WEBVTT

00:04.379 --> 00:07.173 Epithelial cells are the cells that form the boundary

00:07.173 --> 00:09.759 between the inside of you and the outside of you,

00:09.759 --> 00:12.220 and as such, they have to do two things:

00:12.262 --> 00:16.433 One is they have to prevent you from mixing with the outside world,

00:16.474 --> 00:21.396 but also they have to control what you take in from the outside world

00:21.396 --> 00:25.025 and what you excrete back into the outside world.

00:25.442 --> 00:28.778 There's a top of the cell that faces the outside world,

00:28.778 --> 00:30.780 we call that the apical side,

00:30.780 --> 00:35.535 and then there are the sides that face the the intracellular fluid or blood space,

00:35.535 --> 00:37.620 we call that the basolateral side,

00:37.620 --> 00:42.083 and then there's glue that holds those epithelial cells together

00:42.083 --> 00:44.502 and prevent stuff from leaking between them,

00:44.544 --> 00:46.254 we call those tight junctions.

00:47.255 --> 00:49.591 So we're very interested in understanding

00:49.591 --> 00:52.844 the structures that are required to mediate function.

00:55.972 --> 00:59.350 Part of my lab is studying kidney epithelial cells

00:59.350 --> 01:04.189 and trying to figure out how they target proteins to the right places,

01:04.230 --> 01:06.316 apical versus basolateral,

01:06.316 --> 01:09.027 and how they organize their unique structures

01:09.027 --> 01:10.862 in order to carry out their function.

01:11.738 --> 01:15.450 The rest of the lab is studying polycystic kidney disease,

01:15.784 --> 01:20.038 and there are sort of two sets of projects within that group.

01:20.080 --> 01:25.043 One is focused on trying to understand at a molecular and cellular level

01:25.043 --> 01:29.964 what is it that the proteins encoded by the polycystic kidney disease genes do?

01:30.006 --> 01:32.383 What is their physiologic functions?

01:32.383 --> 01:35.637 And the other part of the lab is trying to figure out

01:35.678 --> 01:39.766 what are the therapeutic vulnerabilities in polycystic kidney disease?

01:39.808 --> 01:43.895 Are there small molecules or gene therapy strategies that could be

01:43.895 --> 01:47.649 used to try and fix the disease, or at least slow it down?

01:50.819 --> 01:54.447 We use a lot of different microscopy techniques,

01:54.447 --> 01:57.575 including immunofluorescence microscopy,

01:57.742 --> 02:02.664 electron microscopy, to analyze the kidney and understand its structures.

02:02.705 --> 02:05.375 We do a lot of protein biochemistry.

02:05.375 --> 02:08.336 We do a lot of molecular analysis

02:08.336 --> 02:13.007 and what we're trying to do is put together a holistic picture

02:13.007 --> 02:15.677 of what's going on in cells by interrogating

02:15.677 --> 02:19.430 all of these different features that allow us to assess whether

02:19.430 --> 02:22.225 the pathways and functions that we're exploring

02:22.225 --> 02:24.644 and the therapies that we're trying to develop

02:24.644 --> 02:27.188 mimics the aspects of the human disease.

02:30.400 --> 02:33.236 Like everybody, we're hoping, right, that we're going to develop

02:33.236 --> 02:37.365 a new understanding of how nature works in the context of how

02:37.365 --> 02:39.826 epithelial cells organize themselves

02:39.826 --> 02:44.247 and more immediately, we're hoping that we can identify

02:44.247 --> 02:47.750 new mechanisms that are responsible for polycystic kidney disease

02:47.750 --> 02:50.003 and, most importantly, new therapies.

02:50.170 --> 02:53.673 So our lab has developed a couple of therapies,

02:53.673 --> 02:55.967 one of which is in human clinical trials,

02:55.967 --> 02:59.554 one of which is hopefully headed towards human clinical trials.

03:01.347 --> 03:03.057 The great thing about

03:03.057 --> 03:06.895 working on a genetic disease like polycystic kidney disease

03:06.895 --> 03:08.855 is it can teach us both about

03:08.855 --> 03:12.942 potential therapies and also about fundamental physiology.