SynDaver Labs

Synthetic Humans • Surgical Simulation • Anatomy Models

2016 Catalog

A message from the SynDaver

Dear Organic Human - You are being replaced!

To be more specific, **SynDaver Synthetic Humans** are now replacing deceased bodies in medical education — as they are a biohazard that cannot be relied upon as a teaching tool. Sorry, we have to move forward, and the synthetic human is the new essential for advanced medical training.

If you are still utilizing cadavers or rubber mannequins in your classrooms, then you may want to consider a fresher approach — one that includes the most advanced simulator available today.

Over the last two decades, SynDaver Labs has designed and developed live-tissue replacement products for every Fortune 500 medical device manufacturer in the world, including Johnson & Johnson, Boston Scientific, Stryker, and St. Jude Medical. We also supply the U.S. Food and Drug Administration, U.S. Product Safety Commission, and every branch of the U.S. Armed Forces.

SynDaver Labs' award-winning and patented synthetic human tissues are based on actual live tissue tests to mimic the mechanical, chemical and physical properties of living tissue. We are the only company in the world offering such tissues, organs, and body parts at this remarkable level of fidelity.

So, please review the enclosed material and then visit our website at www.syndaver.com to see for yourself just how effective and beneficial our line of simulation products can be to your organization.

Thank you for taking a moment with us.
Sincerely yours,

The SynDaver

www.syndaver.com • info@syndaver.com • 813-600-5530

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SynDaver
Synthetic Humans

SynDaver Synthetic Humans and body parts are designed for advanced surgical simulation and poly-trauma team training. Individual tissues have been validated over the last two decades to accurately mimic the mechanical, dielectric and physicochemical properties of the relevant living tissue. The resulting tissues respond to all known imaging techniques and medical devices just as live tissue does.

Customization
A variety of pathologies and injuries are available - based on patient images, CAD drawings or simple descriptions. Client may also select gender and skin tone.

SynDaver Anatomy Model
Pg. 6

SynDaver Patient Z-SSH-F-0025

The SynDaver Patient is the newest addition to our award-winning SynDaver Synthetic Human (SSH) product line. In addition to all of the existing features that have made the Synthetic Human world-famous, the SynDaver Patient also includes an open-source physiology engine that controls body motions and all aspects of synthetic biology.

The Patient's autonomic nervous system controls respiration rate, tidal volume, end-tidal CO2, heart rate, heart waveform, arrhythmia, systemic vasoconstriction, body temperature, blink rate and pupil dilation. This means that the body will react to injury and medical intervention exactly as a live human would.

The possible interactions between the SynDaver Patient and medical students delivers simulation that was previously only possible in a real-world emergency room or battlefield. In addition, since the physiology engine is open-source, our clients can create their own scenarios. Featured with the physiology engine is the hypovolemic shock scenario and the real time blood loss tracker.

The family of SynDaver Synthetic Humans products has been used in a wide variety of procedures including open-heart surgery, coronary bypass and stent placement (both femoral and radial approach) with fluoroscopy, chest tube placement, tracheotomy, carotid endartarectomy, cricothyroidotomy, infusion port placement, central line placement with ultrasound, angioplasty, appendectomy, embolectomy, endoscopic surgery with insufflation, femoral cutdown with closure device and hundreds of other procedures.

Extraordinary Features

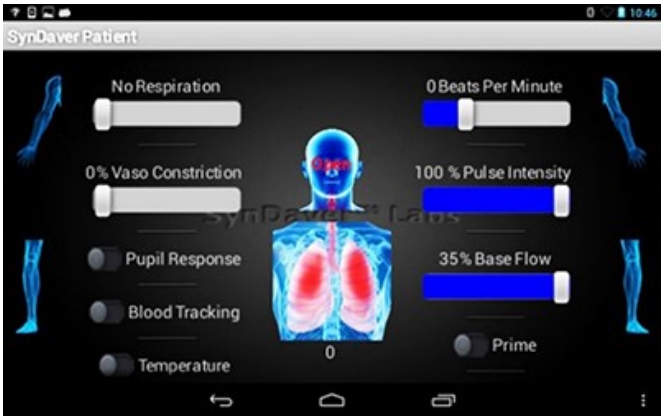
The SynDaver Patient is the world's only full body surgical simulator that combines the ability to operate on any part of the body, synthetic human tissues, animated limbs and an open-source physiology engine. The SynDaver Patient is quite simply the most advanced hands-on medical simulator that the world has ever seen.

Included Components

Animated full body with skin, storage and transport container, battery-powered life support equipment, wireless tablet computer to control body motions and physiology engine and physiology display.

Computer Interface

The system includes wireless control and display tablets with native SynDaver software. Controls include body motion (limbs), respiration rate, tidal volume, end-tidal CO2, heart rate and waveform, arrhythmia, vasoconstriction, temperature, blink rate, and pupil dilation. The separate physiology display follows heart rate, blood pressure, respiration, end-tidal CO2 and temperature.



Imaging Equipment

System is compatible with ultrasound, fluoroscopy, x-ray, and CT imaging equipment.

Surgical Equipment

System is compatible with all known surgical devices including lasers, RF ablation, plasma knives, sonic blades and cryocatheters, as well as bipolar, monopolar and harmonic devices.

SynDaver Anatomy Model Z-SSH-F-0010

The SynDaver Anatomy Model is an education-grade synthetic human cadaver complete with all bones, joints, muscles, organs and tendons in normal human anatomy. Major nervous system and vascular components are also included. The SynDavers are the most realistic synthetic representation of human anatomy ever produced.

The SynDaver Anatomy Model is an ideal alternative to human cadavers in basic anatomy classes. The tissues are a better representation of live tissue than the dead tissue of a cadaver and unlike an actual cadaver, the SynDaver can last virtually forever with proper maintenance.

SynDaver synthetic human tissues have been developed over the last two decades to mimic the physical properties of live tissue. Thanks to this technology, students can become familiar with the look and feel of a live human body without specialized facilities, risk of exposure to biohazards or compromising a live patient.

Imaging Compatibility

- X-Ray
- Magnetic Resonance Imaging
- CAT Scan
- Ultrasound Imaging

Construction Materials

Skeletal system is made from polymer composite with integral fascia sheath. SynTissue brand synthetic tissues are used in all muscular and organ systems.

