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We invite you to join our dedicated and exceptional association of scientists, physicians, advocates, educators, philanthropists, public servants, and clergy as we stride forward in unlocking the healing powers that are already inside our own bodies.

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The Stem for Life Foundation
420 Lexington Avenue, Suite 350
New York, NY 10170

The Stem for Life Foundation's mission is to increase awareness of and access to current and potential stem cells therapies, and to support adult stem cell research.



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Coming Soon!

The Second International Vatican Adult Stem Cell Conference



Meredith Vieira - NBC News



Bill Hemmer - The Fox News Channel



Peggy Noonan - The Wall Street Journal

Recognizing the success of our first Vatican conference in November, 2011, NeoStem, Inc., The Stem for Life Foundation, the Vatican's Pontifical Council for Culture, and STOQ are pleased to announce our second international conference — *Regenerative Medicine: A Fundamental Shift in Science and Culture*. We are thrilled to announce the participation of NBC's Meredith Vieira and The Fox News Channel's Bill Hemmer as Day 1 and 2 moderators, and *The Wall Street Journal's* Peggy Noonan as a panel moderator. From April 11-13, 2013, the focus of this event will be on adult stem cell breakthroughs and education, including the tangible goals of:

- Fostering an open dialogue amongst researchers, physicians, philanthropists, faith leaders, and policy-makers in order to help identify clear, unmet medical needs throughout the world that can be addressed through the development of cellular therapies that will reduce human suffering.
- Expanding global awareness of the here-and-now opportunities of adult stem cell therapies and reducing misperceptions surrounding the field of cellular research.
- Laying the groundwork for a collaborative network of scientists, educators and patrons who embrace the promise of adult stem cells, creating an array of subsequent educational events at leading universities and institutions throughout the world, inspiring the next generation of cellular researchers.

To learn more please visit : www.adultstemcellconference.org ■

Welcome



Welcome to our Fall issue of *Life Lines*! We want to share our latest news and inspire you to become a part of the growing movement to embrace regenerative medicine.

Our leading news is our upcoming *Second International Vatican Adult Stem Cell Conference: Regenerative Medicine – A Fundamental Shift in Science and Culture*. Meredith Vieira from NBC News, Bill Hemmer from The Fox News Channel, Peggy Noonan of *The Wall Street Journal* and Dr. Max Gomez from WCBS-TV are slated to moderate this event featuring leading adult stem cell scientists and clinicians, thought leaders of faith, ethics and culture, as well as Ministers of Health, Ambassadors to The Holy See and regulatory officials from around the world.

In recent months, as more successful adult stem cell treatments are reported, there is a growing consensus that cell therapy will be a key component to the future of medicine. In this spirit, we are proud to announce the upcoming release of our book, *The Healing Cell: How the Greatest Revolution in*

Medical History is Changing Your Life, authored by Msgr. Tomasz Trafny, Dr. Max Gomez, and myself. You can pre-reserve the book now at the Stem for Life website.

In this issue, we chronicle advances by some of our illustrious Scientific Advisory Board members, such as Dr. Anthony Atala of the Wake Forest Institute for Regenerative Medicine. Dr. Max Gomez pens an informative article about adult stem cells, clarifying the distinction between adult and embryonic stem cells.

In honor of our brave men and women in the Armed Forces, we are proud to announce The Stem Cell Project initiative supporting our injured veterans via adult stem cell treatments. From infants to the infirm, we believe our direction will transform medicine and heal those seeking cures. ■

Yours in health,

Dr. Robin L. Smith
President and Trustee

Turning Promise into Progress

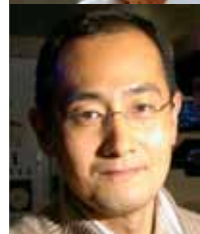
Adult Stem Cell News Highlights

Continuing our steadfast mission to increase public awareness of adult stem cells, SFLF regularly combs the media for trustworthy stem cell news that highlight advances in research and treatment breakthroughs. We would like to take a moment and reflect on some of the achievements made in adult stem cell science since our last newsletter in Spring 2012.

