced physical and biological knowledge
- purchase of ready-to-use knowledge for scientific work

Third Semester

Modules and Credit Points:

1. Experimental Radiation Biology and Imaging (8 CP, second part)
2. Radiopharmacy for Radiobiologists (8 CP, second part)
3. Radiobiology of Normal Tissues (5 CP)
4. Nuclear Medicine, Diagnostic and Therapeutical Radiology (9 CP)
5. Practical Training (8 CP)

Main objectives:

- continued learning of advances knowledge
- completing the education by learning interdisciplinary contents and getting skills for communication with other clinical staff
- preparation for experimental work during Master thesis

Forth Semester – Master Thesis

Extend and Character:

- scientific work to an actual topic in Medical Radiation Sciences, preferably in the field of radiobiology
- topics set by the university teachers working at OncoRay, experimental work inside the research groups
- 5 months work plus defense, together 30 CP

Actual Examples (physics profile):

- Simulation of in-beam PET data sets for irradiation of moving target volumina with ^{12}C ions
- Assessment of Dose in Image Guided Radiotherapy and Out-of-Field by Phantom Measurement

The course in context of networking

Our main idea for interested people

- come to Dresden and apply for our Master course, especially for the Medical Radiobiology profile
- enjoy the course, build connections to the community in Dresden
- work somewhere the world and remember the connection to the people working at OncoRay and you have studied with

Visit of particular modules

- in principle possible for a small number of students once the course is established
- capacity question has to be discussed in detail for each module
- at least theoretical part of modules also available for guest researchers
- students have to come at least for one semester – module duration is 15 weeks plus examination time for organizational and didactic reasons

More reasons to study in Dresden. . .

Original Photo: MalteF

Thank you for your attention!