

2018 Helmholtz – OCPC – Program for the involvement of postdocs in bilateral collaboration projects

PART A

Title of the project: HepatoSpheroArray – a novel miniaturized platform for screening drug candidates for acute liver toxicity

Helmholtz Centre and institute: Karlsruhe Institute of Technology (KIT), Institute of Toxicology and Genetics (ITG)

Project leader: Dr. Pavel Levkin/Dr. Anna Popova

Web-address: <https://www.levkingroup.com/>

Description of the project (max. 1 page):

In state of the art methodology, drug candidates are tested for potential toxicity in animal models, which is very often does not correlate to toxicity pattern compounds express in humans. Because of this, physiologically relevant *in vitro* models based on human cells are picking up for toxicity assessments of compounds.

3D models, such as, spheroids based on human hepatocytes are three-dimensional cell clusters possessing more physiological and “*in-vivo-like*” properties than 2D cell culture. These properties make results, obtained in drug screenings using spheroids, more relevant, reproducible and showing less false-positive outcomes.

The goal of this project is to establish a highly miniaturized platform for high throughput screening of compounds for acute liver toxicity based on the Droplet-Microarray (DMA) platform. The DMA platform is based on the unique ability of superhydrophobic-superhydrophilic micropatterns to form arrays of stable separated homogeneous nanoliter sized droplets. This method allows us to create thousands of isolated droplet nano-reservoirs containing cells. Combining this method with the “hanging droplet” approach will allow us to realize high-throughput formation of an array of homogeneous cell spheroids. Using such highly miniaturized system will allow us to save orders of magnitude cells and reagents per screening, which is critical since compounds and reagents are expensive and number of available primary cells are limited. The candidate will apply this methodology for establishing HepatoSpheroArray using co-culturing of primary human hepatocytes, endothelial cells and immune cells, cultured as 3D spheroids, followed by high throughput screening with a library of FDA approved compounds. The HepatoSpheroArray will be important to improve the efficiency and physiological relevancy of drug screenings, drug discovery, toxicity tests performed in academic laboratories and in pharmaceutical industry.

Description of existing or sought Chinese collaboration partner institute (max. half page):

Required qualification of the post-doc:

- PhD in biology, cell biology, or bioengineering
- Experience with cell culture, cell biological methods, fluorescence and confocal microscopy
- Additional skills in image analysis, image processing, bioinformatics

PART B

Documents to be provided by the post-doc, necessary for an application to OCPC via a postdoc-station in China, which is affiliated to a research institution like a university:

- Detailed description of the interest in joining the project (motivation letter)
- Curriculum vitae, copies of degrees
- List of publications
- 2 letters of recommendation
- Proof of command of English language

PART C

Additional requirements to be fulfilled by the post-doc:

- Max. age of 35 years
- PhD degree not older than 5 years
- Very good command of the English language
- Strong ability to work independently and in a team