



# MONTHLY

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## Welcoming the New Year

*As 2016 starts, our 10th anniversary celebration begins to wind down*

Where has 2015 gone? As you read this, the penultimate edition of the AlphaBioCom Monthly newsletter, you are likely throwing away your 2015 desk calendar and cracking open a fresh 2016 version. The holiday season has come and gone, and we hope you had a wonderful time with family and friends, and lots and lots of food!

We at AlphaBioCom wish you nothing but happiness and memories-in-the-making during the upcoming year and beyond. During this time of reflection, of giving thanks, and of appreciating what we have, we once again thank you—our clients, partners and friends—for your relationship with AlphaBioCom over the years.

Our 10th anniversary year was an exciting one here in our office that seems to be getting smaller and smaller. We've seen our family of clients grow, seen our family of employees grow, and as AlphaBioCom approaches the end of our celebration (we turn 11 in February), we see nothing but good things ahead. We wish the same for you.

Now that 2016 is upon us, why not make a New Year's Resolution to check out the new and improved AlphaBioCom website ([www.AlphaBioCom.com](http://www.AlphaBioCom.com)) and feel free to leave comments and suggestions about our newsletter and our organization. We can be found on Twitter at @alphabiocom, and you can connect with us on LinkedIn.

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## ADVANCES IN CELLULAR AND STEM CELL THERAPIES

### 2005

- **January:** The American Society of Hematology publishes a study showing that combining umbilical cord stem cells from two partially matched donors can be an option for adult patients with leukemia.

### 2006

- **October:** Researchers from Newcastle University in England announce they have grown the first human liver derived from umbilical cord stem cells.

### 2007

- **January:** Scientists from Cambridge University discover the stage at which an embryonic cell is fated to become a stem cell. Differences in cell fate apparently occur as early as the 4-cell-stage.

### 2008

- **January:** A study published in *Nature* demonstrates that human cells can be reprogrammed to pluripotency, allowing for patient-specific cells to be established in culture.

### 2009

- **December:** Having released the NIH Guidelines for Human Stem Cell Research five months earlier, the NIH announces approval of the first human embryonic stem cells.

### 2010

- **July:** Scientists from Stanford University School of Medicine develop a special synthetic matrix that mimics the elasticity of real muscle, allowing stem cells to maintain their self-renewing properties.

### 2011

- **July:** A long-term study of women with stage IV breast cancer finds that, of the women who received aggressive treatment 12 to 14 years before, followed by treatment with their own, specially purified blood stem cells that had been purged of cancer, a greater percentage survived compared with those who were treated with unmanipulated blood grafts.

### 2012

- **February:** In a study published in *The Lancet*, hESC-derived retinal pigment epithelium was introduced via subretinal transplantation into two patients. Patients have shown vision-related quality-of-life improvement for general and peripheral vision and near and distance activities).

### 2013

- **July:** The UCLA stem cell gene therapy for sickle cell disease advances toward clinical trials. The group successfully established that using a lentiviral vector to introduce an anti-sickling beta-globin gene into hematopoietic stem cells from the bone marrow of patients with sickle cell disease results in a continual source of healthy red blood cells.

### 2014

- **July:** Results from a study published in *Lancet Oncology* provide evidence for the improved efficacy of high-dose melphalan plus salvage autologous stem-cell transplantation compared with cyclophosphamide in patients with relapsed multiple myeloma.

### 2015

- **March:** A group from the University of Pennsylvania reports the sustained remission of a patient with multiple myeloma whose cancer had stopped responding after nine different treatment regimens. This patient received an investigational personalized cellular therapy known as CTL019.

# A Decade of Discovery

*A quick look at 10 years of scientific breakthroughs and advances*

It would be impossible to condense the last decade of scientific research and discovery into a space this small. But as AlphaBioCom nears the end of its 10th year, let's take a quick look back at some of the memorable moments since 2005. We have tried to select interesting and memorable events in the world of scientific discovery and advancement. Thanks to [www.infoplease.com](http://www.infoplease.com) for the information, and to you for coming along with us on this journey.

