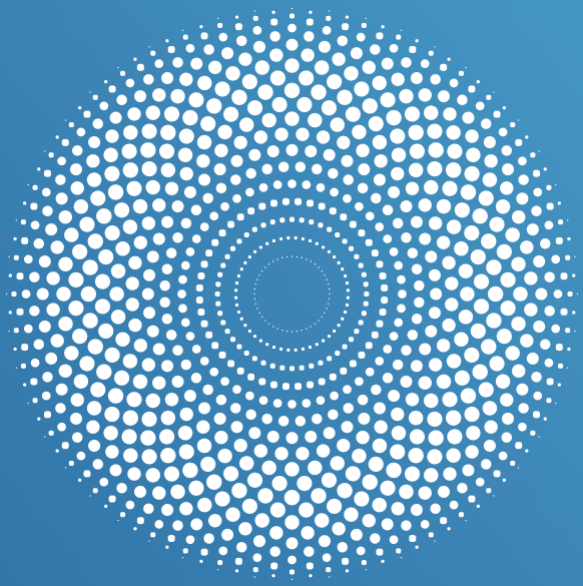
LIFEWAVE®

THE STORY OF THE X39™



LIFEWAVE

X39™

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ACTIVATE YOUR STEM CELLS!

Inside these pages you will learn about the most dramatic anti-aging and rejuvenation product of our time. Benefits can be immediate. Unlike most products, LifeWave X39™ goes to work the minute you apply it.

SUPPORTS WOUND HEALING

Some of our most dramatic testimonials on the X39 have been in the area of wound healing. Wound healing is, of course, a natural process and requires the presence of stem cells. However, as we age our stem cells become less effective. Now, with X39, you can activate your stem cells and provide support for your body's natural healing process.

RAPID PAIN RELIEF

X39 users can experience dramatic reductions in pain. In fact, most people experience a reduction in the sensation of pain and inflammation within minutes of application.

GREATER ENERGY

Clinical studies performed by LifeWave show that the X39 patch improved a person's energy levels. When compared to the baseline there is an improvement in overall energy of the body, organ balance, and L/R symmetry distribution of energy.

SLEEP BENEFITS

Clinical studies performed by LifeWave show that X39 improves the quality of sleep by altering levels of GABA, an important neurotransmitter in the brain. The benefit is a natural improvement in the quality and duration of sleep.

IMPROVED SKIN APPEARANCE

Would you like to not only feel younger but look younger as well? Now you can, with X39. An important part of activating stem cells is increasing the production of collagen. The result is that only a few weeks after applying X39 your skin will start to experience a significant reduction in the appearance of lines and wrinkles.

DRAMATIC ANTI-AGING

Initial clinical work performed by Dr. Loren Pickart showed that when GHK-Cu is elevated in the body, cells essentially are restored to a younger state and begin behaving like younger, healthier cells.

FASTER RECOVERY FROM EXERCISE

Users of X39 report significant improvements in their sports performance and recovery. Since stem cells are designed to repair damaged cells, this is not surprising.

REDUCED INFLAMMATION

Many users of X39 report that after several weeks of using the product, they notice a reduction in the appearance of scars. This is a well-known attribute of elevating copper peptides known as remodeling.

Most of us would like to have the best anti-aging strategies and products possible, and now you can with X39. Elevating GHK-Cu is a proven method to reset thousands of genes back to a younger, healthier state. The result is an unparalleled level of health and vitality.

READ ON AND TAKE THE X39 JOURNEY AHEAD!

INTRODUCTION

Imagine a product that can activate your stem cells, resetting them to a younger, healthier state. This would represent a whole new level of vitality with improvements to your energy, sleep, reduction in pain, reduction in the appearance of lines and wrinkles and support of faster wound healing, just to name a few of the benefits.

Introducing the LifeWave X39 patch: The first product ever that is designed to activate your body's own stem cells. How does X39 accomplish this? Using our proprietary and patented form of phototherapy, X39 elevates the peptide GHK-Cu. This is a naturally occurring peptide in your body that declines significantly with age. In fact, after the age of 60 your levels of GHK-Cu have dropped by more than 60%.

Independent third-party clinical studies on GHK-Cu have determined some remarkable benefits including, support of the body's natural wound healing process. Perhaps even more remarkably, GHK-Cu resets the genes in the body to a younger, healthier state. In initial clinical work performed by Dr. Loren Pickart, Dr. Pickart discovered that old liver cells, when exposed to GHK-Cu, started to function like younger, healthier cells!

Over the past 10 years, I and the research team at LifeWave in San Diego, California have been investigating new methods for dramatically accelerating the way in which the human body heals after injury. The discoveries and inventions that we have created have led to more than 70 global patents in the field of regenerative science. Some of these inventions are so groundbreaking that in initial trials with flat worms (a biological stem cell model) they show a phenomenal 90% improvement in the speed of wound healing.

Later studies with animals and humans showed that in fact with specific applications of electromagnetic fields created by some of these devices, the activity of stem cells could indeed be enhanced, and both animals and humans could heal much faster as compared to no therapy being applied.

Here is another way to express the problem to be solved. As we age, the stem cells in our body become less and less effective. By the time we reach age 60, the stem cells in our body show very little activity, becoming slower and releasing less of the growth factors that are needed to repair our body. By the time we are in our mid-70s, we are showing almost no stem cell activity at all. This is why people who are older have such a difficult time healing from injury.

Most companies working in the field of stem cell medicine inject stem cells from a younger donor person into an older recipient. While this is promising, the problem is that this is potentially dangerous (uncontrolled cell division), costly (in excess of $10,000 for a single treatment) and not legal (most countries have not approved stem cell therapy). But what if there were a way to "reset" our own stem cells and get them to start acting like younger, healthier cells. This would be incredibly safe, incredibly effective and extremely inexpensive. That's what we have done.

I was born in the early 1960s, and when the 1970s came along, I was a big fan of the TV show "The Six Million Dollar Man."

For those of you not familiar with this TV show it was the story of Colonel Steve Austin – played by Lee Majors – who was involved in an accident while testing an experimental plane. The plane crashed, and Colonel Austin was left barely alive, with the loss of both legs, his right arm, and his left eye. Fortunately, Steve Austin had a friend in the government who was able to offer him a radical solution: replace those damaged body parts with robotic parts, making him the world's first bionic man.

In the introduction to the show, a narrator says "He will be better than he was before. Better. Stronger. Faster."

Let's move forward 40 years from the airing of this TV show, and some remarkable things have taken place since then. In fact, many of the futuristic concepts talked about in shows like The Six Million Dollar Man and Star Trek are realities today!

In the TV show, Steve Austin, with the aid of his bionic limbs, can run at 60 MPH, lift cars and see over great distances. Interestingly enough, there is a new technology that the US government has been developing that is a new type of contact lens. It will give the user telescopic vision just like in the TV show! If there is military technology to allow people to run 60 MPH, then it must still be classified.

But what about us regular people that want to achieve our fullest potential and don't want to have robotic limbs? Is there a way that we too can become better, stronger and faster?

And if you're someone that is not interested in sports performance but just wants to have the best quality of health available, can new technology offer us something to solve the problem of declining health with age?

And what if you are already suffering in pain from an illness or injury. Is there something that will give you control over your life and rid you of this pain forever without having to resort to addictive drugs?

The answer to all of these questions is a resounding "YES!".

I founded LifeWave in 2002 as a research company based on a new technology that I had invented (and later patented) for improving health with a new form of phototherapy. In August of 2004, we went to market and LifeWave was an immediate success, generating $17 million in sales in our very first year. Since then, LifeWave has become a global company with offices in the United States, Ireland and Taiwan, and distribution to more than 100 countries. LifeWave has truly become an international success story.

What is it that people love about LifeWave and why have we been so successful?

- Our Energy patches are a new way to get you through the day without caffeine and give you that extra energy from increasing fat burning.
- Our IceWave patches have been clinically documented to relieve pain in minutes, all without any drugs or side effects.
- Glutathione is the body's most important antioxidant, and our light-based method of elevating glutathione offers unparalleled benefits, including increased rates of detoxification and immune system support.
- Carnosine is a miracle nutrient for improving strength, stamina, and cognitive function, and our patch technology has you experiencing the benefits of carnosine your very first week of use.
- Aeon is our revolutionary anti-aging patch based on how a queen bee can outlive a worker bee by 50 to 60 times. Using Aeon daily allows you to manage stress and inflammation and, up until X39, had been our best-selling product since its release.

With all of these life-changing products, who could want anything more?

Well as it turns out there has been a "new frontier" developing in the regenerative medicine community over the past several decades, and it is "stem cell medicine" or "stem cell science."

Stem Cells are the future of health and medicine, and here is why:

- Stem cells could potentially cure diseases such as Parkinson's, diabetes and Alzheimer's.
- Stem cells could rapidly heal burns, relieving pain and saving lives.
- Since stem cells are the precursor to every cell in the body, the potential exists to regenerate the body from damage, even entire organs or entire limbs.
- Stem cells could help us to stay younger longer, or even reverse the aging process

So, if stem cells are so great, then why aren't they being used today? How come you cannot just go to your doctor for "a shot of stem cells"? Well as it turns out, there are MANY good reasons as to why stem cell therapy is generally NOT available today:

- Most countries around the world have NOT approved stem cell therapy.
- Stem cell therapy is very risky with about a 30% chance that the stem cells will actually damage the body.
- Stem cell therapy today has a low chance of success (about 30%).
- Stem cell therapy is extremely expensive.
- The therapy is not practical for an individual to use on a regular basis.

This presents an interesting challenge then. How can we get the benefits of stem cell therapy TODAY without the risk, without having to spend huge amounts of money, and without having to wait for the therapy to become legal? As it turns out there is now an answer, and LifeWave has it!

After many years of research, LifeWave has developed a new product called X39. This LifeWave patch is a method of "activating" the stem cells that already exist in your body (more on that later). The initial users of X39 called the benefits "remarkable," "incredible" and "life-changing" and soon so will you. What can "activating" stem cells do for you?

- Users of X39 report an instantaneous relief of pain and improvement in mobility
- Dramatic improvement in the quality and length of sleep
- Rapid wound healing
- Decrease in the appearance of lines and wrinkles
- Decrease in the appearance of scars
- Greater energy levels
- Improvement in libido
- Youth renewal
- And more!

More information on stem cells will be discussed later in this booklet.

After developing products for over 30 years, and holding over 100 patents and patent applications globally, I can truly say that at this point in my life, X39™ is my greatest achievement. Having a product that works this quickly and provides these many benefits seems like a miracle, or too good to be true, but it is simply applying the magic of stem cells to the human body. Thank you for joining me on the story you are about to read, and like many others before you, you will feel that this is the first day of the rest of your new life.

