Pulsed Electro-Magnetic Therapy... what is it?

Pulsed Electro-Magnetic Therapy, commonly known as PEMF, is energy medicine. Electro-magnetic therapy is modelled after the earth's own electro-magnetic pulse to improve circulation and cell metabolism. Human bodies are alive because of electro-magnetic exchanges between cells. Brain waves are measured with EEG tests and cardiac waves through EKG tests. When a person goes into cardiac arrest, a defibrillator is used to deliver a therapeutic dose of energy to the heart to restart it.

PEMF therapy introduces a low frequency pulsed electro-magnetic field (PEMF) that recharges the cells of the body, allowing them to float freely. This increases active cell functioning surface area and consequently enhancing circulation, oxygenation and hydration. The ability of cells to absorb nutrients and remove toxins from the body is greatly increased.

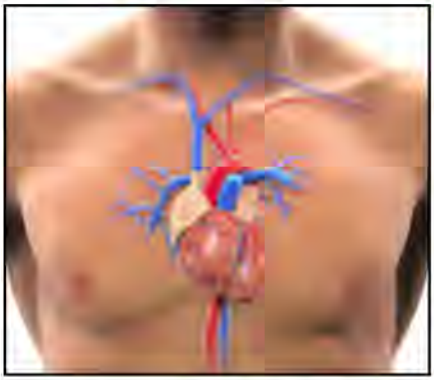
In the 1980s, NASA sent its astronauts to live in space for extended periods. The reduction in exposure to the earth's magnetic field had an adverse health effect. To rectify this problem, they researched the positive effects of PEMF.

One study, put out by the Johnson Space Center entitled "Pulsed Electro-magnetic Fields – A Countermeasure for Bone Loss and Muscle Atrophy," states the following in an article on NASA's website:

Currently, there is a critical need to develop effective countermeasures for bone loss and muscle atrophy to enable future human space exploration to the Moon, Mars and beyond. Progressive muscle atrophy can lead to weakness, fatigue, the inability to perform efficiently assigned tasks, and compromised emergency egress operations. Bone loss causes increased risk of bone fracture and kidney stones, which can also negatively affect mission objectives and success. The purpose of these studies is to develop a pulsed electro-magnetic field device for use as a noninvasive countermeasure to enhance bone retention, prevent or alleviate muscle atrophy, and augment natural healing/regeneration processes. This research represents a major contribution toward enabling humans to live and work safely in space, and is especially relevant to projected human space exploration. On earth, this device could be useful in the treatment of various muscle diseases, age- and cancer-related muscle atrophy, osteoporosis, and other bone diseases.

To understand the benefits of energy medicine and PEMF, we need to understand how the human body works.

Optimizing blood flow



Normal Blood Flow

Blood flows from the heart and into a miniature system of vessels called capillaries, which exchange water, oxygen, carbon dioxide, and many other nutrients and waste chemical substances between the blood and the tissues surrounding them. Blood is manufactured in the marrow of the bones and stays on active duty for approximately 100-120 days before it is recycled. Blood circulates through the body every 20 seconds.

Blood cell efficiency reduction

According to a study published by Intech, a typical human blood cell has a diameter of 5-10 µm and a surface area of approximately 135 µm2. The maximum efficiency of a blood cell is reached when all the surface area of a cell is free to perform its functions.

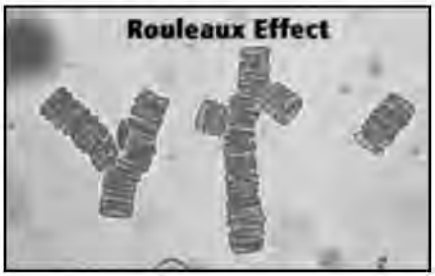
Scientists examining blood cells during live cell analysis have observed a phenomenon called the Rouleaux effect. Blood cells can stick together like stacked coins forming a Rouleaux (clumping of cells). If two cells stack, the combined surface area is reduced from 270 µm2 (2 x 135 µm2) to 193 µm2 or 71%. Their efficiency is reduced further as the number of cells stacks up. A mass of eight or more cells reduces their total cellular efficiency by 50%.

