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Curing the Incurable

with
Dr. Garry F. Gordon MD,DO,MD(H)
Gordon Research Institute

September 22 – 24, 2011
London, UK

World Health Organization & Vaccine Manufacturers Implicated In Massive H1N1 Financial Scam Involving Kickbacks & Cover-ups

by Joel Lord – 6 June 2010

A stunning new report reveals that top scientists who convinced the World Health Organization to declare H1N1 a global pandemic held close financial ties to the drug companies that profited from the sale of those vaccines.

This report, published in the British Medical Journal, exposes the hidden ties that drove WHO to declare a pandemic, resulting in billions of dollars in profits for vaccine manufacturers.

"For WHO, its credibility has been badly damaged. WHO must act now to restore its credibility." Fiona Godlee, Editor of British Medical Journal (BMJ)

Gunpoint vaccination and prison sentences for vaccine refusers in Malawi

By Norma Erickson, President of SaneVax Inc.

Apparently there is no respect for religious freedom or parental rights when it comes to vaccination practices in Malawi. According to a recent article in "*The Malawi Voice*," written by Mike Langa-Lulanga, members of several religious groups who do not believe in medications of any kind recently took their children across the Malawi border into Mozambique to protect their children during an MMR vaccination drive in their country.

Shortly after returning to their home, approximately 131 children were rounded up by local health authorities with police escorts and vaccinated at gunpoint.

In a related incident, the caretaker of three orphans was sentenced to 24 months at hard labor for 'endangering life by failing to supply the necessities of life to a person under one's care without lawful excuse.' His crime? He refused the free MMR vaccine for the three orphans he took into his home and was raising as though they were his own children.

One of the Most Inexcusable Vaccine Revelations of All...

Posted By Dr. Mercola | July 10 2011 | 220,188 views

Former drug company scientist Helen Ratajczak recently created a firestorm of debate from all sides of the vaccine-autism issue when she published her comprehensive review of autism research. This is a massively important study, for more than one reason. One element brought to light that has managed to stay well below the radar is the use of aborted embryonic cells in vaccine production.

CBS News recently reported:

> *"Ratajczak reports that about the same time vaccine makers took most thimerosal out of most vaccines (with the exception of flu shots which still widely contain thimerosal), they began making some vaccines using human tissue.*
>
> *Ratajczak says human tissue is currently used in 23 vaccines. She discusses the increase in autism incidences corresponding with the introduction of human DNA to MMR vaccine, and suggests the two could be linked."*

Study Confirms Autism Boom - Correlates with Aborted Fetal DNA in Vaccines

News

BY LIFESITENEWS.COM

Analyses of autism rate data published by SCPI identify 3 clear change points in U.S. autism disorder trends: 1981, 1988 and 1995, all of which the groups claims roughly correlate with the use of vaccines (Meruvax, MMRII, and Chickenpox) that were cultivated with the use of tissue from aborted children. The group says that it has been unable to identify any other factor that might correlate to the change in autism rates.

THE NEW ENGLAND JOURNAL of MEDICINE

BRIEF REPORT

Autoantibodies to Folate Receptors in the Cerebral Folate Deficiency Syndrome

Vincent T. Ramaekers, M.D., Sheldon P. Rothenberg, M.D., Jeffrey M. Sequeira, M.S., Thomas Opladen, M.D., Nenad Blau, Ph.D., Edward V. Quadros, Ph.D., and Jacob Selhub, Ph.D.

SUMMARY

In infantile-onset cerebral folate deficiency, 5-methyltetrahydrofolate (5MTHF) levels in the cerebrospinal fluid are low, but folate levels in the serum and erythrocytes are normal. We examined serum specimens from 28 children with cerebral folate deficiency, 5 of their mothers, 28 age-matched control subjects, and 41 patients with an unrelated neurologic disorder. Serum from 25 of the 28 patients and 0 of 28 control subjects contained high-affinity blocking autoantibodies against membrane-bound folate receptors that are present on the choroid plexus. Oral folinic acid normalized 5MTHF levels in the cerebrospinal fluid and led to clinical improvement. Cerebral folate deficiency is a disorder in which autoantibodies can prevent the transfer of folate from the plasma to the cerebrospinal fluid.

Another Name for Autism?

Cerebral folate deficiency can be defined as any neuropsychiatric condition associated with low levels of 5-methyltetrahydrofolate (5MTHF), the active folate metabolite in the cerebrospinal fluid, in association with normal folate metabolism outside the central nervous system, as reflected by normal hematologic values, normal serum homocysteine levels, and normal levels of folate in serum and erythrocytes.

Infantile-onset cerebral folate deficiency is a neurologic syndrome that develops four to six months after birth. Its major manifestations are marked irritability, slow head growth, psychomotor retardation, cerebellar ataxia, pyramidal tract signs in the legs, dyskinesias (e.g., choreoathetosis and ballismus), and in some cases, seizures.

