**Studying human kidney malformations in a dish**

Half of the children who have life-threatening long term kidney failure were born with abnormal kidneys. These diseases are called ‘malformations’, meaning that the growth of the kidney went wrong long before birth. Sadly, there are no specific therapies to make these diseased kidneys grow normally. We do know, however, that the growth of normal kidneys before birth is driven by several tens of ‘master molecules’. In this project we will work out which molecules differ between normal and malformed kidneys. At the University of Manchester we use the most up-to-date techniques in which ‘stem cells’ are made from the blood cells of patients and their families cared for in the Royal Manchester Children’s Hospital and the Royal Manchester Infirmary. These stem cells are then used to form mini-kidneys in a dish. We compare the shape and growth of mini-kidneys made from healthy people with those made from people born with abnormal kidneys and who carry abnormal genes, or ‘mutations’. Our exciting study will look in detail at the potential differences in levels of hundreds of molecules in the normal and abnormal mini-kidneys. Only when we have these results can we hope to design therapies, such as adding back a deficient molecule, to make the diseased kidneys grow more normally. Such therapies may allow people to live free from dialysis and transplantation.