

Lewis University
STEM Undergraduate Research Experience (S.U.R.E.) 2019
Faculty Mentor – Project Application

Faculty Name: William Chura, Ph.D.

Department: Biology

Research Project Title: Optimization of Human Dermal Fibroblast Growth with Hydrogels of varying concentrations of amino acids

Research Project Abstract (Please provide an overview of your project -- this will be shared with students as a project description; maximum 250 words):

Current wound management technology can inhibit the healing process due to poor adhesion to the wound surface, low uptake of exudate, and lack of inherent antimicrobial properties. Alternatives to traditional wound dressings include hydrogels, which are supramolecular matrices, stabilized by non-covalent interactions that absorb large amounts of fluid and exhibit flexible behavior. Previous research has shown that amino acids such as tryptophan and serine have increased the non-covalent interactions within the network, resulting in greater gel strength. As wound secretions diffuse through the hydrogel and into the electroactive layer, the conductivity of the matrix increases and induces an electrochemical signal. The efficacy of the composite is characterized by simultaneously measuring swellability and the increase in conductivity, indicating the point of saturation. This research project is a collaboration with Dr. Keleher. The primary role of the student researcher is to grow human dermal fibroblasts within wells with the different hydrogels. The advancements in the construction of these hydrogels over the years has enhanced and the ability of skin growth is crucial to an applicable wound healing matrix. Recent data, suggested optimal amino acids and their concentration are critical for swellability, strength and promotion of HDF growth.