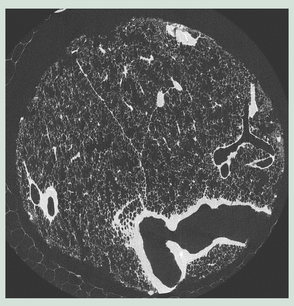
ASTARC Antwerp Surgical Training, Anatomy and Research Center

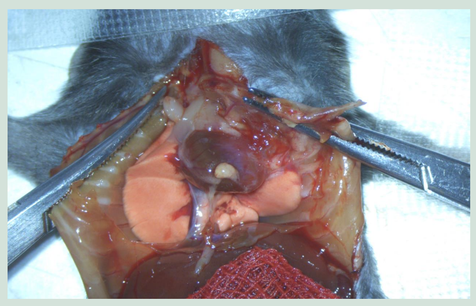
STUDY OF THE AIRWAYS IN CHRONIC LUNG DISEASES

By using…

Human lung tissue



Imaging



Mouse models

Human cell models

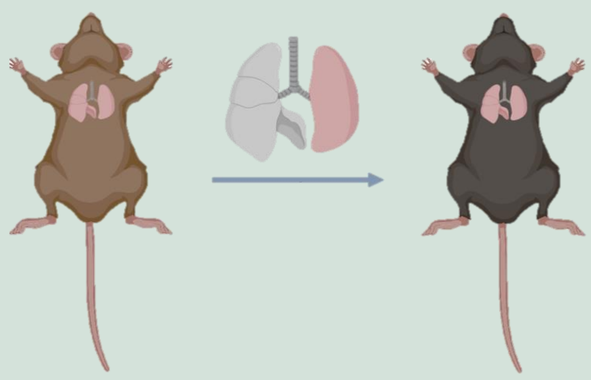
We can…

① Visualize airways and vasculature in chronically diseased lungs

- Human lung tissue processing
- Detailed clinical characterization
- (micro)CT → computer-guided semi-automatic segmentations
- Synchrotron image processing
- Histology & immunohistochemistry

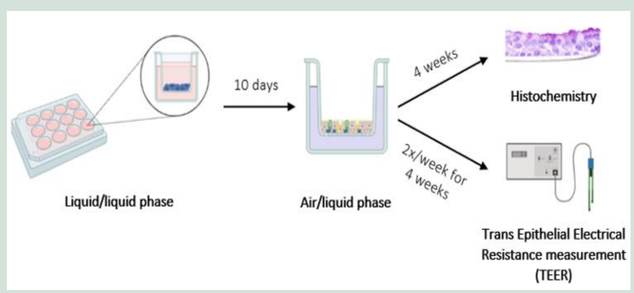
② Study lung transplant complications *in vivo*

- Murine orthotopic lung transplant model to study the mechanisms of allograft rejection
- Performing *in vivo* PET-CT, vascular perfusion, histology, bulk RNAseq



③ Investigate the (pre-)COPD bronchial epithelium *in vitro*

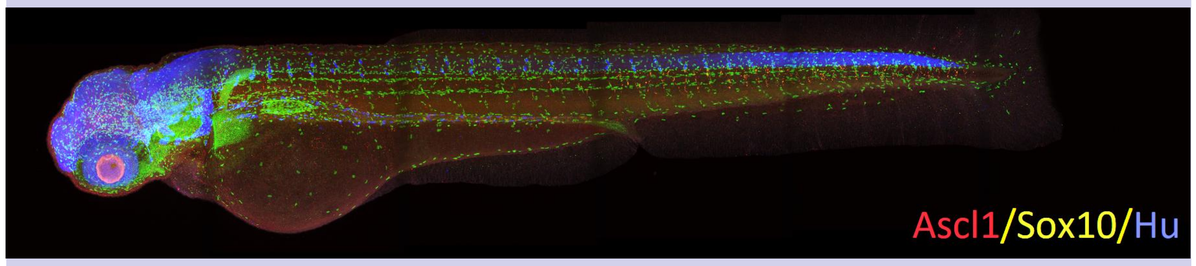
- Development of a 3D air-liquid interface cell culture model using primary airway epithelial cells
- Assesment of mucin & cytokine expression and abundance
- Biochemical and molecular techniques: qPCR/sequencing, ELISA, Western Blotting, immunofluorescence, etc



To…

Unravel the morphological changes and physiological mechanisms of diseases like pulmonary fibrosis (ILD), emphysema (COPD), lung transplant complications (PGD, ACR, CLAD) etc.