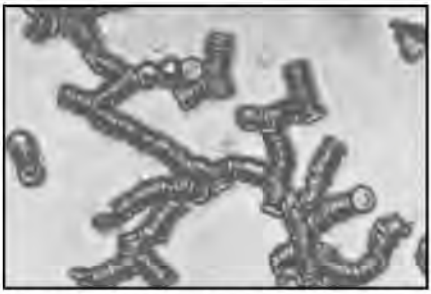
Number of Stacked Cells	Optimum Surface Area µm squared	Stacked Surface Area µm squared	Combined Efficiency of Cells
1	135	135	100%
2	270	193	71%
3	405	251	62%
4	540	309	57%
5	675	367	54%
6	810	425	52%
7	945	483	51%
8	1,080	541	50%
9	1,215	599	49%
10	1,350	657	49%
11	1,485	715	48%
12	1,620	773	48%
13	1,755	831	47%
14	1,890	889	47%
15	2,025	947	47%
16	2,160	1,005	47%
17	2,295	1,063	46%
18	2,430	1,122	46%
19	2,565	1,180	46%
20	2,700	1,238	46%

Cell ineffectiveness due to the Rouleaux effect.

This fact is alarming enough, but another factor must be taken into account. Capillaries are so small (5-10 µm) that blood cells can only pass through them in single file. The Rouleaux Effect is not just about the stacking cells, but also the formation of Rouleaux stacks into combined branches. Cells that are stacked in this way cannot pass through the capillaries as capillaries can only accept free-flowing singular and independent red blood cells.

Blood that cannot pass through the capillaries cannot absorb or dispel toxins or carbon dioxide; neither can it absorb and disperse nutrients or oxygen. Blood affected





Cells stacking and branching due to the Rouleaux effect will not be able to pass through the capillaries in body organs.

fter 8 minutes of PEMF treatment the Rouleaux effect is dispersed and cells can flow freely into the capillaries

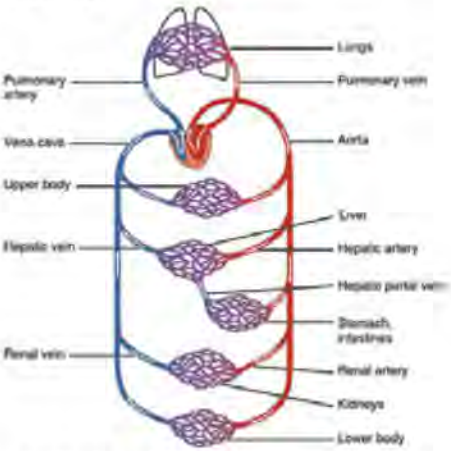
by the Rouleaux effect recirculates without having performed the task it is sent to undertake. If the blood cells are subjected to the Rouleaux effect, disease results because the flow of blood throughout the body is restricted, and the oxygen level in the blood is drastically reduced. Bacteria are anaerobic, meaning they thrive without oxygen and disease will thrive in blood deprived of oxygen. Parasites and viruses also thrive in anaerobic acidic environments.

This problem affects all the major systems in the body, as the blood absorbs and diffuses oxygen and nutrients as well as picking up and dispelling toxins and carbon dioxide at a capillary level.

PEMF and the Rouleaux effect:

Blood passes on nutrients and oxygen while absorbing toxins or enzymes from all the major organs by use of capillaries. Blood cells which power down lose their charge and stick to one another, causing the Rouleaux effect. If the Rouleaux effect is present in the blood, these organs are not properly serviced by the blood.

PEMF positively charges blood cells so that they repel one another, (like magnetic charges repel), making it impossible for them to stick together. PEMF maximizes the ability of the blood cells to perform their tasks because they cannot enter the



capillaries of the major organs. The work of the lungs, liver, intestines and kidneys is optimized when proper and full blood flow can take place. When the blood is oxygenated, so are the organs and tissues, reducing disease, which can produce imbalances, sickness and eventually cancers.

Capillary blood transfer

The **lu gs** absorb oxygen through the capillaries located in small air sacs called alveoli through a process called

diffusion. The lungs absorb oxygen and expel carbon dioxide. Blood carries oxygen to all the major organs for use in energy production (ATP). The byproduct of energy production is carbon dioxide, which is brought back to the lungs and exchanged for oxygen.