Yours in Health and Wellness,

David Schmidt

Founder and CEO, LifeWave

A NEW APPROACH TO HEALTH

What is it that you really want from life? Would you like to look and feel younger? Do you want to have more muscle and less body fat? Do you want boundless amounts of energy and stamina? How about a life that is free of pain? Or maybe you are someone that just wants to be able to get a good night's sleep. If any of this describes you, then you are in the right place at the right time because LifeWave has the answer.

Now when it comes to improving health most people have a variety of different things that they think about.

- "I'll go on a diet or start to eat more healthy foods."
- "I'll start an exercise program."
- "Maybe I'll try that new health supplement."
- "My doctor tells me to use this drug for my condition."
- "There is nothing that I can do so I guess I will just accept it as aging."

Here are some unfortunate facts: Diets do not work for most people, most people do not stay committed to an exercise program, there is no "magic pill" for health, and all drugs have side effects. And if you are in the category of just accepting it as aging, then be thankful you are reading this right now because there is hope.

What if there was a completely new approach to health? What if there was a way to improve upon your quality of life that did not involve any type of diet, exercise program, drug or supplement? And what if this new approach was patented, backed by science and clinical research, and had a proven track record? Welcome to the world of LifeWave.

LifeWave is a new technology in the field of phototherapy. What is phototherapy?

"Light therapy—or phototherapy —consists of exposure to daylight or to specific wavelengths of light using polarized light, lasers, light-emitting diodes, fluorescent lamps, or very bright, full-spectrum light. The light is administered for a prescribed amount of time and, in some cases, at a specific time of day.

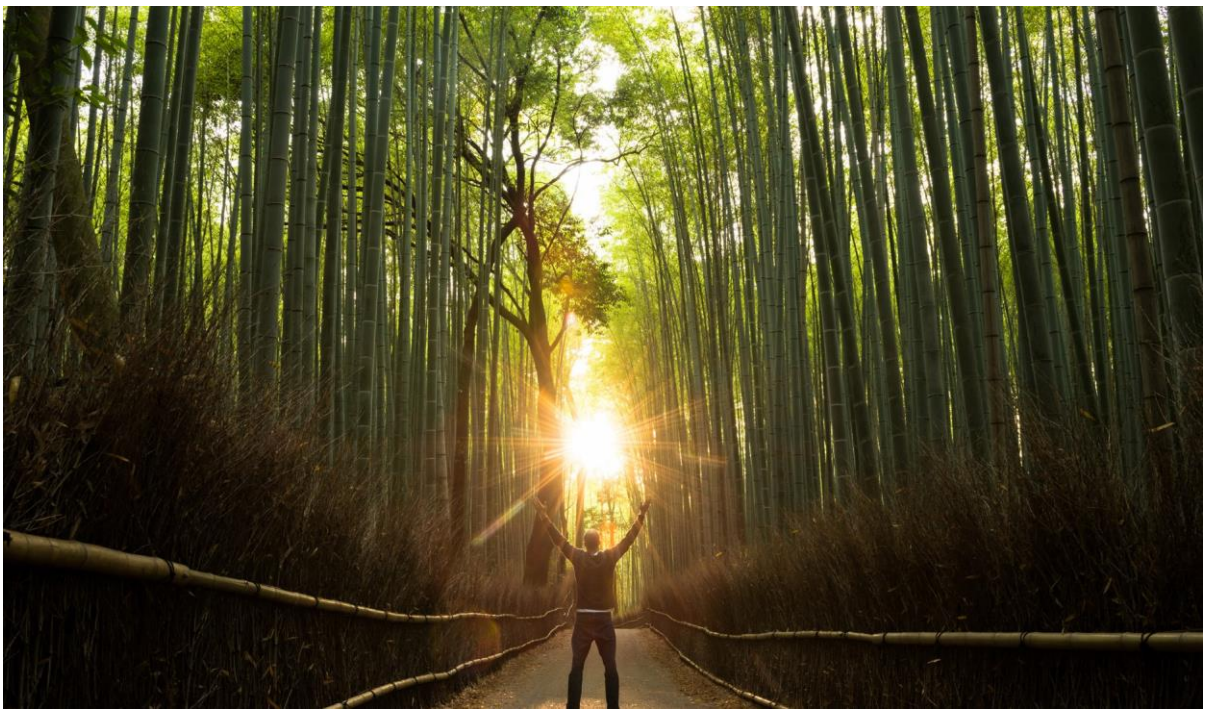
Many ancient cultures practiced various forms of light therapy, including people of Ancient Greece, Ancient Egypt, and Ancient Rome. The Inca, Assyrian, and early German settlers also worshipped the sun as a health-bringing deity. Indian medical literature dating to 1500 BCE describes a treatment combining herbs with natural sunlight to treat non-pigmented skin areas. Buddhist literature from about 200 CE and 10th-century Chinese documents make similar references.

The Faroese physician Niels Finsen is believed to be the father of modern phototherapy. He developed the first artificial light source for this purpose. Finsen used short wavelength light to treat lupus vulgaris, a skin infection caused by Mycobacterium tuberculosis. He thought that the beneficial effect was due to ultraviolet light killing the bacteria, but recent studies showed that his lens and filter system did not allow such short wavelengths to pass through, leading instead to the conclusion that light of approximately 400 nanometers generated reactive oxygen that would kill the bacteria. Finsen also used red light to treat smallpox lesions. He received the Nobel Prize in Physiology or Medicine in 1903.

Since then a large array of treatments using controlled light have been developed. Though the popular consumer understanding of "light therapy" is associated with treating seasonal affective disorder, circadian rhythm disorders and skin conditions like psoriasis, other applications include the use of low-level laser, red light, near-infrared and ultraviolet lights for pain management, hair growth, skin treatments, and accelerated wound healing." (Wikipedia reference)

LifeWave takes a completely new approach to phototherapy:

- Instead of an active light source such as a laser or lamp, LifeWave utilizes a convenient patch that reflects very specific wavelengths of light to the skin.
- The nerves on the skin are stimulated by these specific wavelengths of light, and this triggers a very specific chemical reaction in the body.
- Because there is no drug or supplement involved, LifeWave patches go to work immediately.
- There are different patches for different applications. So, no matter what your interest, we have a product that is right for you.
- LifeWave is cost-effective, safe and backed by over 70 clinical studies.



The science of LifeWave has been advancing for the last 16 years, starting in 2002 when David Schmidt first discovered he could increase energy production in human cells using very specific wavelengths of light. He created a patch technology that people could wear for increasing energy that would reflect specific wavelengths of light onto the surface of the skin as opposed to ingesting chemicals such as caffeine.

Over the last 16 years LifeWave patches have been gaining worldwide credence and use, bolstered by continuous research and documentation of effectiveness. Acceptance of LifeWave patch technology is occurring because David Schmidt has invented phototherapy products that anyone can use. His LifeWave technology has taken phototherapy out of labs and clinics and put it into people's homes.

LifeWave phototherapy technology ranges from energy enhancement to improved sleep, stress reduction, and antioxidant production.

Now LifeWave is introducing the new X39 patch, an advance in promoting stem cell science that is affordable, effective and now proven by research to have far-ranging health benefits. The X39 patch is the most technologically advanced patch ever invented.

How do the patches work? A person who uses LifeWave patches utilizes the body's own energy in the form of infrared body heat to power up or activate the materials in the patch. The patch then reflects light on to the skin which stimulates the nerves on the skin. The result is a specific change in the bodies biochemistry, such as "activating stem cells".

As described in other sections of this booklet, David Schmidt has discovered how to harness the power of peptides. Peptides have many functions in the body, but one of the most important is that peptides are communication devices that the body uses to initiate various chemical processes including antioxidant production, inflammation control, and stem cell activation.

By now, reading this you may be thinking "okay, there is science and science can be wonderful, but what I want to know is, will it meet my needs?" If your needs are relief from pain, a desire to feel better and become better, feelings of vitality and youth, and living healthier by enhancing cellular energy, then you need to try the X39 patch.

Some individuals who have been using the X39 patch for months have nicknamed the X39 patch 'True Beauty' because of the reduction in the appearance of lines and wrinkles. Other people have been amazed by the effect of the X39 in rapidly relieving pain. Still others have been shocked to see that they are healing the way they did when they were in their twenties.

Just how well does LifeWave work?

Let's use our pain-relieving product IceWave as an example. In 2013 a double-blind placebo-controlled clinical study on IceWave was performed at a hospital in France by Dr. Pierre Volckmann. Dr. Volckmann is recognized as the most prominent expert on pain management in France.

The results of this study were incredible. Over 90% of participants experienced pain relief within minutes of use, and remember that this was WITHOUT any type of drug; only light.

Or let's say you were suffering from poor sleep. A clinical study conducted by the prominent neurosurgeon Dr. Norm Shealy concluded that by using Silent Nights patches, the length of sleep could be improved by a staggering 60%. The quality of sleep was also improved.

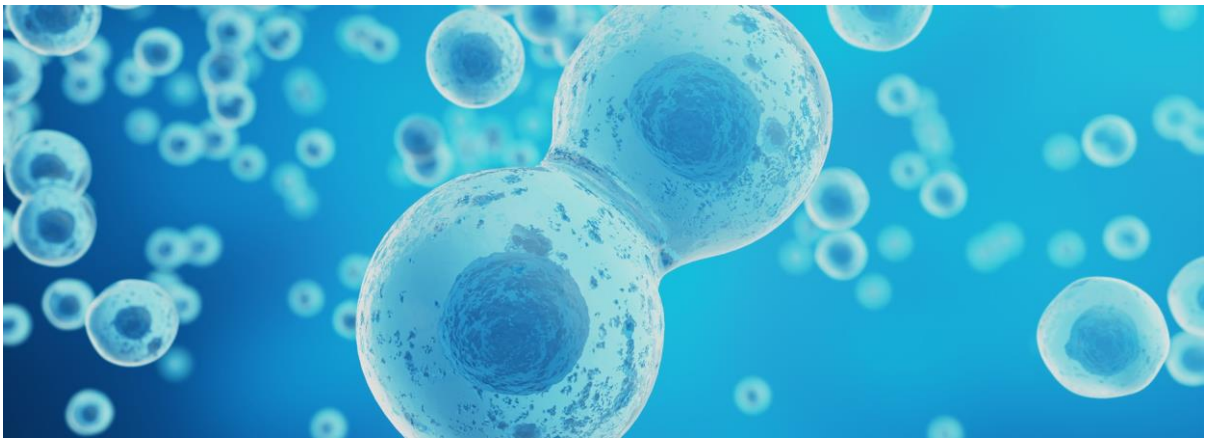
But what if you are already pain-free, you sleep well and are in relatively good health? First, congratulations! But what about the aging process? We know that aging is not kind and eventually even the healthiest of us will fall victim to the aging process. But the good news is that it does not have to be this way. Now, there is a new product that can offer amazing YOUTH RENEWAL benefits, and like our other products, it is all based on light.

