Institute of Molecular Biology

# IMB TechTalk

## Prof. Dr. Wolfgang Wurst


**Institute for Developmental Genetics**

**Helmholtz Center Munich**


# "Extending the genetic toolkit for functional genome annotation"

**13 March 2012, 11:00 h** (*s.t.*)

**Venue:** 2nd Floor Seminar Room
Institute of Molecular Biology (IMB)
Johannes Gutenberg University Campus Mainz

All are welcome to attend

Host: Dr. Bernhard Korn, Director CF & Technology, IMB
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The decoding of the sequences of the human and mouse genomes has been heralded as an historical milestone. This massive accomplishment has required the concerted action of the international scientific community, who have joined forces, exchanged technical and scientific knowledge and pooled resources. Analysis of the mouse and human genomes has resulted in the identification of approximately 21.000 genes as well as of thousands of conserved non-coding regions. Now attention has turned to the next phase of the project, elucidation of gene function in the context of the entire organism in a coordinated large scale fashion.

As part of an international knockout mouse consortium (IKMC, www.knockoutmouse.org/), EUCOMM/ EUCOMMTOOLS will produce conditional mutations throughout the mouse genome in a systematic high throughput way. A collection of up to 12.000 conditionally mutated genes have been generated in mouse embryonic stem (ES) cells using conditional gene targeting approaches in the next three years; from this resource, 620 mouse mutants have been produced for phenotypic analysis. Furthermore, we will establish 250 Cre-driver lines to take full advantage of the conditional EUCOMM alleles. This EUCOMM/ EUCOMMTOOLS library will enable mouse mutants to be established worldwide in a standardized and cost-effective manner, making mouse mutants available to a much wider biomedical research community than has been possible previously. All material including targeting vectors, mutant ES cells, mouse resources, and Standard Operating Procedures (SOPs) generated by EUCOMM are being displayed to the scientific community via the EUCOMM web site (www.knockoutmouse.org/about/eucomm) and the International Knockout Mouse Consortium web site vectors and ES cells will be distributed by the European Mouse Mutant Cell Repository (www.EUMMCR.org), and mice by the European Mouse Mutant Archive (EMMA, www.emmanet.org).

To enhance gene targeting technology, we recently developed zinc-finger nucleases and TALENs in one-cell mouse embryos to generate disease-related mutants harboring single nucleotide or codon replacements. Using gene targeting vectors as template for homologous recombination we introduced missense and silent mutations into the genome. These results demonstrate the feasibility of seamless gene editing in one-cell embryos to create genetic disease models as a simplified mutagenesis tool. The results from various types of TALEN driven experiments in zygotes will be presented and compared to the performance of ZFN-assisted gene targeting.