- In October, The Nobel Prize in Physiology or Medicine was awarded jointly to Sir John B. Gurdon and Dr. Shinya Yamanaka for the discovery that mature cells can be reprogrammed to become pluripotent (immature cells), capable of developing into all tissues of the body. Gurdon experimented with cell reversal in 1962, when he replaced an



Sir John B. Gurdon



Dr. Shinya Yamanaka

egg cell of a frog with the nucleus from a mature intestinal cell. The modified egg cell developed into a normal tadpole. More than 40 years later, in 2006 Yamanaka discovered how intact mature cells in mice could be reprogrammed into pluripotent, immature stem cells. By reprogramming mature cells, scientists and the global health care community at large see an extraordinary opportunity to study disease and develop more cellular therapies and cures.

- In August, a US federal court ruled in favor of legally funding human embryonic stem cell research at the US National Institutes of Health (NIH). Opponents of this ruling feel that this is a violation of the 1996 Dickey-Wicker Amendment, preventing US tax funding for embryos that are destroyed or discarded. Adult stem cell advocates feel that adult stem cells hold the most promise for treating a myriad of diseases.
- At the July AIDS 2012 Conference in Washington, DC, researchers discussed two HIV-positive men who are HIV-free after bone marrow treatments. According to one of the co-researchers, Dr. Timothy J. Henrich of Brigham and Women's Hospital in Boston, cells that repopulated the patient's immune system appear to be immune from becoming re-infected with HIV.
- In June, SanBio and the University of Pittsburgh were featured on CBS News for using stem cells for stroke recovery treatments. Injecting stem cells into the brain of a stroke victim is a hot button issue

because of concerns with effectiveness and safety. After a stroke, a part of the brain generally dies from a lack of oxygen and blood flow. At this point, the proper dose and proper techniques are unknown to produce a clinical benefit. The stem cells die away over time, yet the hope is that they will secrete substances to help repair and reconnect brain cells.

- UCLA announced a new development in bone growth regarding a treatment of fresh, purified fat stem cells. UCLA stem cell scientists purified a subset of stem cells from fat tissue and used the stem cells to grow bone. They discovered that the bone formed faster and was of higher quality than bone grown using traditional methods. The finding may one day eliminate the need for painful bone grafts that use material taken from patients during invasive procedures.

Read All About It!



On June 27, 2012, Msgr. Tomasz Trafny joined Dr. Robin Smith and Dr. Max Gomez to present the first copy of the first edition of the new book, to the Holy Father, Pope Benedict XVI. Reserve your copy today: www.stemforlife.org/healingcell.

The Stem for Life Foundation is pleased to announce the upcoming release, currently scheduled for April 2013, of *The Healing Cell: How the Greatest Revolution in Medical History Is Changing Your Life*, written by Dr. Robin Smith (President and Trustee of The Stem for Life Foundation), Monsignor Tomasz Trafny (Head of Faith and Science Department, Pontifical Council for Culture of the Vatican), and Dr. Max Gomez (Trustee of the Stem for Life Foundation, Health Correspondent for WCBS-TV).

