

TITLE

Unraveling the molecular bases of genomic imprinting disorders

DESCRIPTION

In mammals, about a hundred of genes that are crucial for normal development are expressed exclusively from the allele that is inherited from the mother or from the allele that is inherited from the father. This gamete-of-origin-dependent gene expression known as genomic imprinting is controlled by differential DNA methylation of Imprinting Control Regions (ICRs) that is established during male and female gametogenesis. Once acquired, the epigenetic imprints are faithfully transmitted to the zygote during fertilization and subsequently to somatic cells through mitosis. In humans, abnormal ICR methylation is associated with a heterogeneous group of diseases known as Imprinting Disorders (IDs) and is a common event in cancer. ICR methylation abnormalities have been associated with a number of genetic defects acting in *cis* or in *trans*, but in many cases the etiology is unknown. Several observations indicate that environmental factors can also contribute to ICR methylation abnormalities in early embryos. By using mouse embryonic stem cells (mESCs) as model, we have recently demonstrated that the zinc finger protein 57 (ZFP57) is necessary for maintaining ICR methylation and imprinted gene expression. In humans, ZFP57 mutations have been found in Transient Neonatal Diabetes but not in other IDs, such as Beckwith-Wiedemann syndrome and Silver-Russell syndrome, suggesting that other proteins may be involved.

Our Research Group, established within the Institute of Genetics and Biophysics of National Research Council of Italy, focuses on the molecular mechanisms responsible for imprinting disorders. To achieve this objective, we use methods for DNA methylation and chromatin analysis and employ next generation sequencing technologies to identify proteins involved in imprinting maintenance in cellular models and patient-derived samples.

Job description

Your project: We offer a position for a PhD Student. Your project will aim at the functional characterization of proteins controlling genomic imprinting maintenance, including the identification of interacting signaling pathways and the molecular mechanism causative for imprinting disorders.

Your qualifications: We are looking for a curious, independent and creative person with a strong background and interest in molecular biology. You should hold a university degree in biology or an equivalent field and have good skills in state of the art molecular biology. Knowledge of chromatin-related techniques and basic methods of bioinformatic analysis of NGS-data will be appreciated.

Our Offer: We offer you working in a young creative team, in an innovative, well- equipped and scientifically stimulating surrounding with a variety of training opportunities. As a PhD student at IGB you will be part of the Biomolecular Sciences doctoral training program at the University of Campania.

SELECTION CRITERIA

Eligibility Criteria

- Academic degree: Applicants shall have a master degree or equivalent in **Life or Natural Sciences** (e.g., Biology, Biochemistry, Biotechnology, Molecular Biology or related fields), corresponding to the second level of studies.
- Mobility rule: There will be no nationality restrictions. Applicants can be from any Country. However, according to the mobility rule, at the time of the application deadline researchers should not have resided or carried out their main activity (work, studies, etc.) in Italy for more than 12 months in the 3 years immediately

prior to the reference date. Compulsory national service and/or short stays such as holidays will not be taken into account.

- Research experience: Applicants shall, at the time of the application deadline, be in the first four years (full-time equivalent research experience) of their research careers and not yet awarded a doctoral degree.

Full-Time Equivalent (FTE) Research Experience will be determined from the date when a researcher obtained the degree which would formally entitle her/him to embark on a doctorate, either in the country in which the degree was obtained or in Italy, irrespective of whether or not a doctorate is or was ever envisaged.

Evaluation Criteria

Step 1 -Evaluation of documentation provided by the candidate: a) Academic record and training b) Research activities c) CV/motivation letter; d) Level of English; e) Reference letters.

Step 2 - Interview: a) Scientific knowledge in the field of interest; b) Research experience in the field of interest c), Motivation; d) English proficiency.

Supervisor

Dr. Andrea Riccio