

**Executive Summary**

Soft Tissue Regeneration, Inc. (STR) is an early-stage orthopaedic device company developing a breakthrough tissue engineering platform used to re-grow ligaments and tendons. **STR has demonstrated the complete regeneration of anterior cruciate ligamentous tissue using a degradable synthetic polymeric construct.** STR's first product, the L-C Ligament®, is a ready-to-use, biocompatible and biodegradable synthetic scaffold which facilitates re-growth of a patient's anterior cruciate ligament (ACL) within the knee—providing joint stabilization and ultimately resulting in faster, better healing and greater odds of making a full recovery. The Company's proprietary and patented technology utilizes a degradable polymer that is widely used in orthopaedic implantable devices, and addresses many of the critical issues created by competitive products. To date, STR has completed substantial large animal testing on the product, and results from a one year large animal study demonstrate that the L-C Ligament® can successfully regenerate a native ligament interarticularly. The Company expects the product to enter clinical trials in 2012. STR is also leveraging its technology platform to develop a suite of complementary follow-on products, including STR GRAFT™, an innovative rotator cuff augmentation system.

**Market Opportunity**

ACL rupture is the second most common injury of the knee requiring surgical reconstruction. As of 2001, more than 80% of ACL injuries were being surgically treated, and this figure has grown significantly in the past decade. Furthermore, according to a recent report by Millennium Research Group, there are over 400,000 ACL reconstructions performed every year in the US. Internationally, we project that more than 300,000 ACL surgical interventions occur annually. As such, the worldwide market for the L-C Ligament® can be conservatively estimated to be at least a ***\$2 billion opportunity!***

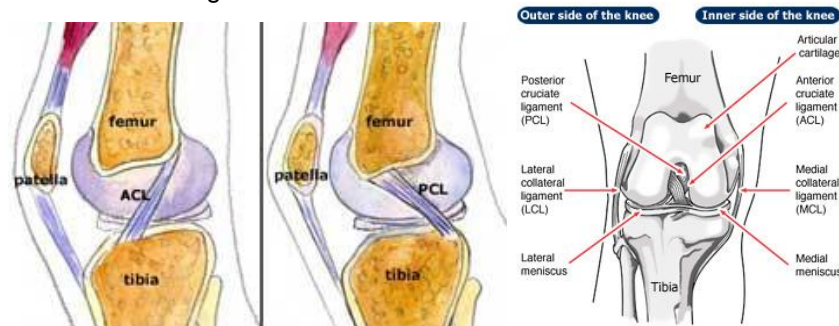
Furthermore, over the next decade the number of ACL reconstructions performed globally is expected to increase at a significant rate, far faster than the general population growth. Some of the key trends driving this include:

- Aging of Baby Boomers Propels Reconstructive Surgeries
- Minimally Invasive Procedures Expected to Encourage More Patients to Undertake Reconstructive Surgeries
- Increase in Number of Procedures in Rest of the World Markets Spurring Demand
- Increase in the Number of Patients Opting for Active Life Style Drives Number of Surgeries
- Better Implant Designs, New Implant Materials and Surgeons Demand for Resorbable Products Boosts the Acceptance of Novel Orthopedic Implants like the L-C Ligament®

*The L-C Ligament® may ultimately increase the number of ACL reconstructions performed if surgeons find the use of the product to provide particular advantages in ease of use, clinical safety and patient outcomes, relative to competitors.*

**Ligaments of the Knee**

The cruciate ligaments are the strong bands of tissue that connect the femur (thighbone) and tibia (shinbone) bones of the knee. Cruciate ligaments support the knee joint, in conjunction with the other stabilizers like the collateral ligaments and the menisci.



**About ACL Tissue Engineering**

The 'tissue engineering' approach to ACL reconstruction uses resorbable scaffolds consisting of synthetic and/or tissue-derived materials to induce neoligament formation. This concept was originally developed for repair of other connective tissues including skin, bone, and cartilage. In contrast to permanent synthetic prostheses that lose strength with time, the mechanical behavior of these implants should improve with time due to neoligament tissue development and ligament remodeling.

