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European Society of Cardiology
The European Heart House
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Dear members of the Council on Basic Cardiovascular Science,

Report for the ESC First Contact Initiative Grant

I would like to first express my gratitude to the European Society of Cardiology (ESC) and the Council of Basic Cardiovascular Science for awarding the First Contact Initiative Grant to support my visit to Yale University, New Haven, CT, USA. This grant has allowed me to spend one week each at Professor Michael Simons' and Professor Martin Schwartz's lab at Yale Cardiovascular Research Centre in February 2020.

I have developed an interest in the role of shear-induced TGF-beta pathway in the pathogenesis of valve calcification during my PhD study. Valve calcification is a pathological process orchestrated by inflammation, fibrosis, lipid accumulation, and endothelial-to-messenchymal transition, and that TGF-beta pathway has an important role in these processes[1,2]. Aortic valves were once thought to be passively moving tissues that ensure the unidirectional flow of blood, but recent studies suggest that the different blood flow profile experienced by each side of the aortic valve might explain the reason why calcification occurs only on the aortic side of the valve (which experienced disturbed flow profile)[3].

At Yale Cardiovascular Research Centre, Professor Simons' laboratory has access to broad in vitro and in vivo techniques for the investigation of TGF-beta pathway. The aim of my visit to his lab was to establish a first contact with his team and to learn various experimental techniques. During my stay at his lab, I was introduced to research projects that are carried out in his lab- these include the investigation of the role of TGF-beta pathway in smooth muscle cells reprogramming in aortic aneurysms and endothelial cells inflammation in atherosclerosis.

Furthermore, I have shadowed his laboratory staff to learn the insertion of indwelling fluid filled catheters (with a strain gauge manometer attached) to monitor the arterial pressure of mice.

On the second week, I visited Professor Schwartz's laboratory. His lab is renowned in the use of variety of biophysical and cell biological tools to investigate the mechanotransduction in the vasculature. One of which is the Fluorescence Resonance Energy Transfer (FRET) technique that allows the investigation of molecular interactions inside living cells. I shadowed a staff in his lab to learn the technique.

In conclusion, the ESC First Contact Initiative Grant has enabled me to visit both laboratories at Yale Cardiovascular Research Centre, where I learned various techniques that are essential for my future work. The visit also helped to develop my professional network. Once again, I would like to express my sincere gratitude to the ESC Council on Basic Cardiovascular Science for this opportunity.

Yours faithfully,

Kuin Tian Pang, PhD DIC

References:

1. Towler, Dwight A. "Molecular and cellular aspects of calcific aortic valve disease." *Circulation research* 113.2 (2013): 198-208.

2. Mathieu, Patrick, Marie-Chloé Boulanger, and Rihab Bouchareb. "Molecular biology of calcific aortic valve disease: towards new pharmacological therapies." *Expert review of cardiovascular therapy* 12.7 (2014): 851-862.

3. Balachandran, Kartik, Philippe Sucosky, and Ajit P. Yoganathan. "Hemodynamics and mechanobiology of aortic valve inflammation and calcification." *International journal of inflammation* 2011 (2011).