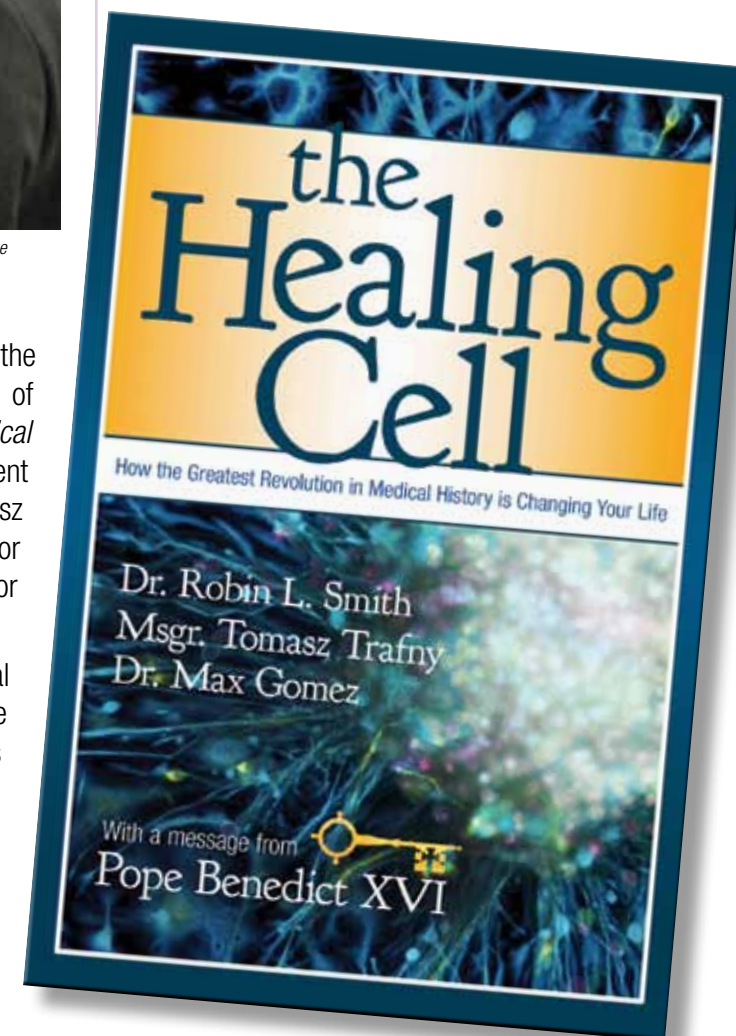
This historic book is a collaboration between The Vatican's Pontifical Council (via its charitable foundation STOQ) and the Stem for Life Foundation. A literary first, it includes a special address by His Holiness Benedict XVI, urging increased support and awareness for advancements in adult stem cell research to alleviate human suffering.

The Healing Cell is the result of the dialogue initiated at the First International Adult Stem Cell Conference (2011) and provides the reader with an engaging, comprehensive overview of adult stem

- Dr. Edward P. Ingenito (Brigham and Women's Hospital Division of Pulmonary and Critical Care Medicine) announced his findings from a study on emphysema. The study showed that when autologous (self-donated) lung-derived mesenchymal stem cells were transplanted into adult female sheep modeled with emphysema, the sheep showed evidence of tissue regeneration with increased blood perfusion, post-transplant. Researchers concluded that their approach could represent a practical alternative to conventional treatments for emphysema.

Don't miss the latest in adult stem cell news. Follow us on twitter.com/StemForLife. ■

cells and their essential role in the future of regenerative medicine. In compelling prose, the book showcases distinct examples of adult stem cell breakthroughs, including their ability to repair damaged hearts and organs, restore sight, eradicate cancer, cure diabetes, heal burns and stop the onslaught of degenerative diseases, such as Alzheimer's and multiple sclerosis. ■



Understanding Stem Cells and Overcoming Misconceptions

By Dr. Max Gomez, Trustee, SFLF and WCBS-TV Health Correspondent

The field of stem cells has been so clouded by controversy and misconceptions that few people truly understand what stem cells are, what their potential is and how much research is being done with them. In fact, when we asked people on the street to tell us about stem cells, the answers ranged from “cells that can help you stop smoking” to “ways to grow body parts” to even “a technique for choosing your baby’s gender and appearance”.

The reality is that stem cells are early stage cells that can divide and develop into various specialized cell types in the body. They can also self-renew to produce more stem cells.

There are two types of stem cells - embryonic stem cells and adult stem cells. In mammals, including humans, adult stem cells act as a repair system for the body, replenishing and healing adult tissue. These adult stem cells are found in children as well as adults and can be found in many tissues and organs.

