

CENTRE OF NEW TECHNOLOGIES, UNIVERSITY OF WARSAW

Laboratory of Stem Cells, Development and Tissue Regeneration at the Centre of New Technologies (University of Warsaw), headed by dr. Krzysztof Kobiela, invites applications for Ph.D. student position. Position is funded by the National Science Centre within Opus grant "Hair follicle stem cells regulation during hair cyclic regeneration".

The project:

The main goal of the project is investigate the behavior of hair follicle stem cells (hfSCs) during stem cells (SCs) quiescence and activation. Our long term objective is to understand how this regenerative hair cycling behavior is regulated at the molecular level, and to apply this knowledge toward regenerative medicine. We have previously shown that inhibition of bone morphogenetic protein (BMP) signaling resulted in the precocious activation of quiescent hfSCs. Recently my laboratory discovered a new, previously unreported mechanism of hfSCs regulation where a competitive balance of BMP/WNT signaling occurs intrinsically in the hfSCs population. We found that hfSCs with suppressed BMP signaling display profound altered expression in the BMP pathway itself and Wnt pathway. However, precisely how BMP/WNT signaling integrates different activators and inhibitors to achieve a molecular network capable of cyclic activation of hfSCs is still unveiling. We hypothesize that there is a constant competition between activator and inhibitor activities in hfSC populations which is critical for maintenance of hfSC homeostasis.

There is great interest in understanding very basic processes that are important for adult stem cells regulation, as these cells are crucial for physiological tissue renewal throughout life. Adult SCs are not only able to produce cells/progenies that participate in adult tissue renewal during normal tissue maintenance, but they can also regenerate tissues after injury. Moreover, precise regulation of adult SC homeostasis is very critical, since deregulation of normal stem cell self-renewal may result in cancer formation. Thus, understanding adult SC regulators which tightly govern the intricate balance of signaling pathways which either activate or inhibit SC homeostasis is a very important question in regenerative medicine. In the proposed research, we would like to understand the molecular mechanism of BMP and WNT signaling in SC regulation using hfSCs as a model system. Currently, my laboratory shed light on how a competitive balance of BMP/WNT signaling regulate hfSCs but there is a gap in our scientific knowledge regarding how BMP/WNT signaling integrate the regulation of different molecular networks in hfSCs during hair cycle. This is an important basic science question in SC biology, since we and other groups have shown that BMP/WNT signaling are key regulators of SC homeostasis in different adult systems. Thus, further understanding the molecular mechanisms through which BMP/WNT signals in hfSCs might be highly instructive to comprehend the general mechanisms that underlie SC homeostasis and how the different SCs determine tissue-specific regeneration as well as cancer formation. This insight might be very useful in translating these basic discoveries to novel forms of SC therapy with applications for human diseases as cutaneous wound healing, androgenetic alopecia or burn alopecia. As BMP/WNT signaling has a key regulatory role in maintaining different types of adult SC homeostasis, the implication for future therapy might be potentially much broader and not limited to skin regeneration, alopecia and skin cancer.

• **Qualifications:**

- Master of Science(MSc) in Biology, Biotechnology or physician (M.D.) title
- Good knowledge of English,
- Knowledge of Adobe Photoshop, Adobe Illustrator, PowerPoint
- Team work skills,
- Experience in laboratory work (mammalian cell culture, laboratory animals - mice handling, cryosectioning, microscopy, molecular biology)

The application should include:

- Curriculum Vitae (CV)
- Cover letter, describing Candidate motivation
- MSc or M.D. certificate
- One or more letters of recommendation from a scientist who is familiar with the Candidate (submitted directly to email address below)

- Information on scientific publications, scholarships, prizes and awards or other relevant documents demonstrating the excellence of Candidate
- A list of attended conferences with titles and authors of presentations

Employment conditions:

The employment as full-time Ph.D. student salary of 3000 PLN (brutto). The maximum appointment is for 36 months. The appointment should start in **July 2017**.

Contact:

Please apply to: k.kobielak@cent.uw.edu.pl (entitle your email "Ph.D. Student APPLICATION").

Deadline for applications: June 25th, 2017