Skeletal and Muscular System

- 600+ Muscles
- 200+ Composite Bones
- Skeletal Fascia
- Ligaments

Nervous System

- Brain
- Spinal Cord
- Peripheral Nerves
- Epidural Space

Cardiovascular System

- Chambered Heart
- Venous Vasculature
- Coronary Arteries
- Arterial Vasculature

Respiratory System

- Lungs
- Vocal Cords
- Trachea
- Complex Oral Cavity

Gastrointestinal System

- Esophagus
- Large and Small Intestines
- Stomach
- Rectum

Urinary System

- Kidneys
- Ureters
- Blatter
- Urethra

Reproductive System

- Prostate (M)
- Uterus (F)
- Penis (M)
- Vagina (F)
- Testes (M)

Other Abdominal Organs

- Mesentery
- Omentum
- Liver
- Pancreas
- Gall Bladder
- Spleen
- Appendix
- Biliary System

SynDaver Surgical Model Z-SSH-F-0015

The SynDaver Synthetic Human is the most elaborate and sophisticated full-body surgical simulator ever devised. An exquisite 3D jigsaw puzzle, every muscle, bone, vascular component and organ is removable and replaceable.

The SSH has been used in a wide variety of procedures including laparoscopic surgery with insufflation, coronary stent placement with fluoroscopy, chest tube placement, cricothyroidotomy, central line placement with ultrasound, septal defect repair, bowel resection, ECMO, tracheotomy infusion port placement, appendectomy, carotid endarterectomy, embolectomy, craniotomy, angioplasty, femoral cutdown with closure device and many more.

SynDaver synthetic tissues have been validated over the last decade to simulate the mechanical and physicochemical properties of live tissue. With this technology, our products have created an entirely new field known as *live tissue replacement*. The SSH is capable of standing in for a human cadaver in medical procedure training but unlike a cadaver, the SSH can last forever.

Customization: A variety of pathologies and injuries are available based on patient images, CAD drawings or simple descriptions. Client may also select gender and ethnicity.

Imaging Equipment: Compatible with all known imaging techniques including MRI, CT, fluoroscopy, and ultrasound.

Surgical Equipment: System is compatible with all known surgical devices including lasers, RF ablation, plasma knives, sonic blades and cryocatheters as well as bipolar, monopolar and harmonic devices.

Features: The model pumps heated synthetic blood (pulsed flow away from the heart and drainage toward the heart) and can be used to simulate procedures with ventilation, insufflation and intubation. Anatomical attributes include:

- Skin with fat and fascia planes
- Every bone, muscle, tendon and ligament
- Fully articulating joints
- Functioning respiratory system
- Complete digestive and urinary tracts
- Visceral and reproductive organs
- Circulatory system with:
  - Heart
  - Coronary Arteries
  - Aorta
  - Vena Cava
  - Primary Arterial Vasculature
  - Venous Vasculature

Muscles, bones, organs and vasculature are all removable and replaceable to allow onsite servicing and upgrades.

System Components: Full body with storage and display container, stainless-steel table, deluxe battery-powered heart pump and all required plumbing. The model may be skinless or covered with either the standard SynDaver synthetic human skin (pure wet chemistry) or our new organosilicate-synthetic human hybrid skin (polymer outer - wet inner).

SynDaver™ Labs
Synthetic Human

Scan to watch video

SynDaver Mortuary Model Z-SSH-U-0005

The SynDaver Mortuary Model includes many features from our line of synthetic humans with modifications to fit the needs of the field. We are aggressively pursuing means to reduce overall costs for the end-user by focusing our efforts on the aspects most relevant to training in the mortuary science field.

The SynDaver Synthetic Human is world famous for accurately reproducing detailed human anatomy with highly realistic materials. Individual tissues of construction have been developed over the course of the last two decades to accurately mimic the look and feel of real human tissue.

Customization
A variety of pathologies and injuries are available – based on patient images, CAD drawings or simple descriptions. Client may also select gender and skin tone.

Imaging Equipment
The SynDaver Mortuary Model is compatible with ultrasound, fluoroscopy, x-ray and CT imaging equipment.

Surgical Equipment
Compatible with all known surgical devices including lasers, RF ablation, plasma knives, sonic blades and cryocatheters, as well as bipolar, monopolar and harmonic devices.

Extraordinary Features

- Injectable vascular system for arterial embalming procedures.
- Compatible with cosmetic feature setting.
- Carotid and femoral arteries which can be replaced by the user for limitless reusability.
- Body cavity compatible with clinical embalming techniques.
- Limitless reusability with proper care and maintenance.

SynDaver Anatomy Models

In addition to our full body Anatomy Model (Pg. x) SynDaver Labs produces arm and leg models which are manufactured from simplified versions of the synthetic human skeletal, muscle, vasculature, nerves, tendon, ligament and fasciae developed by SynDaver Labs for medical device development testing. These education-grade skinless models include bones, fully articulating joints, muscles, tendons and protective storage case.

These models include one full year of upgrades to the skeletal system, muscular system and joints. Customize your model with soft tissue (either silicone rubber composite or SynTissue skeletal muscle) and construction type. This model may also be customized with pathologies, nerves, vessels, and custom colors.

SynDaver Anatomy Arm — Z-ARM-A-0005

Structural Features
Skeletal, muscular, vascular, nervous, fascial, and cartilaginous structures of the shoulder, upper arm, forearm, wrist and hand.

Articulating Joints
Shoulder, elbow, wrist and digits.

Construction Materials
Thermoplastic bones with integral fascia sheath. Muscular tissues are either organosilicate composite or simplified versions of our SynTissue brand synthetic human skeletal muscle, tendon, ligament, fibrous fascia and bone.

SynDaver Anatomy Leg — Z-LEG-A-0005

Structural Features
Skeletal, muscular, fascial, and cartilaginous structures of the hemi-pelvis, thigh, lower leg and foot.

Articulating Joints
Hip, knee, ankle and toes of foot.

Construction Materials
Thermoplastic bones with integral fascia sheath. Muscular tissues are either organosilicate composite or simplified versions of our SynTissue brand synthetic human skeletal muscle, vessels, nerves, tendons, ligaments, fibrous fascia, and bones.

