

Farmington students explore possible role of spinach in regenerating human heart tissue



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FARMINGTON — Students in Shannon McCracken-Barber's Introduction to STEAM class at Farmington Senior High School engaged in a unique project that simulates groundbreaking research focused on the use of spinach leaves in regenerating human heart tissue. The class, which includes a cross-section of students from grades 9 to 12 and all levels of science experience, has embraced the challenge with great enthusiasm.

"The students were excited when they heard about the project and just ran with it," says McCracken-Barber. "Not only the unusual subject matter, but also the collaborative, hands-on approach we would be taking. They like the idea of learning by doing."

McCracken-Barber calls the spinach project “Vascular Vexation” and modeled it on research she herself studied this past summer at the UNH Tech for Teachers Institute, a professional development program for middle and high school instructors focused on building knowledge in both emerging technologies and project-based learning. This past summer’s program was focused on regenerative medicine and biofabrication, industries that are rapidly growing in N.H. and beyond.

Taking place over a number of weeks, McCracken-Barber says her spinach project involves the decellularization of spinach leaves, which transforms them into a veiny framework similar to the natural circulatory system found in humans, one that is ideal for supplying oxygen and nutrients to heart cells. The leaves will then be symbolically recellularized with engineered E. coli that has been colored with a plasmid to demonstrate that new types of cells can be regrown on the spinach framework. This process mimics what would be done in a professional lab.

“This is cutting-edge science that I’m tailoring to fit my class,” says McCracken-Barber. “In the end, the experiments may not be 100 percent successful, but learning to keep a growth mindset and learning from our failures is of huge importance. Just by being actively involved in the process, my students are learning about new areas of science that they can potentially study and job opportunities that they never even knew existed.”

This line of thinking is in perfect alignment with a new workforce development initiative based at UNH focused on cultivating interest and expertise in regenerative medicine and biotechnology and improving overall STEM literacy among middle and high school students. This initiative, called NH CREATES the Future: the NH Collaborative for Regenerative Medicine Education and Training for Engineers and Scientists of the Future, is funded by a \$1.2 million grant awarded to UNH Tech Camp by the National Institutes of Health through its Science Education Partnership Award program.