January 2019

Research interests

- Human physiology and pathophysiology of electrolyte transport in kidney, respiratory tract, and intestine.
- Human pathophysiology and molecular biology of cystic fibrosis.
- Development of novel ways for the treatment of asthma and cystic fibrosis lung disease. Exploring the possibility of targeting alternative ion channels.
- Pathogenic effects of viral and bacterial infections on electrolyte transport in the respiratory epithelium.
- Measurement of ion transport in human biopsies and organoids from colon and airways of patients and healthy volunteers.
- Role of ion channels for cell proliferation and cancer.
- Role of ion channels in inflammatory diseases such as asthma and colitis.
- Contribution of TMEM16 proteins to regulated cell death, i.e. ferroptosis, apoptosis, and NETosis.

Methods used

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<tr>
<th>Electrophysiology</th>
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<tr>
<td>- Open and short circuit measurements in Ussing chambers</td>
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<td>- Patch clamp techniques in all applications</td>
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<th>Fluorescence based techniques</th>
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<tr>
<td>- Immunostaining of cellular components, soluble and membrane proteins in epithelial and non-epithelial cells</td>
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<td>- Fluorescence ratio measurements of intracellular pH, Ca^{2+} and Cl^{-}</td>
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<td>- Confocal microscopy and video imaging</td>
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<td>- Iodide quenching of YFP fluorescence in plate reader and single cell microscopy</td>
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### Cell biological techniques
- Primary and permanent cell culture of epithelial and non-epithelial cells
- S2 techniques including viral transfection, infectious agents
- Cell tracking by HoloMonitor M4 Microscopy
- Casy flow cytometry
- Accury flow cytometry 4 wavelengths
- Reconstitution of membrane proteins in liposomes

### Protein biochemistry & Molecular biology
- Western blotting
- Immunoprecipitation, coimmunoprecipitation
- DNA-cloning techniques
- site directed mutagenesis
- PCR - applications
- DNA sequencing
- siRNA techniques
- CRISPR-Cas technology

### Knockout technology
- *In vivo* and *ex vivo* animals studies
- Conventional and Cre/loxP knockout mice
- Inducible Cre/loxP knockout mice