The cruciate ligaments are the principle internal stabilizing ligaments of the internal knee—they allow normal knee movement of bending and straightening, as well as some rotation of the knee, but prevent excessive movement or dislocation of the femur and tibia bones. There are two cruciate ligaments in the knee: the anterior cruciate ligament (ACL) holds the tibia from sliding forwards, while the posterior cruciate ligament (PCL) holds the tibia from sliding backwards.

## About ACL Injuries

The ACL is one of the most commonly injured ligaments in the United States. ACL injury often occurs in the sports-active population and women suffer ACL tears six to eight times more often than men. The ACL can be torn when the tibia is stressed suddenly in relation to the femur. The mechanism of injury is often associated with aggressive turning or twisting, landing awkwardly, or sudden stops. Approximately 70% of ACL injuries occur through non-contact mechanisms while 30% result from direct contact with another player or object. Because of concerns of long-term failure, ACL tears are rarely repaired using sutures, they are replaced by a substitute graft made of tendon. Grafts commonly used in ACL reconstruction are made from the patellar, hamstring and quadriceps tendons, and can either be autografts (tissue taken from the patient) or allografts (tissue taken from a cadaver). In the U.S., most repairs are performed arthroscopically.

Injury to the ACL results in a threat to an active lifestyle and exposes the patient a significantly higher risk of developing long-term, chronic conditions like osteoarthritis. As such, surgical ACL reconstruction is typically chosen by individuals to allow a return to their previous work and sports activities. The results of primary ACL reconstruction have generally been good at restoring functional stability. However, long-term healing is still far from ideal. Currently, only 65-70% of patients with reconstructed ACL's return to their pre-injury level of sports activity.

## Competition

Today, the vast majority of ACL reconstructions are either autografts or allografts. Currently available synthetic non-degradable grafts are rarely used in the United States and Europe. All three of these graft types offer suboptimal outcomes and carry numerous risks, all of which drive patient and surgeon demand for an effective alternative solution.

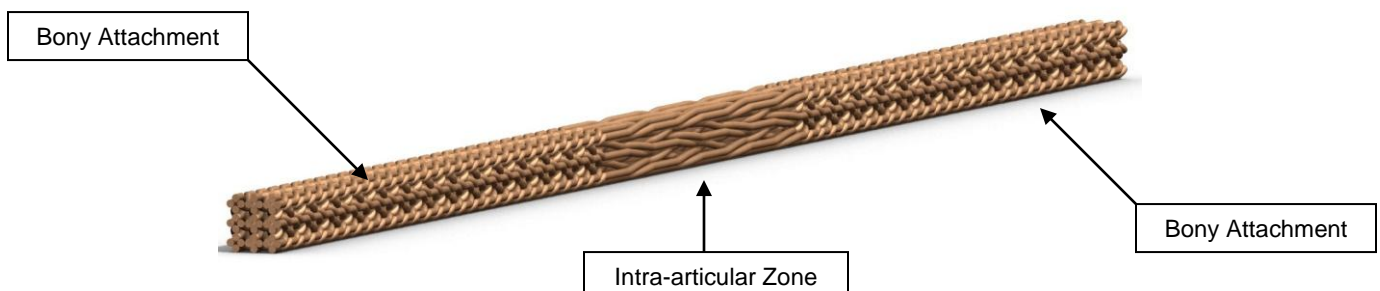
Autografts are the “gold standard” of ACL replacement in most industrialized nations, including the United States. An autograft is a tissue graft made from another part of the patient's body, requiring an additional surgical incision and surgical time to harvest and prepare the graft material. These are often taken from a patient's patellar, hamstring or quadriceps tendon. Autografts usually necessitate additional healing time and have been known to cause both short-term and long-term co-morbidities from the graft harvest, such as pain and weakness at the donor site due to tissue loss. However, autografts are advantageous to many existing competitors since they are readily available and have a low risk of disease transmission, infection, or immune response problems.

