



# Universität Zürich

## Masterstudiengang Biomedizin

### Masterarbeiten Biomedizin

Thema:	<i>Cellular and molecular mechanisms of cardiac fibrosis and dysfunction</i>
Kurzbeschreibung (max. 10 Zeilen)	<p>Cardiovascular diseases are a leading cause of mortality and morbidity in the developed countries with sudden cardiac death accounting for about 15-20% of all cause deaths. Sudden cardiac deaths are often the consequence of abnormal heart rhythms called arrhythmias. Clinical studies demonstrated that ventricular fibrosis represented a strong predictor of ventricular arrhythmia and sudden cardiac death in ischemic and non-ischemic cardiac conditions. Cardiac fibrosis, usually followed by cardiac inflammation, is characterized as an excessive accumulation of stromal cells/fibroblasts and extracellular matrix proteins in the myocardium leading to heart dysfunction.</p> <p>Research interests/projects in the lab:</p> <ul style="list-style-type: none"> <li>• 3D human cardiac microtissue fibrosis/arrhythmia models using induced pluripotent stem cell (iPSC)</li> <li>• Heart-on-chip</li> <li>• Multi-Tissue-on-chip</li> <li>• Precise slice cutting (heart and other organs)</li> <li>• Multi-omics (transcriptomics and proteomics) on heart and patients' sera</li> <li>• Role of stromal cell populations and fibrosis in myocardial remodelling</li> <li>• Role of autophagy and cellular senescence in myocardial dysfunction</li> </ul>
BetreuerIn: (GruppenleiterIn)	Prof. Dr. Gabriela Kania
Institut E-Mail Telefon	<p>Center of Experimental Rheumatology Department of Rheumatology University Hospital Zürich Wagistrasse 14, 8952 Schlieren Switzerland Phone: 0041 43 2533013 E-mail: <a href="mailto:gabriela.kania@uzh.ch">gabriela.kania@uzh.ch</a></p>
Spezielle Voraussetzungen	<p>Basic knowledge in molecular biology, cell culture, heart physiology, fibrosis. <u>Methodology:</u> This Master Thesis offers an excellent possibility to learn range of conventional and molecular biology techniques such as primary cell isolation, cell culture, 3D cells culture, quantitative PCR, single cell/nuclei RNA sequencing, gene silencing and overexpression methods, Western Blot, ELISA, flow cytometry, immunofluorescence and immunohistochemistry, advanced microscopy, non-invasive electrocardiogram, high-speed video analysis, mouse models. On the other hand, it might be a valuable opportunity to be involved in the innovative and clinically oriented project that will give the basis for the future PhD thesis.</p>
Website der Gruppe)	<a href="http://www.en.rheumatologie.usz.ch">http://www.en.rheumatologie.usz.ch</a>

#### Beteiligung der BetreuerIn am Unterricht in Biologie der MNF (nicht ETH oder MedF)

Name	Kurs-/Modulnummer	Anzahl Lektionen (@ 45 min)
Gabriela Kania	BME 303 Diseases of autonomous systems	80