The **liver** removes toxins from the blood but also injects biochemicals that are necessary for digestion. The liver stores glycogen, which is broken down into glucose and dispersed into

the blood when the blood sugar levels are too low. The liver also decomposes tired blood cells and produces hormones that are injected back into the blood. It is in the fine capillaries, which pass through the liver that toxins are removed, while sugars, proteins and hormones are injected into the blood.

The **small i testi e** absorbs nutrients and minerals found in food along with proteins, fats (lipids) and carbohydrates. The intestine is lined with microscopic brushes called villi

and microvilli, which contain networks of capillaries. The villi absorb the nutrients into the capillaries, and they are transported by the blood vessels to different parts of the body where they are distributed. Villi are like the alveoli of the lungs, just performing a different function.

The **kid eys** remove excess organic molecules such as glucose from the blood along with the waste products of metabolism. The kidneys regulate the acid-base balance and blood pressure (through salt-water balance). They remove all soluble wastes and send them to the urinary bladder. Again, this filtering process includes blood travelling through the capillaries.

The Power to Penetrate

When looking for a PEMF device, the device must have the ability to penetrate the human body. As you move away from a PEMF matt, the pulsed electromagnetic field decreases substantially. Many PEMF machines are not strong enough to penetrate the entire body and only penetrate the surface level.

Curatron systems offer full body penetration with superior speed of induction, changing frequencies to avoid cellular adaptation. Curatron also carries high-energy coils for concentrated treatment. The coils operate between 45,000 and 160,000 microTesla. This allows for penetration of the organs, the joints and the brain with the 3D Butterfly coil.

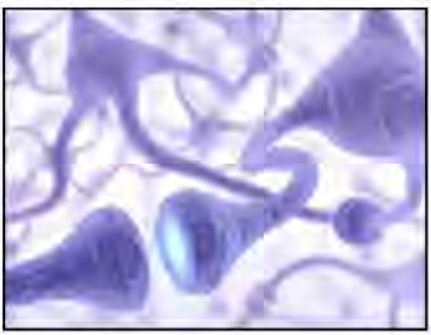
Neuron & Bone Regeneration

The body is continuously undergoing regeneration, replacing each of its 100 billion cells over a period of time. The cells in each organ regenerate at different rates. The heart is regenerated every 20 years. Every bone in the body is regenerated within ten years. Your nails regenerate every 6-10 months. Your liver regenerates every five months. Your blood cells regenerate every four months. Your skin regenerates every 4 weeks. Your lungs regenerate every 2-3 weeks. The lining in your stomach is regenerated every 2-3 days.

N S and PEMF

In September 2003, Thomas Goodwin, Ph.D. of NASA who investigated the effect of electromagnetic fields on neuronal cells, published an experimental study. Neuronal cells are responsible for transmitting electrical signals throughout the body. For example, if you want to open your hand, the brain sends electrical command signals to the muscles responsible for opening the hand. These electrical signals reach these muscles, and if there is no damage to the neuronal cells going from the brain towards these muscles, then the hand will open. If there is damage as a result of an accident or surgery, the body will repair the damage and regenerate the neuronal cells over time.

The purpose of the NASA study was to find out if it was possible to stimulate regeneration or regrowth of neural tissue with electromagnetic fields to improve electrical conductivity between the neuronal cells. The study concluded electromagnetic field stimulation improved regrowth by 250% to 400%.



Neuro receptor cells which tra smit electrical sig als throughout the body.

Roscosmos and PEMF

When Russia conducted experiments sending cosmonauts into space for extended periods, the cosmonauts experienced significant problems when they returned to earth. In outer space, there is no gravity, and consequently, the cosmonauts had muscle and bone problems when they returned to the gravitational field on earth. When initially returning, they could not stand or walk following the recovery of their space module. Specially designed PEMF devices created by Curatron engineers have been used to improve bone density for returning cosmonauts.

Russia cosmo auts treated with PEMF devices desig ed by Curatro 's e gi eers.

Stimulating Bone Growth

PEMF works at a cellular level. All the cells are affected, and the body's systems that deliver oxygen and nutrients while removing toxins are enhanced. This revitalization results in the body's components being able to perform their designated function with optimal efficiency. The bone structure within the body gives us form, but it also houses the factory that manufactures blood cells known as the marrow.

The X-ray shows the rege eratio of a hip i a middle aged woma , removi g the eed for the hip replaceme t o this hip.

