Toronto Regeneration Therapeutics (TRT) Inc, a spin-off company of the University of Toronto (U of T), is the first in the world to develop a technology to store perivascular mesenchymal stem cells from the human umbilical cord. In turn, George Brown College’s Mechanical Engineering Technology Design (METD) students, under the supervision of Professor John Camarda, have developed a customized dissection plate to enable the effective extraction of these unique cells for therapeutic purposes. The college’s Office of Applied Research and Innovation (ARI) seed-funded the project. Isolated in 2005 by Professor John Davies of the university’s Institute of Biomaterials and Biomedical Engineering (IBBME) and founder of TRT, mesenchymal cells are the building blocks for the muscle, bone and connective tissues of the body. They also regulate the immune system. Previous to this discovery, the umbilical cord was discarded at birth. Mesenchymal cells can be adapted to many outcomes, to combat auto-immune and inflammatory diseases, cancer, heart disease and tissue repair after injury. Research on mesenchymal cells is still at the pre-clinical stage.

As a result of contact between Davies and Camarda, Camarda was approached to help with the engineering problem. “This type of cell,” Camarda says, “exists elsewhere in the body, but in the greatest concentrations in the umbilical cord. U of T scientists want to dissect and harvest the cells as quickly as possible.”

“The goal of the design project,” says named MEDT student, “was to make a plate and clamp technology that improved on a U of T prototype and customized it to the umbilical cord.” After touring several local hospitals to understand what technology is currently available for dissections generally, the student design team developed several versions of a steel plate, stabilized it by replacing the original underlying rubber mat with rubber feet on the plate and, most important, replaced the cumbersome bolt-and-screw clamping mechanism with sturdy but disposable plastic clamps. The final result is an 8 x 14-inch dissection plate that is more functional and sanitary, reliable and stable, yet sensitive enough not to damage the study sample.

“[The ‘building block cells’] exist in the greatest concentrations in the umbilical cord. U of T scientists want to dissect and harvest the cells as quickly as possible.”

JOHN CAMARDA, PRINCIPAL INVESTIGATOR

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