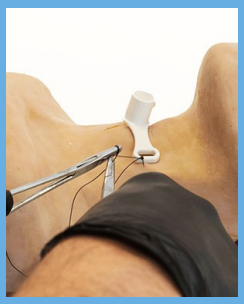
SynAtomy
Task Trainers

SynAtomy Task Trainers enable training in a wide variety of procedures, from a range of imaging techniques including ultrasound, basic suturing and anastomosis skills to advanced surgical procedures such as chest tube placement, emergency airway management, and vascular access.

Extraordinary Features
These task trainers are made with SynTissue synthetic human tissues which are comprised of salt, water and fiber, which feature the world's most realistic tactility. SynTissue synthetic human tissues match the acoustical characteristic of real human tissue.

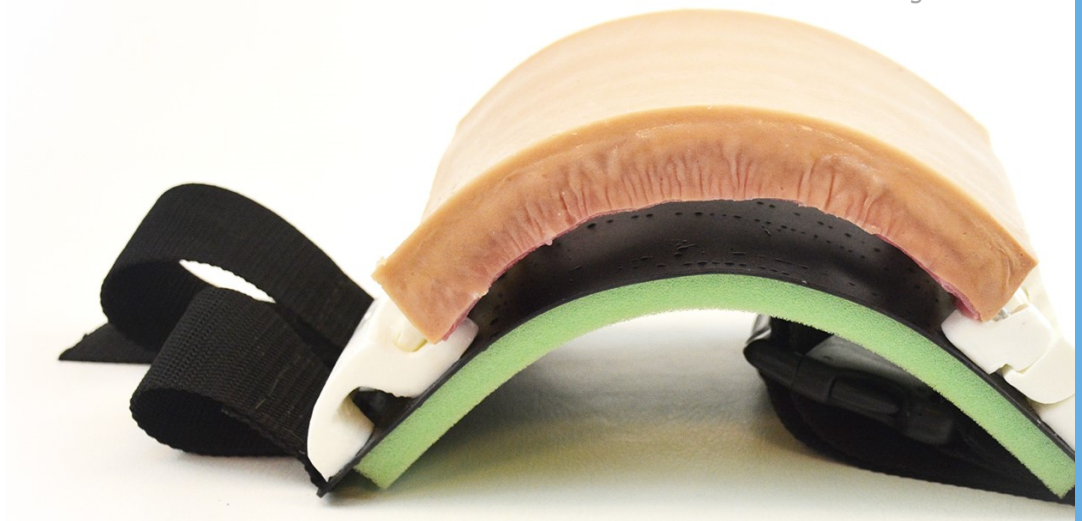
Central Line Trainer
Pg. 13

Airway Trainer
Pg. 11



Cricothyrotomy Trainer
Pg. 12

Wearable Chest Tube Trainer
Pg. 16



SynAtomy Airway Trainers

Our SynAtomy Airway Trainers are realistic medical training platforms ideal for teaching the techniques associated with tracheal intubation. With these trainers, students will be able to learn and master surgical techniques on biohazard-free material that looks, feels, and behaves like live human tissue.

These models include a realistic oral cavity with a hard and soft palate, tongue, uvula, epiglottis and vocal cords. The soft neck with cricocartilage allows users to perform Sellick's maneuver to give a better view of the larynx and/or reduce gastric reflux.

Relevant Skills: Intubation and airway management exercises.

Included Components: Upper torso with nose, mouth, esophagus, hard and soft palate, tongue, trachea, epiglottis, larynx and a Pelican Case for transportation and storage.

Equipment Compatibility: Imaging equipment (Ultrasound, MRI, CT, x-ray, etc.), tracheal tubes, scalpels, tenaculums, aneurysm needles, artery forceps, grooved directors, hemostatic forceps, dissecting forceps, scissors, tenotomes, tracheal dilators, ligatures, auto-suturing and autostapling devices and catheters.

Extraordinary Features: SynTissue synthetic human tissues made from salt, water and fiber, which feature the world's most realistic tactility. SynTissue synthetic human tissues match the acoustical characteristic of real human tissue.

Adult Airway Trainer • Y-AIR-A-0005

Pediatric Airway Trainer • Y-AIR-P-0005

Newborn Airway Trainer • Y-AIR-N-0005

SynAtomy Cricothyrotomy Trainers

Adult Cric Trainer • Y-CRI-A-0005

Our SynAtomy Adult Surgical Cric Trainer is the world's most realistic surgical training platform for cricothyrotomy. In addition, it is compatible with nasogastric intubation and retrograde intubation (adult model only.) These models allow students to practice and repeat technique on a high quality, live-tissue replacement platform in a biohazard-free environment.

Repetitive use will strengthen the ability and confidence of all team members who perform or assist in implementing surgical airways. Typical students who may benefit from this trainer include emergency medical technicians, flight nurses, combat medics, ICU nurses and nurse practitioners. Anatomical features include oral cavity and nasal passages communicating with the lower airway, chin, clavicle, hyoid bone, thyroid cartilage, cricoid cartilage and cricoid membrane.

Relevant Skills: Surgical and needle cricothyrotomy, nasal intubation (adult model only), retrograde airway, palpation, cannulation, application and removal of sutures and staples, surgical cutdown and application of adhesives and bandages.

Included Components: Plastic base, muscular form, two membrane carriages with hyoid and cricoid, skin overlay, 20 replacement tissues and a durable Pelican Case.

Available Options: Choose skin tone and replacement tissue sets.

Equipment Compatibility: Surgical airway devices, autosuturing and autostapling devices, laser scalpels, electrocautery devices, bipolar and monopolar devices, harmonic blades and all known imaging equipment.

Pediatric Cric Trainer • Y-CRI-P-0005

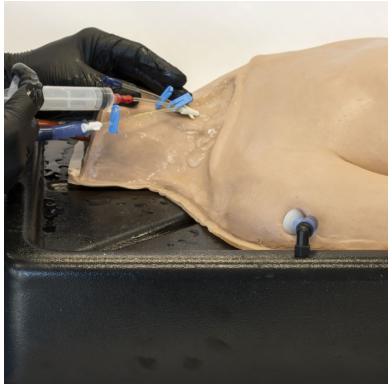
Toddler Cric Trainer • Y-CRI-T-0005

Cric Replacement Tissues • R-CRI-A-0005

These tissue sets are used with the Adult Cric Trainer. Each set includes ten skin replacement tissues and ten cric membranes. Get the most out of your Cric Trainer with repetitive use, practicing technique and building confidence in implementing surgical airways.