Osteoblast cells (bone germination cells) produce bone matter. Osteoblast cells work together as a group called the osteon. They produce the calcium and phosphate-based minerals and deposit them into the organic matrix. The mineralized matrix is a strong, dense mineralized tissue that is formed by the osteons. Bones are comprised of a composite material made up of both collagen and minerals, which give them tensile and compressive strength. Osteoblast cells regenerate the bone cells. PEMF can help heal and strengthen bones as it induces micro-currents, which stimulate the osteoblast cells to produce bone matter. This process is critical to healing, especially with those who have arthritis and osteoporosis.

Cartilage regrowth

Cartilage is the flexible connective tissue found in many areas of the human body. The joints between bones, the rib cage, the ears, nose, bronchial tubes and intervertebral disks all contain cartilage. Cartilage does not contain blood vessels and therefore is difficult to heal.

Injuries often affect the cartilage, but also joints will wear out over time, giving way to Osteoarthritis. Cartilage thins out, as shown on the left in the diagram below.

PEMF has been shown to affect bone healing and cartilage regrowth directly. Pulsed electromagnetic fields stimulate the cells responsible for regrowth. The X-ray below shows the knee of a 70-year-old female who was experiencing extreme pain when walking because the cartilage had degenerated. PEMF encouraged cartilage growth between the bones (on the right).

Healing for many injuries involving bone and cartilage can be assisted through PEMF energy medicine.

X-ray showi g cartilage dege eratio (left) a d rege eratio (right) usi g PEMF therapy.

Pain Management

The body handles pain by producing endorphins (endogenous morphine) in the central nervous system and the pituitary gland. Endorphins block the transmission of pain signals to the brain. Modern medicine deals with the pain by prescribing opiates such as Morphine, Oxycodone, Percocets, Opium and other drugs, which are addictive and harmful to the liver, kidneys, and bowel, especially during prolonged periods of exposure.

PEMF energy medicine stimulates the production of natural endorphins and therefore is very useful in dealing with pain, especially chronic pain. However, it does not have the side effects of invasive surgery or pharmaceuticals. PEMF helps cells heal the original cause of the problem, or underlying pathology and consequently addresses the root cause and the symptoms simultaneously.

Enhanced Immunity

The immune system protects the human body. When the circulation system is working, the lymphatic system can dispatch its resources. These resources fight foreign substances present in the body such as viruses, bacteria, parasites, toxins or cancerous cells in the body.

The body requires a sufficient level of oxygen circulation, balanced glucose levels, consistent temperature, but also optimal voltage (or pH levels) to maintain health. When the body has a high acidity level, bacteria, viruses, parasites and cancers thrive, causing sickness and disease to spread.

PEMF addresses all these areas by boosting the cells to do the jobs for which they were designed. When all the cells work at maximum efficiency, infections are dealt with much more rapidly and effectively. Circulation for the blood and the lymphatic system is maximized to allow the deployment of the body's built-in immune defences.

The immu e system attacki g a virus.

The energy medicine supplied through PEMF can bolster the immune system without the dangerous side effects of pharmaceutical drugs. It encourages the body to heal itself without impeding function.

Improved Sleep and Body Healing

Insomnia or sleeplessness is common in today's society. The National Sleep Foundation's 2002 "Sleep in America" poll showed that 58% of adults in the U.S. experienced symptoms of insomnia a few nights a week or more.

Insomnia is typically followed by functional impairment while awake. Insomnia can occur at any age, but it is particularly common in the elderly. Insomnia can lead to memory problems, depression, irritability and an increased risk of heart disease and automobile-related accidents.

A survey of 1.1 million residents in the United States found that those who reported sleeping about 7 hours per night had the lowest rates of mortality, whereas those who slept for fewer than 6 hours or more than 8 hours had higher mortality rates.

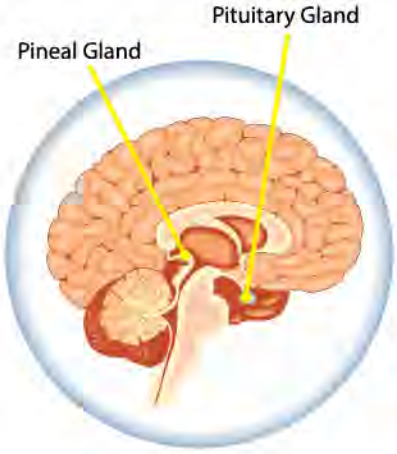
Those who are having trouble sleeping sometimes turn to sleeping pills, which can help when used occasionally but may lead to substance dependency or addiction if used for an extended period.

