About the Maehr lab

We're a **stem cell lab** in a **diabetes center**. Stem cell biology is the hammer; Type I diabetes is the nail. The connection here is not what you might expect: we don't make beta cells. It's rather more complicated. See, type I diabetes is an autoimmune disease. It's not very well understood, for such a common disease, but the prevailing opinion is that T cells (part of your immune system) destroy pancreatic beta cells (which make insulin). Current treatments mostly just replace the missing insulin. Replacing the missing insulin is easier said than done, and type I diabetes can really wear down the people it affects. If we want to someday prevent or cure type I diabetes, we need to get a handle on the autoimmune aspect of the disease.

This is not easy to do, and tens of millions have been spent (example) on T1D trials that did not pan out. Better preclinical research is badly needed. To this end, the Maehr lab is part of a big collaboration to create a new model system for type I diabetes. The scheme is to use a "humanized" mouse model. The meaning of "humanize" is to take mice and transplant into them diabetes-relevant human organ systems: human pancreas, human lymphocytes, and human thymus. This will hopefully give reliable insight into the mechanisms of T1D in humans.

Human organ systems are extremely difficult to procure, so the idea is to use stem-cell-derived organs instead. Our role is to make stem-cell-derived thymic epithelium. Thymic epithelium trains your immune system what to attack and what to let live, so it will be a crucial component of the autoimmune disease mechanics that we want to make available for study.

In order to make progress on these goals, the Maehr lab has invested heavily in recent sequencing-based technologies. I joined the lab as a bioinformatician back in September 2016, and my role is to help my colleagues derive insight from the data they produce. It's an amazing era to be working in molecular biology, and a big privilege to work in this lab in particular. Check out our website for more info, or read my blog for sporadic vignettes on technical topics.