

**PHAR 902: Human-Specific Disease Modeling in Mice  
Spring 2018**

**Course Description:**

Mice as experimental models for human diseases have a long history of use. Every decade, improvements are being made to achieve more advanced models. Mice now are modified genetically to carry human blood and immune cells/liver, brain, lung, gut tissues and human genes. These mice reconstituted with human cells/tissues provide opportunities to study human biology and human-specific diseases. These mouse models also allow for the investigation of human-specific pathogens and vaccines. Students will be exposed to all existing technologies and advances in the creation and applications of humanized mice and related genetic manipulation tools.

**Contact:**

**Course directors:**

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**Location and class time:** DRC I, room 1006; time 16:00 – 17:50.

**Method of instruction:**

Faculty with expertise in mouse models for human disease will teach the course. The majority of recommended reading material is covered in the text book, "Humanized mice for HIV research (2015), Springer New York". **It is available as an e-Book download free of charges at UNMC** or soft cover book for \$25. Additional reading material, such as review articles and journal articles, will be provided.

**Course schedule:**

#	Date	Lecture Topic	Lecturer
1	January 9	Humanized mice as a model for human diseases: infections, malignancies, regeneration and developmental biology.	Dr. Poluektova
2	January 16	<b>Ethical aspects of xenotransplantation.</b> <a href="http://videocast.nih.gov/summary.asp?Live=17471&amp;bhcp=1">http://videocast.nih.gov/summary.asp?Live=17471&amp;bhcp=1</a>	Dr. Poluektova
3	January 23	<b>Mouse Genetic Background and Cross-species biology.</b>	Dr. Poluektova
4	January 30	<b>Genetically engineered mouse models. Modern tools for genome engineering.</b>	Dr. Gurumurthy
	<b>Term paper #1</b>	<b>Complete significance and background information for humanized mice project proposal.</b> <b>Submitted by the end of February 8, 2016</b>	Drs. Gorantla Poluektova, Gurumurthy.
5	February 6	<b>Human Hematopoietic Stem Cells Biology</b>	Dr. J.G. Sharp
6	February 13	<b>Multilineage reconstitution and immune system development.</b> Human T cell, B cell and innate immune cell biology in mice.	Dr. Gorantla
7	February 20	<b>Humanized mice models for human liver pathology and toxicology.</b>	Drs. Osna, Poluektova
8	February 27	<b>Humanized mice for HIV research and therapeutics development.</b>	Drs. McMillan,

			Gorantla
	<b>Term paper #2</b>	<b>Human-specific infection and immune responses, vaccine and therapeutics development. What is possible and what is not.</b> <b>Submitted by the end of March 7, 2016</b>	Drs. McMillan, Gorantla, Poluektova
9	March 6	<b>Human-specific drug metabolism.</b>	Dr. McMillan
10	March 13	<b>Human-specific viral infections and vaccines.</b>	Dr. Poluektova
	<b>Term paper #3</b>	<b>Humanized mice for conditions that involve liver and immune function, infections, toxicology and addictions. Select a specific model</b> <b>Submitted by the end of March 19, 2016</b>	Dr. McMillan, Poluektova, Osna
		<b>Spring Break (March 19-26)</b>	
11	March 27	<b>Humanized mice for neurologic disease studies.</b> Ethical and public concerns.	Dr. Poluektova
12	April 3	<b>Humanized mice for neurologic disease studies.</b> Exploration of human-specific neurotropic infections.	Dr. Poluektova
	<b>Term paper #4</b>	<b>Neuronal or glial components and immune system responses.</b> <b>Submitted by the end of April 11, 2016</b>	Drs. Poluektova and Gorantla
13	April 10	<b>Human oncology studies on humanized mice.</b>	Dr. Poluektova
14	April 17	<b>Human cancer modeling on humanized mice:</b>	Dr. J.G. Sharp
15	April 24	<b>Final Exam: Student presentations (20min each) on the humanized mouse model design for the specific human disease selected.</b>	Drs. Poluektova Gorantla

