

**Program:** Biomedicínské vědy / Biomedical Sciences  
**Specializace:** Biochemie a molekulární biologie / Biochemistry and Molecular Biology  
**Forma studia:** prezenční  
**Školitel:** Dr. Jaeyoung Shin

**Research area:** MAPK signaling molecular in cancer therapy

**Research topic:** The analysis of signaling complexes responsible for resistance mechanisms in tumorigenesis.

**Summary:** RAS-RAF-MEK-MAPK pathway comprises a group of kinases which regulates the activities of effector proteins in growth, proliferation and apoptosis. The extracellular signals from growth factors, cytokines and other stimuli transmitted by surface receptors and upstream signaling molecules are integrated by this cascade of kinases whose activity is regulated by the interaction of oncoproteins and tumor suppressors. RAS-RAF-MEK-MAPK pathway have been validated as effective in therapy against a variety of cancers. The modality with combination of signaling molecular should be considered based on cancer related gene profile of the individual patients.

To do this, gene expression-driven functional signatures were employed as cross-platform high resolution phenotypic discriminators to link concordant cellular responses to siRNA-mediated gene depletions and chemical compound exposure on a library wide scale.

**Requirements on applicants:**

- Master's degree or diploma in biology, biochemistry or in a related discipline
- Applying your broad skill set (molecular biology, biochemistry, microscopy, cell biology) to drive the project further
- Practical knowledge in extraction techniques for biomolecules (e.g. RNA, proteins)

**Info on supervisor:**

Publication:

- Murali A, Jaeyoung Shin, Yurugi H, Krishnan A, Akutsu M, Carpy A, Macek B, Rajalingam K. (2017) Ubiquitin-dependent regulation of Cdc42 by XIAP. *Cell Death Dis.* 29;8(6):e2900
- Jaeyoung Shin, Thomas Kubin, Marcus Krüger, Sawa Kostin, Jochen Pöling, Ulf Rapp and Thomas Braun. (2016) BRAF activates PAX3 to control muscle precursor cell migration during forelimb muscle development. *eLIFE*, 1;5. pii:e18351
- Jochen Pöling, Praveen Gajawada, Manfred Richter, Holger Lörchner, Viktoria Polyakova, Sawa Kostin, Jaeyoung Shin, Astrid Wietelmann, Thomas Böttger, Thomas Kubin and Thomas Braun. (2014) Therapeutic targeting of the oncostatin M receptor- $\beta$  prevents inflammatory heart failure. *Basic Res Cardiol*, 109 (1):396

- Jochen Pöling, Marten Szibor, Silvia Schimanski, Marie Ingelmann, Praveen Gajawada, Zaber Kochfar, Holger Lörchner, Isabelle Salwig, Jaeyoung Shin, Thomas Kubin, Henning Warnecke und Thomas Braun. (2011) Induction of smooth muscle cell migration during arteriogenesis is mediated by Rap2. *Arterioscler Thromb Vasc Biol*, 31(10):2297-305
- Jaeyoung Shin, Hanjoong Jo, Heonyong Park. (2006) Caveolin-1 is transiently dephosphorylated by shear stress-activated protein tyrosine phosphatase mu. *Biochemical and Biophysical Research Communications*, 339:3, 737-741