It is during the sleep cycle that the body heals, repairing damage and regenerates cells. However, many people have trouble with sleep. If the body does not recover during the sleep cycle, sickness will increase, leading to disease, depression and other disorders.

It is during the sleep cycle that natural human growth hormones and Melatonin are produced. These hormones are known to be critical factors in anti-ageing. Many pharmaceutical companies manufacture these hormones, but synthetic supplements often have

side effects and are banned by sports authorities as they are considered performance enhancers. The natural hormones created by our bodies are safe and lack the side effects.

Pulsed electromagnetic fields stimulate the pineal gland to produce Melatonin, which is the essential hormone for sleep, anti-ageing, and is also a powerful antioxidant. PEMF also stimulates the pituitary gland to produce the human growth hormone (HGH), which incites growth, cell reproduction and regeneration in humans and other animals.



Healthy ☒ging

Health and wellness should be one of the essential goals of our lives. Each day we should be working on our health and well-being through a planned blend of diet and nutrition as well as exercise and revitalization.

All of us are going to age. Maintaining cell health and organ function will help us age healthily. New cells are needed to replace old dying cells. During the natural ageing process, our cells are replaced, but we want to ensure they regenerate into a healthy environment. PEMF is a great partner in healthy ageing, ensuring the natural regeneration is carried out to its optimum.

Illness and stress accelerate ageing effects. Sometimes the "cures" prescribed to help us, such as pharmaceuticals, can intensify the process. Diet, exercise habits, environment, toxin exposure all contribute to premature ageing, which is fraught with health issues.

Quality of Life

As people live longer, quality of life is an issue. Living is not just about surviving but also about being valuable contributors to society.

Disease and sickness can lessen the desire to live life to the fullest. Physical degeneration such as cardiovascular disease, high blood pressure, arthritis,

osteoporosis, chronic digestive issues, loss of motor skills and eyesight, diabetes, etc., can all contribute to diminishing the quality of life. Cognitive conditions such as stress, depression, memory loss, and diseases such as Alzheimer's, Parkinson's, can also reduce the quality of life. None of us wants to "survive." We want to "thrive!"

PEMF has a holistic effect on the body's functions because it operates at a cellular level. PEMF addresses all the issues of ageing as cells are energized to perform at their optimal level, restoring a quality of life as they perform their designated function.

Benefits of Curatron Systems

For you g people

- Maintaining good health and preventing illnesses
- Improving physical fitness and mental performance, thus achieving more success at work and school

For elderly people

- Easing of age-related ailments, resulting in better well-being and increased fitness
- Improvement of sleep
- Better vitality
- Better quality of life

For the whole family

- Living to old age in a state of health and fitness
- Being efficient and successful at work
- Nervous system harmony.
- Purification
- Metabolic stimulation

Stress

One of the biggest challenges we face today is stress. Stress is a leading cause of illness and disease, both mental and physiological. Stress causes reactions in the body such as an increased heart rate, sweating, clammy feeling, increased breathing, and over time it can lead to anxiety attacks, heart disease and diabetes. Fatigue, immune problems, anxiety and depression are linked to stress. It is estimated that stress is responsible for 70% of the issues doctors with which have to deal.

Research has shown that daily use of PEMF therapy can alter stress responses by acting directly on the nervous system, glands, cells, tissues, and organs. By working on the hypothalamus and increasing urine excretion of adrenaline, PEMF has been shown to inhibit activation of the sympathetic nervous system and adrenal glands, while preventing a decrease in the body's ability to resist stress. With sustained use of pulsed magnetic therapies, the excitability of the nervous system also decreases, and emotional reactions accompanying stress are corrected. Long-term use of PEMF may be able to help the body remodel tissues that tend to be hyper-reactive to chronic or acute stress so that over time they will become less and less reactive.