After the age of three years, central visual disturbances can become manifest and lead to optic atrophy and blindness.

The only identifiable biochemical abnormality consistently found in these children is a low level of 5MTHF in the cerebrospinal fluid.

Science AAAS | ScienceInsider
Breaking news and analysis from the world of science policy

Preventable Chronic Diseases Are Now the World's Biggest Killers

by Sara Reardon
27 April 2011, 2:55 PM

"WHO Assistant Director-General Ala Alwan cited a World Bank report that found half of families who have a family member with cancer spend more than 30% of their income on treatment, driving 50% of these families below the poverty line as a result".

The chronic health problems of post-industrial societies have now spread to the developing world, says a new report by the World Health Organization.

Diabetes, heart disease, and cancer now cause more deaths worldwide than all other diseases combined, according to the first global status report on noncommunicable diseases (NCDs) released at the WHO Global Forum in Moscow today.

http://news.sciencemag.org/scienceinsider/2011/04/preventable-chronic-diseases.html

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Relation between plasma ascorbic acid and mortality in men and women in EPIC-Norfolk prospective study: a prospective population study

THE LANCET

Volume 357, Issue 9257, Pgs 657 - 663
3 March 2001
doi:10.1016/S0140-6736(00)04128-3

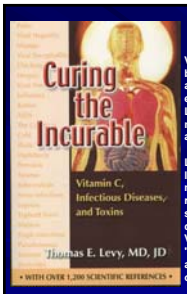
Prof Kay-Tee Khaw FRCP, Sheila Bingham PhD, Ailsa Welch BSc, Robert Luben BSc, Nicholas Wareham MRCP, Suzy Oakes, Nicholas Day PhD

Plasma ascorbic acid concentration was inversely related to mortality from all-causes, and from cardiovascular disease, and ischaemic heart disease in men and women.

Risk of mortality in the top ascorbic acid quintile was about half the risk in the lowest quintile (p<0·0001).

The relation with mortality was continuous through the whole distribution of ascorbic acid concentrations. A 20 µmol/L rise in plasma ascorbic acid concentration, equivalent to about 50 g per day increase in fruit and vegetable intake, was associated with about a 20% reduction in risk of all-cause mortality (p<0·0001), independent of age, systolic blood pressure, blood cholesterol, cigarette smoking habit, diabetes, and supplement use.

http://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2800%2904128-3/abstract



VITAMIN C

Vitamin C, given at sufficiently high doses, by itself, can cure life-threatening infections and neutralize many otherwise fatal toxin exposures, according to author Thomas E. Levy, MD, JD in his extensively referenced new book, Vitamin C, Infectious Diseases, and Toxins: Curing the Incurable.

Levy's book is unmatched in the medical literature. According to Dr. E. Cheraskin, more than 80,000 scientific papers and reports have been written about vitamin C since its chemical nature was first discovered early in the 20th century. The Vitamin C Foundation credits Levy with "doing an almost impossible feat of reading, analyzing and clearly explaining the meaning of the massive science behind vitamin C."

http://findarticles.com/p/articles/mi_m0ISW/is_2003_May/ai_100767885/

Linus Pauling Institute
Micronutrient Research for Optimum Health

Vitamin C

Vitamin C, also known as ascorbic acid, is a water-soluble vitamin. Unlike most mammals and other animals, humans do not have the ability to make their own vitamin C. Therefore, we must obtain vitamin C through our diet.

Vitamin C is required for the synthesis of collagen, an important structural component of blood vessels, tendons, ligaments, and bone.

Vitamin C also plays an important role in the synthesis of norepinephrine.

Vitamin C is required for the synthesis of carnitine, a small molecule that is essential for the transport of fat into cellular organelles called mitochondria, where the fat is converted to energy.

Research also suggests that vitamin C is involved in the metabolism of cholesterol to bile acids, which may have implications for blood cholesterol levels and the incidence of gallstones

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Linus Pauling Institute
Micronutrient Research for Optimum Health

Vitamin C is also a highly effective antioxidant.

Even in small amounts vitamin C can protect indispensable molecules in the body, such as proteins, lipids (fats), carbohydrates, and nucleic acids (DNA and RNA), from damage by free radicals and reactive oxygen species that can be generated during normal metabolism as well as through exposure to toxins and pollutants (e.g., cigarette smoke).

Vitamin C may also be able to regenerate other antioxidants such as vitamin E. One recent study of cigarette smokers found that vitamin C regenerated vitamin E from its oxidized form.

Vitamin C, through its antioxidant functions, has been shown to protect leukocytes from such effects of autooxidation. Phagocytic leukocytes also produce and release cytokines, including interferons, which have antiviral activity.

