STEM CELL GROWTH FACTORS ARE THE REAL MIRACLE!

David A. Steenblock, M.S., D.O.
Personalized Regenerative Medicine™
Mission Viejo, California

26381 Crown Valley Pkwy, St. 130, Mission Viejo, Calif, USA; 800-300-1063
Stem cells are the first cells of the embryo that build new life.

Stem cells continue to help with growth and tissue repair as we age, and slowing after 40 years of age.

Stem cells divide to create more stem cells so theoretically, the body can theoretically repair itself for as long as we live.
Hematopoietic Stem Cells

- Hematopoietic stem cells (called CD34+) are traditionally known to be heme or blood related stem cells.
- They can divide into red blood cells that carry oxygen in the blood, white blood cells that provide immune defense and platelets that can clot together to reduce blood loss.
Hematopoietic Stem Cells

- Red Blood Cells
  - Marrow
- White Blood Cells
  - Lymphocyte
  - Monocyte
  - Eosinophil
  - Basophil
  - Neutrophil
- Platelets
Mesenchymal Stem Cells

- Considered the “structure forming” stem cells.
- They produce bone cells, fat cells, tendons, ligaments and muscle cells and the extracellular matrix that supports the neurons and other cells.
Mesenchymal Stem Cells

- More recently, they have been able to produce liver cells, pancreatic cells, heart cells, kidney cells and neuron-like cells.
- They suppress immune function and are beneficial for auto-immune conditions (due to elevated prostaglandin E2 that reduce pro-inflammatory factors).
Mesenchymal Stem Cells
Both the bone marrow of adults and the umbilical cord blood of newborn babies have very primitive cells that can easily divide into neurons and retinal (eye) cells.

This primitive subset of the hematopoietic stem cell is called the CD 133+ primitive cell.

This primitive cell works provides treatment benefits for neurological and vascular conditions.
Umbilical Cord Derived Stem Cells

- Human umbilical cord derived stem cells include hematopoietic stem cells, mesenchymal stem cells, C133+ neural progenitor cells, and embryonic-like stem cells. These cells are neuroprotective and can survive and often thrive in the ischemic brain.

Stem Cells and their Growth Factors
Treatable Conditions

- Osteoarthritis (DJD)
- Acute & chronic heart disease, heart attack
- Cerebral palsy
- Sports injuries
- Cartilage repair
- Spinal disc disorders
- GI disorders
- Kidney disorders

- Diabetes I and II
- Eye disorders
- Autoimmune diseases
- Multiple sclerosis
- ALS
- Parkinson’s disease
- Dementia
- Huntington’s disease
- Other Genetic Disorders
Stem Cell Growth Factors

- Autologous (self) bone marrow procedures at our clinic use the patient’s own bone marrow stem cells.

- Both the hematopoietic and mesenchymal stem cells as well as any primitive progenitors and very small embryonic-like cells are extracted from the bone marrow and are then immediately given back to the patient by infusion.
Stem cells are able to migrate, secrete trophic factors, promote neuroprotection and modulate the immune response.

Stem Cell Growth Factors

- Stem cells create cell repair and replacement through the growth factors that they produce.
Cultured bone marrow derived mesenchymal stem cells and neural progenitors express nerve growth factor (NGF), brain-derived neurotrophic factor (BDNF), glial cell line-derived neurotrophic factor (GDNF) and ciliary neurotrophic factor (CNTF).

Neural Growth Factor

Nerve Growth Factor
Neural Growth Factor

- Nerve growth factor is important for the growth, maintenance, and survival of certain neurons. It also functions as a signaling molecule.

