

1. Institution

Faculty of Life Sciences (LIFE), University of Copenhagen, Bülowsvej 17, DK-1870 Frederiksberg C, Denmark

2. Principal investigator and contact person

Poul Maddox-Hyttel (poh@life.ku.dk)

3. Key personnel

Name	Research Tasks	e-mail
Senior scientists		
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Vanessa Hall, post doc	Porcine ES cell	vha@life.ku.dk
Technicians		
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PhD-students		
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Morten Kahn, PhD-stud.	Mouse ES cells and pluripotency (allocated to Hagedorn Research Institute)	mkah@hagedorn.dk
Dorthe Rønn Olesen, PhD-stud.	Mouse ES cells and pluripotency (allocated to Hagedorn Research Institute.)	doro@hagedorn.dk
Xenia Asbaek Wolf, PhD-stud.	Porcine ES cells and endodermal differentiation	xaw@life.ku.dk
Mikkel Aabech Rasmussen, PhD-stud.	Porcine ES cells and neuro-ectodermal differentiation	miras@life.ku.dk
Rahul Deshmukh, PhD-stud.	Epigenetic reprogramming and somatic cell nuclear transfer	rd@life.ku.dk
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4. Research profile

Since mid 80'ties, LIFE has promoted a strong research profile where development of embryo-technologies has been supported by cell biological and molecular studies of oocyte and embryo development. During the first era from in the mid 80-ties, in vitro production (IVP) of bovine embryos was given high priority resulting in the birth of the first European in vitro fertilized calf in 1987. During the 90-ties, the focus shifted towards somatic cell nuclear transfer (SCNT), and in 2003, the research profile was extended to include the development of porcine and bovine models for human embryonic stem cell therapy. A major research programme aiming at developing genetically modified pig models by SCNT has been launched in collaboration with University of Aarhus (AU) and Skejby Hospital utilizing the so-called hand-made-cloning technology for a simple and efficient production of SCNT embryos.

5. Key technologies and tools

LIFE has the infrastructure and competence for advanced embryo technology as well as molecular and cell biological analyses of embryos and stem cells. The Department of Large Animal Sciences has facilities for weekly in vitro production of porcine embryos and a newly renovated laboratory with facilities for stem cell culture and production of chimeric embryos. Department of Basic Animal and Veterinary Sciences houses a Leica AF6000LX bioimaging workstation dedicated to imaging of rapid biological events and fluorescence resonance energy transfer experiments, a fully equipped transmission electron microscopy laboratory including a Philips CM-100 microscope equipped with an 11 megapixel Morada CCD camera, several epifluorescence microscopes equipped with CCD cameras, and facilities for state-of-the-art molecular biology such as gene arrays, screening and characterization of genomic libraries such as long range mapping.

LIFE is part of the Biotechnological Bioimaging Centre of Copenhagen and Danish Biotechnological Instrument Centre. Consequently, there is a direct access to three confocal laser

scanning microscopes of which one, a Leica TCS SP2/MP2 system, is equipped with a culture chamber and a Mai Tai tunable IR laser allowing for multiphoton microscopy of living specimens.

6. Selected publications (max. 5)

Gjørret, J.O. and Maddox-Hyttel, P. (2005): Attempts towards derivation and establishment of bovine embryonic stem cell-like cultures. *Reprod. Fert. Dev.* 17:113-124.

Vejlsted, M., Avery, B., Schmidt, M., Greve, T., Alexopoulos, N. and Maddox-Hyttel, P. (2005): Ultrastructural and Immunohistochemical characterization of the bovine epiblast. *Biol. Reprod.* 72:678-686.

Vejlsted, M., Offenberg, H., Thorup, F. and Maddox-Hyttel, P. (2006): Confinement and clearance of OCT4 in the porcine embryo at stereomicroscopically defined stages around gastrulation. *Mol. Reprod. Dev.* 73:709-18.

Maddox-Hyttel, P., Svarcova, O. and Laurincik, J. (2007): Ribosomal RNA and nucleolar proteins from the oocyte are to some degree used for embryonic nucleolar formation in cattle and pig. *Theriogenology* 68S:S63-S70.

Svarcova, O., Laurincik, J., Avery, B., Mlyncek, M., Niemann, H., Maddox-Hyttel, P. (2007): Nucleolar development and allocation of key nucleolar proteins require de novo transcription in bovine embryos. *Mol. Reprod. Dev.* 74:1428-35.