

## **MATRIX BIOLOGY RESEARCH FACT SHEET**

### **The Matrix Biology Program at BRI**

The Matrix Biology Program, one of the five major research programs at Benaroya Research Institute at Virginia Mason (BRI), is focused on the role of extracellular matrix (the natural substance that holds cells together in every tissue) in the regulation of cell behavior in health and disease. In keeping with BRI's focus on autoimmune diseases, researchers in the Matrix Biology Program are uncovering new roles for extracellular matrix in the regulation of immune cell behavior.

Extracellular matrix is more than a structural material – it is a complex mixture of different, interacting molecules through which immune cells must travel after they leave the circulatory system to enter body tissues. The processes involved in immune cell-mediated inflammation occur within tissue environments rich in extracellular matrix. Immune cells within these environments receive specific signals from extracellular matrix that guide their behavior.

Matrix Biology Program investigators are studying how the normal composition of extracellular matrix is altered in tissues where inflammatory and autoimmune processes are taking place and how these alterations influence the activity of immune cells that enter and leave the tissues.

In addition, Program investigators are developing ways to use specific extracellular matrix molecules therapeutically to arrest atherosclerosis, cancer, control lung inflammation-mediated fibrosis, and prevent autoimmune rejection of transplanted, insulin-producing islets of Langerhans for treatment of type 1 diabetes.

Studies of the roles played by extracellular matrix in normal and dysregulated immune function and therapeutic use of extracellular matrix to control immune responses represent new frontiers in immunological research.

### **Meet our Scientists**

The laboratories of Thomas Wight, PhD and Robert Vernon, PhD work in synergy to conduct a wide range of investigations into the role of extracellular matrix in normal and abnormal immune responses. Major studies include evaluation of changes in extracellular matrix during the development of autoimmune (type 1) diabetes and chronic fibrotic diseases of the lung, studies of specific responses of different types of immune cells to specific extracellular matrix molecules, evaluation of synthesis of specific extracellular matrix molecules by activated immune cells, and participation of extracellular matrix in signal exchanges between immune cells.

Work is also being done to determine the influence of specific extracellular matrix molecules on the growth of blood vessels and the movement of immune cells from blood vessels into tissues. In addition, both labs are developing therapeutic applications for extracellular matrix. For example, the Wight lab has discovered that a specific variant of the extracellular matrix molecule *versican* has the potential to arrest atherosclerosis by stabilizing the structure of the blood vessel wall.

The Wight lab is also investigating the potential use of the extracellular matrix molecule *hyaluronan* as a medium to suppress inflammation in a variety of settings.

The Vernon lab is developing an implantable device for treatment of type 1 diabetes that combines transplanted, insulin-producing islets of Langerhans with an array of extracellular matrix molecules that provide physical support to the islets, promote islet survival, and control the immune responses to the graft.

### **Community Support**

BRI needs community support to continue its crucial work of finding the causes and cures to eliminate autoimmune diseases. For more information about supporting BRI call (206) 583-6083 or visit [BenaroyaResearch.org/donate-now](https://BenaroyaResearch.org/donate-now).