Read on to learn about how stem cells are the future of health and medicine, and how LifeWave has the only product available for activating those stem cells and putting them to work for you, achieving benefits never before possible.

STEM CELLS: THE FUTURE OF HEALTH AND MEDICINE

What are stem cells?

Stem cells are cells that have the potential to change into other types of cells in the body during growth and development. In adults, stem cells serve as the body's repair system in that stem cells possess the capability of dividing to replenish themselves. Stem cells also possess the capability of turning into specialized organ cells in a process called differentiation. It is through stem cell differentiation that stem cells can replace damaged organ cells. It is through the replacement of damaged cells by new organ cells, derived from stem cells, that regeneration occurs. The use of stem cells to treat human diseases is now termed "regenerative medicine."



Why are stem cells important?

Stem cells are different from other kinds of cells in the body in that they are unspecialized cells that have the capability of turning into any type of specialized cell. Stem cells are located throughout the body, and they may remain dormant (non-dividing) for years until they are activated. Activation of stem cells to differentiate into specialized cells occurs when a need arises for new cells to maintain organ and tissue function. Also, injury to tissues can stimulate the activation of stem cells, when adequate capability of peptide production and gene expression still exists. All stem cells are capable of dividing and renewing themselves, but as we age the peptides that activate stem cells decline and stem cell renewal drastically slows down. When the process of cell death exceeds renewal and stem cell-initiated repair, organ degeneration begins, health will deteriorate and eventually, if organ functions fall too far, death soon follows.

How are stem cells used?

Although doctors have known about stem cells for over 60 years, it was not until 1968 that doctors used bone marrow stem cells to perform the first successful bone marrow transplant. Currently, doctors can now harvest stem cells from blood and fat. These stem cells can then be injected back into the bloodstream or directly injected into tissues. While many people can experience a benefit, the process is very expensive and can cost tens of thousands of dollars for each injection. Costs of stem cell injections vary widely, and insurance does not cover many of these procedures, which are still considered experimental by many insurance companies. Clinics that harvest your own stem cells from blood and fat are now present in many countries and USA states. Generally, reinjection of harvested stem cells is well tolerated. Just about any condition you can think of is a candidate for stem cell injections.

Another possibility is that harvested stem cells from blood and fat can also be induced to divide to grow larger amounts in labs. Cloning of stem cells allows doctors to give larger amounts with each injection, but this process is prohibited in many countries. "The FDA contends that any process that includes culturing, expansion, and added growth factors or antibiotics requires regulation because the process constitutes significant manipulation (Reisman and Adams, 2014)."

Unfortunately, government regulations severely restrict the use of stem cells and regulations differ widely across the world. New research over the last ten years has discovered that specialized adult cells from the skin, liver and other cells can be forced to revert back to undifferentiated stem cells. However, this process is mainly confined to university and biotechnology labs and is very expensive. Also, some of these converted stem cells will grow into tumors, so safety issues have not yet been resolved. "Ensuring the safety and efficacy of stem cell-based products is a major challenge, says the FDA. Cells manufactured in large quantities outside their natural environment in the human body can potentially become ineffective or dangerous and produce significant adverse effects such as tumors, severe immune reactions, or growth of unwanted tissue (Reisman and Adams, 2014)."

Who needs stem cells?

EVERYONE!

How can stem cells help you?

Stem cells can actually treat many conditions and diseases that are currently untreatable by any current therapy. The major issues at this time are safety, efficacy, legality and cost.

What are my options?

At this time in history, each person is faced with very limited choices regarding stem cells:

1. Do nothing and let nature take its course.
2. Pay for stem cell injections that may not be legal or safe.
3. Investigate alternative methods of improving health.

(Reisman M, Adams KT. Stem cell therapy: a look at current research, regulations, and remaining hurdles. P T. 2014;39(12):846-57.)

In summary, in the future (perhaps the next 10 to 20 years) injections of stem cells will be very common, and stem cells will be used to treat illnesses that are deemed to be incurable today. At the moment most stem cell treatments are not legally authorized, carry significant risks, have a very low chance of success, and are incredibly expensive. The need exists today for a way to benefit from stem cells without the above disadvantages.

THE SCIENCE BEHIND LIFEWAVE

How do LifeWave patches work?

LifeWave non-transdermal patches are phototherapy products that stimulate the skin with light to produce health benefits not obtainable by other approaches. The patches reflect light in the infrared and visible wavelength range to stimulate the body to improve energy production and the flow of energy in the body. Other effects include reduction of pain, reduction of stress, improvement in the duration and quality of sleep, detoxification, reduction in the appearance of lines and wrinkles, and many other general health and wellness benefits.

The Infrared spectrum of light, which includes all radiation between wavelengths just beyond those of the deepest reds of the visible spectrum (700 nm) up to (100,000+ nm (the microwave range), is established to have multiple effects including pain relief properties (Putowski et al., 2016). The infrared spectrum also creates photobiomodulation when applied to the skin of both animals and humans. Research and application of light therapy dates back thousands of years, and today light therapy is a recognized science with many products that function on this basis having been approved for use in medical applications by governments around the world, including the FDA in the United States.

What is photobiomodulation?

Photobiomodulation is the low-power non-thermal delivery of photons in the visible or near infrared spectrum (405–1000 nm) that elicits a beneficial biological response in cells and tissue (Liebert et al., 2017).

Exposure of humans to light "... has been shown that signaling pathways are triggered within the cells, transcription factors are activated, and gene expression patterns are altered. Exposure to photobiomodulation results in key physiological changes – increased anti-inflammatory cytokine levels, decreased pro-inflammatory cytokine levels, upregulation of antioxidants and survival factors, increased cell proliferation and reduced levels of apoptosis (Hamblin, 2016)."

A simple way to understand this is to think about how our bodies respond to sunlight. When we go in the sun, ultraviolet light will cause our body to produce Vitamin D, an excellent example of how a specific wavelength of light will cause a chemical change in our body. By using other wavelengths of light we can achieve other health benefits.

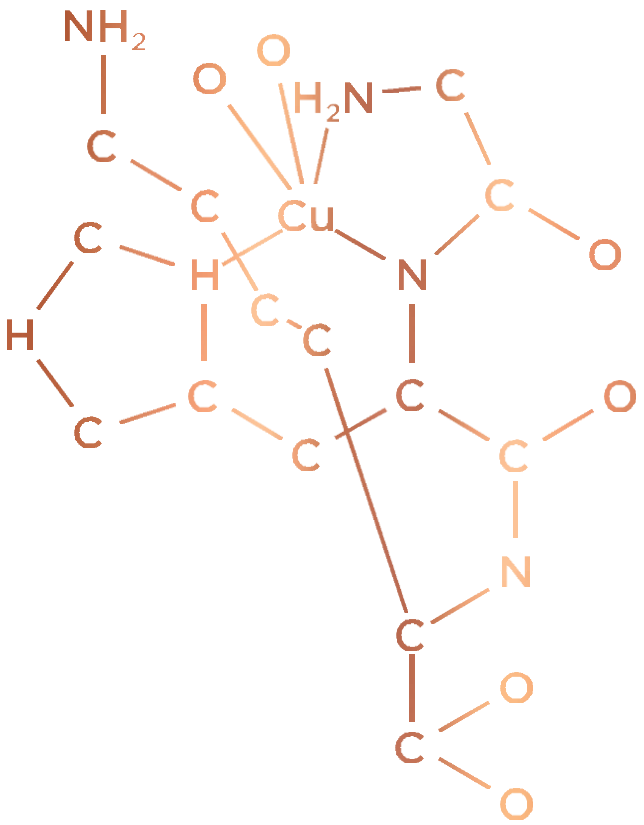
What does photobiomodulation do in the body?

Photobiomodulation:

1. Increases production of multiple antioxidants including glutathione;
2. Increases peptide production and the release of signaling peptides in tissues;
3. Exhibits anti-inflammatory effects and improved pain control;
4. Increases cellular production of energy (ATP);
5. Increases protein synthesis;
6. Regenerates tissues (Vatansever et al., 2012).

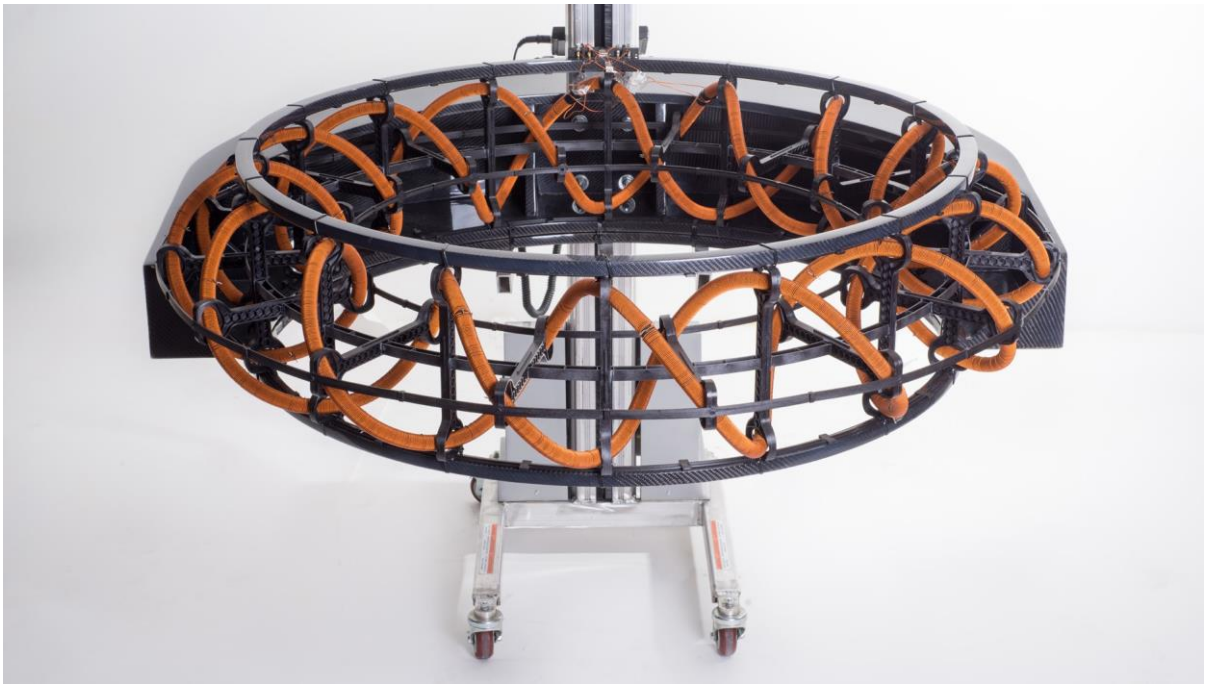
Although traditional methods of infrared photobiomodulation are typically based on the use of infrared lamps, lasers, and light emitting diodes as the source of infrared light, many natural materials are also capable of absorbing and reflecting infrared light from a source of light. For example, there are "infrared wraps" commonly used in Japan for pain relief (Vatansever et al., 2012).

