Science Museum Lates Proposal/Organ-on-a-Chip Technologies Network/Paul Holloway/11.07.19

Tell us about yourself

The 'Organ-on-a-Chip Technologies Network' is a group of scientists from many different disciplines (including biologists, clinicians, engineers and chemists) who share the common goal of developing miniature living models of simplified human organs, to give a better understanding of human disease and more effectively test drugs in human cells before they are given to people. The Network was set up in 2018 to establish an Organ-on-a-Chip research community in the UK. We are now keen to share with the public the exciting developments that have been made in this new and fast moving field.

What would you propose to do at Lates and how does it link to the theme?

We would like to take part in the 2020 'Medicine Lates' with a 'make and take' event. Organ-on-a-chip research has provided some exciting advances that could vastly improve the way we test and develop new medicines, thus would be an excellent fit for the Medicine theme, as we look to the future of how new medicines will be developed.

The make and take event will take the form of an '(Organ on) chip shop', providing the opportunity for participants to learn more about Organ on chip technology at the shop counter and even go round into the 'kitchen' where they can make a miniature organ on chip keyring to take home.

A façade of a chip shop counter will mark the entrance to the make and take area. Instead of the usual menu of fish and chips, different organs will be displayed along with different 'chips' (miniature devices that mimic human organs). Passing Lates goers can talk with volunteers at shop counter who will explain more about how scientists are mimicking key functions of organs using cells in miniature devices called 'organ on chips' to improve how drugs are developed and tested. Participants will also be invited into the 'Kitchen' where they can make their own Organ on Chip keyring. The make and take will take 5 to 15 mins and cater for ~16 people at a time (4 make tables, each with a different organ theme). Participants will arrange cells and structural elements taken from the 'ingredients' section of the kitchen, assemble and draw a schematic of a device representing a human organ. Volunteers will be on hand to talk though designs and how scientists try to make organ on chips that are 'as simple as possible or as complex as needed'. Photographs of their creations will be taken on a 'microscope' and printed to shrink acetate. The volunteers will give the participants a ticket to come collect their chip later after cooking (giving them time to chat with the researchers or visit the other Lates events). Meanwhile a volunteer will place shrink film print outs in a mini electric oven for 3 min at 160^{o}C which causes them to shrink to a fraction of their size, to demonstrate the miniature scale that organ on chips are created on. A key chain will be attached and presented in a paper chip cone for the participant to collect at the shop front.

What makes your event unique for our audiences?

This event will give the Lates attendees the unique opportunity to learn about the cutting edge developments in how scientists can grow cells in the lab and how microchip technologies have been adapted to create miniature devices that organise living cells in a way that represents an organ. The activity will get them to think about how the function and structure of an organ might be simplified and miniaturised, just as organ on chip scientists are doing. In fact using shrink acetate is one of the many ways that scientists can make actual organ on chip devices, with the thickness of the printed ink in a line being used as a mould to create channels. Feeling the thickness of the raised ink on their key chains will give participants a feel for how small the channels are in organ on chip devices allowing them to imagine biology at the scale of the cell.