

Invention helps students learn surgical techniques before operating on patients

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In the last 50 years, modern medicine has made astounding advances in surgery, yet many of today's veterinary and human medicine students still hone basic surgical and suturing skills on carpet pads and pig's feet before transitioning to a live patient. An invention by Colorado State University veterinarians provides students with artificial body parts that look, feel, behave, and even bleed just like real skin, muscles and vessels.

The artificial replicas of sections of human and animal bodies -- such as an abdominal wall -- give students a realistic learning environment that will bridge the gap between classroom lectures and procedures such as surgical cuts and sutures on real human or animal patients.

"It is a significant, stressful leap for medical and veterinary students from the classroom to the surgery suite," said Dr. Dean Hendrickson, a veterinarian and director of CSU's Veterinary Teaching Hospital and one of the inventors. "Industry standards for training sometimes actually teach incorrect techniques, or skills that don't translate into real-world situations, so students don't have the ability to realistically prepare for [surgery](#) before a live patient. These artificial simulations help students master their technique, dexterity and confidence before they operate for the first time on a person or someone's pet."

The artificial tissues consist of layers of silicone that closely simulate skin, [connective tissue](#) and muscle. Built into the silicone are realistically placed and sized "blood vessels" that are connected to an artificial blood

source that supplies the tissue with realistic bleeding. For example, students practicing sutures will experience blood coming into a wound or [incision](#) from both sides of the tissue at realistic locations and rates.

Some models are colored realistically, such as a brown-skinned abdominal wall of a horse, with white layers and red layers representing muscles and tissues. However, students also may use simulated tissue in translucent material so they can better view and understand, for example, suture patterns from a three-dimensional perspective while learning correct stitches.

"Our hope is that, with this model, we can begin to help [students](#) build better skills that will make for better outcomes," said Dr. Fausto Bellezzo, a co-creator of the technology with Hendrickson. Bellezzo is also a veterinarian and researcher at CSU's Veterinary Teaching Hospital.

The creators are working with CSU Ventures to identify investors and partners to advance development of the model for teaching animal and human medicine. CSU Ventures is a subsidiary corporation of the Colorado State University Research Foundation, a private, non-profit foundation that helps the university move technologies from the university into the commercial sector. The foundation has filed a provisional patent for the technology.

Provided by Colorado State University

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