Linus Pauling Institute
Micronutrient Research for Optimum Health

Disease Prevention

- **The amount of vitamin C required to prevent chronic disease appears to be more than that required for prevention of scurvy.**
- **Much of the information regarding vitamin C and the prevention of chronic disease is based on prospective studies, in which vitamin C intake is assessed in large numbers of people who are followed over time to determine whether they develop specific chronic diseases.**

Cardiovascular Diseases

- **The NHANES 1 study found that the risk of death from cardiovascular diseases was 42% lower in men and 25% lower in women who consumed more than 50 mg/day of dietary vitamin C *and* regularly took vitamin C supplements, corresponding to a total vitamin C intake of about 300 mg/day.**

Cancer

- **A prospective study that followed 870 men over a period of 25 years found that those who consumed more than 83 mg of vitamin C daily had a striking, 64% reduction in lung cancer compared with those who consumed less than 63 mg per day.**

Linus Pauling Institute
Micronutrient Research for Optimum Health

Vitamin C and Lead Toxicity

In a study of 747 older men, blood lead levels were significantly higher in those who reported total dietary vitamin C intakes averaging less than 109 mg/day compared to those who reported higher vitamin C intakes.

A much larger study of 19,578 people, including 4,214 children from six to 16 years of age, found higher serum vitamin C levels to be associated with significantly lower blood lead levels.

A U.S. national survey of more than 10,000 adults found that blood lead levels were inversely related to serum vitamin C levels.

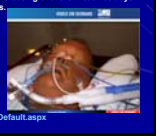
An intervention trial that examined the effects of vitamin C supplementation on blood lead levels in 75 adult male smokers found that 1,000 mg/day of vitamin C resulted in significantly lower blood lead levels over a four-week treatment period compared to placebo.

Centre for Advanced Medicine Ltd
http://www.camltd.co.nz/h1n1.html

High Dose IV Vitamin C Saves NZ Man with Swine Flu Damaged Lung

A 56 year old male was referred to Auckland Hospital ICU on 1 July 2009 with total respiratory failure, for ECMO external oxygenation. The patient had contracted H1N1 Swine flu (confirmed by tests) while on holiday overseas, and had developed what is known as 'white out' pneumonia. This refers to x-rays showing no air space in the lungs. After 20 days of life-sustaining ECMO treatment and other critical care, the patient, who was unconscious by induced coma, had not responded. The ICU team advised the family of the likely outcome and had prepared them for the possibility of the patient's death.

At the family's request, information was provided to ICU doctors including ISO 9001:2008 registered protocols, safety data, dosages and access to vials of IV vitamin C under CAM's license for wholesale medicines. The patient received intravenous vitamin C starting on the evening of 21 July, continuing until 29 July. 25 grams was provided on the first day increasing over the first three days to 50 grams twice daily which was sustained for a further six days.



By 24 July x-rays indicated increasing lung function and ECMO external oxygenation was discontinued on 26 July. After several days of assisted ventilation and critical care for ongoing secondary conditions, the patient was able to commence his recovery and rehabilitation. The patient was discharged from hospital on Friday 18 September, and is recovering at home on the farm.

Watch the 60 Min News Report:
http://www.3news.co.nz/Living-Proof/tabid/371/articleID/171328/Default.aspx

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High Dose Vitamin C Is Safe For Cancer Patients

19 Mar 2006

Scientists from the RECNAC II project have published findings that verify the safety of high dose intravenous vitamin C. In this study, published in the Puerto Rico Health Sciences Journal, vol. 24 (4): 269-276, a phase one clinical trial with 24 terminal cancer patients receiving between ten and sixty grams of sodium ascorbate daily for eight weeks, adverse effects were reportedly minor. "The results presented in this manuscript should allay fears about the safety of 'mega-dose' vitamin C," said Dr. Joseph Casciari, co-author of the manuscript. This research comes on the heels of independent studies demonstrating efficacy of high dose vitamin C against tumor cells in experimental tumor models. Moreover, recently published case studies suggest that high dose intravenous vitamin C can be an effective clinical modality against cancer (RECNAC II, March 2000, and National Institutes of Health (NIH), September 2005).

Vitamins vs. Chemotherapy and Radiation for Cancer Therapy

by Reagan Houston, MS, PE
Townsend Letter – Aug/Sept 2009

Vitamins can strengthen the immune system to improve regular therapies and safely kill cancer. Here we compare cancer therapy by multivitamins with radiation and most chemotherapies. The late Abram Hoffer, MD, PhD, prescribed a regimen high in oral vitamin C plus other vitamins and minerals (Table 1). He also prescribed a diet low in meat, very low in sugar, but high in fruits, vegetables, and water. Most of his patients had failed prior surgery, radiation, and/or chemotherapy as prescribed by their oncologists. To all of his cancer patients, Hoffer offered the vitamin regimen, diet, and hope based on the results with earlier patients.