Conversely, an allograft is a tissue graft replacement of the ACL with tendon material from a cadaver. Since they are taken from a third-party, allografts are always subject to supply constraints and have become increasingly expensive in recent years due to high screening costs, handling fees, and excess demand. Relative to autografts, there are several advantages to allografts including the elimination of an additional incision site and related pain from graft collection, prevention of long-term co-morbidities from tissue harvesting, faster patient healing time and a shorter surgical procedure. However, allografts also have significant drawbacks. Despite careful screening and handling techniques, allografts are associated with a higher risk of disease transmission (e.g. HIV) and bacterial infection (e.g. MRSA) since they cannot be sterilized—several studies have previously linked allograft infections to patient deaths. Research also suggests that, compared to autografts, allografts are more susceptible to stretching, leading to long-term weakness and poorer healing potential. Furthermore, introducing a foreign tissue into the body always risks an unfavorable immunogenic response, even with extensive compatibility screening.

In the past, several companies have attempted to solve the shortfalls of allografts and autografts by developing synthetic ligament replacements made of non-degradable materials such as the Leeds-Keio and Gore-Tex ligaments. However, currently available ligament prostheses and augmentation devices have high rates of long-term failure and are not FDA approved for primary ACL repair. These devices are susceptible to long-term mechanical failure due to creep and fatigue, and their implantation may also lead to stress shielding—resulting in poor neoligament formation and bone abnormalities.

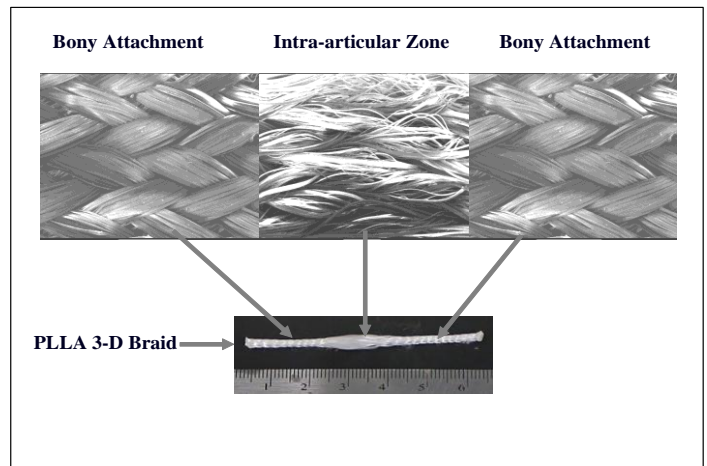
## L-C Ligament® Overview

STR's lead product is a novel tissue engineered device based on a biocompatible and degradable, three-dimensional (3-D) braided scaffold made from poly L-lactic acid (PLLA) fibers. This scaffold, known as the L-C Ligament®, is comprised of three regions: a femoral tunnel attachment site (bony attachment end), a ligament region (intra-articular zone), and a tibial tunnel attachment site (bony attachment end). These regions can be seen in the figure and picture below:



The L-C Ligament® has several distinct advantages over other tissue engineered constructs, including controlled pore size, integrated pores, resistance to wear and rupture, and mechanical properties comparable to the natural ACL. The control of pore size and the integration of pores in the scaffold is important for the movement of nutrients throughout the scaffold and for the removal of cellular waste, both of which enhances cell proliferation and neoligament tissue in-growth. The 3-D braiding scheme of the L-C Ligament® allows fibers to be woven throughout the entire thickness of the braid. This gives the braid toughness and reinforces the structure by preventing total scaffold failure if a few of the fibers become damaged. This feature helps make the L-C Ligament® resistant to sudden rupture and wear.

The L-C Ligament® is an effective solution for all of the shortcomings of autografts, allografts, and non-degradable synthetics discussed in the Competition section. Because there is no tissue harvesting from another site on the patient's body, the L-C Ligament® does not create the problems of secondary injury and related complications at the donor site. This ultimately saves time and money for the surgeon and hospital, while simultaneously resulting in a less invasive procedure, a faster healing time, and a superior long-term outcome for the patient. Since the L-C Ligament® is composed of a synthetic material, it does not face any supply constraints or high procurement costs, as seen with allografts, and can be produced in a sterile environment without sacrificing the mechanical properties of the device. Unlike autografts and allografts, use of a sterilized L-C Ligament® carries no risk of disease transmission. Also, the L-C Ligament® is made of PLLA, a well-known, biocompatible, and FDA approved material that does not elicit a permanent foreign body reaction and degrades gradually (allowing it to be replaced by natural tissue). Lastly, since the device will completely degrade as the new ligament is formed, it will not be subject to the long-term mechanical failures seen with non-degradable synthetic grafts.