- NGF is critical for the survival and maintenance of sympathetic and sensory neurons. Without it, these neurons undergo apoptosis or programmed cell death. Nerve growth factor also promotes axonal growth.
Brain-derived neurotrophic factor (BDNF) also supports neuronal survival and promotes neurogenesis and synaptic function. BDNF also promotes long-term memory.
Glial-derived Neurotrophic Factor

- Glial-derived neurotrophic factor promotes the survival and differentiation of dopaminergic neurons and prevents apoptosis in motor neurons. It also assists with kidney development.
Ciliary Neurotrophic Factor

Ciliary neurotrophic factor promotes neurotransmitter synthesis and neurite outgrowth. It also assists with neural and oligodendrocyte survival.
Vascular Endothelial Growth Factor

- The stem cells also produce vascular endothelial growth factor that creates new blood vessels in fetal development, hypoxia, tissue damage, and exercise.
Additional Growth Factors

- **Adrenomelullin (AM)**
  Increases the tolerance of cells to oxidative stress and hypoxic injury and angiogenesis.

- **Angiopoietin (Ang)**
  Promote angiogenesis, the formation of blood vessels from pre-existing blood vessels.
Additional Growth Factors

- **Bone morphogenetic proteins (BMPs)**
  Induce the formation of bone and cartilage and orchestrate tissue architecture throughout the body, including the development of the heart, CNS, cartilage and post-natal bone structure.
Additional Growth Factors

- **Epidermal Growth Factor (EGF)**
  Stimulates cell growth, proliferation, differentiation and survival.

- **Fibroblast growth factor (FGF)**
  Involved in angiogenesis, wound healing and embryonic development.
Additional Growth Factors

- **Hepatocyte growth factor (HGH)**
  Has a major role in embryonic organ development, in adult organ regeneration and in wound healing.
  HGH regulates cell growth, cell motility and morphogenesis.
Platelet-derived growth factor (PDGF)
Regulates cell growth and division in the vascular system and promotes blood vessel formation.

Placental growth factor (P1GF)
During embryogenesis, P1GF promotes angiogenesis and vasculogenesis.
Additional Growth Factors

- Interleukin 1 – activates T cells.
- Interleukin 2 – T-cell growth factor, stimulates IL-1 and activates B-cells and natural killer cells.
- Interleukin 3 – stimulates non-lymphoid cells.
- Interleukin 4 – Activates B & T cells and mast cells.
Additional Growth Factors

- Interleukin 5 – Differentiates activated B cells and eosinophils.
- Interleukin 6 – Stimulates Ig synthesis. Growth factor for plasma cells.
- Interleukin 7 – Growth factor for pre-B cells.
Alternatives in Growth Factor Production?
Alternatives in Growth Factors

- There has been a shortage of human organs for transplantation. In 2011, over 111,000 Americans were on the waiting list for organ transplants.

- An alternative that is gaining credibility is the use organs and growth factors from animals. This is called xenotransplantation.
According to the World Health Organization, xenotransplantation, animal to human, is defined as “living cells, tissues or organs of animal origin and human body fluids, cells, tissues or organs that have ex vivo with these living, xenogeneic materials.”

(http://www.who.int/transplantation/xeno/en)
The History of Xenografts

- The Papyrus of Ebers (1500 B.C.), the writings of Aristotle (384-322 B.C.) and Pliny the Elder (A.D. 23-79), all contained many preparations made from human and animal organs to treat diseases.
The History of Xenografts

- 2400 years ago Hippocrates (460-370 BC) advocated that animal skin be used to cover human ulcers and burns.

- Hippocrates also put forth the idea that a diseased organ could be treated by giving the patient fresh, healthy tissue of the same type.
The History of Xenografts

- 1762 - Dr. Hunter in England, and in 1849, Dr. von Berthold in Germany, implanted testes in castrated roosters and demonstrated positive responses.

