

# **Final Report for Scientific Exchange Grant from European Working Group on Cardiac Cellular Electrophysiology**

Host: Professor Andrew W. Trafford, Unit of Cardiac Physiology, University of Manchester

Candidate: Mani Sadredini, Institute for Experimental Medical Research, Oslo University Hospital and University of Oslo

Exchange period: February-March 2022

## **Purpose of visit**

The purpose of this visit was to observe and get experience with an optical mapping system for electrophysiological assessment of the rodent heart. In our labs, we have used the combination of telemetric ECG surveillance and  $\text{Ca}^{2+}$  imaging of single cells to study arrhythmias and arrhythmia mechanisms. Additionally, we have used the patch-clamp technique to assess action potentials. To better understand arrhythmias we wish to broaden our methodological approaches. Specifically, optical mapping of intact hearts has been of great interest to us. This technique will both better resemble the *in vivo* environment of cardiomyocytes and allow insight into regional differences in cardiac  $\text{Ca}^{2+}$  handling. Specifically, the combined  $\text{Ca}^{2+}$  and voltage mapping has been important to us. Visiting Professor Trafford's lab was an excellent opportunity to learn this technique from experienced researchers.

Currently, we are also focusing on large animal models of myocardial infarction in our labs. Ahead of the visit, we realized that we could also learn from the long experience Professor Trafford's lab has with large animal models. Especially, isolation of cardiomyocytes from large animals.

## **The visit**

Everyone in Professor Trafford's lab were very hospitable and allowed me to take part in all activities on the optical mapping setup and large animal cell isolation. These activities took place four days per week which allowed me to watch the protocols many times. I also got to see the individual variations of how different researchers conducted the experiments. The extent of the stay also gave me the opportunity to observe any challenges that could occur and how to deal with them. I was allowed to get hands on experience by performing some of the steps of experimental protocols whenever possible. Finally, I got the opportunity to conduct practice experiments on the optical mapping setup on my own. A representative from the company that manufactured the optical mapping system was also in the lab many times during my stay and demonstrated features of the hardware, software and analyses of the data.

## **Future perspectives**

Following this exchange we have installed an optical mapping system similar to the system at Professor Trafford's lab. The experience and knowledge acquired from Professor Trafford's lab allowed us to successfully run experiments on the setup immediately after installation of


the system. These experiments will be valuable for several of our planned projects and we are looking forward to put the skills acquired in Manchester into practice in Oslo. Following this exchange we have also implemented the cardiac cell isolation protocol for large animals from Professor Trafford's lab.

I would like to thank Professor Andrew Trafford for giving me the opportunity to visit his lab and making my stay highly educational. I am also very thankful to all of his students who made an effort to include me in their experiments and teach me the methods. Finally, I am grateful to the European Working Group in Cardiac Cellular Electrophysiology for supporting this exchange.



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**Professor Andrew W. Trafford**  
Director of the Host Centre



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**Mani Sadredini**  
Exchange grant awardee