**Modelling congenital cystic disease using human pluripotent stem cell-derived kidney organoids**

Some individuals carry abnormal genes that affect their kidneys so that these don’t work properly. In the end these people will likely need dialysis or kidney transplantation to survive. Working closely with the Manchester Renal Genetic clinics for children and adults, we have identified several families who have a particular faulty gene for a molecule called HNF1B which regulates how the kidneys form. In humans mutation in this gene can cause death before birth or lead to people having cysts in their kidneys which don’t filter the blood properly. We have made stem cells form the blood of these individuals in our stem cell lab and are able to generate mini-kidneys from these in a dish. We are starting to work out what exactly goes wrong in the stem cell derived mini-kidneys with this faulty gene, so that we can look into how to reverse or prevent it. In this project we will challenge the mini kidneys to see how they cope with particular stimuli. By determining the difference between how the healthy mini kidneys and the diseased ones behave we will identify molecules which are absent, present at too high a level, or don’t work properly and we can then target these with drugs. Our results will help design therapies to make kidney cells develop and function properly in the body. In future, such therapies may allow people to live free from dialysis and transplantation.