SynAtomy Ultrasound Trainers

Central Line Training System — Y-CLT-A-0005



Our SynAtomy Central Line Trainer is a realistic medical training platform designed to help students learn and practice the techniques associated with central venous catheterization.

Repetitive practice with this trainer will help students improve their technique and strengthen their confidence with inserting central venous catheters. Medical professionals who may benefit from practicing on this model include nurses, paramedics, cardiovascular technologist, physicians, EMTs, nurse practitioners and physician assistants.

Equipment Compatibility:
Laser scalpels, electrocautery devices, gamma knives, ultrasonic probes, syringes, needles, catheters, antiseptics and all known imaging equipment (ultrasound, MRI, CT, x-ray, etc.)

Relevant Skills:
Central line placement, ultrasound guidance, cutdown, cannulation, catheterization, incisions, suturing, stapling and adhesive application.

Included Components:
Central Line Pump Base with wireless tablet control (bluetooth) and four soft tissue torsos. Soft tissue variants include Monolithic (whole piece) and Modular (components separable). Each include venous and arterial intima, media and adventitia, skeletal muscle and adult human skin. Vascular features include the common carotid artery, the superior vena cava (which transitions directly into the inferior vena cava), and the common, subclavian and jugular veins.

Paracentesis Trainer — Y-PAR-A-0005

Our SynAtomy Paracentesis Trainer is a lifelike medical training platform designed to teach users techniques associated with ultrasound guided paracentesis procedures. This simulator helps users to effectively learn the skills needed to identify appropriate anatomy and guide needle and catheter insertions by using ultrasound equipment.

This model can simulate intraperitoneal fluid consistent with hemoperitoneum, ascites or other pathological scenarios. Students can target intraperitoneal fluid and guide their needle to the target in real-time for pathological evaluation.

Relevant Skills: Ultrasound guidance, aspiration of fluid, catheterization, needle placement and the application of antiseptics and adhesives.

Included Components: Liver, gall bladder, stomach, small intestines, spleen, pancreas, appendix, prostate, kidneys, ureters, large intestines, bladder, ascites, adjustable fluid system and included storage case.

Equipment Compatibility: Imaging equipment (ultrasound, MRI, CT, x-ray, etc.), catheters, needles and syringes.

Paracentesis Trainer Ultrasound Imaging

Lumbar Puncture Trainer — Y-LPN-I-0005

Our SynAtomy Lumbar Puncture Trainer is a realistic medical training platform ideal for learning and practicing epidural and lumbar puncture procedures. This trainer provides life-like palpable feedback and supplies CSF fluid. Anatomic features include lumbar vertebrae L4-L6, ligamentum flavum, epidural space, and dura.

Repeated use of our trainer will allow students to master their technique and acquire enhanced comprehension toward the clinical procedure. Attendants who may benefit from this product include physiatrists, anesthesiologists, surgeons, neurologists, nurse anesthetist, radiologists, physician's assistants, nurse practitioners, and other nursing staff.

Relevant Skills: Collection of CSF, catheterization, application of antiseptics, and needle insertion.

Included Components: Upper back torso, cerebral spinal fluid, and lumbar vertebrae L5-L2. This product also comes with a durable Pelican Case for storage and transportation.

Midscapular Thoracentesis Trainer — Y-THR-A-0005

The SynAtomy synthetic Midscapular Thoracentesis Trainer has been designed to closely simulate ultrasound guided thoracentesis. Our model has the appropriate basic landmarks and internal anatomy of a patient with a large volume of fluid within the pleural space.

Included Components: Trainer includes foam torso with supportive stand and soft tissue insert. Thoracentesis insert is encased by skin and contains subcutaneous fat, muscular form, ribs, parietal pleura, lung, diaphragm, replaceable pleural fluid, and Pelican Case.

Relevant Skills: Ultrasound guided midscapular thoracentesis, removal of plueral fluid.

Equipment Compatibility: Compatible with all ultrasound units and designed for use with small gauge needles and catheters.

Arthrocentesis Knee — Y-ARN-A-0005

Our SynAtomy Arthrocentesis Knee trainer is a high-fidelity synthetic knee ideal for teaching students how to perform or assist in arthrocentesis. Continuous practice on this lifelike simulator will help students build their skills and confidence in a safe and biohazard-free environment.
This right knee model utilizes lifelike capabilities such as aspiration resistance when a needle tip is superficial to the joint capsule. Ultrasound compatible anatomic features include the patella, tibia, fibula, femur, synovial sac and synovial fluid. Simulated synovial fluid may be removed medially or laterally.

Included Components
Synovial cavity with replaceable synovial fluid, patella, tibia, fibula, femur, muscular form, subcutaneous fat, skin, Pelican Case Stand.

Relevant Skills
Ultrasound guidance, knee aspiration, intra-articular injection, suprapatellar effusion, and palpation.

Complex Breast Phantom — Y-BST-A-0005

Our SynAtomy Breast Phantom is a highly lifelike medical training platform ideal for students and professionals who seek to improve hand-eye coordination and learn new techniques. This simulator accurately emulates the ultrasonic characteristics of tissues found in a typical human breast and allows students to practice procedures such as palpation, mammography and seed implantation.

Pathologies such as hematomas, lesions, cancerous tumors, fibrous cyst, or abscess may be added to this model. Each model is constructed with highly realistic synthetic human tissues that mimic the mechanical, thermal and physico-chemical properties of live tissue.

Relevant Skills: Breast elastography, palpation, seed implantation, mammogram and ultrasound imaging.

Included Components: Skin, subcutaneous fat, bulk fat, a natural wear layer of dead skin at the surface and three discrete layers (epidermis, dermis and hypodermis) that move independently from one another.

Wearable Chest Tube Trainer W-CHT-E-0005

Our SynAtomy Wearable Chest Tube Trainer is a highly lifelike medical training simulator designed to teach users interested in developing skills associated with tube thoracostomy placement. This trainer provides realistic characteristics such as appropriate frictional values (whilst incising the skin and subcutaneous tissue), appropriate puncture resistance (from the intercostal muscle and pleura during tube insertion) and direct simulated feedback from a well protected patient actor.

