[**Expanding Fibronectin Function in 3D Environments**](http://blog.akronbiotech.com/2015/05/10/expanding-fibronectin-function-in-3d-environments/)

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The extracellular matrix (ECM) is a complex network of biological material – such as proteins and polysaccharides – that is secreted by cells and which regulates many critical processes critical for cell survival, such as cell-to-cell communication and migration. The many individual ECM components are implicated in numerous processes that cells rely on, and they are increasingly being seen as as therapeutic targets.

Fibronectin, a key ECM protein that is close to our hearts – and one that we wrote about extensively in the past – regulates cell migration, differentiation, organization and has been implicated, recently, in [T cell immunotherapy to treat cancer](http://www.ncbi.nlm.nih.gov/pubmed/24497917).

Alongside other key components of the ECM such as collagen, laminin and vitronectin, fibronectin was recently shown to be able to be formed into implantable ECM scaffolds that are suitable as first-generation synthetic tissue. Preliminary results of a new ECM collection and assembly technique from skeletal muscle cells were recently [published in the journal Biomaterials](http://www.sciencedirect.com/science/article/pii/S0142961215000447) by Jeffrey Molchok’s lab at the University of Arkansas.

Elsewhere, the use of fibronectin is being extended, owing to its high cellular function, to novel tissue engineered assemblies: A recent study in the journal International Journal of Hematology-Oncology and Stem Cell Researchdescribed the expansion of hematopoietic stem cells in 3D nano-scale scaffolds coated with fibronectin. The authors studied the expansion of CD34+ cells fibronectin-coated polycaprolactone (PCL) scaffolds, and observed a 1.5-fold increase in cell expansion compared to that observed in regular, 2D cell culture scaffolds. A higher expression of CXCR4 in 3D confirmed that the cells were better homed in the fibronectin-coated scaffold.

This study relates to recent ongoing work by Rutgers University which investigates whether fibronectin in 3D culture plays a role in the healing process of breast cancer patients after radiation therapy and how such an effect is dependent on the nature and environment of the 3D culture/tissue. [The authors recently presented their preliminary results](http://journals.lww.com/plasreconsurg/Citation/2015/05001/Abstract_175___The_Role_of_Fibronectin_on_Spatial.180.aspx), and more studies are underway.

We are keeping a close eye on such studies, and are actively supporting further advancements in cell therapy involving fibronectin and complex 3D scaffolds as next-generation constructs for tissue regeneration. Our expertise in fibronectin development as well as construction of 3D nano-scale scaffolds is enabling such discoveries.