*STR's L-C Ligament® is a revolutionary development and has the potential to create a new paradigm for ACL treatment.*

### Testing and Regulatory Overview

The Company has already completed significant *in vivo* and *ex vivo* studies of the L-C Ligament® in both large and small animals as well as performed extensive testing on the product's mechanical and chemical properties. Results from a one year animal study in an ovine (sheep) model demonstrate that the L-C Ligament® can successfully regenerate a native ligament interarticularly. Pre-clinical testing also confirms that the product also allows for synovial encapsulation and cell in-growth in both bony tunnels, both of which improve over time. To further evaluate the device and gain regulatory approval, STR plans to complete its chronic large animal study to be followed by first-in-man testing and a pivotal clinical trial in Europe in 2012. All European human studies will be conducted in accordance with both EU and FDA standards, multiple sites have already been identified for the trial. Once a CE Mark is obtained, the company will initiate a domestic clinical validation trial to gain FDA pre-market approval (PMA).

In 2009, STR initiated pre-IDE interactions with FDA to develop the chronic animal testing protocol and clinical trial plans for the L-C Ligament®. The large animal study is designed to compare the results of the L-C Ligament® versus a standard ACL autograft in an ovine (sheep) model. Currently underway is a long-term full-scale chronic large animal trial based on a total sample of more than 50 animals.

### Product Pipeline

STR intends to leverage its proprietary platform to develop a collection of follow-on products. The Company's lead pipeline product is the STR GRAFT™, a rotator cuff augmentation device with a U.S. addressable market of over 400,000 procedures per year. The company has already completed a pilot large animal study on STR GRAFT™ with very favorable results. STR plans to file for FDA 510(k) clearance and European CE Mark on the rotator cuff augmentation device in 2012.

The current pipeline also includes a modified version of the L-C Ligament® to be used for the repair of the posterior cruciate ligament (PCL). The combined potential market for these two follow-on products and the ACL application of the L-C Ligament® is estimated to be approximately \$4 billion by 2012. In addition, STR's platform can be expanded to many other ligaments and tendons throughout the body, including those found in the hips, elbows, wrists and ankles.

### Manufacturing

The L-C Ligament® is fabricated using a proprietary 3-D braiding process. Multi-filament PLLA fibers are plied together to create a yarn bundle. Yarn bundles are then placed in a custom built braiding machine. Sequential motion of the carriers

using alternating tracks results in the formation of a 3-D braided structure. STR has an exclusive relationship with an ISO certified, contract manufacturer that possesses proprietary braiding machinery and technology to produce the L-C Ligament®. This CMO's internal manufacturing capacity is sufficient to meet all needs of L-C Ligament® commercialization. Although this manufacturer will be responsible for final quality control certification, STR intends to manage the quality process internally. The Company has also engaged another contract manufacturing company to provide sterilization and packaging services during the product development and early commercialization phase. Once regulatory approval nears, STR will evaluate the long-term utilization of third-party contract manufacturers (CMO's) versus financing capital expenditures and equipment to create an internal manufacturing facility. However, during early and mid stage development, the Company will employ a simple, focused, capital efficient business model.

### **Sales, Marketing and Distribution**

Once a CE Mark is obtained, the Company will launch the L-C Ligament® and STR GRAFT™ in Europe. International sales, marketing and distribution of the product will be via Strategic Partners and Alliances with distributors in key territories. The distributors will perform the sales and marketing function, which includes sales to hospitals and surgical centers via direct sales force (leveraging existing relationships), customer service, local product marketing and promotion, and sample programs and management. STR will be responsible for overseeing manufacturing as well as regulatory, marketing support materials and customer service training. The initial plan is to begin selling the product in Western Europe, focusing on the United Kingdom, Germany, France, Italy and Spain. The device will be marketed under the STR L-C Ligament® brand name.