What makes these cells exciting is their remarkable capacity to transform or become any number of different cell types...with some limitations. Usually they can only become cells of the same tissue type. This means that adult stem cells could be used for what are called cell-based therapies, offering the possibility of a renewable source of replacement cells and tissues to treat diseases including Alzheimer’s disease, spinal cord injury, stroke, burns, heart disease, diabetes, arthritis and more.

So what are these remarkable cells? What do they look like? And, more importantly, what makes them different from - and more powerful than - most other cells? Let’s start with some highly simplified and abbreviated basic cell biology.

Most of us think of a cell as a ball of liquid or gel filled

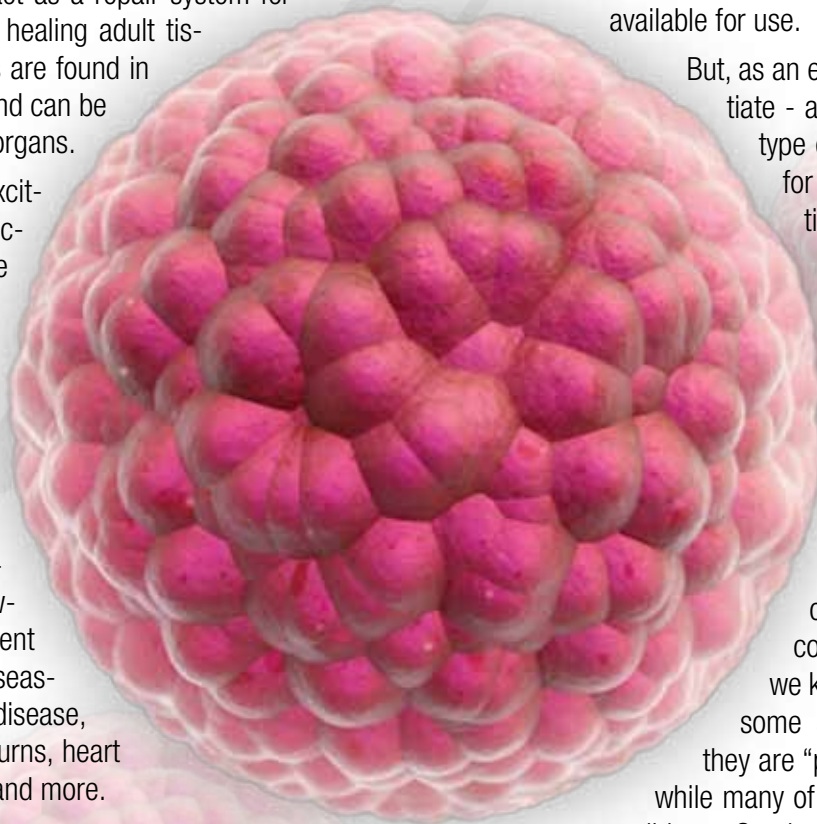
with a bunch of tiny structures just floating around inside. In fact, a cell is an incredibly complex and orderly organism where literally trillions of chemical reactions are happening every second. The outside of a cell is a semi-fluid envelope called the cell membrane. Embedded in the membrane are large sugar and protein molecules that regulate how things like nutrients and waste pass in and out of the cell as well as help transmit signals to the cell’s interior. The control center of the cell, the nucleus, contains genes made up of various combinations of DNA. Some genes help cells become bone... others to become skin, muscle, liver cells and so on. This is what’s called “differentiation.”

In an embryonic stem cell, virtually all genes are “open for business” meaning the stem cell not only contains all of the genetic code needed to turn it into every type of cell in the human body, but it’s all available for use.

But, as an embryonic cell starts to differentiate - as it starts to become a specific type of cell - DNA that’s not needed for that particular cell type to function begins to shut down. Inactive genetic material or “heterochromatin” is formed...and while the unneeded genes are still present, they’re just not accessible.