- In 1889 Dr. Brown-Sequard injected himself with testicular extract from guinea pigs and was “tremendously rejuvenated”.
The History of Xenografts

- June 13, 1920 – Dr. Serge Voronoff did an ape to human- testicular implant.
- January 1928 – One thousand Surgeons participating in a medical conference held in Austria agreed that “The gland transplantation operation devised by Dr. Serge Voronoff afforded transient regeneration.”
The History of Xenografts

- 1920-1930s
  Dr. Paul Niehans
  “The Father of Cell Therapy” and xenotransplantation.
The History of Xenografts

Type of operating room used by Dr Niehans to transplant organ tissues from fetal sheep obtained via “C” Section to adjacent patients.
In 1964, Dr. Reemtsma transplanted a kidney from a chimpanzee into a patient with end-stage renal disease. The operation extended the patient’s life for nine months.

Alternatives in Growth Factors

THE VERTEBRATE BODY

<table>
<thead>
<tr>
<th>FERTILIZED EGG</th>
<th>LATE CLEAVAGE</th>
<th>BODY SEGMENTS</th>
<th>LIMB BUD STAGE</th>
<th>LARVA/FETUS</th>
<th>ADULT/OFFSPRING</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUMAN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MONKEY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHICKEN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SALAMANDER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Alternatives in Growth Factors

Rabbit pancreas

Human pancreas
In 1995, researchers showed that hematopoietic-promoting factor and stem cell factor from the porcine kidney were able to proliferate mouse hematopoietic progenitor cells, granulocyte-macrophage colony-forming units, and erythropoietic burst-forming units.

Alternatives in Growth Factors

- Research on animal organs and growth factors has predominantly involved the pig, sheep and rabbit.
- There are a number of barriers that include (1) immunological rejection, (2) physiological incompatibilities, and (3) the transmission of microorganisms.
In collaboration with the International Xenotransplantation Association, the University Hospital Geneva and the World Health Organization, an international inventory has been established to collect basic data on xenotransplantation procedures in humans. (http://www.humanxenotransplant.org)
The International Inventory has found 29 human applications of xenotransplantation, including islets of Langerhans, kidney cells, chromaffin cells, embryonic stem cells, fetal and adult cells from various organs or the use of extracorporeal perfusion from hepatocytes, the liver, spleen or kidney.

Porcine Research
Alternatives in Growth Factors

- With organs and growth factors from other humans as well as from animals, there is the challenge of bacteria, fungi, parasites and viruses.
- Pig-human transplants can infect humans with porcine endogenous retroviruses (PERVs)
- Because PERVs are found in the DNA of pigs, they cannot be eliminated from all xenotransplants.
Alternatives in Growth Factors

Overcoming these infection barriers includes:

- Selection of PERV-C free low-producer animals.
- Vaccination against PERV’s
- Transgenic pigs with PERV expression inhibited by RNA interference
Alternatives in Growth Factors

- The use of antiretrovirals and PERV Knockout animals.

Pancreatic islet isolation and purification was conducted on adult male inbred Wuzhishan pigs and compared with age- and sex matched control pigs obtained from a local slaughterhouse.

The anatomical structure of the Wuzhishan pig pancreas was more similar to the human pancreas than were the controls.
Isolated islets from Wuzhishan pigs were viable. They responded to glucose challenge in vitro and induced normoglycemia for 3 to 5 days in diabetic rats after intraportal transplantation.
The authors suggest that the Wuzhishan miniature pig pancreas may be a feasible source of islets for xenotransplantation.

Alternatives in Growth Factors

Porcine neonatal islets of Langerhans with porcine Sertoli cells were administered to 12 children with type 1 diabetes (insulin-dependent) without immunosuppression.
Alternatives in Growth Factors

The authors reported a significant reduction in exogenous insulin requirements during the 4 year follow-up among six patients, two of whom became temporarily insulin-independent.

With the genetic modification of pigs, cell transplant studies such as those of pancreatic islets are leading to more hopeful results. The range of possibilities offered by this technology will be unlimited, making it possible for xenotransplantation to be a clinical reality soon.

Alternatives in Growth Factors

- With sheep, the Center for Living Cell Therapy in Lenggries, Germany was started by Dr. Siegfried Block who had worked with Dr. Hans Niehans.

