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Non-Invasive NaV Measurements using Molecular Imaging

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Voltage gated sodium channels constitute an integral component of electrical conduction in the heart and the nervous system. By depolarizing cardiomyocytes or neurons, they initiate action potentials that underlie the electro-mechanical coupling and neuronal firing. Changes in cardiac NaV function or expression levels can have severe consequences. For example, patients with loss-of-function or gain-of-function mutations in the SCN5A gene, which decodes cardiac NaV1.5, are at risk of suffering sudden cardiac death due to ventricular arrhythmias. However, it has not been possible to measure NaVs in vivo due to lacking molecular probes or techniques. To fill this gap and enhance our understanding of in vivo NaV function, we have developed the first positron emission tomography (PET) radiotracer for NaVs –radiocaine. In this talk, I will present the development and *in vivo* characterization of radiocaine and discuss steps towards future translational perspectives.

Biography:

Dr. Matthias was born in Trier (Germany) and moved to Mainz University (Germany) for studying Biomedical Chemistry in 2004. During his study, he spend two research semesters at the Brookhaven National Laboratory (USA) and joined the laboratory of Joanna Fowler, pursuing research in radiochemical method development (11C) and *in vivo* positron emission tomography (PET) imaging. Matthias returned to Germany for his graduate studies in the International Max Planck Research School for Life Sciences (IMPRS-LS) in Munich with Dirk Trauner. His PhD-research was dedicated to organic chemistry, chemical biology and electrophysiology, yielding multiple first-in-classphotoswitchable ligands for ion channels and GPCRs. For his postdoctoral training, Matthias returned to the USA and the field of molecular imaging as a Marie-Slodowska-Curie fellow at Stanford University (Chemistry) and Harvard Medical School/MGH (Biomedical Imaging).

Matthias' group in the pharmacy department performs KU interdisciplinary Leuven (Belgium research in Chemical Biology and Imaging with the goal of understanding ion channel dynamics in human disease.