We used to think that was the end of the story... that “adult” cells were fully and irreversibly differentiated and only capable of making more copies of themselves. But now we know better. It turns out we keep some stem cells around. Technically they are “progenitor” cells - meaning that while many of their genes have shut down... not all have. So, they can be re-programmed or re-activated to a certain extent... to make more of the tissue they’re found in. For our purposes, we’ll call them “adult” stem cells. And we’re now learning that these adult stem cells are found in many, perhaps most, tissues in the body.

These “adult” or “somatic” stem cells are generally what we call



“multipotent” - meaning they can become several different types of cells... but usually only within the same broad tissue type. For example, neural stem cells can become brain and other nervous system cells, but not muscle or blood.

More recently, however, it’s been found that adult stem cells might be able to become cells of different tissue types, which is called trans-differentiation. These cells are said to be “pluripotent”... the example here is bone marrow stem cells that may be able to differentiate or mature into liver, lung, GI tract and skin. It’s thought that these pluripotent cells are the cells we call “VSELs”... short for very small embryonic-like stem cells.

But now, scientists have figured out an even neater trick: how to take fully differentiated cells and revert or reprogram them into stem cells. It’s done by taking the “shut down” genes and opening them up for business again... either by unwinding the tightly wound, inactive DNA... or by inserting some key genes that the cell needs to revert to its embryonic-like state. This is usually done using viruses with the needed genes engineered into them. The virus then does what it often does best, inserts its genetic material into the human cell’s DNA.

When these cells are cultured, some of them actually dedifferentiate. Not only do they look like embryonic cells... they have the potential to become many different tissues. All of this is happening even as you read this. There are at least 3500 clinical trials going on right now using adult and/or transformed cells to treat diseases ranging from leukemia to orthopedics to heart disease.

Think about what this means. We are on the brink of a whole new way of treating disease: cellular therapy... harnessing the power of nature, the potential locked inside our own cells, to repair, treat and even cure some of the most difficult diseases of mankind. Not with drugs or surgical procedures that can leave us scarred or damaged or suffering from serious side effects, but with cells. In the future your doctor might prescribe, instead of pills, custom-made cells to treat your disease...and made from your own cells!

Medicine will never be the same. ■

Opening Doors, Opening Minds

SFLF at the Catholic Medical Association Conference

In September, The Stem for Life Foundation attended the Catholic Medical Association’s 81st Annual Educational Conference in St. Paul, Minnesota, titled *A Witness to Hope: Medicine and the New Evangelization*. Joined by an audience of thousands of Catholic medical professionals, clergy and not-for-profit organizations devoted to health and healing, SFLF joined in a broad range of discussions pertaining to the cultural, intellectual and spiritual contexts of the current crisis of modernity. The event, which spanned several days, offered a dynamic array of provocative panels and keynote speeches.

The Stem for Life Foundation was invited to discuss its forthcoming

Second International Vatican Adult Stem Cell Conference: Regenerative Medicine — A Fundamental Shift in Science and Culture, which will be held in The Vatican from April 11-13, 2013. Interest in our event was incredibly high, and an attendee of the conference was selected to attend the event in Rome.

Over the course of three days, hundreds of attendees visited The Stem for Life booth, where they learned more about our programs for the year ahead pre-ordered copies of our forthcoming book, *The Healing Cell: How the Greatest Revolution in Medical History is Changing Your Life*, which will be published by Hachette-Filipacchi Media in 2013 and will be available in bookstores across the nation.

“This was a terrific event for the Foundation, helping us to forge strong relationships with some of America’s leading Catholic healthcare professionals,” said Todd Aydelotte, who attended the event on behalf of The Stem for Life Foundation. “Our advocacy efforts are sounding a clarion call to the world about the ability of adult stem cells to turn back the rising tide of chronic disease and heal our bodies — and this message was incredibly well received.” ■



State Capitol building - St. Paul, MN.

