



Fundación Biofísica Bizkaia  
Biofisika Bizkaia Fundazioa



## FUNDACIÓN BIOFÍSICA BIZKAIA / BIOFISIKA BIZKAIA FUNDAZIOA

OFFER – Predoctoral position

Publication date: November 30, 2020

Fundación Biofísica Bizkaia (FBB) is a center of excellence on an international level with the main aim of promoting a multidisciplinary program in the field of Biophysics and its application in the areas of Biotechnology and Health, focusing all its resources in Instituto Biofisika Institutua (UPV/EHU, CSIC).

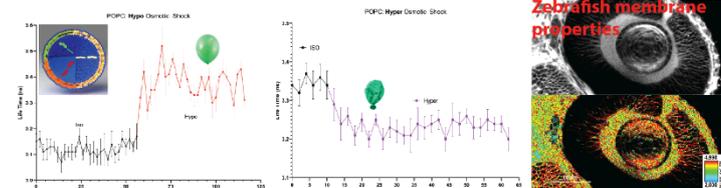
### The project

Some viruses such as Human T-lymphotropic Virus-1 (HTLV-1), Herpes Simplex Virus (HSV) or Human Immunodeficiency Virus (HIV) can infect virus using different pathways, fusion, endocytosis and to spread between cells by a tight and highly organized cell-cell interface. If these viruses infects T-cells, they inhibit the signalling capacity of the immunological synapse, which is complex cellular structure that T-cell forms when reacts and attack an APC (Antigen-Presenting Cells).

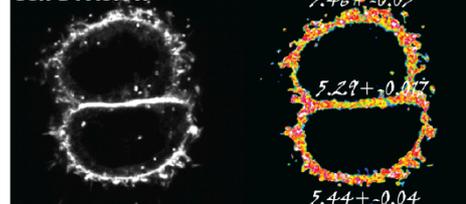
This project aims to contribute to better understand the role of the clustering of certain lipids and proteins in Specialized Membrane Domains in the biogenesis of the viral infection and the immunological synapse.

For this purpose, the coordination of specialized lipid and proteins clustering formation and membrane mechanics will be mainly investigated using the tools we have in our hands as micropatterning, Cryo-EM, light-sheet microscopy, super resolution. Specially fast-FLIM and High Speed-Atomic Force Microscopy (HS-AFM), technics which our lab has a wide experience 1-5. Rapid-FLIM combine with a special lipid probe (FliptR) will offer the mechanical information of plasma membrane and organelles, while, using the HS-AFM we will be able to observe the dynamic of proteins acting on the membrane during the formation of viral infection and immunological synapse.

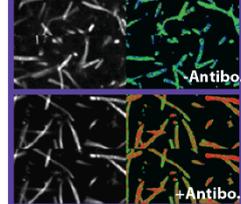
#### FLIM: Membrane mechanics



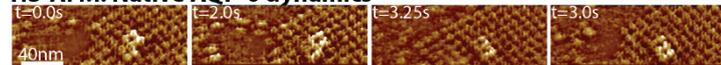
#### Cell Division



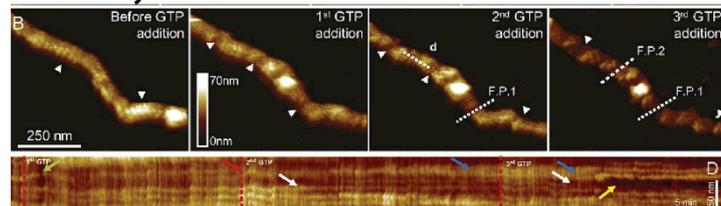
#### Bacteria+Antibiotic



#### HS-AFM: Native AQP-0 dynamics



#### HS-AFM: Dynamin constriction



Our group is interested to understand the lipid membrane and protein mechanics and dynamics from in-vitro to embryo systems. The institute of Biofisika has an amazing technical and human environment, in addition, we count with fantastic national and international collaborators which will impulse the student and project developing.



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1. Goujon, A.; Colom, A.; Strakova, K.; Mercier, V.; Mahecic, D.; Manley, S.; Sakai, N.; Roux, A.; Matile, S., Mechanosensitive Fluorescent Probes to Image Membrane Tension in Mitochondria, Endoplasmic Reticulum, and Lysosomes. *Journal of the American Chemical Society* 2019, 141 (8), 3380-3384.
2. Colom, A.; Derivery, E.; Soleimanpour, S.; Tomba, C.; Molin, M. D.; Sakai, N.; González-Gaitán, M.; Matile, S.; Roux, A., A fluorescent membrane tension probe. *Nature Chemistry* 2018.
3. Colom, A.; Redondo-Morata, L.; Chiaruttini, N.; Roux, A.; Scheuring, S., Dynamic remodeling of the dynamin helix during membrane constriction. *Proc Natl Acad Sci U S A* 2017, 114 (21), 5449-5454.
4. Chiaruttini, N.; Redondo-Morata, L.; Colom, A.; Humbert, F.; Lenz, M.; Scheuring, S.; Roux, A., Relaxation of Loaded ESCRT-III Spiral Springs Drives Membrane Deformation. *Cell* 2015, 163 (4), 866-879.
5. Colom, A.; Casuso, I.; Rico, F.; Scheuring, S., A hybrid high-speed atomic force–optical microscope for visualizing single membrane proteins on eukaryotic cells. *Nature Communications* 2013, 4, 2155.

### **Education and Experience Required**

We are looking for a highly motivated students with a master degree or degree in Science, Engineering or technology.

The position will be fully funded for 1 year, which can be extended an additional year. The researcher will be strongly supported in his/her applications for a full PhD fellowship.

Team working and communication skills will be appreciated

**Contact:** Applicants are encouraged to send the next documentation through the Biofísica website contact page (<http://biofisika.org/contact/>), adding the following subject: [*Job Application: 74AColomPredoc*]

1. Curriculum Vitae
2. Reference letters (if possible)

### **Deadline: February 12, 2021**

Please note that due to the large number of applicants expected, it will not be possible to communicate the evaluation results to all the candidates.