## 2005

**Jan. 19:** Cancer replaces heart disease as No. 1 cause of death for people ages 85 and under. The silver lining is that deaths from both have fallen.

## 2006

**Feb. 8:** A \$415 million, 8-year federal study finds that a low-fat diet does not decrease the risk of heart disease, cancer, or stroke.



**Aug. 24:** Poor Pluto. The International Astronomical Union votes to reclassify Pluto as a dwarf planet.

## 2007

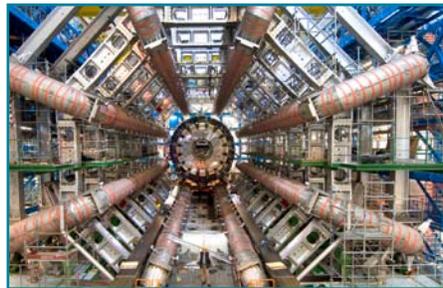
**Feb. 2:** A 3-year study by the Intergovernmental Panel on Climate Change concludes that global warming is very likely caused by human activity—specifically the emission and buildup of carbon dioxide in the atmosphere.

**Nov. 20:** Two teams of scientists, one in Wisconsin and the other in Japan, announce they have discovered a way to make induced pluripotent stem cells—cells that behave like embryonic stem cells. By adding 4 genes to skin cells, they were able to reprogram skin cells into any of the body's 220 types of cells.

## 2008

**Sep. 10:** The Large Hadron Collider, a 17-mile-long looped track located an aver-

age of 300 feet beneath the Swiss-French border, accelerated two beams of particles to 1.2 trillion electron volts (TeV) and then smashed them together.



## 2009

**Feb. 12:** A special court rules that vaccinations do not cause autism. The court ruled in a civil case brought by 3 families seeking compensation from the federal vaccine-injury fund. Scientific evidence refutes any connection.

**April 26:** After confirming 20 cases of swine flu in the United States, including 8 in New York City, the U.S. declares the outbreak a public health emergency.

## 2010

**Apr. 1:** The Environmental Protection Agency issues formal guidelines for the amount of greenhouse gas emissions cars will be able to produce.

**Nov. 4:** A government-financed study finds that current smokers and former heavy smokers who receive an annual CT scan of their lungs reduce their risk of dying from lung cancer by 20%; other conditions can also be detected via the scans.

## 2011

**Feb. 14:** An X-class solar flare, the most powerful form of solar flare, erupts and jams radio communications in China.

**July 8:** The space shuttle Atlantis launches into space for the last time from the Kennedy Space Center. It is the 135th and final

flight of the space shuttle program, which started in 1981.



## 2012

**July 4:** Physicists discover a new subatomic particle, which is believed to be the Higgs boson, the elusive last key to understanding why we have life and diversity in the universe.

**Aug. 5:** A plutonium-powered rover named Curiosity lands on Mars.

## 2013

**Feb. 15:** Debris from a meteor hits Siberia, Russia, injuring more than 1,000 people.

**March 14:** Physicists at the European Organization for Nuclear Research (CERN) confirm that the new particle discovered during the summer of 2012 appears to be a Higgs boson.

## 2014

**July 31:** According to the World Health Organization, the Ebola virus outbreak in West Africa is the worst since the virus was first identified almost 40 years ago.

**Nov. 12:** For the first time ever, a spacecraft lands on a comet. After leaving the mother ship Rosetta, a probe named Philae lands on Comet 67P, located 310 million miles from Earth.

## 2015

**July 14:** The spacecraft New Horizons comes within 7,800 miles of Pluto's surface, capturing images of Pluto.

**Sep. 10:** Scientists announce the discovery of a new pre-human species, *Homo naledi*, found at Rising Star Cave outside Johannesburg, South Africa. This species of hominid is believed to have existed 2.5 million to 2.8 million years ago.