The Wearable Chest Tube Trainer uses soft tissue from our SynAtomy product line with mechanical features that allow it to be worn by a mannequin or live actor. The structural elements in this item incorporate ballistics-quality armor to prevent injury. Professionals who may benefit from this trainer include emergency medical technologists, field medics, flight medics, naval medics, paramedics, first responders, emergency physicians and nurses.

Relevant Skills: Region sterilization, local anesthesia application, rib palpation, dermal incision, subcutaneous cut down, intercostal muscle puncture, chest tube placement, chest tube fixation via suture techniques and chest tube management.

Included Components: Armored vestige platform, reusable ribs and replaceable tissue plate.

SynAtomy Surgical Trainers

Craniotomy Trainer — Y-CRN-A-0005

Our SynAtomy Craniotomy Trainer is a realistic medical training platform ideal for teaching the techniques associated with cranial access. With this trainer, students will be able to learn and master surgical techniques on biohazard-free material that looks, feels, and behaves like live human tissue.

This model includes a realistic calvarium with skin, subcutaneous tissue, dura mater, subarachnoid membrane, pia mater, and gray matter.

Relevant Skills: Craniotomy, high speed bone sawing, bone flapping, bone removal, irrigation, skin incising and subcutaneous cutdown.

Included Components: Cranial part of the brain, calvarium, arachnoid membrane, Dura mater, dermal tissue layers and subcutaneous tissue layer.

Available Options: Choose skin tone, operational pump base, complex vascular anatomy, pathological aneurysm, pathological cyst or pathological mass.

Equipment Compatibility: Standard Imaging equipment (Ultrasound, MRI, CT, x-ray, etc.), scalpels, aneurysm needles, artery forceps, grooved directors, haemostatic forceps, dissecting forceps, scissors, ligatures, auto suturing devices, auto stapling devices, craniotomes, high speed lateral cutting drills, high speed boring drills, ultrasonic cutting devices, bone grafting and flapping structures.

Lateral Canthotomy Trainer — Y-CAN-A-0005

Our SynAtomy Canthotomy Trainer is a realistic medical training platform ideal for teaching the techniques associated with lateral and medial canthotomy. For clinicians, training in this procedure is important due to the limited time before orbital pressure can cause vision loss, which may occur before a patient can reach a specialist.

The model includes the posterior orbital and nasal section of the skull, 4 newton dermal tissue layer, subcutaneous tissue, lateral and medial canthus, periorbital ecchymosis and exophthalmos.

Relevant Skills: Ophthalmologic procedure model for a lateral and medial canthotomy for temporary relief from orbital compartment syndrome, injectable anesthetic in subcutaneous tissue on lateral and medial canthus site and dermal tissue cutdown.

Included Components: Posterior orbital and nasal section of the skull, 4 newton dermal tissue layer, subcutaneous tissue, lateral and medial canthus, periorbital ecchymosis and exophthalmos. Product is shipped vacuum packed in a durable travel and storage container.

Equipment Compatibility: Injectable local anesthesia needle, Small hemostats, iris or Stephen scissors.

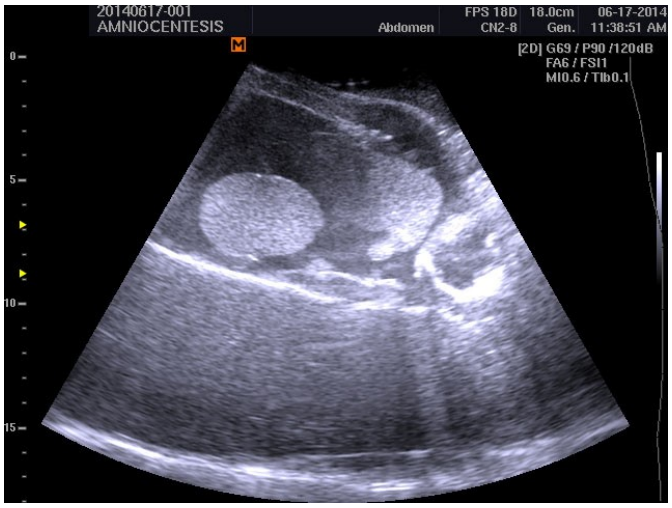
Amniocentesis Trainer — O-BWL-E-0005

Our SynAtomy Amniocentesis and Chorionic Villus Sampling Trainer is a realistic medical simulator ideal for teaching techniques associated with ultrasound guided amniocentesis as well as chorionic villus sampling procedures. Each model contains realistic pelvic anatomy including two gravid uteruses with fetus, umbilical cord with fetal and placental cord insertions, placenta and cervix. A uterus insert with a fetus of 16 weeks gestational age is provided for amniocentesis, along with a uterus insert with a fetus of approximately 12 weeks gestational age for chorionic villus sampling.

Continual use with our trainer will allow students to effectively master their technique and strengthen their confidence which may help minimize the incidence of infection among patients. Tissue insert is symmetrical and can be flipped over for needle placement on either side, and the uterus inserts can be rotated to simulate various placental placements.

Relevant Skills: Aspiration of amniotic fluid, aspiration of chorionic villi, ultrasound skills including transabdominal needle placement and identification of contraindications regarding placental placement.

Included Components: Foam pelvic phantom, gravid uterus with 16 week fetus, gravid uterus with 12 week fetus, a tissue insert and one skin.



Uterus • O-UTR-A-0005

Our uterus model features complex multi-component structure with cervix, inner and outer os, fallopian tubes and ovaries. This organ is also available with patent arterial and venous vasculature, and a variety of pathologies and states of pregnancy. They are ideal for incorporation into complex model systems for hysterectomy and pelvic sling surgery training.

Umbilicus • T-UMB-A-0005

Six inch umbilicus fabricated from proprietary SynDaver synthetic human tissues. Includes two patent arteries and one patent vein.

SynAtomy Basic Suturing Skills

These tissues were designed with extensive input from our medical device, hospital and military clients to exhibit realistic puncture resistance, suture holding, and electrocautery, laser scalpel and plasma knife performance.

SynTissue brand synthetic human tissue components are designed on the basis of physical tests performed on actual living tissue. Each synthetic tissue is validated (tensile modulus, abrasion resistance, penetration force, coefficient of friction, thermal conductivity, dielectric constant, etc.) under the same physical conditions as the live tissue it is designed to simulate. The resulting synthetic tissue responds to stimulus much like the real living tissue.

