Submission Date: 05/08/2024

2023 Academic Year Bio-SPMs Collaborative Research Research Report Summary

Title of the research project		Atomic force microscopy-based adhesion and elasticity mapping of contact-induced allorecognition in a model eukaryote	
PI (Person in charge of the research project)	Name	António Pedro da Rocha Cardoso Gonçalves	
	Affiliated Institution and Department/Division/etc.	Industrial Biotechnology and Food, VTT – Technical Research Centre of Finland, Finland (during Bio-SPM Collaborative Research visit to NanoLSI: College of Medicine, National Cheng Kung University, Taiwan)	
	Position		
Bio-SPMs that you used (Check the boxes)		☐	Atomic resolution/3D-AFM
		☐	High-speed AFM
		☐	SICM
		■	AFM for Cell Measurement
Collaborative NanoLSI Faculty Members		Clemens M. Franz, Associate professor	

Describe the summary of the research project

I have been interested in fungal cell-cell communication and fusion, which is an important process in the biological lifestyle of filamentous fungi [1]. In fact, cell fusion is an important cellular event across all domains of life, from microbes to humans (placental development, organ sculpting, skeletal muscle formation, bone remodeling, fertilization, …) [2]. In particular, I have previously described a genetic checkpoint (allorecognition) during cell fusion in the model organism *Neurospora crassa* that takes place upon cell-cell contact [3]. During this project, we set out to investigate how atomic force microscopy could assist in mapping the mechanical and adhesive changes during cell fusion, especially after fusion partners have come into contact. We also took the advantage of Dr. Franz's expertise in holotomography to further obtain relevant data to characterize the cell fusion process in previously unknown ways.

References

1 Gonçalves, A. P. et al. Conflict, Competition, and Cooperation Regulate Social Interactions in Filamentous Fungi. Annu Rev Microbiol 74, 693-712, doi:10.1146/annurev-micro-012420-080905 (2020).

2 Aguilar, P. S. et al. Genetic basis of cell–cell fusion mechanisms. Trends Genet 29, 427-437, doi:10.1016/j.tig.2013.01.011 (2013).

3 Gonçalves, A. P. et al. Allorecognition upon Fungal Cell-Cell Contact Determines Social Cooperation and Impacts the Acquisition of Multicellularity. Curr Biol 29, 3006-3017 e3003, doi:10.1016/j.cub.2019.07.060 (2019).

*This form (Form 3) will be open on the NanoLSI website in the following academic year.

*Note that this form should be prepared in one A4-size paper.

*Submission Deadline: May 10, 2024 (Friday). Submit it as a PDF file.

*Submission Destination: the person in charge of Bio-SPMs collaborative research at WPI-NanoLSI, Kanazawa University

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