What we have done at LifeWave is to use organic materials confined to patches placed on the skin that are capable of absorbing infrared light (body heat) and retransmitting specific wavelengths back into the body. These LifeWave patches are a revolutionary discovery that has been proven to be effective by numerous open-label and double-blind studies completed since 2002. These studies can be found at www.LifeWave.com. This technology has already been proven to reduce pain, improve sleep, increase energy production, improve the appearance of the skin, increase antioxidant levels and increase peptide synthesis. We have now taken LifeWave into the next generation by utilizing this technology to increase the production of a peptide called GHK-Cu, a naturally occurring material in the body proven to activate stem cells in the body.



How has David Schmidt done this?

In the late 1990s until 2002 David Schmidt was an owner in a company involved in developing survival equipment for the US Navy through government contractors. As a result of this work he was invited to be part of a design team for the Navy's next generation mini-sub. This mini-sub was to be manned by Navy SEALs, and a need existed to find a way to improve the energy and survivability of the crew without having to resort to drugs.



Earlier in his career David had conducted energy medicine research at Pace University while pursuing a degree in biology. This research performed in the late 1980s involved the use of electromagnetic equipment of his own design to selectively target and treat neuroblastoma cells. The research was a success and demonstrated that electromagnetic energy, when applied properly, could influence the health and well-being of a cell. David decided that he would continue research along these lines and develop an energy-based product to solve the needs for this project.

It is important to note that research funded by DARPA (Defense Advanced Research Projects Agency) and conducted by Whelan indicated that there were specific wavelengths of infrared light that could initiate elevation of mitochondrial energy (Whelan et al., 2001a, 2001b). Stimulation of mitochondria is important because the mitochondria provide ATP, the basic chemical unit of energy for cells. ATP is the chemical responsible for energy release in injury repair, muscle contraction, peptide production, and pain relief.

"It is generally assumed that the formation of a peptide bond requires at least five ATP. Nevertheless, experimental values suggest a much greater ATP requirement for peptide synthesis or related processes (van Milgen, 2002)." It has been shown in this regard that specific wavelengths of light 633nm and 810-890nm can both elevate ATP production, increase peptide production and produce pain relieving effects. LifeWave patches have been found to emit wavelengths of light in these ranges.

During his investigation of the effects of light on the human body David also learned that research studies had established that the biological effects of light on the body were not specific to devices that produce light. Instead, it is light at specific wavelengths that create the biological effects and not the device which produced it. At first, he experimented with jade, tourmaline and ceramic materials that absorb human infrared energy.

David's breakthrough came when he recognized that the waveforms of infrared and visible light produced by organic materials would match biological structures better than the waveforms produced by inorganic materials or electronic devices.

So, he started experimenting with specific types of organic sugars and amino acids. He created solutions composed of stereoisomers of L-amino acids and D-sugars capable of self-assembly into nano-sized crystals that when activated by body heat emits specific wavelengths of infrared and visible light known to act through phototherapy and photobiomodulation to produce physiological effects in both animals and humans.

"Stereoisomers are isomers that differ in spatial arrangement of atoms, rather than order of atomic connectivity. One of the most interesting types of isomer is the mirror-image stereoisomers, a non-superimposable set of two molecules that are a mirror image of one another. The existence of these molecules is determined by a concept known as chirality. Chirality essentially means 'mirror-image, non-superimposable molecules" *(http://chem.libretexts.org/Core/Organic_Chemistry/Chirality/Chirality_and_Stereoisomers)*.

In more detail, isomers are two compounds with the same formula but have a different arrangement of atoms in the molecule and exhibit different properties. It is the unique properties of the use of different isomers along with differently sized nano-crystals in the different patch products that provide LifeWave patches with their different effects.

The LifeWave patches like the X39 patches are manufactured by impregnating a disc of fabric with a proprietary solution of chiral stereoisomers. The impregnated fabric, in turn, is sandwiched and sealed between two films of high-density medical-grade plastic that is impermeable to moisture and other environmental factors. A layer of medical-grade hypoallergenic adhesive is applied to one side of the patches, so that the patches may be easily and conveniently applied to the surface of the skin *(Schmidt, 2014)*.

Chiral stereoisomer molecules are used in the nanocrystal LifeWave patches because these chiral nanostructures are optically active and have photophysical properties *(Litvinov, 2016.)* "Similarly, to transitions between energy levels in an atom, a photon can be emitted or absorbed during charge carrier transitions between energy levels in nanocrystals *(Litvinov, p. 12, 2016)*." "The transition frequencies, i.e., absorption or luminescence wavelengths, can be tuned by altering the nanocrystal size. Apart from this, the nanocrystals possess unique optical properties, such as wide absorption spectrum *(Litvinov, p. 12, 2016)*."

LifeWave patch proprietary formulas are designed to produce differently sized nano-crystals in the different patch products as can be seen in electron micrographs of LifeWave patches produced by Dr. Marc Stuart in 2013. Nanostructures are usually considered as particles less than 100 nm in dimension.

The organically-based optically active nanocrystal mixtures in LifeWave patches operate as localized reflectors that absorb and trap a large part of body heat (wideband infrared emission) and reflect a specific part of the spectrum in a narrow band in the infrared spectrum back to the body.

Research published in 2006 by Tulip and Clark confirmed the principle concept of the patches when these scientists demonstrated that solutions of amino acids would form optically and electrically active molecular crystals.

LifeWave has pioneered the development of this technology that uses structured bio-molecular nano-crystals to emit specific wavelengths of light for the production of photobiomodulation effects in both humans and animals. When a LifeWave patch is placed on the surface of the skin, the technology provides the ability to safely transmit specific wavelengths of light to optimize certain biological functions such as energy production, peptide synthesis, and pain control. These devices are essentially passive transmitters that use organic nano-crystal antennas which have both photonic and electronic (dielectric) properties. The nano-crystal antennas in the LifeWave devices absorb infrared radiation (body heat) in the range of 700-20,000 nanometers and emit light in the infrared and visible spectra back into the body. The small nanometer-size crystals in LifeWave patches exhibit spectroscopic properties, such as light absorption and light emission. "The term dielectric is used to indicate the energy storing capacity of the material (by means of polarization) *(https://en.wikipedia.org/wiki/Dielectric)*."

"A dielectric material is a substance that is a poor conductor of electricity, but an efficient supporter of electrostatic fields -an electrostatic field can store energy. An important property of a dielectric is its ability to support an electrostatic field while dissipating minimal energy in the form of heat. *(http://whatis.techtarget.com/definition/dielectric-material)*."

LifeWave has developed this new technology for energy production, pain management, sleep improvement, peptide production, stress management and, with the X39 patch, production of the peptide GHK-Cu that turns on (activates) stem cells. LifeWave patches can safely be combined with other therapies. In fourteen years with hundreds of thousands of users, there have never been any reports of drug interactions or interference with implantable medical devices such as pacemakers. So by introducing the X39 patch, LifeWave is harnessing the power of stem cells to promote healing.

"No physician in the history of humanity has ever healed a patient. Only the cells of the patient can heal the patient. Only cells know how to close wounds, understand what to do with insulin and how to destroy pathogens. The best a physician can do, is to move obstacles out of the way of cells (e.g., by surgery), supply materials and weapons to the cells (e.g., drugs and building blocks of life) and leave the fight against disease to the cells. Harnessing the power of the cells is the fundamental basis of Regenerative Medicine *(DR. JOSEPH PURITA - www.stemcellorthopedic.com)*."

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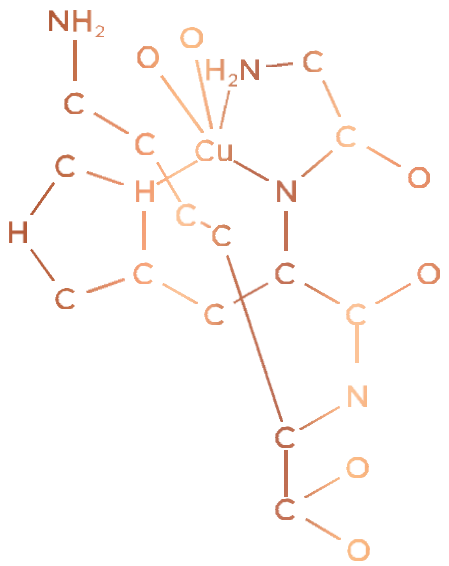
GHK-CU – WHAT THE RESEARCH SHOWS

What is GHK?

GHK is an abbreviation of glycyl-L-histidyl-L-lysine which is a human copper-binding peptide. Research has shown that GHK is both safe and non-toxic (Pickart et al., 2012b). When anyone is considering the use of any product, they have to answer three questions. 1) Is it safe? 2) Does it work? 3) Can you afford the product? As you read this booklet keep these three questions in mind.



Okay so GHK is a peptide, but what are peptides?

Peptides are chains of two or more amino acids. Peptides are not only the building blocks of proteins, but they are also bioregulators and hormones that control genetic expression and the biological activity of all the cells in the body.

Why are peptides important?

Since the 1960s an increasing amount of research has discovered that peptides play a significant role in regulating biological aging. The Russian military initiated much of the original peptide research in efforts to make their soldiers stronger and more resilient. This research was headed by Professor Vladimir Khavinson who determined that peptides are bioregulators that can slow down the aging process. While this booklet is basically about the peptide GHK-Cu and its effect on stem cells and genes, it now appears that other peptides like glutathione and carnosine are also gene regulators.

