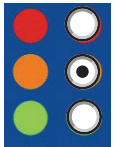


# Promotionsprojekt (ID = 5407\_1)



<b>Thema/Titel des Projekts</b> (max. 200 Zeichen)	
Single-Cell RNA Sequencing of Infant-Derived Enterospheres: Mesenchymal vs. Neuronal Stem Cell Proportions and Functional Responses to Stimulation	
<b>Art des Projekts / des Vorhabens</b>	
<input checked="" type="checkbox"/> experimentell <input checked="" type="checkbox"/> experimentell- grundlagenwissenschaftlich <input type="checkbox"/> experimentell-tierexperimentell <input type="checkbox"/> klinisch <input type="checkbox"/> klinisch – experimentell	<input type="checkbox"/> patientenorientiert <input type="checkbox"/> statistisch <input type="checkbox"/> statistisch-theoretisch <input type="checkbox"/> theoretisch <input type="checkbox"/>
<b>Fachgebiet</b>	
Kinder- und Jugendmedizin Fachgebiet 2	Fachgebiet 3
<b>Forschungsschwerpunkt</b>	
Forschungsschwerpunkt	Forschungsschwerpunkt
<b>Graduiertenkolleg / School</b>	
Graduiertenkolleg / School	Graduiertenkolleg / School
<b>Durchführungsort (Zentrum, Institut/Klinik )</b>	
Klinik und Poliklinik für Kinderchirurgie	
<b>Beschreibung und Zielsetzung des Forschungsprojekts</b>	
<p>The gut is more than just a tube—it's a complex, dynamic ecosystem where different cell types interact to maintain homeostasis. Enterospheres, derived from intestinal stem cells, contain a fascinating mixture of neuronal stem cells (NSCs) and mesenchymal stem cells (MSCs), which play crucial roles in gut motility, barrier integrity, and immune function. The balance between these populations may hold the key to understanding pediatric gastrointestinal disorders, yet little is known about their relative proportions and functional divergence in early-life development.</p> <p>Recent advances in 3D gut models have enabled the culture of enterospheres, but the detailed composition and dynamic shifts within these spheres remain largely unexplored. How do neuronal and mesenchymal cells communicate within the enterosphere? Do inflammatory signals shift the balance? This project aims to answer these questions by refining enterosphere culture and using single-cell RNA sequencing (scRNA-seq) to profile the transcriptional landscape of NSCs and MSCs under homeostatic and pro-inflammatory conditions.</p>	

<b>Aufgaben und Methoden</b>	
<p>The primary goal of this project is to quantify and characterize the proportions of mesenchymal stem cells versus neuronal stem cells within infant enterospheres, both under baseline conditions and upon stimulation.</p> <p>Specific objectives include:</p> <ol style="list-style-type: none"> <li>1. Optimizing Enterosphere Culture: Establish and refine protocols to ensure optimal survival of both NSCs and MSCs.</li> <li>2. Baseline Single-Cell RNA Sequencing: Define the cellular composition of enterospheres, specifically quantifying NSCs vs. MSCs.</li> <li>3. Stimulation of Enterospheres: Apply pro-inflammatory stimuli (e.g., IL-1<math>\beta</math>, TNF-<math>\alpha</math>, LPS) to assess differential responses</li> </ol>	
<b>Anforderung an die Bewerber:innen:</b>	
<p>Scientific curiosity and the love for big data, coding, or analyzing single-cell sequencing results.</p> <p>12 months full-time lab</p>	
<b>Voraussichtlicher Beginn:</b>	03/03/2025
<b>Voraussichtliche Dauer des Projekts (in Monaten):</b>	18
<b>Davon in Vollzeit:</b>	12
<b>Einbindung in Forschungsbesprechungen, Vortrags- und Seminarreihen:</b>	JC Kinderchirurgie, JC Basic Science Kinderchirurgie
<b>Finanzielle Fördermöglichkeit:</b>	iPrime
<b>Betreuer:in des Promotionsvorhabens:</b>	Christian Tomuschat
<b>Co-Betreuer:in:</b>	Johanna Hagens
<b>Ansprechperson:</b>	Christian Tomuschat
<b>E-Mail-Adresse(n):</b>	c.tomuschat@uke.de
<b>Instituts- oder Klinikwebseite:</b>	
<b>Gewünschte Bewerbungsunterlagen:</b>	
<b>Bewerbungsfrist:</b>	28/02/2025