# A Very Promising Approach

*Stem cell research is at the forefront of new therapeutic advances*

Stem cells are a type of unspecialized cell that possesses the ability to self-regenerate and the potential to grow into a variety of different cell types. These cells play important roles in living organisms. In developing organisms, they give rise to new tissues and organs; in adult tissues, they repair and replace tissues that are damaged or lost because of aging, injury, or disease. Given their unique regenerative abilities, stem cells have remarkable potential for scientific research. Scientists have been using stem cells to create model systems of various cell types to study human diseases or test new drugs. Most importantly, because some stem cells can be cultured and differentiated in vitro, they have the potential to serve as unlimited sources of tissues and organs for therapeutic purposes. Thus, stem cell research is one of the most fascinating research areas at the frontier of technology innovations.

On the basis of origin, stem cells can be primarily classified into embryonic stem cells, adult stem cells, and induced pluripotent stem (iPS) cells. Embryonic stem cells are derived from the inner cell mass of an early-stage embryo and have the potential to develop into cells of any type (pluripotency). Scientists have been able to grow embryonic stem cells under laboratory culture conditions. If maintained appropriately, embryonic stem cells can be incubated for months without differentiating. When necessary, scientists can differentiate embryonic stem cells into a specific cell type by changing the culture conditions and culture medium compositions. The differentiated cells can then be used for research or disease treatment.

In adult organisms, stem cells coexist with differentiated cells in various tissues and or-

gans, such as brain, bone marrow, peripheral blood, skeletal muscle, skin, teeth, and the heart. Fetal, cord blood, and placenta-originated stem cells are also considered adult stem cells. The primary function of adult stem cells is to maintain and repair their surrounding tissues. Compared with embryonic stem cells, adult stem cells have lower versatility and regenerative ability, and many of them can only give rise to limited cell types. In addition, culturing and manipulating adult stem cells under laboratory conditions are generally inefficient, despite some reported successful cases. Because adult stem cells are difficult to isolate and reproduce in large quantities, their therapeutic utility is limited. Currently, the only type of adult stem cells regularly used for disease treatment are blood stem cells isolated from bone marrow.

The discovery in 2006 of the four crucial genes that govern the pluripotency and regenerative ability of stem cells may represent the most remarkable breakthrough in the history of stem cell research. Engineered ex-

Given their unique regenerative abilities, stem cells have remarkable potential for scientific research

pression of these four genes can reprogram differentiated cells into an undifferentiated state with self-renewal ability, leading to the development of cells. Induced pluripotent stem cells can grow and expand relatively efficiently under appropriate culture conditions and potentially represent an unlimited source of stem cells for research or therapeutic purposes. Interestingly, because iPS cells may carry post-transcription genetic modifications that cannot be reversed during reprogramming, they often exhibit increased differentiation toward the same or similar cell type of their origin, known as epigenetic memory. For example, pancreatic beta-cell-derived iPS cells have a tendency to develop into insulin-secretion cells during culture. Therefore, when choosing the source cells for generating iPS cells, scientists need to carefully balance the abundance and the epigenetic memory of the source cells so that large quantities of desired cell types can be obtained efficiently after differentiation.

Currently, the most widely used stem cell therapy is bone marrow transplantation for treating leukemia and lymphoma. Numerous investigational trials are underway to test the feasibility of stem cell therapy using in vitro cultured and differentiated cells. Many diseases tested for stem cell therapy—such as neurodegenerative diseases, congestive heart failure, multiple sclerosis, macular degeneration, and diabetes—involve the loss of function in specific types of cells. Replacing the defective cells with functional cells derived from embryonic or iPS cells may provide a cure for these diseases. However, there are several major challenges that prevent regular use of stem cell therapy in clinical practice. These challenges include low or unpredictable cell integration after transplantation, patient immunological rejection of the transplanted cells, and the tumor-causing potential of the stem cells.

Ongoing research is directed toward overcoming these limitations. Overall, stem cell therapy represents a very promising approach to treating many diseases and improving human health.