As biologically active peptides decline with age, gene expression also declines resulting in decreased protein synthesis. Reduction of proteins and enzymes in the body results in impairment in metabolism and tissue repair producing age-related decline and degeneration of the body. Methods that increase peptide availability are now known to have anti-aging effects. This booklet will explain the extensive research on the peptide GHK-Cu.

GHK-Cu levels are high in young people, but the concentration of GHK-Cu drops in humans with increased age. In a study performed at the University of California at San Francisco, young male medical students (age 20–25), were found to have about 200 nanograms/mL of GHK-Cu in their blood plasma, while the healthy, male medical school faculty (average age of 60) had a decline of 60% with a plasma levels of only 80 nanograms/mL (Pickart, 2008; Pickart et al., 2017).

Following the original discovery of GHK-Cu in 1973 by Loren Pickart, numerous articles and publications have appeared in the scientific literature discussing its beneficial and incredible properties.

GHK-Cu can:

- Increase stem cells
- Activate over 4000 genes to more youthful levels
- Reduce pain
- Reduce anxiety
- Repair DNA damage and promote DNA repair

- Produce antiaging effects at a cellular level
- Promote organ regeneration
- Suppress the production of fibrinogen which reduces the tendency of forming blood clots in the circulatory system
- Improve blood flow in tissues
- Tighten loose skin and increase the thickness of aged skin
- Improve skin hydration
- Stimulate the production of collagen
- Improve skin firmness, elasticity, and clarity
- Reduce appearance of fine lines, depth of wrinkles, and improve the structure of aged skin
- Smooth rough skin
- Reduce photodamage, mottled hyperpigmentation, and skin spots
- Improve overall skin appearance
- Stimulate wound healing
- Protect skin cells from UV radiation
- Reduce inflammation and free radical damage
- Promote hair growth and thickness, enlarge hair follicle size

GHK is an effective copper transporter

- The blood protein albumin is the main source of copper transport in the bloodstream. The peptide GHK has the ability to acquire copper ions from albumin and move copper into cells of injured tissue (Pickart et al., 1980; Lau et al., 1981).
- "Due to its small size and unique copper-binding characteristics, GHK may be able to facilitate rapid exchange of copper in the intracellular space (Pickart et al., 2018)."
- GHK plays an important role in regulating copper availability at a cellular level. The key concept is that GHK provides the body with the ability to correct copper imbalances at a cellular level (Pickart et al., 2012b).
- A deficiency of intracellular copper impairs the activity of the copper-dependent enzyme SOD (superoxide dismutase). When SOD activity is impaired, cells are subjected to oxidative stress that disrupts many cellular functions including DNA functions and energy production. When the energy production of cells is compromised to an extreme degree, the cells die. Cell death is the opposite of cellular regeneration.

- Copper delivery into cells is also essential for stem cells to start proliferating and regenerating tissues (Pickart et al., 2015a).

What role does copper have in injuries?

- Copper is an essential element in the anti-oxidant protein SOD (copper-zinc superoxide dismutase. Also, copper bound to GHK activates genes involved in antioxidant production and tissue regeneration to promote wound healing, pain control, reduce inflammation and stimulate stem cell generation (Pickart et al., 1980; Uauy et al., 1998).
- Copper is involved in multiple biochemical processes besides antioxidant production. Copper is also involved in growth and differentiation, and nervous system health (Pickart et al., 2018).
- Memory problems and cognitive decline are common problems of an aging population. Peptides like GHK that produce both antioxidant and anti-inflammatory activity are capable of restoring copper balance and youthful gene functioning. Restoring gene function in this way produces an anti-aging effect and may play a beneficial role in reducing age-associated cognitive decline (Pickart 2012b).
- For many years it was thought the effects were due to the ability of GHK to deliver small amounts of copper into cells (Pickart et al., 1980), but new research since 2010 has determined that GHK, when bound to copper, modulates the action of over 4000 genes to a healthier state (Hong et al., 2010; Campbell et al. 2012; Pickart et al., 2015a; Pickart et al., 2017).

Gene effects of GHK:

- Since Loren Pickart discovered GHK-Cu in 1973 many research studies have been initiated. As these studies were reported in the scientific literature, numerous effects were identified as being caused by GHK. Over time the question arose of how such a simple peptide could cause such a wide range of effects (Pickart et al., 2018b). The answer came when gene expression studies were done on over 13,400 human genes. These gene expression studies found that GHK affected nearly 1/3 of human genes, moving their gene activity to a more youthful state.
- "GHK's copper activates regenerative and protective genes (Pickart et al., 2017)."
- GHK activates antioxidant genes (Pickart et al., 2015). GHK has been found to elevate levels of antioxidant enzymes and increase glutathione levels.

- GHK activates gene expression involved in wound healing. So far it has been established that GHK accelerates wound-healing of the skin, hair follicles, liver, gastrointestinal tract, brain, and bone tissue (Pickart et al., 2014). However further research may find that GHK has broader effects on multiple other organs.
- GHK-Cu stimulates gene expression of DNA Repair genes (Pickart et al., 2017). DNA damage in young people is usually quickly repaired, but as aging progresses DNA repair slows down. Promotion of GHK to youthful levels can help reestablish the activity of DNA repair genes and can diminish the deteriorating effects of aging (Pickart et al., 2014).
- GHK stimulates genes that remove damaged proteins (Pickart et al., 2017).

- GHK stimulates expression of nerve-related genes involved in brain repair (Pickart et al., 2017).
- GHK-Cu can directly modulate over 4000 human genes and more importantly can reverse gene expression to a more youthful healthier state producing an anti-aging effect (Lamb, 2007; Iorio et al., 2010; Campbell et al., 2012)!
- GHK-Cu is present in large amounts when people are young, but the levels decline with age. GHK is typically released when tissues are injured which helps explain why people heal much faster when they are young than when they are of advanced age. Numerous clinical studies have now shown that methods that increase GHK-Cu cause injuries to heal faster (Pickart, 2008).

Skin

- Clinical studies have shown that GHK-Cu can tighten and firm loose skin, and improve skin thickness and elasticity. GHK-Cu can also reduce fine lines and wrinkles, reduce, hyperpigmentation, and reduce sun damage (Finkley et al., 2005; Pickart et al., 2015a).
- GHK-Cu is proving to be one of the most effective molecules that promote skin repair and regeneration (Gorouhi et al., 2009). GHK stimulates the synthesis of collagen and elastin; both proteins are necessary components of youthful skin (Pickart et al., 2018b). With age, the skin loses collagen and elasticity and begins to sag and wrinkle. GHK-Cu has been found to improve the appearance of skin, sometimes in a dramatic fashion.

- "Krüger et al. confirmed an increase in skin thickness in the range of the epidermis and dermis, improved skin hydration, a significant smoothing of the skin by stimulating collagen synthesis, increased skin elasticity, a significant improvement in skin contrast and an increased production of collagen (Pickart et al., 2018b)."
- Skin regeneration depends on maintaining the viability and proliferative potential of stem cells. Unfortunately, skin stem cell proliferative potential declines with age. Promoting GHK-Cu to more youthful levels is capable of restoring the gene activity of healthy stem cells (Pickart et al., 2015a).

Wound healing

- Deficiencies in GHK-Cu associated with aging can result in less optimal wound healing.
- It is clear from multiple clinical studies that GHK-Cu can speed wound healing through a variety of mechanisms including increasing stem cells in the skin, producing growth factors, activating youthful genes, increasing the production of collagen and elastin, increasing antioxidant levels, reducing inflammation, and increasing blood flow into wounds (Pickart et al., 2008; 2012b; 2018b; Gul, 2008; Gruchlik et al., 2012).

- By controlling oxidative stress and inflammation and by providing copper delivery to injured tissues, several factors that impede wound healing can be addressed by GHK-Cu (Pickart, 2008).
- "In 2003 Canapp et al. demonstrated that GHK-Cu improved healing of ischemic wounds and suppresses inflammation by lowering the level of acute-phase inflammatory cytokines such as TGF-beta and TNF-alpha (Pickart et al., 2012b)."
- By helping to reestablish blood flow into injured tissues GHK provides essential nutrients and oxygen necessary for wound repair.

Pain and anxiety effects

- Pain studies so far have been limited to animal studies since most humans will not willingly participate in scientific research where they have pain inflicted upon themselves.
- Both mice and rat studies have shown that GHK improves pain control and reduces anxiety (Bobyntsev et al., 2015; Sever'yanova et al., 2017).
- Gene studies have also found the seven anti-pain genes increased with GHK-Cu (Pickard et al., 2018B).

- Since LifeWave has introduced the new GHK-Cu patches, numerous unsolicited testimonials have been received from distributors who have remarked how the patches have improved their pain control along with improved energy and sleep.
- Dr. Steve Haltiwanger, the Health and Science Director, has also observed rapid resolution of pain in numerous individuals upon whom he has applied the patches.
- Perhaps the most remarkable discovery regarding the X39 patches is that they are an effective pain management system that works for many types of chronic pain.

GHK-CU – A BETTER WAY TO BENEFIT FROM STEM CELL SCIENCE

What role does GHK-Cu have in stem cells and anti-aging?

- More than a decade ago, scientists discovered it was possible to create stem cells by reprogramming a person's skin cells.
- Back in 2007 Takahashi and colleagues proved that the use of peptides could produce stem cells from skin cells. These stem cells were pluripotent, which means they were capable of transforming into all of the cell types that make up the body making them capable of repairing different tissues and organs (Takahashi et al., 2007).
- Scientists determined that they could use this procedure to create any cell type in the body and study the basic biology of specific diseases that afflict people, ranging from Down syndrome to diabetes.
- Stem cells residing in the skin can mobilize when skin is injured, and GHK-Cu is naturally released by the tissues when injuries occur, but older people have less GHK-Cu to release. Increasing GHK-Cu levels by external measures have the benefit of activating stem cells causing them to migrate from the skin and change their differentiation program where they can change into other types of cells to promote organ repair and regeneration (Gonzales et al., 2017; Pickart et al., 2018).
- Beneficial effects of raising GHK-Cu back to youthful levels have been confirmed for many organs such as skin, lungs, liver, intestinal lining, nervous system and bones (Pickart et al., 2015; Pickart et al., 2018). "The effects of GHK cover a wide range of physiological processes, from regeneration and wound healing to anxiolytic, anti-aggression and analgesic effects. GHK increases the level of antioxidant enzymes and has an anti-inflammatory effect (Pickart et al., 2018)."
- Basically, GHK-Cu has been found to regulate gene expression in the process of stem cell activation. During stem cell activation some genes that have been silenced during aging or down-expressed have to be turned on, while other genes have to be suppressed or silenced (Yang et al., 2015).

