WEBVTT

00:00:05.171 --> 00:00:08.466 Myeloid cells are part of the innate immune system.

00:00:08.550 --> 00:00:12.303 These are the most abundant cells we find in circulation,

00:00:12.303 --> 00:00:14.347 in blood as well as in tissues.

00:00:14.347 --> 00:00:17.267 So we study them because they're involved in all processes.

00:00:17.267 --> 00:00:19.060 They're the first responders,

00:00:19.060 --> 00:00:23.940 but they don't leave when things go out of control, they stay,

00:00:23.940 --> 00:00:26.943 and we think they're primary drivers of the disease

00:00:26.943 --> 00:00:30.321 and instruct other cells as well to drive disease.

00:00:33.992 --> 00:00:37.829 We study infectious, inflammatory and autoimmune disease in the lab,

00:00:37.829 --> 00:00:42.625 and we're trying to understand how immune cells drive pathologies and disease.

00:00:43.043 --> 00:00:45.712 And the focus primarily is myeloid cells.

00:00:45.712 --> 00:00:48.465 So we study monocytes, macrophages and neutrophils,

00:00:48.465 --> 00:00:50.925 and we study how these cells drive disease.

00:00:50.925 --> 00:00:53.970 We follow them to the course of a disease.

00:00:54.054 --> 00:00:59.726 Trying to find more human relevant models where we watch a disease progress,

00:00:59.726 --> 00:01:02.520 learn from it, then go back and perturb it

00:01:02.520 --> 00:01:06.399 and learn from that perturbation and try to gain a better understanding

00:01:06.399 --> 00:01:09.319 so that we can make better drugs treating disease.

00:01:12.530 --> 00:01:15.325 So conceptually we start with human data.

00:01:15.325 --> 00:01:16.868 So we pick a disease.

00:01:16.868 --> 00:01:18.161 It could be fibrosis.

00:01:18.161 --> 00:01:19.120 It could be cancer.

00:01:19.120 --> 00:01:20.747 It could be infectious disease.

00:01:20.747 --> 00:01:24.626 We did a lot of work with SARS-CoV-2 infection in COVID-19.

00:01:24.626 --> 00:01:26.086 We start with the human data

00:01:26.086 --> 00:01:28.588 and based on this observational data,

00:01:28.588 --> 00:01:33.218 we make a hypothesis that we are going to test in a mouse model.

00:01:33.593 --> 00:01:36.096 We have something called humanized mice.

00:01:36.096 --> 00:01:40.683 This work was pioneered by my mentor Richard Flavell two decades ago,

00:01:40.683 --> 00:01:44.604 and I have been building on it to improve the types of cells we have.

00:01:44.646 --> 00:01:48.191 The unique aspect of this mouse is it has genes,

00:01:48.191 --> 00:01:52.112 human genes that are necessary for human immune system to develop.

00:01:52.112 --> 00:01:53.738 On top of a human immune system,

00:01:53.738 --> 00:01:56.407 we have also provided tissue cells to these.

00:01:56.407 --> 00:01:59.119 So they have a liver that is humanized.

00:01:59.119 --> 00:02:01.162 We have humanized the lung.

00:02:01.162 --> 00:02:06.209 We have humanized the intestine, and we have humanized the skin.

00:02:06.459 --> 00:02:09.838 So now we have a system where we can study human cells

00:02:09.838 --> 00:02:12.841 in the context of any type of disease.

00:02:12.966 --> 00:02:17.554 We study them, we start perturbing or identifying networks that are driving

00:02:17.554 --> 00:02:19.013 and we block those networks.

00:02:19.013 --> 00:02:21.432 We take them out of the equation and see if they matter.

00:02:21.432 --> 00:02:22.308 If they don't matter,

00:02:22.308 --> 00:02:26.688 then we go back to the human data and try to come up with better hypotheses.

00:02:26.688 --> 00:02:29.023 If they matter, we still go back to the human data

00:02:29.023 --> 00:02:34.737 and see if there is any sign there that you know, encourages us to keep working.

00:02:37.866 --> 00:02:39.534 So, I do basic science,

00:02:39.534 --> 00:02:42.287 but I hope that one day

00:02:42.328 --> 00:02:47.375 findings that we found in the lab are gonna help someone.

00:02:47.917 --> 00:02:51.546 So before something is a candidate for drug development,

00:02:51.546 --> 00:02:55.925 we need to study it in a human relevant system, hence our mice,

00:02:55.925 --> 00:03:01.347 and do this iterative work where we go back and forth with human data,

00:03:01.389 --> 00:03:06.102 mouse model, human data, mouse model and gain a true mechanistic understanding.

00:03:06.102 --> 00:03:08.855 And once we have a strong candidate

00:03:08.855 --> 00:03:12.984 after really hard work, then we try to take it to clinic,

00:03:12.984 --> 00:03:16.321 and I think the way we're doing our research

00:03:16.321 --> 00:03:20.200 will allow us to go to clinic with better candidates

00:03:20.200 --> 00:03:22.535 and also maybe make it faster

00:03:22.535 --> 00:03:27.957 so that what we find on the bench doesn't take 20 years for it to go to clinic.