Equipment Compatibility:
Laser scalpels, electrocautery and RF ablation devices, harmonic blades, monopolar and bipolar devices, plasma knives, ultrasound equipment and all known imaging equipment.

Skin tone may be selected. Shelf life is guaranteed to be at least five years.

Basic Suture Pad • T-PAD-E-0005

Dimensions
- Overall Thickness 6-7mm
- Large Pad 20cm x 20cm
- Small Pad 10cm x 10cm

Layers
- Adult Skin
- Subcutaneous Fat

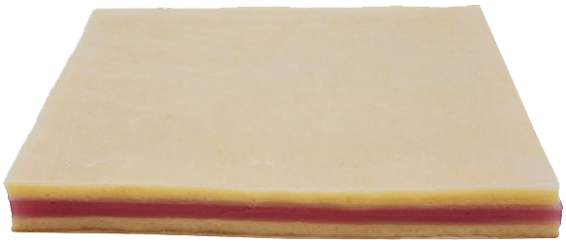
Additional Skills
- Injection
- Implantation
- Cutdown

Abdominal Suture Pad • T-PAD-E-0015

Dimensions
- Overall Thickness 20-25mm
- Large Pad 20cm x 20cm
- Small Pad 10cm x 10cm

Layers
- Adult Skin
- Subcutaneous Fat
- Bulk Fat
- Skeletal Muscle
- Rectus Fascia
- Scarpa's Fascia

Additional Skills
- Injection
- Implantation
- Cutdown
- Stoma repair
- Wound drain
- Stomach Tube Placement



Muscular Suture Pad • T-PAD-E-0010

Dimensions
- Overall Thickness 10-11mm
- Large Pad 20cm x 20cm
- Small Pad 10cm x 10cm

Layers
- Adult Skin
- Subcutaneous Fat
- Skeletal Muscle

Additional Skills
- Injection
- Implantation
- Cutdown

Knot Tying Pad • T-KTP-E-0005

Dimensions
- Overall Thickness 7-10mm
- Square Pad 15cm x 15cm

Layers
- Skeletal Muscle/Fibrous Fascia Hybrid

Additional Skills
- Suturing
- Incisions

Deluxe Suturing Kit — K-SUT-E-0010

Our SynAtomy Deluxe Suturing Kit is a great training platform for both advanced students and experienced professionals seeking to hone the skills associated with more advanced suturing and surgical procedures.

Included Tools: Surgical practice board, storage case, instruction manual (Suture and Surgical Hemostasis, by Rebecca Pieknick), surgical stapler, staple removal tool, instrument-quality suturing tools (needle driver, scissors, and tweezers), scalpel with 10 replacement blades, and 20 assorted sutures.

Included Tissues: Complete Deluxe Student Tissue Pack [T-STU-P-0010] See below.

Dimensions: Case is 8in x 6in x 4in (L x W x D).

Basic Suturing Kit — K-SUT-E-0005

This complete suturing kit includes an instruction manual, basic suturing tools, industry best SynTissue synthetic human tissues, and a durable travel case.

Included Tools: Storage case, instruction manual (Suture and Surgical Hemostasis, by Rebecca Pieknick), student-grade tools (hemostats, scissors, and tweezers), scalpel with 3 blades and 3 assorted sutures.

Included Tissues: Complete Basic Student Tissue Pack [T-STU-P-0005] See below.

Basic Student Tissue Pack • T-STU-P-0005

- Large Basic Suture Pad [T-PAD-E-0005]
- Knot Tying Pad [T-KTP-E-0005]
- Double Layered Bowel [O-BWL-E-0005]
- Anastomosis Vessels (2) [Pack Exclusive]

Deluxe Student Tissue Pack • T-STU-P-0010

- Large Basic Suture Pad [T-PAD-E-0005]
- Knot Tying Pad [T-KTP-E-0005]
- Double Layered Bowel [O-BWL-E-0005]
- Anastomosis Vessels (2) [Pack Exclusive]
- Small Abdominal Suture Pad [T-PAD-E-0015]
- Small Muscular Suture Pad [T-PAD-E-001]
- Thoracic Aorta [V-AOT-E-0005]
- Coronary Artery [V-COR-E-0005]

SynAtomy Anastomosis Skills

These models employ simplified versions of our patented SynTissue brand synthetic human tissues. Designed with extensive input from our medical device, hospital and military clients, these materials exhibit realistic puncture resistance, suture holding, and electrocautery, laser scalpel and plasma knife performance.

SynTissue brand synthetic human tissue components are designed on the basis of physical tests performed on actual living tissue, and each synthetic tissue is validated (tensile modulus, abrasion resistance, penetration force, coefficient of friction, thermal conductivity, dielectric constant, etc.) under the same physical conditions as the live tissue it is designed to simulate. The resulting synthetic tissue responds to stimulus much like real living tissue.

Equipment Compatibility
Laser scalpels, electrocautery and RF ablation devices, harmonic blades, monopolar and bipolar devices, plasma knives, ultrasound equipment, and all known imaging equipment.

Relevant Skills
Manual and robotic-assisted anastomosis.

Double Layer Bowel — O-BWL-E-0005

Our SynAtomy Double Layer Bowel segments feature separate external muscular and internal mucosal layers and are designed for use in anastomosis training. Product is supplied as a single segment which may be re-used many times.

Dimensions:
20mm x 15cm (OD x L)

Aortic Valve • H-ARV-E-0005

Our SynAtomy Aortic Valve is designed for use in heart valve replacement training exercises. The valve design is based on actual CT images to assure anatomical accuracy. Product is supplied as a single unit that may be reused many times.

Dimensions
22mm x 15mm (OD x L)

Mitral Valve • H-MTV-E-0005

Our SynAtomy Mitral Valve is designed for use in heart valve replacement training exercises. The valve design is based on actual CT images to assure anatomical accuracy. Product is supplied as a single unit that may be reused many times.

Dimensions
22mm x 15mm (OD x L)

Abdominal Aorta • V-AAO-E-0005

Dimensions: 23mm ID (trunk), 10mm ID (iliac arch), 15cm overall length.

