



PhD thesis in Yeast Molecular Genetics CNRS Montpellier, France

A 3-year PhD fellowship funded by the French Research Agency (ANR) starting Oct-Dec 2018 is available in the 'DNA Replication, Genome Instability & Cell Identity' lab headed by Etienne Schwob at the Montpellier Institute of Molecular Genetics (IGMM, <http://www.igmm.cnrs.fr/en/team/replication-et-instabilite-genomique/>).

Candidates having recently completed a Master Degree in Genetics or Cell Biology and having lab experience with yeast molecular genetics, next generation sequencing and/or advanced live cell imaging techniques are encouraged to apply.

The thesis project aims at better understanding the mechanism of DNA recombination, both during mitosis and meiosis. DNA recombination is essential for the repair of pathological or programmed double-strand breaks (DSB), of collapsed replication forks, and is responsible for genome diversification during evolution, sexual reproduction and cancer. The project is based on our finding, using the yeast *S. cerevisiae* as a model, of a new regulatory step allowing cells to complete chromosome replication in mitosis by using a recombination-based mechanism related to break-induced replication (BIR). BIR is highly mutagenic and causes loss of heterozygosity and genome structural variations similar to those seen in cancer cells. Interestingly the new control mechanism we identified also contributes to meiotic recombination.

Within this project, the PhD fellow will identify the precise step, shared between BIR and meiotic recombination, which is promoted by this reaction. For this he/she will use highly synchronized meiotic cells followed by physical detection of recombination intermediates. He/she will also characterize the full spectrum of chromosome rearrangements caused by this type of mitotic DNA replication using the Oxford Nanopore long read sequencing strategy. This work will shed important new light on the mechanism and extent of DNA strand exchanges during gametogenesis and cancer. The project will be carried out in collaboration with the lab of Valérie Borde at Institut Curie in Paris.

Montpellier is a scientifically and culturally vibrant city situated in the south of France, near the Mediterranean Sea midway between Nice and Barcelona. It is one of the most attractive and fastest-growing city in France, hosting >70,000 students and researchers particularly active in life sciences and agronomy. IGMM is located on the CNRS campus, along with two other CNRS life science institutes (CRBM & IRIM), an Institute of Functional Ecology (CEFE) and soon joined by a large chemistry department (Pôle Balard). IGMM, CRBM and IRIM (hosting together 500 students, engineers and scientists) have numerous scientific exchanges and share their high-end technical facilities (microscopy, flow cytometry, animal facility, genomic collection, DNA combing, yeast facility) providing an ideal environment for students to start their scientific career.

Candidates must be highly motivated and interactive, proficient in English, and have proven track of lab experience. To apply, please send a CV, letter of motivation and names of 2 references to Etienne Schwob (schwob@igmm.cnrs.fr; +33 43435 9679) or Nicolas Talarek (nicolas.talarek@igmm.cnrs.fr; +33 43435 9677).