

Description of Funded Research Projects

1st Call for H.F.R.I. Research Projects
to support Post-Doctoral Researchers

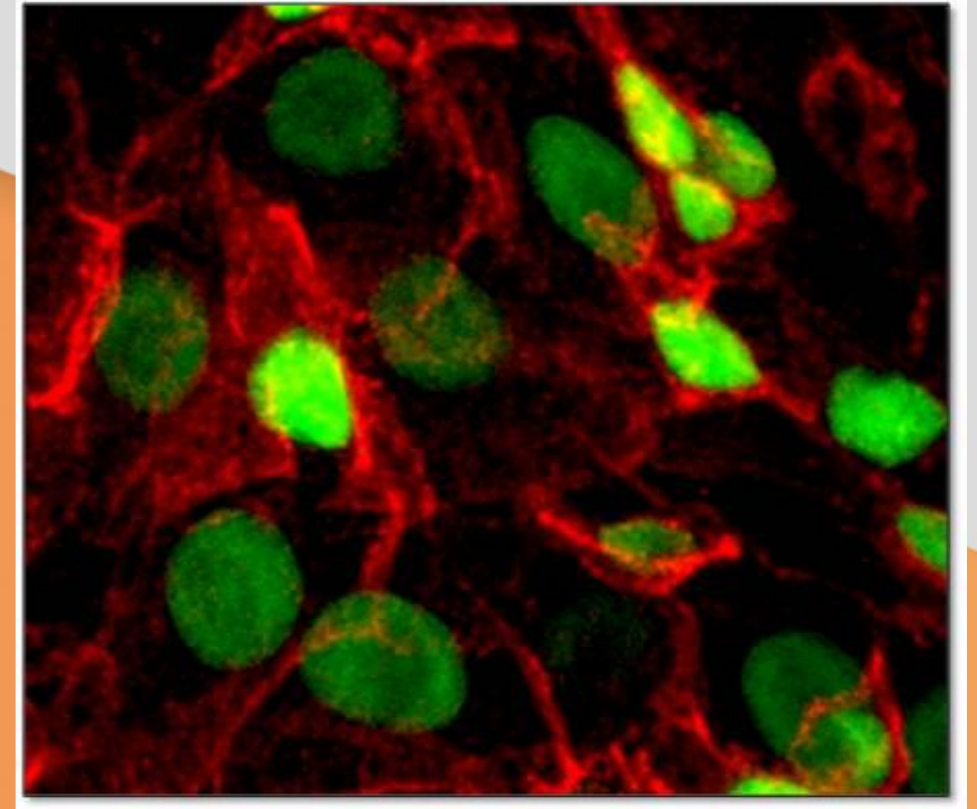


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Research Project Title:

**Epigenetic Regulation of Intestinal Stem
Cells in Drosophila**

Principal Investigator:
Zoe Veneti



Popular Title:

Epigenetic mechanisms of intestinal stem cells. What do fruitflies have to offer in colon cancer research?

Scientific Field:
Life Sciences

Host Institution:
University of Crete



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Tissue stem cells can transition into higher proliferative states and transform into cancer stem cells depending on the interactions between genetic, epigenetic and environmental factors, but the mechanisms are still largely unknown. Although mammalian intestinal stem cell (ISC) biology has gained tremendous progress in recent years, the complexity of the mammalian gastrointestinal tract, posts strong barriers to the understanding of these interactions.

The *Drosophila* midgut has a relatively simple cellular organization, and midgut ISCs are the only mitotic cells that replenish the different cell types in this tissue under normal and pathogenic conditions. Therefore, by performing a small-scale in vivo RNAi screen, we have identified three SET domain lysine methyltransferases (KMTs) as important epigenetic regulators of ISCs under normal and pathogenic conditions. This proposal aims to further study their role in the context of intestinal stem cell proliferation and regeneration, by using *Drosophila* as an in vivo model system, in order to provide an integrated approach for understanding their mechanism of action and examine their potential as drug targets for intestinal diseases and cancer. Understanding the conserved epigenetic mechanisms that control stem cell proliferation, self-renewal and differentiation during normal tissue homeostasis and regeneration upon damage, is a prerequisite to unlocking the keys to regenerative medicine and cancer.

Intestinal diseases including colorectal cancer are a major health problem causing significant morbidity and mortality worldwide. Furthermore, the numbers of patients are rising in the western world, potentially due to changes in life style and nutrition. Novel approaches and ways of thinking with regards to these diseases have the potential to bring new advances in diagnosis and treatment. Stem-cell-based therapy is an attractive approach for intestinal diseases and colorectal cancer. The human intestinal tract however, is a complex organ difficult for experimental manipulation. The use of *Drosophila* as an in vivo model system to study epigenetic regulation of intestinal stem cells will provide critical information about tissue regeneration and may provide novel insights from intestinal disease mechanisms to treatment strategies.

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The H.F.R.I. postdoctoral grant will give me the opportunity for the first time to acquire full responsibility of financial management, implementation, and publication of my research in high quality peer reviewed journals; additionally, I will be training a PhD student. This would greatly facilitate my current career development, as well as future grant applications that will secure my place in scientific research and help Greece overcoming problems related to brain drain and financial crisis.

*The Principal Investigator,
Zoe Veneti*

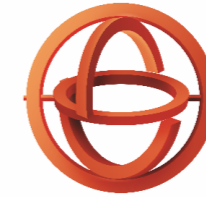
Funding

Amount: **180,000 €**

Duration: **36 months**

Foundation: **H.F.R.I.**





H.F.R.I.
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