

ISN-CAEN Award Category 1A (December 2016 Round)

Report

Project Title: Learn on how to culture the human embryonic stem cells and how to differentiate the cells into neural lineage

Awardee: Miss Khairunnisa Ramli

Advisor: Angela Ng. Min Hwei, PhD

Home Laboratory: Tissue Engineering Centre, Canselor Tunku Muhriz Hospital, National University of Malaysia Medical Centre (UKMMC), Kuala Lumpur, Malaysia.

Host Laboratory: Institute of Reproductive and Developmental Biology (IRDB), Faculty of Medicine, Hammersmith Hospital Campus, Imperial College London, England, United Kingdom.

Host laboratory's Advisor: Wei Cui, MD, PhD

Dear Dr Caroline Rae,

Special thanks to the ISN-CAEN Committee's members. I was very pleased and grateful to be awarded with the ISN-CAEN Award Category 1A (December 2016 Round) to visit Dr Wei's laboratory, located in Institute of Reproductive and Developmental Biology (IRDB), Hammersmith Hospital Campus, Imperial College London (ICL), England, United Kingdom from 3rd of April to 30th of June, 2017.

On my arrival at the laboratory, Dr Wei Cui warmly welcomed me. Soon, I attended the laboratory safety briefing by Dr Yoyo in order to fulfil the administrative requirements and further conducted online safety tests which are compulsory for all new fellows. In general, I had an opportunity to discuss research's progress and results in weekly group meeting with her students in the Stem Cell and Development group. In addition of that, I managed to attend the joined group meeting with

other research's group in IRDB and seminars given by external research fellows from different universities in England.

My specific objectives were (1) to learn on how to culture the human pluripotent stem cells i.e. human embryonic stem (ES) cells (2) to learn on how to differentiate the stem cells into the neural lineage. I tagged under her post-doctoral fellow, Dr Shuchen Zang. This visit greatly expands my horizon in stem cells research and knowledge whereby I learn on how to culture the pluripotent stem cell i.e. human embryonic stem cell which is more challenging and quite different with the mesenchymal stem cells, multipotent stem cells that I cultured in my PhD project. In the first month, I observed and learnt on how to culture the cells. The important thing in culturing the pluripotent stem cells is to be able to recognise the morphology of undifferentiated and differentiated stem cells as this would dictate when should we re-plate into new culture dish; and what we are going to prepare and do with the cells for further analysis. At the end, I managed to culture my own pluripotent stem cells and applied the principles and knowledge that I learnt before. I conducted one of the tests to confirm the pluripotency property of the cells which is the formation of the embryoid bodies. The formation of the three lineages i.e. mesoderm, ectoderm and endoderm mark the pluripotency of the cells resembling the development of the embryo *in vivo*. It is essential to be noted that this knowledge could be applied in generating and culturing the induced pluripotent stem cells as the cells would mimic and resemble the properties of ES cells.

Regarding the second specific objective, I learnt on how to differentiate the ES cells into neural progenitor cells. ES cells are known to its efficiency in differentiating into the three lineages. Based on my preliminary analysis of RNA and protein extracted from neural-differentiated ES cells, there was no expression of pluripotent markers for ES cells (Oct4 and Sox2). I managed to detect the expression of Pax6, a significant marker used to indicate the neural-differentiation process.

In summary, I managed to learn new techniques which are on how to culture the pluripotent stem cells in Dr Wei's lab that known to be quite challenging compared to another type of cells. One thing that one must bear in mind is the importance of maintaining a good undifferentiated ES culture and the ability to recognise the morphology of undifferentiated and differentiated state of ES cells. This new knowledge is essential for my centre as we would like to embark on the pluripotent stem cell research in the near future. Hence, I am really thankful to the International Society for Neurochemistry for having considered my application and providing this great opportunity to conduct a short-term research in Imperial College London, one of the top universities in the world.

Warm regards,

Khairunnisa Ramli



A group photo with my researchmates. From left: Siti Aminah, Dr Shuchen Zang (post-doctoral fellow), Hui Han, Jason (at the back), Dr Wei Cui, Khairunnisa (ISN-CAEN fellow) and Jen.