MGC course **' Genetic engineering in model organisms: technology and application in basic and medical research '**

Date: **17-21 June, 2019 (3 days course and 2-day international workshop on Innovative Mouse Models)**

Location: LUMC

Registration

Note: Friendly request to fill in the name of your department and institute at the registration!

This course will deal with the basic principles underlying the generation of transgenic, knock-out (KO) and knock-in (KI, *i.e.*, gene-modified rather than gene-inactivated) mice.

KO and KI mice were traditionally made through Embryonic stem cell (ESC) technology. ESC derivation, *in vitro* genetic modification and use in the generation of chimeric mice represent another main theme of the course.

Most recently, the spectacular advances in CRISPR/Cas9-assisted gene modification have found wide application in mouse genetics. CRISPR/Cas9-technology strongly facilitates gene targeting in ESCs, but can also directly be used in zygotes, evading the ESC route. Both applications will be presented, as well as the application of CRISPR/Cas9 technology in non-germ-line gene modification.

The course will consist of lectures covering technology and applications of genetic engineering in basic and medical research. Practical demonstrations will show crucial steps in the generation of transgenic, KO and KI mice, and principles of in vivo imaging.

The first three days of the course will prepare participants for the 2-day international workshop on Innovative Mouse Models (IMM 2019) immediately following the course.

There is a minimum of 14 and a maximum of 25 places. Deadline for registration 3 June, 2019. Should the course be oversubscribed then places will be allocated based on a first-come first-serve basis.
The course is free of charge for all members of MGC associated departments and the Research School OOA. Participants from the academic world other than the aforementioned departments pay €600 (3 days course and two days symposia including one dinner). Course fee for participants outside these institutes is €750.

Programme - 2019

Morning: LUMC hospital (building 1), Lecture Hall 2

09.00 - 09.15	Introduction/course setup	*Peter Hohenstein*
09.15 - 10.00	Origin/genetics of laboratory mice	*Jan-Bas Prins*
10.00 - 10.45	Genetic modifiers	*Paul Krimpenfort*
	Epigenetic modifiers	*Lucia Clemens-Daxinger*
	Gut bacterial modifiers	*Els Robanus-Maandag*
10.45 - 11.00	*Coffee break*	
11.00 - 12.00	Conventional transgenesis/	*Peter Hohenstein*
	Gene targeting in ES cells	
12.00 - 12.45	CRISPR/Cas9-assisted	*Karamjit Singh*
	gene modification/Gene editing	

12.45 - 13.45   *Introduction participants + Lunch*
(Lunch will be provided throughout the week to all participants free of charge; tea/coffee will be provided at 10-11 and 3-4 pm)

Afternoon: LUMC hospital (building 2), Meeting Egg T-03-038/T-00-022

13.45 - 15.30	Demonstrations	
	a. Microinjection	*Margot Linssen*
	b. ES cell culture	*Jill Claassens/Conny Brouwers*
	Literature study	
	Tea break	
15:30 - 18:00	Histology/obduction	*Daniela Salvatori*

Morning: LUMC hospital (building 1), Lecture Hall 2

09.00 - 09.30	How to make a construct/ recombineering	*Cor Breukel*
09.30 - 10.15	Conditional gene targeting	*Peter Hohenstein*
10.15 - 11.00	Oligo targeting *versus* CRISPR/Cas9 in ES cells	*Hein te Riele*
11.00 - 11.15	*Coffee break*	
11.15 - 12.00	Toolbox transgenesis	*Ivo Huijbers*
12.00 - 12.45	ENU mutagenesis	*Lucia Clemens-Daxinger*
12.45 - 13.30	*Lunch*	

Afternoon: LUMC hospital (building 1), Lecture Hall 2

13.30 - 14.00	Imaging technologies	*Eric Kaijzel*
14.00 - 14.30	Intervention studies in a mouse cancer clinic	*Olaf van Tellingen*
14.30 - 16.00	Demonstrations	
	a. Bioluminescence	*Ivo Que*
	b. Multiphoton imaging	*Annelies van der Laan/ Leon Munting*
	c. MRI	*Ernst Suidgeest/* ?????
16.00 - 17.00	*Tea break* and preparation of literature presentations	

Morning: LUMC hospital (building 1), Lecture Hall 3

09.00 - 10.30   Literature presentations/discussion

10.30 - 10.45   *Coffee break*

10.45 - 12.15   Literature presentations/discussion

12.15 - 12.50   Drosophila   ***Aniek Janssen***

12.50 - 13.30   *Lunch*

Afternoon: LUMC hospital (building 1), Lecture Hall 3

13.30 - 14.05   C. elegans   ***Marcel Tijsterman***

14.05 - 14.40   Zebrafish   ***Jeroen den Hertog***

14.40 - 15.15   Fragile X syndrome   ***Renate Hukema***

15.15 - 15.30   *Tea break*

15.30 - 16.05   Cardiovascular disease   ***Ko Willems van Dijk***

16.05 - 16.45   Forum on Mouse models for diseases: do they gratify?
                     Renate Hukema (Fragile X syndrome)
                     Ko Willems van Dijk (Cardiovascular disease)

17.30   Registration Workshop IMM2019
              Program: see page 7-9

LUMC hospital (building 1), Lecture Hall 1

All day   **10th Workshop on Innovative Mouse Models**
                   Leiden University Medical Center
                   http://immworkshop.nl/

                   Eighteen invited speakers from leading laboratories present the
                   latest developments on genome alteration protocols (with a focus
                   on CRISPR/Cas9) and novel imaging technologies.
                   Keynote lectures, combined with oral presentations of selected
                   abstracts encourage in-depth discussion of novel technologies.

                   (*free attendance for course participants*)

Thursday, Friday

12.30 - 13.30   **Meet-the-expert lunch meeting with keynote speakers**

                   Thursday   CRISPR/Cas9 (???)
                   Friday   ????

                   To prepare for the meet-the-expert lunch, three papers will be
                   presented by three groups on Wednesday morning (45 min each).
                   Of each group, 3 persons present the essentials of the paper
                   (introduction - critical data - discussion).
                   The others prepare questions for the speakers and take the lead
                   in the discussion with the speakers.