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# A Chance to Bond and to Help Others

For more than 50 years, National Charity League, Inc. (NCL), a 501(c)(3) non-profit, has thrived as one of the nation's most distinctive and well-respected mother-daughter membership organizations. Today, NCL has more than 196 chapters with more than 55,000 actively engaged members—women and their daughters in grades 7 through 12—in 23 states. Its mission is to foster mother-daughter relationships in a philanthropic organization committed to community service, leadership development, and cultural experiences.

In May 2014, the Valley Forge Chapter of NCL was formed, creating the first chapter in Pennsylvania. My daughter Reilly and I became founding members. Our chapter initially partnered with four local charities: Cradles to Crayons, Manna on Main, Meadowood Senior Living, and Special Olympics. Coming into our second year, we've added Gift of Life Family House, Lower Providence Library, Perkiomen Watershed Conservancy, and Operation Gratitude & Operation Homefront (US Troops and their families).



**AlphaBioCom Finance Manager Denise Smith and her daughter Reilly participate in an event to support Cradles to Crayons as part of their involvement with the mother-daughter National Charity League, Inc.**

Our experience has been wonderful. At Cradles to Crayons, we cleaned and organized shoes, books, and clothing and filled new backpacks for children in need. For Manna on Main, we sponsored a food drive, supported a 5k run, and helped in the soup kitchen. At Meadowood, we provided blankets and holiday cards and also assisted the seniors in making holiday ornaments.

Most recently, we supported the athletes at Special Olympics Villanova Fall Fest on Nov. 7. We helped with the long track, where most athletes competed in 2 of 4 races. The 3000-meter course ran through the hilly Villanova campus. The focus and drive of these athletes to finish is amazing. And of course, their excitement is contagious. We had a blast celebrating the end of the day with a fun dance party in the Quad with the athletes. Special Olympics is truly one of our favorite times.

NCL has provided us with many opportunities to help those in our community. Each month, we can't wait to select a few dates and charities when we can give back. Every aspect of volunteering has been rewarding. However, for me, there is an added bonus of doing these activities with my daughter. Reilly has learned how amazing people are when you give them just a moment of your time. I hope she takes these moments with her as she grows into an adult. And of course, these moments are ones I'll keep with me forever.

## MEET THE STAFF

**Brian Catton, PharmD, Scientific Communications Manager**



As a Scientific Communications Manager, Brian works with the scientific lead and assists with the development of abstracts, posters, slide decks, and both primary data and review manuscripts.

Brian earned his PharmD at Shenandoah University in Winchester, VA. He is a member of the Pennsylvania Pharmacists Association as well as the New Jersey Pharmacists Association. He has delivered continuing education presentations with both state pharmacy organizations, and he was named the recipient of the 2014 Pharmacists Mutual Distinguished Young Pharmacists Award with the New Jersey Pharmacists Association. He publishes monthly for the Pediatric Pulse section in *Pharmacy Times*.

He has worked as a Clinical Pharmacist at Home Infusion Solutions, LLC, and as a Pharmacist at Weis Markets, and Enclara Pharmacia.

Brian joined the team at AlphaBioCom in August 2015.

**Veronica Casina, PhD, Account Manager**



As an Account Manager, Veronica is responsible for managing projects, running both internal and external meetings, and assisting the scientific staff when needed.

Veronica received a Bachelor of Science degree in Biochemistry from the University of Delaware in 2006, then received her PhD in Biochemistry from Wake Forest University in 2011.

The numerous awards she has received include a T32 NIH Hemostasis and Thrombosis Training Grant (2012), the American Society of Hematology Abstract Achievement Award (2013), and the GlaxoSmithKline Fellowship at Wake Forest University (2006). She held a Postdoctoral Fellowship at the Children's Hospital of Philadelphia, where her research focused on hematopathology, and spent more than a year as a Research Scientist at QPS, LLC doing pharmacokinetic and anti-drug antibody analysis.

Veronica joined AlphaBioCom in July 2015.



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