PhD Project Advertisement

Project title: Ferroptosis and phospholipid metabolism for chemo- and immunotherapy sensitization in urothelial cancer

Lead supervisors:
PhD position 1: Felix Engel and Arwin Groenewoud (zebrafish)
PhD position 2: Markus Eckstein (patient/bioinformatics)

Location: Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany

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Project description: Platinum-based chemotherapy, targeted chemotherapy and immune checkpoint inhibitors are ap-proved for clinical handling of locally advanced (la) and metastatic (m) urothelial carcinoma (UC). Yet, overall response rates for these therapies are limited (~20%), patients often progress rapidly, and molecular insights in processes driving therapy resistance are scarce. TCGA data analysis suggests that fatty acid (FA) metabolism and ferroptosis are deregulated in UC contributing to chemoresistance. Overall aim of the here proposed project is to expand our already initiated living patient-derived laUC/mUC biobank to identify novel predictive biomarkers for laUC/mUC patients eligible for either chemo- or immunotherapy as well as to utilize a high throughput zebrafish platform to elucidate mechanism underlying chemo- and immunotherapy resistance and to predict therapy outcome.

Aim 1: Expanding our existing patient-derived living laUC/mUC biobank and identification of predictive biomarkers in regards to therapy resistance
Aim 2: Evaluating the therapeutic response of patient-derived UC cells in a zebrafish model
Aim 3: Determining the effect of ferroptosis induction and/or FA metabolism alteration on UC treatment resistance using a novel zebrafish model
Aim 4: Assessing the role of potential biomarkers in chemo- and immunotherapy resistance.

Training opportunities: The PhD candidate will be integrated into the Graduate School of Life Sciences at FAU which offers an interdisciplinary structured training program for scientific and medical doctoral students in the Faculty of Medicine and the Department of Biology. For training modules, Mentoring Committees, and other specifics see https://www.life.fau.eu/.

Student profile: This project would suit candidates with a background in biology, molecular medicine, biotechnology, bioinformatics, or similar with a keen interest in cancer biology. It is expected that the candidates have experience in at least one of the following techniques: cloning, cell culture, confocal microscopy, or bioinformatics. Experience with zebrafish and/ or primary cell culture would be of advantage.

Stipend (Salary): E13 TV-L (65%) for 3 years, starting latest 1st of July 2023.

The Engel lab:  
We are currently 3 postdocs, 5 PhD students, and 2 technicians plus some MD and Master students. The lab is very international and interdisciplinary working on cancer biology, heart development and regeneration, biofabrication, as well as kidney development and disease utilizing molecular and cell biology techniques, biofabrication, zebrafish, mice, and rats as well as hiPSCs and human patient tissues.
Prof. Engel has published > 100 manuscripts (> 45 as senior author) in peer-reviewed scientific journals with > 5,650 total citations and an h-index of 42. He published in a large variety of high impact factor (IF) journals as senior author (IF > 15: Cell Res, Adv Funct Mater), leading interdisciplinary journals (PNAS, Elife) as well as leading journals in the various research fields (Adv Healthc Mater, Biomaterials, Development, Cardiovasc Res). In addition, the group is highly engaged in collaborations and contributed to publications in journals such as Cell, Mol Cell, Dev Cell, Curr Biol, and Biofabrication.

For further information see:
https://scholar.google.de/citations?user=8eJtEtkAAAAJ&hl=de
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