Dr. Anthony Atala

Anthony Atala, MD, a Stem for Life Foundation Scientific Advisory Board member, directs The Wake Forest Institute for Regenerative Medicine, where he oversees a team of scientists working to build replacement organs and tissues in the lab and develop cell therapies for more than 30 different areas of the body. Recently reported research by Atala's team includes a project to "print" replacement tissues and organs in the lab, as well as an effort to build a muscle implant to repair muscle damage.

The project to print organs uses a 3-D printer that prints both cells and a material to hold cells together into an organ-shaped prototype. The process starts with using data from a patient's medical scans, such as a CT, to create a computer model of the organ. The computer then guides the bioprinter as it prints the prototype layer-by-layer. While the research is still experimental, the goal is to one day print an organ structure — using a patient's own cells — that could be implanted in the patient.

The goal of the muscle project is to help patients with muscle defects ranging from cleft lip and palate to those caused by traumatic injuries or surgery. New research shows that exercise is a key step in building a muscle-like implant in the lab with the potential to repair muscle damage. In mice, these implants successfully prompt the regeneration and repair of damaged or lost muscle tissue, resulting in significant functional improvement. The strategy is to take a small biopsy of muscle from a human patient and to place cells derived from this tissue on a strip of biocompatible material. The strip is then "exercised" in the lab until it develops into an implant that can prompt muscle regeneration and recovery. The work is still experimental, but scientists are hopeful about developing it for human patients. ■



SFLF to Launch *The Stem Cell Project*

In the 1940s, The United States orchestrated what is regarded by many as the greatest scientific collaboration initiative in modern history. Uniting the brainpower of over 130,000 scientists, engineers and military and government officials across three different nations — the U.S., Canada and Great Britain — The Manhattan Project was a true 'race against the clock' designed to create the first atomic bombs, which would ultimately destroy the cities of Hiroshima and Nagasaki, ending the Second World War.

The Manhattan Project was designed to address a significant challenge. Specifically, as Germany ramped up its own atomic research programs, U.S. Government and military officials believed that the U.S. already had the capability to build the bomb quickly, yet scientists and engineers were not collaborating and sharing intelligence. In fact, in many cases, these parties were competing against one another for government and funding support, slowing the progress of atomic breakthroughs.

If America can unite its greatest minds in hope of building a weapon of mass destruction, vanquishing barriers between the scientific, military and government communities, as well as public and private enterprise, then surely we can unite our forces to serve those who have served our nation most — America's wounded warriors, the countless brave men and women of the U.S. Armed Forces who have returned home from the battlefield with lost limbs, burned skin and damaged organs, traumatic brain injuries, and, in many cases, a lifetime of pain and rehabilitation.

As in the 1940s, many renowned adult stem cell scientists working today believe we are very close to developing the cellular technologies that will allow our wounded warriors to actually 'regrow' a lost limb or severely burned skin, repair a damaged brain, or miraculously, allow a

disabled wounded veteran to rise up from his or her wheelchair and walk again. And while organizations such as AFIRM (The Armed Forces Institute for Regenerative Medicine) have made extraordinary progress in fostering a more collaborative approach to creating cellular therapies for wounded soldiers and veterans, the reality is that countless universities, research centers and institutes, spanning public and private enterprise, and organizations serving veterans, are not collaborating enough.

In recent months The Stem for Life foundation, with support from well-known figures from the U.S. Armed Forces and organizations that serve wounded soldiers and veterans, have begun preparations to launch The Stem Cell Project, a 10-year 'race against the clock' designed to accomplish three miraculous goals: To regenerate a soldier's lost arm or leg; to reverse the damage suffered from a traumatic battlefield brain injury; and to develop the technologies that will allow severely burned soldiers to grow new skin.

We will be sharing more information in the coming months about this incredibly exciting and important initiative for America's wounded warriors. In the meantime, we encourage you to donate to The Stem for Life Foundation so that this dream may become a reality. ■