

## Request for student project

**Topic:** Cancer Biology of Metastasis  
**Aim of project:** To study mechanism of cancer cell plasticity-regulation by cell density  
**Scope:** 6 months to 1 year (e.g. Master thesis or Medical thesis)  
**Scientist:** Dr. Heda Hosseini  
**PI:** Prof. Christoph Klein

**Background:** We have recently found that cell density has impacts on migration and proliferation phenotypes of breast cancer cells. High cellular density upregulates protein expression of Her2 oncogene, when it localizes to cell membrane. Her2 membrane localization induces cell proliferation and decreases stemness and migration properties of cancer cells. In contrary, Her2 localizes into the nuclear position in low cellular density that decreases cell proliferation and increases stemness and migration of cancer cells. We already found protein-binding partners of Her2 in the nuclear and membrane states of Her2 and aim to investigate role of these candidates in (i) Her2 cellular localization and (ii) cancer cell phenotype switching by cell density.

**Question:** How Her2 cellular localization regulate cell proliferation and migration phenotypes of cancer cells?

### What will you learn and work with:

1. **Molecular biology:** Cell invasion/migration assays, cell proliferation assays, Western blotting, co-Immunoprecipitation (Co-IP), siRNA knock down experiments, qPCR, immune cell staining,
2. **Cell culture experiments:** Normal cell culture, live imaging and screening, and 3D culture.
3. **Microscopic experiment:** Screening and fluorescent imaging, cell sorting ...

### What is your tasks:

1. Setting up cell proliferation and invasion assays for target cell lines
2. Setting up Co-IP for new candidates
3. siRNA knock-down of candidate genes and sequential confirmation using western blotting and qPCR
4. New manipulated cells will be subjected for functional experiments

### What is granted from our side:

1. Expert training for all required experiments
2. Supervising support during all project
3. International environment
4. Good scientific practice
5. Authorship in all publications comes out of the project

### What do you do if you are interested in this project?

Please contact to Dr. Hosseini or Dr. Guzvic, send your C.V (including your scientific experiences) and arrange an appointment to find out more before next steps.

[Hedayatollah.Hosseini@ukr.de](mailto:Hedayatollah.Hosseini@ukr.de)

[Miodrag.guzvic@ukr.de](mailto:Miodrag.guzvic@ukr.de)

### References:

- Hosseini et al., (2016). Early dissemination seeds metastasis in breast cancer. Nature. 10.1038/nature20785
- Klein, C.A. (2009). Parallel progression of primary tumours and metastases. Nature reviews Cancer 9, 302-312.
- Klein, C.A. (2013). Selection and adaptation during metastatic cancer progression. Nature 501, 365-372.