For the United States, the Company plans to launch the L-C Ligament™ upon receipt of pre-market approval (PMA) and STR GRAFT™ upon receipt of 510(k) clearance from the FDA. As FDA approval nears and European customer feedback is available, STR will be evaluating a direct versus an indirect distribution network via strategic alliances for the U.S. product launches.

### **Intellectual Property**

STR has an exclusive license agreement with Drexel University for the worldwide rights to the broad, groundbreaking patent filed by STR founder Cato T. Laurencin, MD, PhD, entitled: "Ligament Replacement Constructs and Methods for Production and Use Thereof". This patent has already been granted in the European Union, Canada, Australia and Japan and is pending in the United States. The patent includes replacement constructs comprising a degradable, polymeric fiber-based, three-dimensional braided scaffold, as well as repairing, replacing or reconstructing a damaged tendon or ligament with these scaffolds.

The Company also maintains a portfolio of complementary patents and patent applications covering internal developments, pipeline products, and related IP used in scaffold-based tendon or ligament regeneration. STR is not aware of any patents or published applications that will prevent the commercialization of their products.

### **Executive Team**

#### **Joseph W. Reilly, CPA, MBA – President and Chief Executive Officer, Member of Board of Directors**

Mr. Reilly is a seasoned executive and entrepreneur with over 30 years experience. He previously served as the President and CEO Theranostics Health, a startup biotech company developing personalized cancer diagnostic therapies. He has also worked as a Managing Director for The Chatham Group, LLC and CEO of Powertrusion International, a market leading composite technologies company. Mr. Reilly is a Certified Public Accountant and graduate of St. John's University with a BS and MBA.

#### **Cato T. Laurencin, MD, PhD – Founder and Chief Science Officer, Member of Board of Directors**

Dr. Laurencin is a world-renowned scientific researcher, chemical engineer, and orthopaedic surgeon, who currently serves as Dean of the University of Connecticut School of Medicine and Vice President of the University of Connecticut Health Center. He is the inventor of the L-C Ligament® and has spent nearly a decade developing STR's platform for tissue engineering. Dr. Laurencin has aided in the development and evaluation of number of orthopaedic products and has served as a scientific advisor and board member for dozens of public and private companies and foundations. Dr. Laurencin holds degrees from Harvard, M.I.T. and Princeton; he is an expert in Sports Medicine and completed surgical fellowships at Cornell University Medical Center and the Hospital for Special Surgery.

#### **Robert Poggie, PhD – Consultant, Clinical and Regulatory Affairs**

Dr. Poggie has over 20 years experience managing and executing orthopaedic and biomaterial product development, device testing and analysis, clinical research, and FDA and CE Mark regulatory clearances. He is the founder and President of BioVera, a medical device consulting services firm exclusively tailored to the orthopaedic industry. Dr. Poggie holds numerous degrees from Vanderbilt University..

***Numerous additional key hires are anticipated concurrent with future financing.***

Members of the Advisory Board and Board of Directors, many of whom are experienced scientists and entrepreneurs, extensively support the company. STR's Board of Directors includes: Joseph Reilly, Cato Laurencin, MD, PhD, Michael B. Aronson (MentorTech Ventures), Russell Tweeddale (Connecticut Innovations), and Robert S. Langer, ScD (MIT).

#### **Advisory Board – STR is supported by world-class scientific, business, and clinical opinion leaders including:**

**Robert S. Langer, Sc.D** – Dr. Langer is one of the foremost experts in biotechnology, tissue engineering and materials science. He is an Institute Professor at M.I.T. (the highest honor awarded to a faculty member) and leads the largest and most published tissue engineering laboratory in the world. Dr. Langer is one of the world's most prolific inventors in

medicine, a seasoned entrepreneur and is the most cited engineer in history. He has received over 150 major awards, has written over 1,000 articles, has more than 600 issued (or pending) patents, and has founded more than two dozen companies. Dr. Langer currently serves on STR's Board of Directors as well as the Scientific Advisory Board.

