3 Signs the Future of Medicine is Already Here

By Edgar A. Suter M.D.

Introduction

From conception to old age, all the processes of our bodies are performed and regulated by innumerable cells and chemical messengers. No longer a far-fetched dream, long, happy, and pain-free lives are within our reach.
Diseases thought unconquerable, even aging, are being conquered. Injuries thought to be irreparable or reparable only by surgery are now repaired with simple injections.
Happy to say, medicine has advanced.
For some of us—just in time!

Stem cells, exosomes, and peptides, alone or in combination, are being used to treat an array of disease and injury.
See Table 1.

Table 1.

erectile dysfunction
diabetes
depression
Crohn's Disease
Multiple Sclerosis
Parkinsonism
obesity
degenerative arthritis
inflammatory arthritis
Alzheimer's Disease
autism
heart conditions
kidney disease
neuropathy
brain and spine injuries
stroke
asthma
emphysema
torn tendons
damaged cartilage
hair restoration
cosmetic treatments
impaired exercise tolerance
bone density

Some are surprised that we use stem cells, exosomes, and peptides to treat genetic diseases. Stem cells, exosomes, and peptides do not change our genes, but instead exert beneficial "epigenetic" (non-genetic) influence on the genetically-disordered metabolic pathways. In other words, stem cells and exosomes do not fix the abnormal genes, but can chemically overcome the damaging abnormal metabolism. Such metabolic benefits include slowing, stopping, or even reversing the course of the genetic disease, reducing or eliminating our patients' symptoms, thereby improving your functionality and quality of life. The tools of regenerative medicine are here now: **stem cells, exosomes, and peptides.** Here is what they are and how we use them.

Stem Cells

Stem cells are the embryonic and placental cells that mature into the magnificently complex and different cells, tissues, and organs of our bodies. Stem cells are a starting point, a basic building block of what makes us. Stem cells persist in us for our entire lives and are the basis for repair of acute and chronic injuries, but, older stem cells lose their vigor, lose their abilities to become as many types of cells, and secrete only about a hundred chemical messengers. Younger stem cells are vigorous, "pluripotent" (able to become almost any type of human cell), and actively secrete quadruple the number of activating and healing chemicals as old stem cells.

We are rapidly unravelling the mysteries of the chemical pathways and metabolic messengers that instruct, stimulate, and invigorate stem cells to differentiate, regenerate, and repair any and every type of cell in our bodies. Because they are immature cells, stem cells do not provoke a transplant rejection response. You may safely receive another person's donor stem cells without risking "graft versus host" rejection.

How do stem cells work?

Stem cells use three broad strategies: (1) they generate **new cells** needed for growth and repair, (2) they secrete hundreds of important **chemical messengers**, and (3) they **recruit, activate, and invigorate** your own old and tired stem cells to join in growth and healing with new vigor.

Stem cells become and stimulate production of new cells. For example, research shows that stem cell injections cause new cartilage cells to form in damaged joints. In some cases, stem cell healing of "bone-on-bone" allows patients to avoid joint replacement surgery. Similar benefit is observed in a variety of orthopedic, brain and spine injuries and disorders.

Stem cells release hundreds of chemical messengers that include potent growth factors, anti-inflammatory chemicals, peptides, immune-modulators, cytokines (small protein messengers), and RNA (the "ribonucleic acid" that regulates the protein synthesis).

These chemicals stimulate repair, growth of new cells, calm damaging inflammatory and immune processes, and are necessary for life itself.

Stem cells activate and recruit other stem cells to join in the healing processes. Loosely speaking, the donation of young stem cells becomes a "fountain of youth" for our old and worn-out adult stem cells. Stem cells can be harvested from our adult tissues, but these adult stem cells are not our best choice.

Why Choose Placental Stem Cells?

Adult stem cells are most commonly harvested from bone marrow and abdominal fat, but the additional surgical procedure adds cost, time, and pain. Bone marrow aspiration of stem cells requires sucking bone marrow through a needle driven into the bone marrow of the breast bone or hip. Surgery, abdominal liposuction, can be used to harvest adipose stem cells from our belly fat, but again adding cost, time, and pain. Besides, adipose and marrow stem cells are weak and few in number.

Our best choice is **placental stem cells!**

After decades of research and clinical trials, consensus finds that placental stem cells are the most effective stem cells available to us now. Don't get confused by the medical jargon and abbreviations. Placental stem cells are harvested from the richest and most-ethical sources of vigorous pluripotent stem cells, placentas obtained at scheduled C-sections of carefully-screened mothers. In the past these placentas would have been discarded, so there is no ethical dilemma in putting these rich tissues to good use.

How do we use these precious cells?

We have many delivery options: aerosol (nebulized), misting (spray), intravenous (vein injection), intra-articular (joint injection), local injections (for example, into tendon tears or arthritic spinal facets), intra-penile (the "P shot"), intra-vaginal (the "O shot"), micro-needling (tiny needling of the superficial skin, usually for cosmetic and hair restoration therapy), and intra-thecal (spinal tap injection, typically for neurodegenerative disorders like Parkinsonism, ALS, and Multiple Sclerosis).