- Stem cells are influenced by the tissue niche they are located in and are affected by the microenvironment in which they reside. The chemistry of the extracellular matrix particularly the presence of peptide regulators affects the mobility, growth, and differentiation of stem cells (Gaur et al., 2017; Pickart et al., 2018).
- "An examination of the GHK-induced actions on gene expression relevant to stem cell function finds many genes that control development and differentiation, cell growth, RNA and DNA synthesis and transcription (Pickart et al., 2018)."
- The stem cell biotech firm Gamida Cell of Jerusalem, Israel, has a patent in which they claim that GHK increases proliferation of stem cells, and when GHK binds to copper in the body the GHK-Cu causes stem cells to progress into differentiated cells (Peled et al., 2010).
- GHK-Cu activates genes that control stem cell production in nervous tissue (brain) and other organs, which produces both antioxidant protective effects as well as regenerative effects (Pickart et al., 2017). GHK helps increase the number of dendritic connections in the brain; these connections are an important component of memory function. GHK enhances the production of Nerve Growth Factor, a critical factor involved in brain repair. GHK activates genes and causes the body to release chemicals that are involved in pain control. The analgesic effect of GHK is well recognized in animal studies.
- The gene activation effects in brain stem cells may potentially prove to be of great benefit to older people who are having declining mental functions.
- Biologically active GHK-Cu has a multitude of reported antiaging effects including wound healing, regeneration of aged skin, tissue regeneration (skin, hair follicles, stomach and intestinal linings, hair growth, brain, and boney tissue) and activation of stem cells (Pickart et al., 2012: Pickart et al., 2017).
- In summary, for anti-aging effects to occur resident stem cells in the tissues have to be activated. Peptides like GHK-Cu can also cause some differentiated cells to revert to pluripotent stem cells and acquire mobility where they travel to regenerate other organs (Blanpain et al., 2014; Oritz et al., 2017).

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WHAT THE X39 CAN DO FOR YOU

The X39 patch was first released on a prelaunch basis July 2, 2018. The first users of this patch product reported some remarkable benefits.

These included:

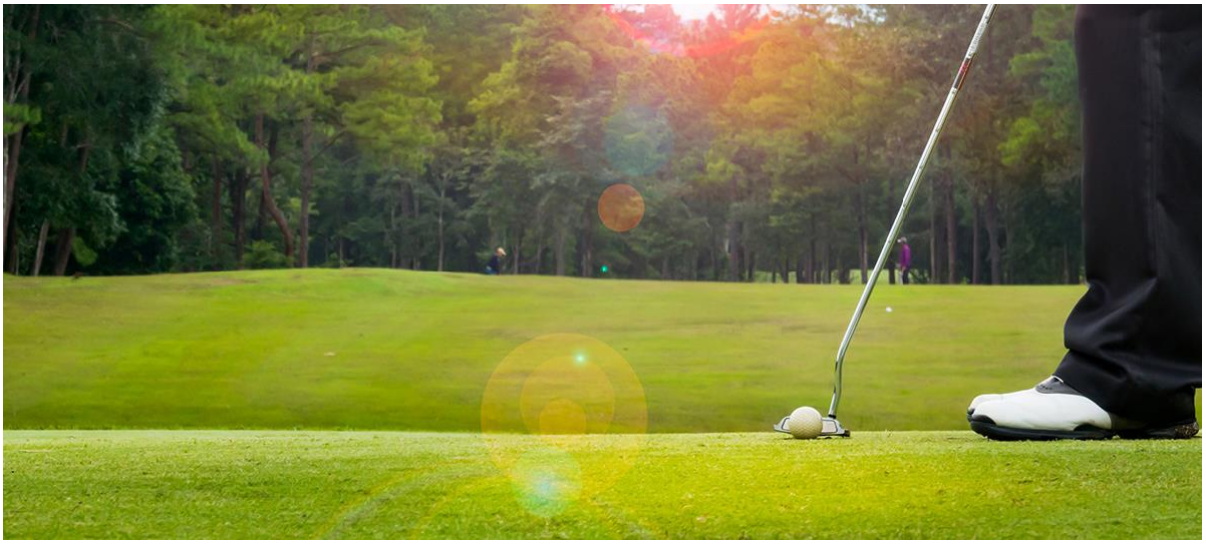
- Many cases of "instantaneous" pain relief (pain relief within seconds of application)
- Reduction in inflammation
- Very rapid wound healing
- More energy
- Much deeper sleep
- Enhanced mental clarity
- Faster recovery from exercise
- Better sports performance
- Healing of old injuries
- Tightening of the skin
- Hair growth (reported by some people).

But are all of these things really possible from one product? And if so, then how would this be possible at all? Let's dive a bit deeper into why the above experiences are not only possible but why we would expect these things to happen.

Pain Relief and Reduction in Inflammation

GHK-Cu has been shown in clinical studies to have anti-inflammatory properties. What is interesting about this is that the exact mechanism remains unclear (up until a few years ago, it was not known how aspirin provided pain relief). That said, a study on the GHK peptide and its copper complexes decreased TNF-alpha-dependent IL-6 secretion in normal human dermal fibroblasts. IL-6 is an interleukin cytokine that can be either inflammatory or anti-inflammatory. So this suggests that GHK-Cu could modulate IL-6 to being anti-inflammatory.

The anti-inflammatory properties of GHK-Cu make it a viable alternative to corticosteroids or non-steroidal anti-inflammatory drugs in the treatment of inflammatory skin conditions.



In practice, the X39 patch is simply applied to the back of the neck, and this will provide pain relief just about everywhere in the body. As an option, you may also apply the X39 to the site of pain. Here are two different examples:

Joe D. had problems with his knees for years, having been through a knee replacement surgery, and plagued with chronic inflammation and pain around his knees which limited his mobility. This knee pain greatly interfered with Joe's ability to enjoy a round of golf. When Joe was introduced to LifeWave, every day he would apply five patches (which included IceWave, Aeon and Glutathione) to the knees. By using all these patches on his knees, he was able to manage the pain and inflammation. However when Joe was introduced to the X39, he was able to remove ALL of these five patches and simply use just one X39 patch directly on the knee. This actually gave him better results than using those other five patches. And now Joe is playing the best golf of his life.

Christine G. has had problems with both knees as well. Some of her favorite activities have included skiing and dancing, but in recent years she has tended to avoid these activities because the knee pain and stiffness was too great. When Christine was introduced to the X39, she applied one patch to the back of the neck. Within minutes she noticed a significant reduction in pain and stiffness in her knees. As Christine continued to use the X39, her results continued to improve to the point where she went out dancing with her friends to celebrate!

So here we have two cases with very similar problems, and both individuals achieved the similar results; one with a placement directly on the pain, and the other just by simply applying to the back of the neck.

Very rapid wound healing

One of the most well-studied areas of research on GHK-Cu has been in the area of wound healing. This is extremely exciting when we consider HOW wound healing is taking place, and what this means to the improvement in our quality of life.

It was in the late 1980s that GHK-Cu started to attract the attention of researchers as a natural compound that could be used to help promote improved wound healing. Some of this early research took place at the Université de Reims Champagne-Ardenne in France.

At the proper concentrations, GHK-Cu was shown to stimulate the synthesis of collagen in skin fibroblasts. This, of course, is necessary for wound healing but has the obvious application at helping to tighten and firm the skin. What was also significant about this research in France was that GHK was present in collagen, which suggested that this peptide is released when an injury takes place. This would explain why, as we age and the amount of GHK-Cu in our bodies decreases, our ability to heal also declines. GHK-Cu also increased synthesis of decorin – a biochemical involved in the regulation of collagen synthesis, wound healing regulation and anti-tumor defense.

Maquart, FX; Pickart, L; Laurent, M; Gillery, P; Monboisse, JC; Borel, JP (1988). "Stimulation of collagen synthesis in fibroblast cultures by the tripeptide-copper complex glycyl-L-histidyl-L-lysine-Cu2+". FEBS Lett. 238 (2): 343–6. doi:10.1016/0014-5793(88)80509-x.

Wegrowski Y, Maquart FX, Borel JP. Stimulation of sulfated glycosaminoglycan synthesis by the tripeptide-copper complex glycyl-L-histidyl-L-lysine-Cu2+" Life Sci 1992; 51(13):1049-56

Siméon, A; Wegrowski, Y; Bontemps, Y; Maquart, FX (2000). "Expression of glycosaminoglycans and small proteoglycans in wounds: modulation by the tripeptide-copper complex glycyl-L-histidyl-L-lysine-Cu(2+)" . J Invest Dermatol. 115 (6): 962–8. doi:10.1046/j.1523-1747.2000.00166.x.

It is, of course, normal in research to move from in vitro testing (test tubes) to animal studies before doing any human testing. A series of animal experiments at various laboratories established the pronounced wound healing activity of GHK-Cu. In one study involving rabbits, the dermal wounds were evaluated. It was found that GHK-Cu facilitated wound healing, causing better wound contraction, faster development of granular tissue and improved angiogenesis (development of new blood vessels). Importantly, antioxidant levels were elevated.

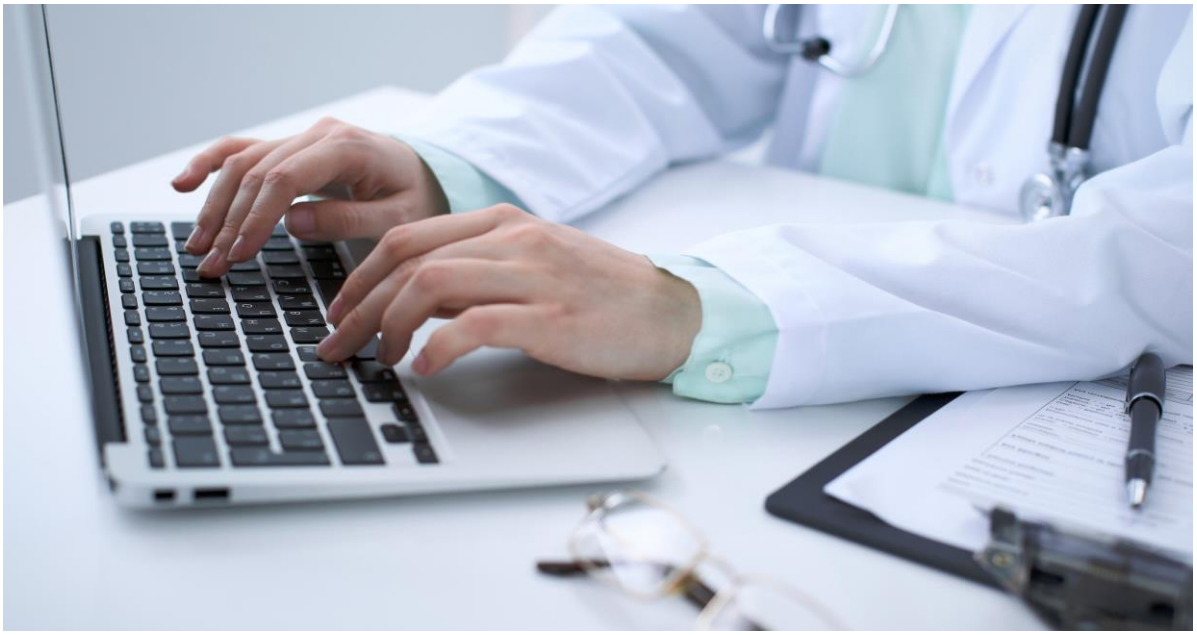
Gul, NY; Topal, A; Cangul, IT; Yanik, K (2008). "The effects of topical tripeptide copper complex and helium-neon laser on wound healing in rabbits." Vet Dermatol. 19 (1): 7–14. doi:10.1111/j.1365-3164.2007.00647.x.