Thoracic Aorta • V-AOT-E-0005

Dimensions: 23mm ID (trunk), 6mm ID (renal arteries), 15cm overall length.

Simple Aorta • V-AOS-E-0005

Dimensions: 23mm x 15cm (ID x L)

Femoral Artery • V-FEM-E-0005

Dimensions: 7mm x 15cm (ID x L)

Carotid Artery • V-CAR-E-0005

Dimensions: 6mm x 15cm (ID x L)

Coronary Artery • V-COR-E-0005

Dimensions: 4mm x 15cm (ID x L)

Nerve Bundle • O-NRV-E-0005

Dimensions: 5mm x 15cm (OD x L)

Saphenous Vein • V-SPH-E-0005

Dimensions: 10mm x 15cm (ID x L)

Ureter • O-UER-E-0005

Dimensions: 7mm x 15cm (OD x L)

Vas Deferens • O-VAS-E-0005

Dimensions: 3mm x 7cm (OD x L)

Heart Pump — A-HRT-A-0005

Our SynAtomy Heart Pump is designed to enable experimentation and training with our SynDaver synthetic humans by providing an active circulation of simulated blood throughout its vasculature. The pump features an adjustable pressure system and pulsatile flow.

Dual pump orientation enables arteries to carry simulated blood toward the cranial end of the trainer and the veins to carry simulated blood toward the caudal end of the trainer. Flow rate and pressure are both designed to accurately simulation realistic blood flow.

Unit Functions:
Simulation of venous and arterial blood flow.

Included Components:
12.8V LIFePO4 rechargeable battery, peristaltic pump, continuous flow pump, tablet, internal charger and external charge cable.

Equipment Compatibility:
SynDaver synthetic human, F.A.S.T. ultrasound torso and arterial and venous systems.

Platform Pump — A-PPM-A-0005

Our SynAtomy Platform Pump is designed to allow experimentation and training with our synthetic veins, arteries and vessel pads by transporting water or other fluid throughout the blood vessels. The platform includes a DC powered pump that provides a low-rate steady state flow through one vascular component at a time.

Flow rate is controlled by valves at the proximal and distal ends of the vessel. Pressure is adjustable through a stopcock at the end of the tubing. Flow rate and pressure are both designed to accurately simulation realistic blood flow.

Power:
External battery pack with 8 AA alkaline batteries. Allows operation up to six hours on a full charge.

Housing:
Open sump ABS plastic hull with removable high-density polyethylene platform.

Included Components:
Acrylic-polyvinyl chloride thermoformed platform with sump basin, removable perforated high-density polyethylene platform, DC powered impeller pump, external battery pack, 8 AA alkaline batteries, inlet and outlet tube set and instructions.

SynTissue
Organ Models

Our SynTissue Organ Models are by far the most realistic synthetic organs available anywhere in the world. The structural design is based on an amalgam of CT and MRI images from actual patients and the synthetic tissues employed in construction have been validated against the mechanical, physicochemical, thermal and dielectric properties of living tissue.

Imaging Equipment
Compatible with all known imaging equipment including MRI, CT, fluoroscopy and ultrasound.

Surgical Equipment
Compatible with all known surgical devices including lasers, RF ablation, bipolar, monopolar and harmonic devices.

SynTissue Kidney Model
Dissected
Pg. 27

Brain O-BRA-A-0005

Organ Features
Complex brain includes separate cerebral hemispheres, temporal and occipital lobes, limbic system, cerebellum, frontal lobe, corpus striatum, insula, nucleus lentiformis, internal capsule, ventricles and arachnoid membrane. Optional vasculature is patent and plumbed for use in a flow loop.

Options
Select sensor, vascular and pathology options.

Typical Uses
These organs are used in the SynDaver Synthetic Human product line. They are also incorporated into complex models for craniotomy surgical training.

Trachea O-TRA-A-0005

Organ Features
D-shaped lumenal superstructure, individual hyaline cartilage rings with trachealis muscles, lubricious mucosal layer and muscular jacket material.

Options
Select construction, branch complexity and tissue hue.

Typical Uses
These organs are used in the SynDaver Synthetic Human product line. They are also often incorporated into complex model systems for the testing of endotracheal tubes, bronchoscopes and drug delivery devices.

Lung • O-LNG-A-0005

Select left or right lung. These lungs are ideal for incorporation into complex model systems for the testing of breathing circuits, bronchoscopes and respiratory devices.

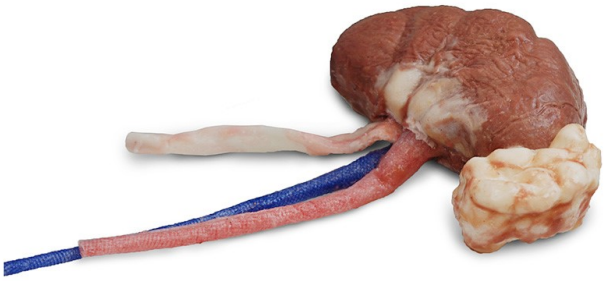
Spleen • O-SPL-A-0005

Spleen features skinned outer structure. This organ is also available with the splenic vein and artery. They are ideal for incorporation into complex model systems for transplant training and medical device testing.

Liver • O-LIV-A-0005

Our liver model features skinned outer shell with lobed structure. This organ is also available with the primary arterial and venous trunks, complete biliary system, and a variety of pathologies. They are ideal for incorporation into complex model systems for liver transplant training and biliary stent testing.

Kidney • O-KID-A-0005



Our kidney model features skinned outer structure with separate adrenal glands. This organ is also available with patent and functional renal pelvis, ureter and renal artery and veins. They are ideal for incorporation into complex model systems for kidney transplant training and urinary device testing.

Shown here with options.

Gall Bladder • O-GLB-A-0005

Our gall bladder model features muscular outer shell with inner mucosal lining. They are ideal for incorporation into complex model systems for the investigation of gallstone treatments.

Pancreas • O-PAN-A-0005

Our pancreas model features textured surface with pancreatic notch, head, body and uncinate process. This organ is also available with bile ducts and the primary arterial and venous trunks. They are ideal for incorporation into complex model systems for pancreatic tumor removal and testing gallstone treatment devices.