For some lung problems, doctors use nebulized stem cells. Sometimes, especially for systemic disorders (for example, lupus, diabetes, rheumatoid arthritis), an intravenous route is preferred. In my own case, a 1ml intravenous injection of stem cells almost entirely eliminated my asthma overnight and I have remained virtually asthma-free for months.
For tendon and cartilage tears and for "bone-on-bone" arthritis, we will usually do a small injection of stem cells into the joint fluid or at injured tendon. For regions with complex anatomy, as with hip and spinal facet injections, we often use ultrasound imaging to guide delivery of the stem cells.

For younger autism patients, patients may select nasal misting of the stem cells because stem cells can migrate through the nasal mucosa and cribriform plate (the home of our smell receptors) to then percolate in the fluid that bathes the brain and spinal cord.

For cosmetic procedures like hair restoration and facials, we do micro-needling with stem cell injections. Euro-threading face lifts can be supplemented by first bathing the slowly dissolving threads in stem cells.

For erectile dysfunction we usually rely upon a pair of tiny and relatively painless injections into the base of the penis.

For life-threatening neurodegenerative disorders (for example, Multiple Sclerosis, Parkinsonism, Alzheimer's, Lou Gehrig's Disease) or traumatic brain and spine injuries, we do a "spinal tap" technique, intra-thecal delivery of stem cells into the fluid that bathes the spinal cord and brain.

Expectedly, the dose and delivery are jointly planned with the patient through careful consultation, examination, and review of medical records and the best available research and clinical trials. Stem cell therapy has been used with success for decades, but, like every aspect of medicine, treatment improves day by day. Reassuringly, the FDA recently stated that stem cell treatments are generally safe. Some conditions or ongoing treatments, such as cancer and chemotherapy, disallow stem cell treatment. Chemotherapy agents are toxic not only to cancer cells, but also to stem cells. We are also cautious because we do not want to "feed" a cancer with growth factors. After a cancer is proven cured, generally 5 years cancer-free, we may consider stem cell therapy for other conditions.

Some people have sought foreign treatment because of the availability outside the USA of "colony expansion," growing stem cells in laboratory conditions in order to increase and concentrate the number of stem cells. Such medical tourism is no longer necessary because the FDA has approved certain tissue banks to make placental stem cells and exosomes available. The same conditions we are treating with millions of placental stem cells can now also be supplemented with billions of exosomes. What are these **exosomes**?

How do exosomes work?

Like stem cells, exosomes work primarily by the hundreds of beneficial chemical messengers. Because of the huge variety of chemicals within exosomes, the benefits of stem cell and exosome treatment are both immediate and long-lasting. Some chemicals, like the anti-inflammatories, work immediately. Other chemicals ramp-up production of certain beneficial proteins that begins within a few weeks and often lasting several months, beneficial effects lasting well after the dosed cells or exosomes are gone.

The chemical messengers work by an immense variety of metabolic processes and pathways. Consider Table 2. a sample of some of the key factors in placental stem cells.

Table 2.
BMP5 stimulates bone growth
GDF15 regulates inflammation, apoptosis (programmed cell death), cell repair, growth
OPG stimulates bone growth
G-CSF stimulates the bone marrow to produce more stem cells and granulocytes (certain white blood cells that fight infection)
SCF necessary for stem cell growth
TGFß3 an anti-inflammatory protein that converts Inflammatory T-cells into anti-inflammatory Regulatory T-cells
VEGF stimulates formation of new blood vessels
VEGFR-2 receptor for VEGF
ICAM-1 blocks inflammatory binding sites on white blood cells
IL-1RA blocks the inflammatory cytokine IL-1
IL-6 activates macrophages to remove damaging debris
IL-10 the cytokine that signals conversion of inflammatory to anti-inflammatory T-cells
MCP-1 attracts mononuclear cells to the repair site
MIP-1 attracts mononuclear cells to the repair site
PDGF-BB stimulates growth in healing tissues
TIMP1 blocks degradation of healing cartilage
TIMP2 blocks degradation of healing cartilage
HGF essential in wound healing and organ regeneration
GDNF promotes survival of nerve cells
BDNF promotes survival of nerve cells
FGF potent growth factor
TNFR1 inactivates TNFα, an inflammatory cytokine
TNFR2 inactivates TNFα, an inflammatory cytokine
Histone Deacetylation mRNA codes for histones (proteins that uncoil DNA allowing better gene transcription)
GDF11 researched as an anti-aging factor
GDF15 regulates inflammatory pathways, apoptosis, cell repair, and cell growth
IGFBP1-6 bind, protect, and transport IGF-1 and IGF-2 growth factors
OPG one of the Tumor Necrosis Factor receptors
TGF-ß1 control of cell growth, cell proliferation, cell differentiation, and apoptosis
BMP4 involved in bone, cartilage, and muscle development and fracture repair
BMP7 helps mesenchymal cells become bone and cartilage
microRNA regulates gene expression

How do we use exosomes?

Exosomes can be used alone or in combination with stem cells and even scaffolding like platelet-rich plasma and Wharton's Jelly (the goo inside the umbilical cord). Exosomes are delivered by the same routes as for stem cells.