**James R. Andrews, MD** – Dr. Andrews is internationally known and recognized throughout the world for his scientific and clinical research contributions in knee, shoulder and elbow injuries, and his skill as an orthopaedic surgeon. He is the founder of the Andrews Sports Medicine and Orthopaedic Center (ASMOC) and co-founder of the American Sports Medicine Institute (ASMI). Dr. Andrews is a member of the Sports Medicine Committee of the United States Olympic Committee and serves as an Orthopaedic Consultant to many collegiate and professional sports teams, including the Washington Redskins and the Tampa Bay Devil Rays. He previously served as the President of the American Orthopaedic Society for Sports Medicine (AOSSM).

**Clarence Shields, Jr. MD** – Dr. Shields is an orthopaedic surgeon at the Kerlan-Jobe Orthopaedic Center, one of the world's top facilities for treating orthopaedic and sports injuries, and is an Associate Clinical Professor at UCLA. Previously, he served as President of the AOSSM and was the practicing team doctor for the Los Angeles Rams for over 20 years. In addition to his clinical practice, Dr. Shields is an accomplished orthopaedic researcher and has published book chapters and articles in many major journals. Dr. Shields currently serves as the Chairman of STR's Scientific Advisory Board.

**Robert A. Stanton, MD** – Dr. Stanton is the chairman and managing partner of Orthopaedic Specialty Group, P.C. in Fairfield, Connecticut and currently serves as the immediate past President of the AOSSM. Dr. Stanton also holds membership in the Connecticut State Medical Society (CSMS), Yale Orthopaedic Association (YOA), Fairfield County Medical Association (FCMA), the International Society for Arthroscopy, Knee Surgery & Orthopaedic Sports Medicine (ISAKOS) and the Arthroscopy Association of North America (AANA).

**Robert Arciero, MD** – Dr. Arciero is an orthopaedic surgeon and professor at the University of Connecticut School of Medicine and is a member of the international ACL Study Group.

**Kenneth R. Alleyne, MD** – Founder of Eastern Orthopaedics and Sports Medicine, Dr. Alleyne is a skilled orthopaedic surgeon with fellowship training in sports medicine, knee and shoulder surgery. He is also CEO of Gardiner-Ebers, a healthcare consulting firm providing services to the private equity and hedge fund communities. Dr. Alleyne is also an experienced life science entrepreneur who founded S3 Medical and Morphogen Pharmaceuticals.

**William R. Walsh, PhD** – Dr. Walsh is a University of New South Wales Professor & Director of the Surgical & Orthopedic Research Laboratories. He has served on the scientific advisory boards of numerous public and private companies as well as the editorial board of many leading trade publications. Professor Walsh is an accomplished medical researcher and internationally known lecturer who has been involved with development of numerous orthopedic products.

### Corporate Strategy

STR's goal is to become a leading tissue engineering company for certain soft tissues, leveraging our novel technologies to commercialize products for the regeneration of ligaments and tendons. Key elements of our strategy include:

- Product advantages including ease of use, time saving, safety, quality, improved efficacy and cost effectiveness
- Internal research and development capabilities to expand product offerings
- Streamline development by employing a simple, focused and capital efficient business model
- Establish technology platform as the industry standard for tissue engineering via out-licensing and development with strategic partners
- Ultimately market products worldwide direct and/or indirect via strategic alliances/partners

### Funding

**Seeking Series B Investment Round: \$5.0M to \$7.0M with \$2.0M coming from existing investors.**

**Current Investors include:** MentorTech Ventures, Connecticut Innovations, The Vertical Group and Launch Capital

**Primary Uses of Proceeds / Key Milestones:**

- Complete Large Animal Testing for L-C Ligament® and STR GRAFT™
- Complete European Clinical Trial for L-C Ligament®
- Obtain CE Mark for L-C Ligament®
- Obtain FDA 510(k) Clearance and CE Mark for STR GRAFT™
- Product Pipeline Development

### Contact Information

**Joseph W. Reilly, President & CEO**  
Phone: 973-879-6367  
Email: [jwreilly@softtissueregeneration.com](mailto:jwreilly@softtissueregeneration.com)

**Soft Tissue Regeneration, Inc.**  
142 Temple Street, Suite 206  
New Haven, CT 06510, USA