Degree Program in Brief

Duration of Study/Credits
4 semesters/120 credits, full-time program

Degree Type
Master of Science (M. Sc.)

Start of Course
Winter semester

Language
English

Admission Requirements
- A Bachelor’s degree in natural sciences or state examination in Medicine or Veterinary Medicine
- Submission of a Letter of Motivation, CV and a Transcript of Records showing modules accounting to 140 ECTS as well as passing the aptitude assessment
- Proof of sufficient English language skills before the end of the application period

For more information:

Costs per Semester
No tuition fee. Detailed information:

Further Information
www.med.tum.de/en/master-program-radiation-biology

Contact

Technical University of Munich
School of Medicine
Department of Radiation Oncology
Ismaninger Str. 22, 81675 Munich

General Questions about Studying at TUM
Student Service Center
Arcisstrasse 21, 80333 Munich, Room 0144 (Service Desk)
Tel +49 89 289 22245
studium@tum.de

Program Specific Questions
mscradbiol.med@tum.de

In Cooperation With
Bundesamt für Strahlenschutz | Institut für Radiobiologie der Bundeswehr | Comprehensive Cancer Center München | Helmholtz Zentrum München

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Objectives

Mankind has always been exposed to ionizing radiation from natural sources such as cosmic radiation arriving at the surface of the earth and radioactive radon gas produced by the radioactive decay of uranium in subterranean rock formations. Other sources of radiation include environmental exposures and medical diagnostics.

Today, radiology, nuclear medicine and radiation oncology are central disciplines in modern interdisciplinary oncology. Many cancer patients can be cured with modern radiation techniques, or symptoms can be controlled effectively. In the era of personalized medicine, biology-driven radiation approaches can tailor treatment to the individual patient and his or her disease.

Therefore, it is essential to understand the molecular and cellular mechanisms of radiation effects on tumors and normal tissues, to use this knowledge for personalized radiation treatments. As cancer survivorship increases, we are seeing a small but significant increase in chronic diseases and secondary cancer associated with the earlier radiation treatment. Only by understanding the interaction between ionizing radiation and normal or tumor tissues the benefits and the health risks from applying radiation can be balanced.

The medical uses of radiation, as well as the broad social and political implications of radiation, will be at the forefront of our teaching. In the last decade, radiation biology has undergone a shift away from biophysical models of radiation interaction with DNA and is now more closely allied with molecular studies of cellular regulation and cell-cell interaction. These exciting new areas will be highlighted in teaching and research work.

Requirements

- students with strong interest in radiobiological research and interdisciplinary learning
- high motivation to do practical work undertaken in laboratories
- abilities for self-organization, initiative and teamwork as well as enthusiasm for and commitment to the program

Distinctive Features of the Program

- An international program taught completely in English.
- An interdisciplinary approach covering all relevant aspects of radiation including molecular biology, genetics, cancer biology, immunology, radiation-induced early and late morbidities, epidemiology, radiation physics, dosimetry and radiation protection.
- Two research practicals in laboratories or governmental agencies dealing with radiation research.
- Focus on developing research, presentation and paper writing competences.
- Completion of a research project and master’s thesis on a current topic.
- Opportunity to pursue a research practical and/or master’s research project abroad.

Career Profile

The comprehensive approach we take to teaching will establish a wide range of skills. These can form the basis of a successful career as a medical scientist for example in fundamental or translational research in radiation oncology, cancer biology, cell biology, environmental sciences, radiation medicine and other related disciplines. The acquired competences also qualify the successful graduate for a career with a range of non-governmental organizations and local or national radiological protection organizations.

Degree Program Structure

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<th>Semester</th>
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<tbody>
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<td>1st</td>
<td>Human Anatomy/Pathology and Physiology/Pathophysiology</td>
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<tr>
<td>2nd</td>
<td>Radiation Physics and Dosimetry</td>
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<td>3rd</td>
<td>Clinical and Experimental Radiation Oncology</td>
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<td>4th</td>
<td>Thesis</td>
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