IBMC
INSTITUTO DE BIOLOGIA MOLECULAR E CELULAR
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INSTITUTO
DE INVESTIGAÇÃO
E INOVAÇÃO
EM SAÚDE
UNIVERSIDADE
DO PORTO

Two PhD student Fellowship (M/F)

Project: ERC-2015-CoG-681443-CODECHECK

Title: "Cracking the Code Behind Mitotic Fidelity: The Roles of Tubulin Post-Translational Modifications and a Chromosome Separation Checkpoint"

Internal Reference: PR332002

We are recruiting two PhD students to join the Chromosome Instability & Dynamics research group at the IBMC/i3S.

Requirements: The candidate must be a PhD student with a MSc in Biology or related areas and a BSc in Biology, or related areas. We are looking for a highly motivated PhD student, with previous research experience on mitosis. Candidates with solid experience with cell culture, biochemistry, advanced microscopy and state-of-the-art molecular tools will be preferential.

Work plan: The work will be focused on understanding the role of tubulin post-translational modifications in mitosis (plan A) and the establishment of a new model system for the study of mitosis (plan B). (please see respective Abstracts and Plans of Work below).

Legislation and Salary: The fellowship is regulated by current laws relating to the Statute of Science Research Fellows, namely Law 40/2004 of August 18, amended by DL 123/2019, from 28th August and the Regulation of Scientific Research Studentships of the IBMC. The monthly allowance is 1064 € (net and tax free, http://alfa.fct.mctes.pt/apoios/bolsas/valores).

Location: The work will be developed at the Chromosome Instability & Dynamics laboratory of the IBMC, i3S, under the supervision of Helder Maiato.

Duration: 12 months, possibly renewable until the end of the project, to start on May 1st, 2020.

Selection method: The candidates will be listed according to their CV, experience in the proposed areas and methodologies, and the requirements of the call. If justified, the pre-selected top candidates will be interviewed (interview 75% and CV 25%).

Jury:
President: Helder Maiato
Members: Bernardo Orr and Antonio Pereira

erc European Research Council

Application deadline and submission forms: The call will be open from 17th to 27th April 2020. Proposals must include CV and motivation letter specifying which plan (A or B) the candidate is applying to, Master certificate, and registration at the PhD program. Applications must be done by online submission:

http://www.ibmc.up.pt/gestaocandidaturas/index.php?codigo=PR332002

Form of notification of results: The final results of the evaluation will be publicized in the IBMC Web site, through a list sorted by final score, and the selected applicant will be notified by email.

Abstract and Plan of Work A:

The tubulin code is described as a set of post-translational modifications (PTMs) of α- and β-tubulin heterodimers and a variety of tubulin isotypes that regulate distinct microtubule functions and properties. These tubulin PTMs and isotypes dynamically control the localization and function of mitotic molecular motors through a differential binding affinity, ensuring mitotic efficiency and faithful genome duplication. Here we propose a comprehensive and systematic approach to identify the full cohort of MAPs and molecular motors that show distinct sensitivity to selective tubulin PTMs on microtubules isolated from mitotic cells. Subsequently, all MAPs and motors that show selective sensitivity to specific tubulin PTMs in mitosis will be validated using established in vitro reconstitution and functional assays.

Abstract and Plan of Work B:

Arguably, the simpler the system, the easier it is to understand it. However, progress in our fundamental understanding of mitosis has been limited by the fact that simpler model systems that are ideal for molecular and genetic manipulation (such as yeasts) are not suitable for high-resolution microscopy studies. On the other hand, those systems where these studies are possible (e.g. newt lung cells and rat kangaroo cells) are not amenable for molecular manipulation. Here we propose to establish a unique mammalian model system for mitosis that combines the powerful genetic tools and low chromosome number of fission yeast and Drosophila with the exceptional cytological features of a rat kangaroo cell for micromanipulation and high-resolution live-cell microscopy studies of mitosis. This system is based on hTERT-immortalized fibroblasts from a female of the Indian muntjac, the mammal with the lowest documented chromosome number (n = 3). Chromosomes of the Indian muntjac are large, compound structures that resulted from DNA fusions. In particular, each kinetochore of the X chromosomes is a natural “super-resolved” structure that binds more than 50 microtubules. We will use the unique cytological features of the Indian muntjac to investigate with unprecedented resolution the mechanisms behind chromosome positioning during mitosis.