DIFFERENTIATION OF ENTERIC NEURONS IN ZEBRAFISH

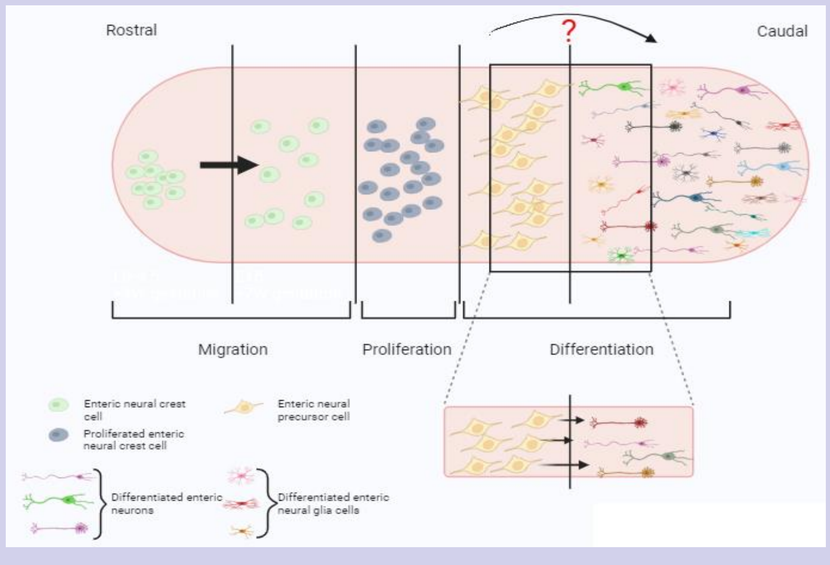


① Visualize neuronal subtypes

- Identification neuronal subtypes
- Spatiotemporal expression profiles of target genes
- Correlation between targets and enteric precursors/neurons
- Neuron quantification
- Immunofluorescence, RNAscope

② Study gene functions in ENS development

- Identification involved genes in ENS development
- Knock-out, knock-down zebrafish models
- Morpholino-injections
- Housing WT, mutated, MO-injected zebrafish lines
- Breeding and maintenance



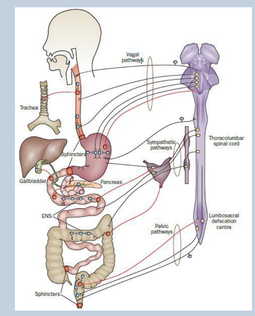
Objective: To unravel the key elements involved in enteric neuronal differentiation

Long-term goal: To aid therapy development for enteric neuropathies

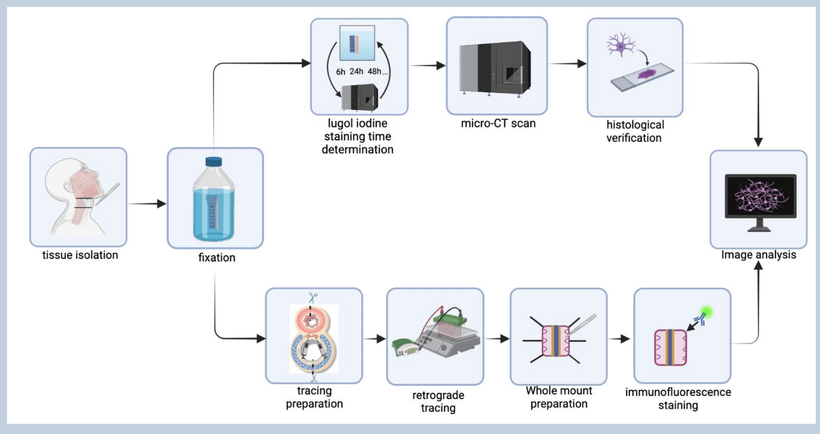
IMAGING HUMAN ORGANS USING MICROCT

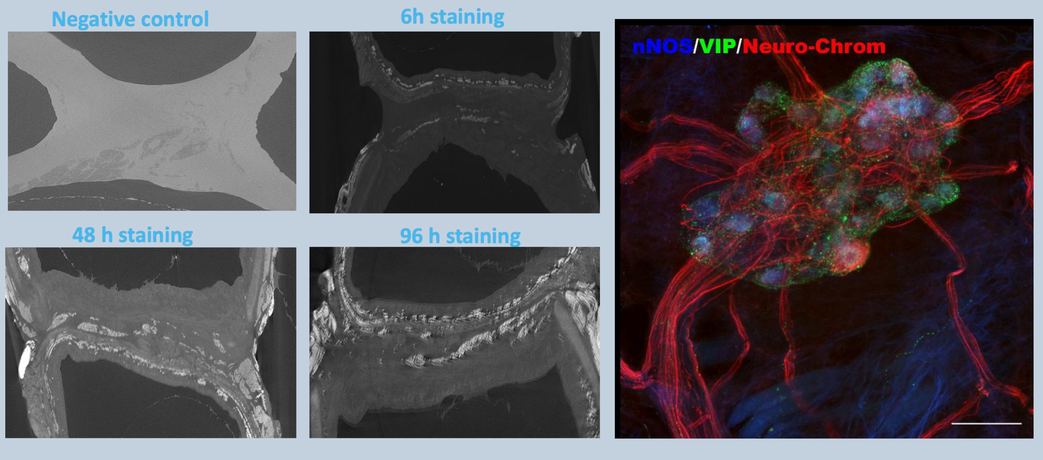
Microtomography (microCT) is a 3D imaging technique utilizing X-rays to see inside an organs and tissues, slice by slice. It is an ideal instrument to unravel areas of interest in tissues and organs, which can be isolated and histologically processed for further research using immunohistological procedures.

In our research group, post-mortem organs and tissues of human cadavers are examined to reveal pathological and normal morphology.



Objective: To detect the presence of a direct neuronal connection between the human trachea and esophagus





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LEARN Lung Research Antwerp