- The Center raises 700 sheep in the high mountains, away from damaging environmental effects.
Alternatives in Growth Factors

- 85 different fetal or neonatal organs are available for live sheep cells that are used to treat specific health functions.
- The clinic offers cells to treat aging, impotence, Down’s syndrome, AIDS and many other conditions.
- [http://www.frischzellen-kur.de](http://www.frischzellen-kur.de)

In Russia, the use of rabbit newborn pancreatic grafts with kidney showed a survival rate of 75% in 26 type 1 (insulin-dependent) diabetic children. The results included insulin stabilization, reductions in glycoslyated hemoglobin, reduced exogenous insulin and a small increase in serum C-peptide.
Alternatives in Growth Factors

- In diabetic nephropathy children, there was also a decrease in albuminuria from about 220 to 60 mg/day.

(http://nikrrom.chat/ru/list1_en.htm)

Alternatives in Growth Factors

- As stem cell research has expanded, there have been organizations that promote rabbit fetal precursor stem cells (BCRO: Bio-Cellular Research Organization in Russia and Eco-Ultrafiltrates in Europe).
Alternatives in Growth Factors

- The BCRO website states that there have been no rabbit transmittals of any viral diseases, retroviruses or prions to humans.

(http://www.eco-ultrafiltrates.com/)
Alternatives in Growth Factors

- Rabbit progenitor cells have been used in clinical studies around the world for diabetes, immune deficiency disorders, neurological degeneration, cardiovascular disease, and genetic disorders in children.
Alternatives in Growth Factors

- Article on rabbit progenitor cells and the diabetic retina:

Alternatives in Growth Factors

- The rabbit fetal progenitor cells have also been given 3 times a year to children with Down’s Syndrome.
From Dr. Molnar’s article:

Alternatives in Growth Factors

- FCTI (Eco-ultrafilterates from Europe) is using ultrafiltration and nanotechnology to create rabbit derived progenitor cells and growth factors without the proteins.

- Do these products actually promote regeneration?
Alternatives in Growth Factors

- The ready-to-use Eco-ultrafiltrates contain components up to a nominal molecular weight of 10 kDa – about 1/9th of the smallest virus known at this time.

- The first ultra-filtrate for the skin and the mucosa was from a histological study by Dr. F. Leyh in 1981. Since then, the FCTI company was formed and more products have been created.
Alternatives in Growth Factors

- Eco-ultrafiltrates have a variety of stem cell products that support the skin, mesenchyme, placenta, male and female revitalization, thymus, immune, kidney, liver, adrenal cortex, adrenal medulla, prostate, pituitary, pancreas, bone, cartilage and synovia, lungs, blood, spinal cord, heart, eye, colon, transfer factor, thyroid, etc.
Alternatives in Growth Factors

- Xenotransplantation businesses are expanding throughout the world.
- Before we use xenograft growth factors with our patients, more research will be needed to determine the safety and effectiveness of these products.
Our Treatment Program
Treatments

- Our clinic offers autologous (donor and host are the same person) bone marrow stem cell therapies with the person’s own growth factors.
- If patients are in their 70’s and 80’s, several bone marrow treatments may be necessary to revitalize their stem cells and growth factors.
Treatments
Treatments

After the transfusion, the stem cells circulate throughout the body to repair or replace damaged and aging cells.
Support for the Stem Cells

- The stem cell treatments can benefit a variety of hard-to-treat conditions.

- The elimination of toxins, infections and other problems before, during and after stem cell treatments (including checking for sleep apnea),

- The use of hormones, growth factors and additional therapies enhance the results.
Support for the Stem Cells

- Each case is different and some may take more time to prepare for the procedure to achieve optimum results.
- The combination of stem cell/progenitor cell therapies with electromagnetic therapy provides increased improvement for a longer time.
Together, we can make a difference.
For Further Information

Check out our websites and sign up for our newsletter at:

- http://www.stemcellmd.org
- http://www.stemcelltherapies.org

My clinic toll free number is 800-300-1063