Stomach • O-STO-A-0005

Our stomach model features multilayered structure with thin muscular outer jacket, thick muscle middle layer and lubricious mucosal lining. Organ includes fundis and anchor points for pyloric and cardiac sphincters. They are ideal for incorporation into complex model systems for the testing of gastrointestinal devices.

Esophagus • O-ESO-A-0005

Our esophagus model features moist pink mucosa, submucosa, muscularis externa and adventitia, approximately 25 cm long. They are ideal for incorporation into complex model systems for the testing of esophageal dilators and stents.

Small Intestine • O-SIN-A-0005

Our small intestine model features duodenum, jejunum and ileum. Organ comes preloaded with waste matter. They are ideal for incorporation into complex model systems for the testing of medical devices and equipment.

Large Intestine • O-LIN-A-0005

Our large intestine model features cecum, colon (ascending, descending, transverse and sigmoid), rectum, anal canal and appendix. Organ comes preloaded with waste matter. They are ideal for incorporation into complex model systems for the testing of medical devices and equipment.

Urinary Bladder • O-BLD-A-0005

Our urinary bladder model includes ureters and urethra. Structure features muscular outer shell with mucosal inner lining. They ideal for incorporation into complex model systems along with the kidneys for the evaluation of urinary devices.

Uterus • O-UTR-A-0005

Our uterus model features complex multi-component structure with cervix, inner and outer os, fallopian tubes and ovaries. This organ is also available with patent arterial and venous vasculature, and a variety of pathologies and states of pregnancy. They are ideal for incorporation into complex model systems for hysterectomy and pelvic sling surgery training.

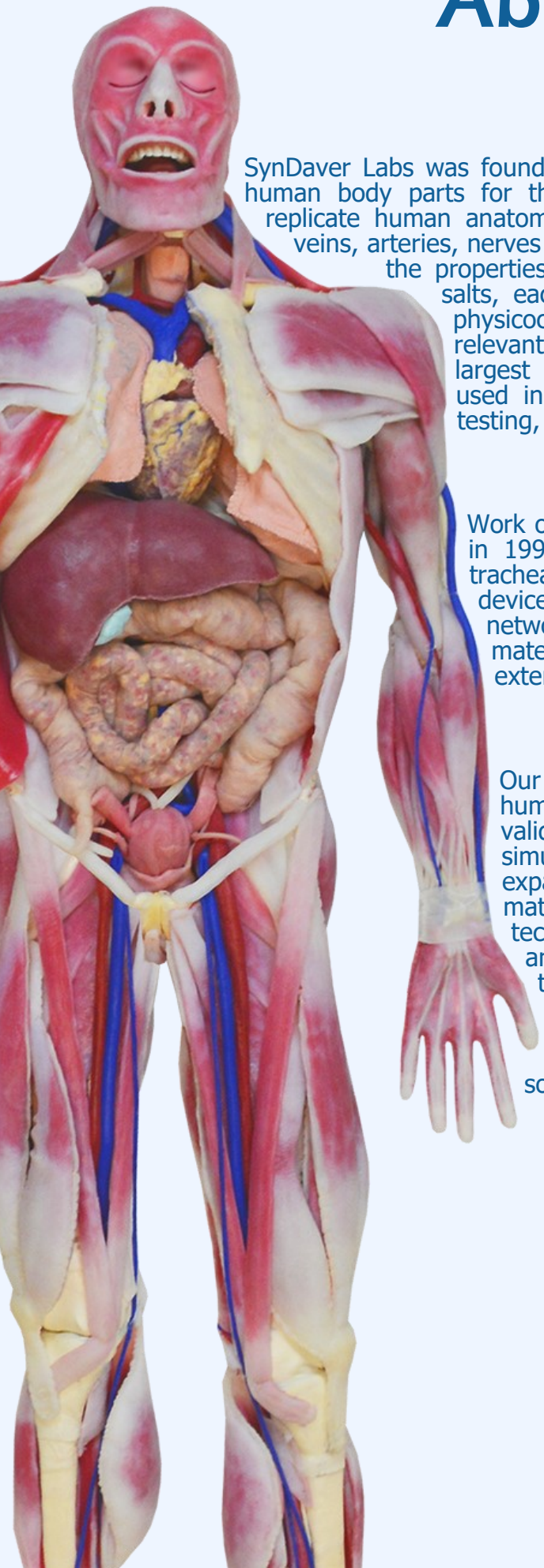
Penis • O-PEN-A-0005

Our penis model features shaft with patent urethra, glans, meatus and foreskin. They are ideal for incorporation into complex model systems for the testing of medical devices and equipment.

Prostate • O-PRO-A-0005

The prostate gland is available in several sizes and can include various pathologies (fluid filled cysts, fibrous cysts, calcified nodules, benign prostate hyperplasia). The hardness can be changed based on client specifications as well. They are ideal for incorporation into complex model systems for manual digital exam training, radiological imaging acquisition training and medical device testing.

About SynDaver Labs



Background

SynDaver Labs was founded in 2004 to commercialize a novel system of synthetic human body parts for the medical device industry. These sophisticated models replicate human anatomy in great detail, including individual muscles, tendons, veins, arteries, nerves and organs, all made from complex composites that mimic the properties of discrete living tissues. Made from water, fibers, and salts, each of these tissues have been validated for mechanical, physicochemical, thermal and dielectric properties against the relevant living tissue. In fact, SynDaver Labs maintains the world's largest database of live tissue properties and our products are used in such diverse fields as surgical training, medical device testing, consumer products evaluation and ballistics testing.

History

Work on this technology was initiated at the University of Florida in 1993. Initial studies involved the manufacture of synthetic trachea models to replace live animals in the testing of airway devices and the development of inter-penetrating polymer fiber networks to mimic lumenal structures such as vessels. The materials developed as a result of these studies are now used extensively in industry as simple vein and artery mimics.

Future

Our focus to date has been the development of synthetic human tissues for use in medical device verification and validation tests. However, we are now in the process of simultaneously increasing the number of tissues in our library, expanding the body of live tissue data upon which these materials are based and reducing the overall cost of the technology. Our ultimate goal is the replacement of live animals and human cadavers in medical education and training with synthetic analogs which are more cost-effective than the relevant animal or human model. We are also developing a family of synthetic humans which breathe, bleed and react to stimulus with autonomy - some purely synthetic and some with living cells.