

OPEN POSTDOCTORAL POSITION

in Laboratory of Developmental Mechanobiology

A fully-funded postdoctoral research position is available in the Laboratory of Developmental Mechanobiology (led by Teije Middelkoop), which is a part of the Institute of Molecular Genetics (Prague, Czech Republic) and is located in the BIOCEV Centre (Vestec, Czech Republic), to study the biophysical principles of embryonic left-right symmetry breaking. Our group is interested in how forces, arising in the cytoskeleton of embryonic cells, drive morphogenesis in early *C. elegans* embryos.

About possible research directions

Embryo development involves constant remodelling of embryonic shape. These shape changes, collectively referred to as morphogenesis, require active forces generated in the actomyosin cortex. We previously showed that a *C. elegans* actin polymerase of the Formin family is required for the generation of molecular-scale rotatory forces, i.e. torques. Torque generation in the actomyosin cortex triggers chiral counter-rotatory movements and ultimately drives left-right asymmetric rearrangements of embryonic cells. This work opened up numerous novel research directions:

- 1) How are molecular-scale forces and torques converted into cellular-scale chiral actomyosin flow behaviour?
- 2) How does cellular-scale chiral behaviour of the actomyosin cortex facilitate morphogenetic rearrangements of cells at the embryo-scale?
- 3) How do molecular torque-generating mechanisms diversify on evolutionary time scales?

We have defined several projects to tackle the above questions and the postdoctoral candidate is free to decide which topics she/he/d prefers working on. In addition, the candidate is welcomed to formulate and pursue her/his/d own research questions within this framework.

About the methodology

We exploit the strength of *C. elegans* genetics to precisely titrate cytoskeletal forces in early embryos. We also aim to further expand the *C. elegans* genetic toolkit by adopting synthetic biology methods, like optogenetics, to gain spatiotemporal control over embryonic force-generating. Moreover, we perform various types of time-lapse fluorescence imaging, including

spinning disc confocal microscopy, TIRF and SIM-TIRF super-resolution microscopy, followed by quantitative image analysis.

About the candidate

Candidates should have a university degree as well as a PhD degree in biology, biophysics, biochemistry, engineering or equivalent. The candidate should be enthusiastic about performing interdisciplinary work outside of her/his/d comfort zone and be open to collaborate with scientists from various disciplines. Experience in any of the methodology described above will be considered positively.

About the Institute

The Laboratory of Developmental Mechanobiology at the Institute of Molecular Genetics (IMG) is situated in the BIOCEV Centre (www.biocev.eu), which is a collaborative project of 6 institutes of the Czech Academy of Sciences. Both the BIOCEV Centre and the IMG come with state-of-the-art research infrastructure, including top-notch microscopy facilities.

We offer

- A fully funded postdoctoral position, initially for two years, with the possibility of extension.
- Interdisciplinary training at the interface between developmental biology and biophysics.
- A collaborative scientific environment with state-of-the-art microscopy facilities.
- Full focus on research without teaching obligations.

For more information

Visit the website(s):

www.middelkooplab.com

www.img.cas.cz/research/teije-corneel-middelkoop/

To apply

Written applications should include a cover letter, a structured CV and contact information of two references, and can be sent to the group leader: Teije Middelkoop, teije.middelkoop@img.cas.cz