

Competencies

PhD and ScD – Molecular Imaging Department of Environmental Health Sciences

Evaluation Opportunities

1. Develop a knowledge base of the fundamental principles, instrumentation, and importance of molecular imaging

Specific Competencies	Learning Opportunities	Course Work/Exam	Written Comps	Dept Preliminary Orals	School Preliminary Orals	Thesis	Final Defense	Public Thesis Presentation	Non-Thesis Research	Annual Advisor Review	Research Committee Review
Define “molecular imaging” and understand its importance in biomedical and environmental health science research	180.609-10 Principles of Environmental Health I-II 186.620 Radiochemistry 187.610 Principles of Toxicology 187.661 Fundamentals of Neurotoxicology M520.432 Medical Imaging Systems Molecular Imaging Seminar, Journal Club and Grand Rounds Participation and Presentation	X	X	X						X	
Describe the tracer principle, the categories of imaging tracers and the underlying physiology and biochemistry of molecular imaging	120.602 Introduction to Molecular Biology 186.601 Introduction to Radiation Health Sciences Molecular Imaging Seminar, Journal Club and Grand Rounds Participation and Presentation	X	X	X					X	X	
Describe the basic components and operation of the major types of instrumentation used in molecular imaging, including SPECT, PET, MRI and MRS	186.610 Nuclear Instrumentation M520.432 Medical Imaging Systems Thesis	X	X	X		X	X	X	X	X	

M = School of Medicine course described at <http://www.hopkinsmedicine.org/som/students/academics> (Electives Book)
 M520.432 is offered by Biomedical Engineering (co-listed as 580.472)

**PhD and ScD – Molecular Imaging
Department of Environmental Health Sciences**

2. Apply molecular imaging skills and knowledge to answer biomedical questions and further public health goals

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Analyze molecular imaging data and interpret results, demonstrating an understanding of the statistical approaches needed to analyze data	140.615 Statistics for Laboratory Scientists M520.432 Medical Imaging Systems Molecular Imaging Seminar, Journal Club and Grand Rounds Participation and Presentation Thesis	X	X	X		X	X	X	X		
Demonstrate a fundamental understanding of molecular biology, pharmacological, and biochemical approaches of validating and applying molecular imaging techniques to define the molecular basis of environmental disease	120.602 Introduction to Molecular Biology 183.631 Fundamentals of Human Physiology 187.632 Molecular Toxicology 187.661 Fundamentals of Neurotoxicology M260.709 Molecular Biology and Genomics M340.703 Cell Structure and Dynamics Thesis	X	X	X	X	X	X	X	X		X
Demonstrate an ability to formulate hypotheses that can be quantified and tested	180.609-10 Principles of Environmental Health I-II 306.665 Research Ethics and Integrity 550.860 Research Ethics 550.865 Public Health Perspectives on Research Laboratory Experience Thesis	X				X					X
Expand the knowledge base concerning the mechanism of actions of environmental agents in human disease	187.610 Principles of Toxicology 187.661 Fundamentals of Neurotoxicology Molecular Imaging Seminar, Journal Club and Grand Rounds Participation and Presentation Thesis					X	X	X			X

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M260.709 is offered by Molecular Biology and Genetics

M340.703 is offered by Cell Biology

Competencies

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3. Effectively disseminate and translate advancements in research and methods

Evaluation Opportunities

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Develop skills in communication of molecular imaging concepts in both written and oral presentations	M520.432 Medical Imaging Systems Molecular Imaging Seminar, Journal Club and Grand Rounds Participation and Presentation	X	X	X	X	X	X	X			
Develop skills in critical reading, discussion and evaluation of literature	Molecular Imaging Journal Club and Grand Rounds Participation and Presentation Literature Reviews	X				X	X	X			