

SEMESTER I

LSM4228 EXPERIMENTAL MODELS FOR HUMAN DISEASE AND THERAPY

Prerequisite: LSM2103 Cell Biology

Workload: 26 lecture hours + 8 practical hours + 6 tutorial hours + 10 hours additional reading

Course description:

Experimental models including animal and cellular models are pivotal for the study of human diseases and development of therapeutics. They help to characterize disease pathophysiology, evaluate the mechanism of action of existing drugs, discover and validate new drug targets and candidates, establish pharmacodynamics/pharmacokinetic (PK/PD) relationships, estimate clinical dosing regimens and determine safety margins and toxicity. Recent advancement of genomic and gene editing technology facilitated the establishment of more disease models that can closely mimic human diseases, including diseases that involve environmental factors. In this module, we will discuss the technology, application as well as limitations of the current experimental models.

S/N	Topics	Lecture hours
1.	Cellular and animal models for human disease and therapy: values and challenges.	2 [Ge]
2.	Cellular models for cancer	2 [Ge]
3.	Mouse models for cancer (including environmental factors)	2 [Ge]
4.	Rodent models of cardiovascular diseases (including environmental factors)	2 [Ge]
5.	Mouse models for neurodegenerative diseases	2 [Ge]
6.	Fish models for human diseases: technical capability, suitability and applicability.	2 [Gong]
7.	Current fish models for human diseases	2 [Gong]
8.	Fish in drug screening	2 [Gong]
9.	Genetic engineering technologies in animal disease models and drug development	2 [Gong]
10.	Human cancer immunotherapy in cellular and animal models.	2 [Wang]
11.	Animal models & human gene therapy	2 [Wang]
12.	Monoclonal antibody therapeutics: In vitro and in vivo production	2 [Wang]
13.	Animal models for stem cell therapy.	2 [Wang]
14.	Practical: Zebrafish liver cancer induction and chemical inhibition in transgenic larvae	8h (open lab) [Gong]
		Total Lectures: 26 h Practicals: 8 h Tutorials: 6 h Additional reading: 10 h
	Total hours:	50 h

TEXT BOOK: None.

SUPPLEMENTARY READING: Relevant research papers and book chapters will be provided.

MODE OF ASSESSMENT: 50% CA and 50% Final Examination

MODULE CO-ORDINATOR:

A/Prof Ge Ruowen (Tel: 6516-7879; E-mail: dbsgew@nus.edu.sg)

LECTURERS:

A/Prof Ge Ruowen (Tel: 6516-7879; E-mail: dbsgew@nus.edu.sg)

Prof Gong Zhiyuan (Tel: 6516-2860; E-mail: dbsgzy@nus.edu.sg)

Prof Wang Shu (Tel: 6516-7712; E-mail: dbsws@nus.edu.sg)