

Research projects @LUMC for MSc LST

Example projects from recent years

Human Genetics

Research at the department of Human Genetics is clustered in four research programmes:

- Functional Genomics of Muscle, Nerve and Brain Disorders
- Genome Instability and Cancer
- Molecular Technology and Informatics for Personalised Medicine and Health
- Functional Genomics of Systemic Disorders

Identification of hELOF1 and its role in Transcription-coupled Nucleotide Excision Repair

group of Martijn Luijsterburg (Regulation and Dynamics of Nucleotide Excision Repair)

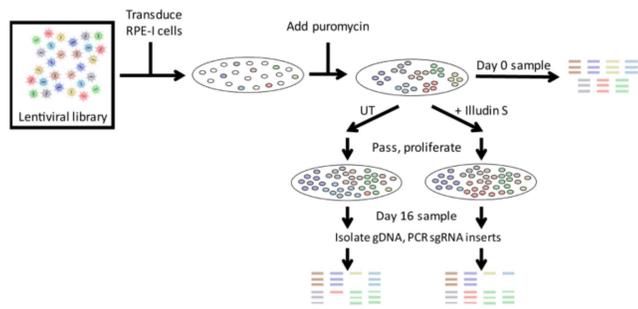


Figure: Loss of hELOF1 results in illudin S sensitivity. Schematic representation of the illudin S genome-wide CRISPR-Cas9 screen. RPE-I cells are transduced with a lentiviral library targeting 18,056 human protein-coding genes and positive cells are selected with puromycin. Illudin S sensitizes cells when they are KO for transcription-coupled nucleotide excision repair (TCR). UT: untreated.

A possible role for Chk1 in deletion mutagenesis at G4-induced double-strand breaks in *C. elegans*

group of Marcel Tijsterman (Genome stability)

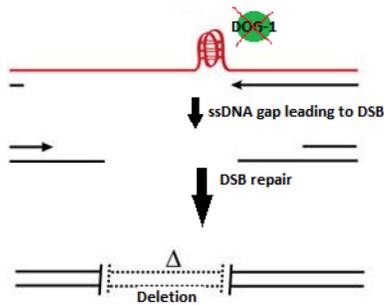


Figure: G4 removal in the absence of DOG-1 eventually leads to a double-strand break (DSB). DSB repair results in DNA with deletions.

Other departments

including Nephrology, Pathology, Rheumatology, Hematology

The Role of PGC-1 α and MCT1 in Metabolic Differences Between hiPSC-ECs and hMVECs

group of Bernard van den Berg (Glycocalyx group, Nephrology)

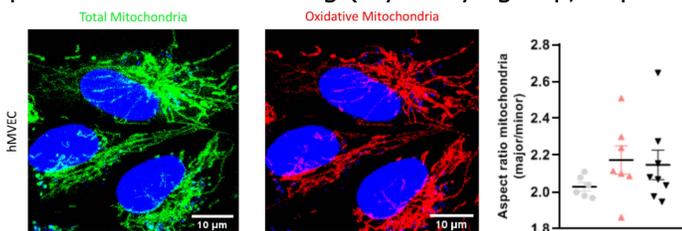


Figure: MitoTracker staining shows no difference between the different cell types. Representative cross-sectional confocal images of hMVECs, hiPSC-EC transduced with mock and shPGC-1 α stained for MitoTracker Red (oxidative mitochondria) and MitoTracker Green (total mitochondria). The aspect ratio of the mitochondria of hMVECs (N=6), hiPSC-ECs transduced with mock (N=7) and shPGC-1 α (N=8).

Cell & Chemical Biology

The division of Cell & Chemical Biology aims to unravel the molecular details of the working of cells in their normal function and the perturbed functioning in diseased cells and to help translate our knowledge and technologies to clinical practice.

Infection and transformation efficiency of *Salmonella* isolates from patients who developed colon cancer

group of Jacques Neefjes (Chemical immunology)

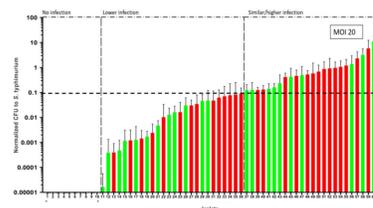


Figure: Infection efficiency of sixty *Salmonella* isolates in MEFs *Arf*^{-/-} + *c-MYC* at MOI 20. Red bars indicate isolates associated with cancer and green bars indicate isolates non-associated with colon cancer.

YAP and TAZ: growing drug targets for uveal melanoma

group of Aart Jochemsen (Molecular cell biology)

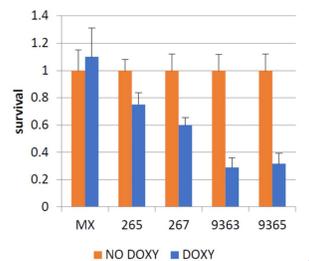


Figure: Growth inhibition of OMM2.5 cells after 5-day treatment with doxy or not. Growth inhibition is largest in case of a TAZ knockdown, but also observable in YAP knockdowns.

Medical Microbiology

Research of the LUMC Department of Medical Microbiology is organized in a bacteriological and a virological research programme.

Understanding and combating RNA viruses: the mode of action of novel nucleoside analogues that inhibit replication of Chikungunya virus

group of Martijn van Hemert (Molecular biology of +RNA virus replication)

		210		220		230		240
D=	1. ChikV	D E Q V L L A R N I	G L C S T D L T E G	R R G K L S I M F K	K K L K P C D R V I			
D=	2. SFV	D E Q V L L A R N I	G L C F A W S L T E G	R R G K L S I M F K	K K L K P C D R V I			
D=	3. SinV	D E Q V L L A R N I	G L C S T K L S E G	R R G K L S I M F K	K K L K P C D R V I			
		250		260		270		280
D=	1. ChikV	F S V G S T L Y P E	S R L L L S W H L	P S V F H L K G K Q	S F T C R C D T V V			
D=	2. SFV	F S V G S T L Y P E	S R L L L S W H L	P S V F H L K G K Q	S F T C R C D T I V			
D=	3. SinV	F S V G S T L Y P E	S R L L L S W H L	P S V F H L K G K Q	S Y T C R C D T V V			
		290		300		310		320
D=	1. ChikV	S C E G Y V V K K I	T M S P G L Y G K T	V G Y A V T I H A I D	G F L M C K T T D T			
D=	2. SFV	S C E G Y V V K K I	T M S P G L Y G K T	V G Y A V T I H A E	G F L M C K T T D T			
D=	3. SinV	S C E G Y V V K K I	T M S P G L Y G K T	V G Y A V T I N N S E	G F L M C K T T D T			

Figure: Partial protein alignment of CHIKV, SFV and SINV. Identity is indicated by the grey highlights: white 70-100%, light grey 40-70% and dark grey 0-40%. The marked residues are the residues that were changed in resistant mutants.

Rules

LST students can perform research projects at the LUMC without prior permission of the Board of Examiners.

Research specialisation:

- major research project of 40-60 EC
- optional minor research project of 20-40 EC

Other specialisations:

- major research project of 30-50 EC
- optional minor research project of 20-30 EC

An internal supervisor at the LIC monitors the project and organises the final evaluation. See masters.lc.leidenuniv -> research project for more information.