Peptides

Proteins are long, folded chains of amino acids. Peptides are chains of amino acids that are much shorter than proteins. Some of our natural hormones and chemical messengers are peptides. The amino acid sequence of our natural peptides can be altered to improve the potency or duration of the peptide's effect.

How do peptides work?

Stem cells and exosomes work through the complex interactions of hundreds of chemical messengers. Peptides are single chemical messengers with one or more specific functions. As research continues on the complex interactions of our bodies' chemical messengers, peptides are increasingly being used to treat an impressive variety of medical and aging problems. Instead of using the full array of stem cells, exosomes, and hundreds of chemical messengers, some conditions, especially if mild, lend themselves to relatively inexpensive targeted therapy with single agents, peptides.

How do we use peptides?

Some peptides may be used topically—an example is thymosin ß4 that is applied to the scalp for hair restoration. Some peptides may be used orally—an example is BPC-157 that is taken for wound healing, ulcer therapy, and Crohn's Disease. Other peptides are injected superficially into the skin on the abdominal wall, much like an insulin shot—examples are Bremalanotide-PT141 for erectile dysfunction and ipamorelin/CJC1295, a peptide blend that mimics Growth Hormone Releasing Hormone (GHRH). Such GHRH peptides promote the anabolic effect helpful in recovering from athletic injuries and improving exercise tolerance. The GHRH peptides stimulate and prolong the natural release of Human Growth Hormone (HGH).

Other peptides help weight loss, increase libido in men and women, improve sleep quality, tanning, and many other conditions. Peptides therapy is relatively inexpensive, since peptide cycles typically cost a few hundred dollars. Stem cell and exosome treatments are more expensive, but usually in the neighborhood of a few thousand dollars out-of-pocket.

Serendipity

Mention of Bremalanotide-PT141 brings to mind an anecdote about its serendipitous discovery. Our natural tanning hormone secreted by the pineal gland, the peptide MSH (Melanocyte Stimulating Hormone), was being studied to develop Melanotan II, a tanning agent that did not require sunlight (ultraviolet) exposure. One of the researchers injected himself with a double-dose of the Melanotan II and developed a spontaneous and long-lasting erection. Serendipity.

Further study on Melanotan II led researchers to develop Bremalanotide-PT141, a very effective treatment for erectile and female sexual dysfunction. Importantly, many men who fail Viagra-like drugs, do respond to Bremalanotide-PT141. In refractory cases, cases that do not respond to the first and second-line therapies, we do "the P shot," a relatively painless—Easy for me to say, right? —injection of stem cells or exosomes into the penis.

The Future is Already Here

We all age and suffer from illness and injury. Although this is a normal part of life, we should be pro-active. We have ways to minimize the impact of aging, illness and injury.

We can do more than diet, exercise, pills, and surgery. Our most wise patients act even before disease and symptoms are manifest.

That is why my regenerative medicine colleagues and I have developed a special passion and respect for these leading-edge therapies to help our patients stay active and healthy throughout their lives. Stem cells, exosomes, and peptides are often, but not always, effective for a wide range of medical conditions. Nobody can guarantee significant benefit to each and every patient. Some patients get no benefit at all, but many patients have had, as in my own case, dramatic improvement.

Many clinical trials are underway and we can expect refinement of stem cell, exosome, and peptides treatment protocols, but the future is already here.

About the Author

Dr. Edgar Suter completed his undergraduate education at Santa Clara University in Santa Clara, California. He then went on to obtain his Doctor of Medicine degree from the University of California School of Medicine in Davis, California and the Creighton University School of Medicine in Omaha, Nebraska. Dr. Suter also studied at the UCLA's Brain Research Institute where he focused on neurological disorders.

Dr. Suter has an exceptional level of knowledge and expertise in the fields of Nuclear Medicine, Primary Care, Emergency Medicine, Radiology and Neuroscience. He is board certified as a Specialist in all aspects of Clinical and Laboratory Nuclear Medicine.

With over 35 years of experience in practicing medicine, Dr. Suter is one of the most qualified and well-rounded physicians providing regenerative medicine treatments. He is passionate about bringing leading edge technology, advanced treatments options and minimally invasive therapies to his patients. Instead of simply addressing the symptoms, Dr. Suter's approach to treatment is focused on uncovering the underlying cause of illness and using the latest developments and research in medical science to help restore the natural functioning of human body.

As a specialist in Nuclear Medicine, a field that is focused on studying molecular activity to diagnose and treat disease, Dr. Suter has in depth understanding of how the functioning of human body at the cellular level impacts a patient's overall health. His extensive experience in diagnostics of major illnesses coupled with his deep knowledge and understanding of the field of Regenerative Medicine, makes him an ideal physician for patients dealing with complex health conditions such as MS, Parkinson's, Alzheimer's, Osteoarthritis, ALS and other autoimmune disorders.

Dr. Edgar Suter practices Regenerative Medicine with his colleagues at Vibrant Health Care in Scottsdale.

Phone: (480) 874-5806
Email: info@VibrantHealthCare.org