Cangul, IT; Gul, NY; Topal, A; Yilmaz, R (2006). "Evaluation of the effects of topical tripeptide-copper complex and zinc oxide on open-wound healing in rabbits." Vet Dermatol. 17 (6): 417–23. doi:10.1111/j.1365-3164.2006.00551.x.

The studies above were looking at healing a localized wound. However, what has also been found in research studies is that GHK-Cu also promotes an improvement in wound healing throughout the entire body.

GHK-Cu has been found to induce a system-wide enhancement of healing in rats, mice, and pigs. As an example, when GHK-Cu is injected in one area of the body (such as the thigh muscles), improved healing is observed at another part of the body (such as the ears). Injecting GHK-Cu in these studies strongly increased measures of healing such as collagen production, angiogenesis, and wound closure. [17]

Pickart L. Compositions for accelerating wound healing in mammals containing cupric salt or complexes with amino acid or peptide. US Patent 5,164,367, 1992.



In one study, a wound 6mm in diameter was induced on the back of rats. For 13 days the wounds were treated daily with topical GHK or given no treatment. At the end of the study, the wound size had decreased by 64.5% in the GHK group and by 28.2% in the control group. The difference between the GHK group's wounds and those of the control group was statistically significant.

Canapp SO Jr, Farese JP, Schultz GS, Gowda S, Ishak AM, Swaim SF, Vangilder J, Lee-Ambrose L, Martin FG (Nov–Dec 2003). "The effect of topical tripeptide-copper complex on healing of ischemic open wounds." Vet Surg. 32 (6): 515–23. doi:10.1053/jvet.2003.50070. PMID 14648529.

The fact that GHK-Cu has worked so well in both the laboratory and in animal studies is fine, but what about clinical studies with human beings?

In 1994 a clinical study was published in the journal *Wound Repair and Regeneration* looking at this same question. In this study a 2% GHK gel showed promising results in the treatment of 120 diabetic patients, increasing the percentage of ulcer closure from 60.8% to 98.5%, and decreasing the percentage of infection from 34% to 7%. The rate of healing was three times greater with GHK.

Mulder DPM1, Gerit D.; Patt PhD2, Leonard M.; Sanders DPM, Lee; et al. (1994). "Enhanced healing of ulcers in patients with diabetes by topical treatment of glycyl-l-histidyl-l-lysine." Wound Repair Regen. 2 (4): 259–269. doi:10.1046/j.1524-475X.1994.20406.x.

More energy

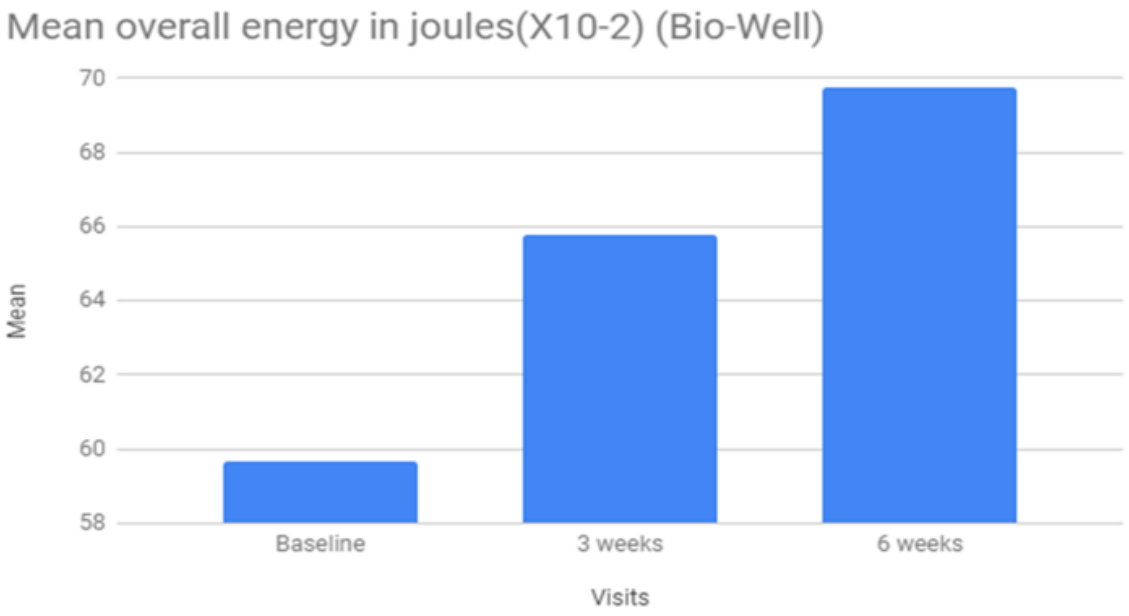
A study published in July of 2015 looked at the cosmetic benefits of GHK-Cu.

GHK-Cu may Prevent Oxidative Stress in Skin by Regulating Copper and Modifying Expression of Numerous Antioxidant Genes Loren Pickart, Jessica Michelle Vasquez-Soltero, and Anna Margolina Skin Biology, Research & Development Department, 4122 Factoria Boulevard SE, Suite No. 200, Bellevue, WA 98006, USA Received: 17 June 2015 / Accepted: 21 July 2015 / Published: 28 July 2015

Here is an excerpt from the abstract of this study:

The copper binding tripeptide GHK (glycyl-l-histidyl-l-lysine) is a naturally occurring plasma peptide that significantly declines during human aging. It has been established that GHK:Copper(2+) improves wound healing and tissue regeneration and stimulates collagen and decorin production. GHK-Cu also improves the condition of aging skin and hair, and possesses antioxidant and anti-inflammatory effects. In addition, it increases cellular stemness and secretion of trophic factors by mesenchymal stem cells. GHK's antioxidant actions have been demonstrated in vitro and in animal studies. They include blocking the formation of reactive oxygen and carbonyl species, detoxifying toxic products of lipid peroxidation such as acrolein, protecting keratinocytes from lethal Ultraviolet B (UVB) radiation, and blocking hepatic damage by dichloromethane radicals. This paper reviews biological data demonstrating positive effects of GHK in skin and proposes interaction with antioxidant-related genes as a possible explanation of its antioxidant activity.

One of the most common experiences people report with the X39 patch is an improvement in energy levels. When the Energy patches were first developed in 2002, and then first sold through our network in 2004, it was established with multiple clinical studies that the Energy patches were upregulating which is known as beta oxidation (fat burning) by around 23%. As the body derives more energy from fat than carbohydrates, it was easy to see why people were reporting the feelings of more energy.



The Aeon patch was released in 2011, and this patch has been designed to reduce inflammation and increase antioxidant production with the benefit of providing stress relief. People who use Aeon often report feeling calmer during the day as well as having more energy from this stress reduction.

It is hypothesized at this point based on the data we have that the X39 is increasing the feeling of energy that people have through the reduction of inflammation, oxidative stress, and elevation of antioxidants. Since we know that GHK-Cu provides these benefits, and that inflammation and oxidative stress reduce a person's energy capacity, this is a reasonable conclusion. In the future, there may be studies that look at this specific benefit of the X39 patch.

As of December 2018, a clinical study completed by Dr. Thornton Streeter did in fact demonstrate that continued use of the X39 patch resulted in an overall improvement of a person's energy levels.

As a review, following is what LifeWave has substantiated by its own clinical research as the benefits that come from wearing the X39 patch on a regular basis:

SUPPORTS WOUND HEALING

Some of our most dramatic testimonials on the X39 have been in the area of wound healing. Wound healing is, of course, a natural process and requires the presence of stem cells. However, as we age our stem cells become less effective. Now, with X39, you can activate your stem cells and provide support for your body's natural healing process.

RAPID PAIN RELIEF

X39 users can experience dramatic reductions in pain. In fact, most people experience a reduction in the sensation of pain and inflammation within minutes of application.

GREATER ENERGY

Clinical studies performed by LifeWave show that the X39 patch improved a person's energy levels. When compared to the baseline there is an improvement in overall energy of the body, organ balance, and L/R symmetry distribution of energy.

SLEEP BENEFITS

Clinical studies performed by LifeWave show that X39 improves the quality of sleep by altering levels of GABA, an important neurotransmitter in the brain. The benefit is a natural improvement in the quality and duration of sleep.

IMPROVED SKIN APPEARANCE

Would you like to not only feel younger but look younger as well? Now you can, with X39. An important part of activating stem cells is increasing the production of collagen. The result is that only a few weeks after applying X39 your skin will start to experience a significant reduction in the appearance of lines and wrinkles.

DRAMATIC ANTI-AGING

Initial clinical work performed by Dr. Loren Pickart showed that when GHK-Cu is elevated in the body, cells essentially are restored to a younger state and begin behaving like younger, healthier cells.

FASTER RECOVERY FROM EXERCISE

Users of X39 report significant improvements in their sports performance and recovery. Since stem cells are designed to repair damaged cells, this is not surprising.

REDUCED INFLAMMATION

Many users of X39 report that after several weeks of using the product, they notice a reduction in the appearance of scars. This is a well-known attribute of elevating copper peptides known as remodeling.

CLINICAL STUDIES

As of December 2018, LifeWave has completed more than 80 clinical studies on its products since 2002. X39 is no exception, with clinical research comprising traditional blood, urine and saliva analysis along with various bioelectrical data such as Heart Rate Variability. We have also completed clinical work utilizing self-assessment to determine how X39 improves such things as pain management and sleep.

