



Ph.D. in Evolutionary Epigenomics

The Molaro Lab - [Evolutionary Epigenomics and Genetic Conflicts](#) - is seeking Ph.D. candidates to investigate the function short H2As histone variants in the mammalian epigenome

Fully funded for 3 years

Who we are

Our team studies the evolution of chromatin pathways and the epigenome. More specifically, we focus on understanding how past and ongoing genetic conflicts shaped the function of the epigenome. We combine phylogenetic approaches with *in vivo* epigenome profiling to identify genetic innovations in chromatin pathways and characterize their function (e.g. see Molaro *et al.*, *Genome Research*, 2018; *Mol. Biol. Evol.*, 2020). We study these questions in normal and pathological contexts, using mouse models and mammalian tissue culture (e.g. see Molaro *et al.*, *PLoS Biology*, 2020; Chew *et al.*, *Nature Comm.*, 2021).

Our lab is located at the Genetics, Reproduction and Development Institute (iGReD), in [Clermont-Ferrand, France](#).

Proposed project

Histones are evolutionary conserved proteins that package genetic information into chromatin. In placental mammals, including in humans, short H2A histone variants are specifically deposited in the chromatin of reproductive cells. Unlike other histones, short H2As have been subjected to unprecedented levels of evolutionary diversification suggestive of an ongoing genetic conflict. Recently, we found that short H2As function as novel parental imprints influencing post-fertilization development (Molaro *et al.*, 2020); and that their induction in human cancers was associated with altered transcription (Chew *et al.*, 2021). Yet, how short H2As carry out these essential functions in the context of their evolutionary diversification remains currently unknown. The Ph.D. candidate will have the opportunity to tackle this question by: (1) studying short H2A's chromatin functions during mouse reproduction; (2) comparing the action of short H2A orthologs on the epigenome; and (3) identifying the molecular players in conflicts with short H2As using phylogenomics.

Training

During their time in the lab, the student will develop skills in: molecular, cell and developmental biology; epigenomics; evolution-guided hypothesis testing; and bioinformatics. The student will work in a diverse and inclusive environment that also promotes skill building in science communication through paper writing, seminars and attendance to international conferences.

Application details:

- Please contact, the Ph.D. advisor, Dr. Antoine Molaro – antoine.molaro@uca.fr - with a CV and a cover letter (1 page).
- Selected applicants will be auditioned by an independent jury upon affiliation with the doctoral school (ED 65).