Depression

Depression is a state of low mood and aversion to activity that can affect a person's thoughts, behaviour, feelings and sense of well-being. Depressed people can feel sad, anxious, empty, hopeless, worried, helpless, worthless, guilty, alone, irritable, hurt, or restless. They may lose interest in activities that were once pleasurable, experience loss of appetite or overeating, have problems concentrating, remembering details or making decisions as though in a brain fog. Those who experience depression may also contemplate, attempt, or commit suicide. Insomnia, excessive sleeping, fatigue, aches and pains, digestive problems or reduced energy may occur. Studies show that PEMF was found to be helpful across

a wide range of forms of depression, including bipolar disorder, where significant improvement of symptoms has occurred.

PEMF stimulates the neurons to vibrate at the frequency of the earth's circadian rhythms and stimulates electrical activity in the brain, changing the neuronal networks and thereby altering the mood, reducing depression and anxiety. Energy medicine is non-addictive.

Neurological Disorders

Neurons are the core components of the central nervous system, which includes the brain and spinal cord. They also make up the ganglia of the peripheral nervous system.

Neurons are electrically excitable cells that process and transmit information through electrical and chemical signals. They connect to form neural networks. Sensory neurons which respond to touch, sound, light and all other stimuli affecting the cells of the sensory organs that then send signals to the spinal cord and brain. Motor neurons receive messages from the brain and spinal cord and cause muscle contractions and affect glandular outputs. Inter-neurons connect neurons to other neurons within the same region of the brain or spinal cord in neural networks.

The brain is the control center of the central nervous system. It is a complex organ that directs the activity of all other components of the body. The brain is composed of different lobes that are responsible for various functions.

All neurons maintain voltage gradients across their membranes utilizing metabolically driven ion pumps. Changes in the cross-

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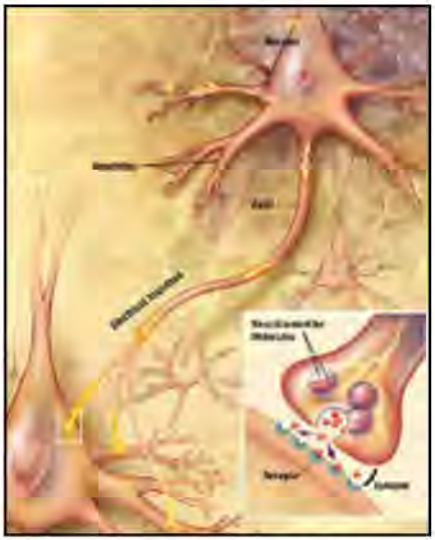


membrane voltage can alter the function of voltage-dependent ion channels. If the voltage changes by a large enough amount, an all-or-nothing electrochemical pulse called an action potential is generated, which travels rapidly along the cell's axon and activates synaptic connections with other cells when it arrives.

PEMF assists neurological disorders such as Parkinson's, Alzheimer's, and related issues such as depression and phobias because it stimulates neurons and, thus, brain cells to return to normal functioning frequencies.

Stroke management

Studies have shown that PEMF energy medicine is beneficial for stroke management, producing significant improvements in function by boosting brain plasticity (the ability of the brain to remodel itself to improve motor function, enhance comprehension and speech). By stabilizing the physical learning processes of the brain,

The Science of Energy in the Human Body

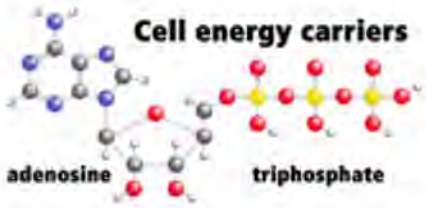
Cellular engines

The human body is composed of one hundred trillion cells. The cells are like mini-engines powered by fuel (from the nutrients we digest) mixed with oxygen (from the air we breathe) and ignited by electrons stored in the cell batteries (mitochondria) driving the metabolism process. Each cell is designed to perform different functions, all working symbiotically to

propel life in the body. Marrow cells within some bones create red blood cells. Blood cells deliver nutrients and oxygen to the body while removing toxins. Other cells, such as those in the liver and kidneys, combine to perform tasks such as cleaning the blood. Whatever the specific cellular function, each cell is powered by the same process.