The following is a summary of a study performed by Dr. Melinda Connor on the X39 patch. This study explores the metabolic implications and physiologic results of wearing the Lifewave X39 patch over the period of one week. Measures were taken at baseline, 24 hours and at 7 days of wearing the patch.

A sample of convenience of 15 subjects made up of both men and women aged 40-65 were selected to participate in this study. For the purposes of this study the Sabre Sciences HPA2 metabolic suite has been selected. The HPA 2 Profile includes both urine and saliva collection.

The urine evaluates 5-HTP, Serotonin, Dopamine, Epinephrine, Norepinephrine, GABA, Glutamate, Histamine, L-DOPA, Normetanephrine, Metanephrine 3-Methoxytyramine. The saliva evaluates, Cortisol and DHEA. Several additional measures have been added to the HPA2 suite, Glutathione, and a cysteine to cystine ratio will also be tested using the urine sample.

All study participants had testing done at base line, 24 hours and 7 days. Six minute recordings of EKG, pulse, respiration, heart rate variability (HRV), temp, blood volume pulse, galvanic skin response, 2 EMG (muscle) leads.

A series of questionnaires were administered to support metabolic findings. Marlowe Crowne (accuracy of findings), McGill Pain Scale, Pittsburgh Sleep Quality Index, AIOS-VAS (for vitality and well-being), Profile of Mood States (POMS) (anxiety/depression), WAIS III (short- and long-term memory).

After only one day of wearing X39, people reported feeling better. After one week of using X39 there was statistical significance showing clear overall improvement in the feelings of vitality and wellness.

WAIS III (short and long term memory)

WAIS III is a well-established intelligence test which includes a standard memory test. There was a clear improvement in short term memory by day 7.

It is also interesting that there was improvement in both mid- and long-term memory as well, though to a much lower degree.

Pittsburgh Sleep Quality Index

This questionnaire showed an immediate strong shift the first night, though it was not quite significant. The shift by day 7 was significant.

This is particularly important as sleep strongly effects everything else related to health and well-being.

Metabolic outcomes urine testing

Amino acids and neurotransmitters play a critical role in health and well-being If an individual's amino acid and neurotransmitter production is broken, the individual cannot maintain body health for long.

The number of statistically significant changes demonstrated in this study shows the powerful impact of the X39.

Among the 20 biochemicals improved include: Epinephrine, GABA, Histamine, Normetanephrine, PEA (Phenylethylamine), Alpha-aminobutyric acid.

Epinephrine	-	Marker of Response to Stress
GABA	-	Quality of Sleep, Anxiety, Mood
Histamine	-	Measures Inflammatory Response
Normetanephrine	-	Measure for Adrenal Glands
PEA (Phenylethylamine)	-	Indicator for Mood and Cognition
Alpha-aminobutyric acid	-	Indicator for GABA Synthesis

A number of amino acids also improved:

Cystine	-	Involved in Glutathione Formation
Glutamine	-	Involved in Intestinal Repair
Lysine	-	Immune Function
Leucine	-	Muscle Repair
Tryptophan	-	Involved in Sleep

Heart Rate Variability

HRV measures ratios of the low frequency and high frequency muscle contractions in the heart.

Statistical significance was achieved in demonstrating that X39 helps to support the health of the heart.

BVP-HR, EMG, Skin-Condition, Temperature and Respiratory Rate

Reduction in blood pressure and improved muscle relaxation are consistent changes which are present in the physiology data.

Greater flexibility in HRV in the over age-60 population is an important finding.

Summary

The data from this study shows improvement in:

- Blood pressure and overall health of the heart
- 17 statistically significant amino acid changes over the 7 days
- Key neurotransmitters involved in overall health
- Improvement in sleep levels
- Improvement in short-term memory
- Improvement in reported feelings of overall health and vitality.

REAL LIFE EXPERIENCES WITH X39

"AFTER 30 DAYS STICKING WITH X39 MY SHOULDER GOT BETTER BY 80%"

"In August 2017, I injured my right shoulder in a fall. Diagnosis: tear of two tendons For personal reasons, I refused an operation. Medical treatments and physical therapy until April 2018 did not improve it at all. Almost any sleeping position caused me pain and I have not slept through a single night for months. In July 2018, I began to use X39 locally. Over two weeks I had no improvement again, but on day 18 my shoulder felt a bit lighter. After 30 days sticking with X39 my shoulder got better by 80% Since I swam regularly and competitively, it was extremely frustrating not having been in the pool once for almost one year. I will use X39 for another month and I am convinced that my shoulder will be 100% resilient and pain free afterwards."

- Wolfgang

"NO PAIN... CLARITY... IMPROVED VISION"

"I am so excited to share with you my X39 experience: I have been wearing the patch for just 20 days. I feel better and have more every day: I have no pain waking up, clarity of the mind, and my eyesight has improved. I am 62 years old and so I am happy to have again vaginal secretions (many women suffer from vaginal dryness) But I have been surprised by my husband's results: he suffered from depression, with anger issues, joint stiffness and muscle twitches. While sleeping he often screamed. So, I decided first for a 10- day AEON application to go with X39 and after just 20 days my husband got back to being a quiet gentleman with a sweet smile/no grudge nor anger/and he walks normally! Thanks from my heart."

- Prof.ssa Rossella Savo

"MY SKIN LOOKS MUCH YOUNGER AND HEALTHIER"

"I have noticed after I have been using X39 for 2-3 weeks my skin looks much younger, healthier and shines 24/7 with or without make up. I am so excited, thank you for this discovery!"

- Betty Aslanis

"NO PAIN... MORE ENERGY... GOOD SLEEP"

"I felt very good, no pain in my back and knees, overall more energy and good sleep. And it was that way from day one."

- Karen Madsen

"WITHIN 60 SECONDS THE PAIN WAS ALMOST GONE"

"On Saturday, I stepped on a small nail, it went 12 mm into my right food. This really bugged me as I had a football match scheduled for the next day at 12.00. I got help cleaning the wound and dressed it with a band aid. I stacked a x39 patch onto the band aid. Within 60 sec. the pain was almost gone and was able to walk normally. and now 18 hours later I am playing sports again."

- Michael Kongsbak Jonasson

"QUICK HEALING POWER"

"My testimonial with the X39 is especially the quick healing of 3 scratches while doing the garden. I think I will see more change on my skin over the months with the X39 (sun spots among others). I have used patches for 11 years and I have a very good diet. Now most people have health problems and pain, the testimonials are eloquent and great. A big future with the X39."

- Frederic Larché

"THE FIRST TIME I AM PAIN FREE AFTER MORE THAN 10 YEARS"

"I had a lower back pain for more than 10 years. It is much worse when I am sitting in the airplane. Even after I took the pain killers. 2 hours later the pain wold come back unbearable. One day I brought this round little patch with me. It is called X39- It is a stem cells patch, completely natural, no chemicals. It activates my own stem cells. I put it on when I was in the airplane. The whole flight was with no pain at all. This is the first time after more than 10 years. It is amazing. When I flew back home I tried it again and still no PAIN. The most important thing is, it's completely natural. Because my husband is a doctor he likes to use it for giving him energy. No money can buy PAIN FREE."

- Nancy Boksberger

"IT'S AMAZING"

"I received a video testimonial on the X39. Two days ago I encouraged a lady in Arusha, Tanzania that I have known for some time to try X39. Emiliana has been in and out of the hospital with lumbar displacement. She can hardly sit. She can't turn in bed. They sent me her medical report and X-ray. After applying X39; Day 1 she felt less pain in her waist. Last night she heard her back pull and twist. She then felt some calmness. Shortly thereafter she was able to turn in bed. This morning she bathed herself. By the time they were doing the video she had sat down for 3hrs. She stood up and walked a bit in the video. She says she is going to tell her DR and everybody who knows her condition. It's amazing."

- Anthony Massawa

"WOW, WOW, WOW. I AM VERY EXCITED TO SEE WHAT HAPPENS IN MY BODY IN THE NEXT MONTHS!"

"My skin is tighter around my body and I have much more flexibility. The X39 is repairing old injuries. I had a spinal disc herniation C4 for about 20. Years, I feel how the X39 is working on that - my body is changing. I have an underactive thyroid function. My Thyroid is swelling and of course I had some symptoms like irritability, but now they have gone after two days. As a child I broke my ankle, it used to hurt once in a while, since X39, this problem is complete gone. I am studying at the moment to be a naturopath; my memory is increasing incredibly. I am able to learn more quickly."

- Pilar Heinrich

"TOTAL PAIN RELIEF WAS ACHIEVED"

"K.H. came to pain clinic. Had significant pain in right Deltoid Bursa. I had him hold patch for 2 minutes and he received 90% pain relief. A patch was placed on back of neck (C7), and then total pain relief was achieved. I gave him 5 patches to use at home per instructions to place on back of neck and below belly button."

- Norm Shealy, MD

"IT'S A MIRACLE"

"My wife has had severe hip pain for years. After the 2nd patch these were her words "It's a miracle." She had not been able to move her leg in certain directions but now she can!!! I also have had right hip pain. It is much easier to put my sock on now. I am also able to do certain Jiu Jitu's moves that I have not been able to do in years. Also, when I squat, I would put my left knee down and keep my right knee up. I am now able to squat normally with no problem."

- Dr. Michinori Tao

"X39 HAS GIVEN ME BACK MY LIFE!"

"I have been using the x39 for 28 days now. I am a 69 yr. old female with a history of bilateral mastectomy and knee replacement. I am very active, owning, caring for and riding two horses. I lost so much energy following these medical procedures that I was sadly considering whether I could continue my equestrian lifestyle. X39 has given me back my life! My energy level has greatly increased and after 2 wks my sleep (another sad side effect of medical procedures) has greatly improved. My mood is much improved and life seems good again. I do hope x39 will be available to us soon, as I only have 2 days remaining!"

- Louann Hendricks

"HEALING CURVE IS FASTER"

"For 6 month I have had right knee trouble, some menisci issues, really painful and a lot of swelling. It was getting better slowly with less pain and less swelling. I put the X 39 patch directly on the knee and I can verify that it is a lot better and healing curve is faster. After 2 weeks the pain had eased of and I could put more and more weight on the leg. Now after 4 weeks my knee is stronger and I am climbing the stairs and bicycling without any problem. I am still putting it on to make sure that the cartilage will heal profoundly. Thank you ever so much for X39"

- Pernille Knudtzon, MD

"MY HEAD AND VISION ARE MUCH CLEARER"

After using x39, my head and vision are much clearer. I am full of energy; my face is brighter and cheeks are rosy.

- Lisa Wu