Fall 2016 Bioengineering Seminar Series

On Both Sides of the Cell Membrane: Engineering Synthetic Stem Cell Niches and Gene Circuits to Regulate Chondrogenic Stem Cell Phenotypes

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In this seminar, I will highlight some of our recent efforts in the area of cartilage tissue engineering. While tissue engineering with adult mesenchymal stem cells (MSCs) offer exciting alternative therapies for repairing traumatic cartilage injury, many challenges remain with respect to engineering a functional tissue cartilage replacement. One area that has been highlighted in recent studies is the instability of the chondrocytic phenotype of induced MSCs. Isolated articular chondrocytes will produce abundant collagen II and aggrecan when cultured in hydrogels *in vitro*. In contrast, when chondrogenesis is induced in MSCs, they generally produce a less functional matrix and express markers of endochondral ossification (hypertrophy) in long-term cultures. I will highlight some of our recent efforts in understanding how the extracellular microenvironment of the pre-chondrogenic stem cell niche regulates early chondrogenesis and the synthetic biology approaches that we are employing to stabilize chondrogenic MSC phenotype. Our long-term goal is to improve chondrogenesis and phenotypic stability of adult MSCs and ultimately their success in generating functional cartilage tissue.

Where: SSOE Seminar Room, NI 1027
When: Friday, October 21, 2016
Time: 12:00 – 1:00 pm

Dr. Rhima Coleman received her Bachelors degree in Mechanical Engineering from the University of Rochester. She then received a Masters in Mechanical Engineering and a PhD in Bioengineering from Georgia Institute of Technology. Her research focus was tissue engineering of cartilage to prevent growth discrepancies in children. Dr. Coleman then moved to Hospital for Special Surgery in New York City to study methods to prevent mineral from forming in cartilage for her postdoctoral work. Finally, Dr. Coleman joined the faculty of Biomedical Engineering here at the University of Michigan in 2012 to form the Cartilage Healing and Regeneration Laboratory, where she continues her studies in cartilage tissue engineering.