Insulin-secreting microtissues - 3D cell-based structures for pancreatic islets’ regeneration

Diabetes is a significant health problem affecting over 8% of the population and increasing to epidemic proportion worldwide. In type1 diabetes, the pancreas completely stops producing insulin, a hormone that enables the body to use glucose found in foods for energy. The beta cells, responsible for insulin production, are located in pancreatic islets. Pancreatic islet transplantation is an efficient therapeutic strategy, but often rejection and poor function of islets occur after transplantation. A new tissue engineering approach has been recently described in the literature, based on the developing of multicellular aggregates or spheroids from commercial pancreas-derived cell lines. In this project, the potential of mesenchymal stem cells to form cellular spheroids and differentiate into insulin-producing cells will be investigated. These structures can be used to study pathological mechanisms involved in diabetes, as well as the effect of different drugs used for the treatment of diabetes. The participating students will explore several techniques to generate stem cell spheroids and test their ability to secrete insulin as a response to glucose stimulation. Students will develop their own hypotheses, test them in the lab, and select optimal methods for generation of insulin-secreting microtissues. Six students are needed for this project.

For Fall 2015 : need 1 student

Fall 2015 Application

Name of CI you are applying for:

Your Name:

Major w/ Track and Minor if any:

Current GPA:

Expected Graduation (Semester and Year):

Application Questions:

1) Why do you want to join this CI?
2) List your significant (3+ hours a week) out of class hobbies/organizations/work/commitments that would limit your out of class commitment/availability to this CI experience.

3) What has been your favorite Bioengineering or Engineering Class to date and Why?

4) What do you want to do after you graduate from Clemson?

5) Name one thing that you learned in a class that you think you could effectively apply to this Creative Inquiry.

6) Describe your personal approach, group interaction and typical effort that you contribute to team related projects. Give a significant example, and describe how your interaction made the team/project better that it would have been without you.

7) What percentage of time are you on time to things?

8) How organized are you?

9) How creative are you?

10) Please attach any lab report, poster or paper that you have completed that is a good indicator of your academic or research abilities, and indicate your specific contribution to this document.