



Genetic engineering in model organisms

Technology and application in basic and medical research

The ability to modify genes at the level of the mouse germ line by transgenesis and gene targeting has been crucial for our understanding of gene function and has yielded many highly valuable models for human diseases. This course will show how CRISPR/Cas technology has revolutionized genetic engineering in animals, both in the germ line and in somatic tissue.

Genetic engineering, when combined with the recently developed technology of whole-animal cellular and molecular imaging (*e.g.*, bioluminescence, MRI, multiphoton imaging), allows direct visual access to complex biological processes in their native environment, thus providing a better insight into mammalian biology than ever before. Genetically modified mice were traditionally made through embryonic stem cell (ESC) technology, which includes ESC derivation, *in vitro* culturing and genetic modification, and the generation of chimeric mice. Most recently, the spectacular advances in CRISPR/Cas9 technology provided direct access to the mouse zygote, bypassing the need for ESCs, and to somatic tissues.

The course will cover technology and applications of genetic engineering in basic and medical research. During four days, lectures given by experts in the field will provide participants with an overview of the latest mouse genetic engineering and imaging technologies. Thereafter, participants attend the online seminar series “11th Workshop on Innovative Mouse Models”. Keynote speakers from leading laboratories present the latest developments on advanced genome alteration protocols, efforts to improve the relevance of disease models, including models for viral infection, and ethical issues related to animal experimentation. The course will be closed by meet-the-expert sessions with selected speakers.

Date:	Introductory course: May 25-28, 2021 Seminar series: June 3, 10, 17 and 24, 2021
Location:	Online
Target audience:	PhD students with little or no experience in the field of transgenesis and <i>in vivo</i> imaging. This course is also of interest to those already working with animal models but wishing to expand their knowledge of the above technologies for applications in their own research
Price:	Free of charge for all MGC and OOA members
ECTS:	2.0
Organization:	Lucia Daxinger, Peter Hohenstein, Hein te Riele, Els Robanus Maandag
Registration:	MGC courses (medgencentre.com)