Rechargeable energy carriers

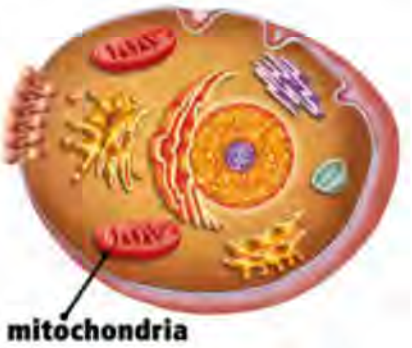
Most cell processes use the same energy source, the rechargeable energy carrier, adenosine triphosphate or ATP. The phosphate groups in this energy carrier are held together by very high energy chemical bonds. Under certain conditions,



one of the phosphates can break away, releasing energy. The energy released is used for energy-hungry reactions that keep a cell alive and impact directly on our health. When phosphate is released, what is left is adenosine diphosphate (ADP), or spent fuel cells. These spent fuel cells are recharged from ADP to ATP. This process requires the infusion of energy, which comes from the food we eat.

How the energy factories recharge the energy carriers

All nucleated cells contain mitochondria, which are the energy factories of the cell. Mitochondria take in molecules derived from food with lots of chemical bond energy, which are the breakdown products of sugars and fats. These fuel molecules are disassembled inside



the mitochondria to release their chemical bond energy. This energy is in the form of electrons. Pumps embedded in the cell membrane push the hydrogen ions obtained from the fuel molecules into the inner membrane sack within the mitochondria. These are some of the raw materials for energy production.

The role of oxygen

Oxygen has a powerful attraction for electrons and is used to recharge the ADPs (flat batteries), turning them into ATPs (charged batteries). Oxygen has a powerful pull on electrons generated by the mitochondria and uses most of the energy in the fuel molecules to push the hydrogen ions through the cell ATP synthase enzymes, recharging the flat battery (ADP) into a charged battery (ATP) by adding a phosphate ion to it. Without oxygen, the cell can only make 2 ATPs for every sugar molecule metabolized. With oxygen, the same cell can produce 38 ATPs from each sugar molecule.

Cell batteries

According to Nobel Prize Laureate, Dr. Otto Warburg, cells maintain a voltage across their membranes.

Each cell is designed to have a positive charge on the outside and a negative charge on the inside. The exterior is charged with Sodium ions, while the inside of the cell is charged with potassium ions. The two charges are separated by the cell membrane, which serves as an insulator. Within the cell are ion pumps which pump ions into and out of the cell through the cell membrane. More potassium ions are injected into the cell while sodium ions are pumped out of the cell, positively charging the cell. The difference in electrical potential (voltage) across the membrane is referred to as trans-membrane Potential (TMP). This process of charging the cells creates a second type of "cell battery" or energy storage (ATP is the first).

Cells will power-down due to the ageing process, stress, unhealthy diet, and the toxic environment in which we live. Dr. Warburg found healthy people had cell voltages of 70-100 mV; people with chronic illnesses had cell voltages between 30-50 mV; whereas cancer patients displayed cell voltages less than 15-20 mV. Diminished cellular voltage has a direct correlation to disease and sickness. Cancer cannot thrive in highly charged cells; this is why we never hear of cancer of the heart, as it is the muscle that has the highest voltage of any organ in the body.

Energizing the body

The energy produced during the ATP bio-electrical process empowers the body's components to perform the function for which they were designed, such as respiration, circulation, movement, digestion, reproduction, and all organ functions.

PEMF energy medicine and the body's cells

PEMF energy medicine enhances the work of charging the batteries (transforming the mitochondria's ADP to ATP). It stimulates all the components involved in delivering the oxygen and nutrients to the mitochondria for energy (ATP) production. PEMF enhances the body's delivery systems, including circulation and hydration. It increases oxygen absorption by energizing the cellular pumps, which boost the absorption of vital nutrients, and the expulsion of waste toxins from the metabolic process. The energized cells have an increased charge (TMP), which maximizes the aerobic respiration (with oxygen) of the body for optimum energy production (ATP).

naerobic respiration

Cells will still create energy without oxygen in a process called anaerobic respiration. This process is hugely inefficient, producing only 2 ATP for every molecule of sugar processed (aerobic respiration produces 38). Anaerobic respiration also creates toxic byproducts such as lactic acid and slows down the body's ability to heal itself as infections occur more quickly in an acidic environment that lacks oxygen. If the body is not delivering enough oxygen for the mitochondria to create ATP, then it will result in fermentation. An athlete will experience "cramps" because the cells are inefficiently producing ATP with lactic acid as a byproduct. Disease thrives in an acidic environment, promoting infection and slowing down the healing process.