Table 1: Dr. Hoffer's Regimens (3), (6)

	Early	Later
Vitamin C mg	12,000	12,000
range	3,000-40,000	3,000-10,000
* Vitamin A, IU	10,000-50,000	
* Beta carotene	30K-75K IU	30,000 IU
Vitamin B complex	B50 to B100	1 or 2 of B100
Vitamin B-3	5,000 IU	To 19,000 IU
Vitamin E	300 IU	
Vitamin E succinate		800 IU
Selenium	600 mcg	400 to 600 mcg
Zinc as citrate	60 mg	60 mg
Coenzyme Q10		300 IU
Curcumin		300 mg
* Bioperin		15 mg

* Optional

Table 2: Survival of Cancer Patients After Seeing Hoffer (11)

Type of Cancer	With Vitamins	Without Vitamins
Breast	70	3.7
Lung	17	2.0
Ovary	16	3.6
Pancreas	40	2.4
Uterus	99	4.0
All 30 types	45 months	2.6 months

Dr. Hoffer's results were excellent. Those who refused vitamins lived a median of only 2.6 months. The 101 who accepted vitamins lived 45 months after seeing Hoffer (Table 2).

Anticancer Res. 1997 Sep-Oct;17(5A):3513-20.

Modulating factors of radical intensity and cytotoxic activity of ascorbate (review).

Sakagami H, Satoh K.

Ascorbate acts both as an antioxidant and as an oxidant, depending upon the environment in which the molecule is present.

We have reported that millimolar concentrations of ascorbate induced apoptotic cell death, characterized by cell shrinkage, nuclear fragmentation and internucleosomal DNA cleavage, in human myelogenous leukemic cell lines. Ascorbate derivatives, which can induce the apoptosis, produced the radical(s), elevated the oxidation potential and stimulated the methionine oxidation in the culture medium, whereas inactive derivatives did not. This suggests that the ascorbate induce the apoptosis by its prooxidant action. The effects of various factors, such as temperature, pH, metal, metal antagonist, redox agent, serum protein, polyphenol and (natural, chemically modified) polysaccharide on the radical intensity and apoptosis-inducing activity of ascorbate are reviewed. Gallate and benzo[a]phenothiazine derivatives, which can induce apoptosis or monocytic differentiation in human myelogenous leukemic cell lines, also produced radicals. These data suggest the significant role of radicals in the initiation of diverse biological activities.

PMID: 9413196 [PubMed - indexed for MEDLINE]

Vitamin C Injections Slow Tumor Growth in Mice

NIH News

High-dose injections of vitamin C, also known as ascorbate or ascorbic acid, reduced tumor weight and growth rate by about 50 percent in mouse models of brain, ovarian, and pancreatic cancers, researchers from the National Institutes of Health (NIH) report in the August 5, 2008, issue of the *Proceedings of the National Academy of Sciences*.

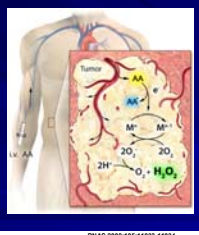
In their laboratory experiments on 43 cancer and 5 normal cell lines, the researchers discovered that high concentrations of ascorbate had anticancer effects in 75 percent of cancer cell lines tested, while sparing normal cells.

In their paper, the researchers also showed that these high ascorbate concentrations could be achieved in people.

The team then tested ascorbate injections in immune-deficient mice with rapidly spreading ovarian, pancreatic, and glioblastoma (brain) tumors. The ascorbate injections reduced tumor growth and weight by 41 to 53 percent. In 30 percent of glioblastoma controls, the cancer had spread to other organs, but the ascorbate-treated animals had no signs of disseminated cancer. "These pre-clinical data provide the first firm basis for advancing pharmacologic ascorbate in cancer treatment in humans," the researchers conclude.

http://www.nih.gov/news/health/aug2008/niddk-04.htm
Image: Mark Levine

Proposed mechanism for tumoricidal action of ascorbate acid (AA) Vitamin C.



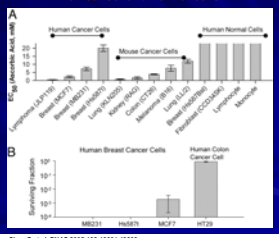
Pharmacologic concentrations of ascorbate may engender a pro-oxidant cytotoxic state within tumors.

In initial *in vitro* experiments, there was observed hydrogen peroxide (H2O2)-dependent cytotoxicity after ascorbate exposure (EC50 4 mM) in five cancer cell lines, whereas normal cells were resistant.

PNAS 2008;105:11033–11034

PNAS

Effects of pharmacologic ascorbic acid concentrations on cancer and normal cells.



Chen Q et al. PNAS 2005;102:13604-13609

PNAS

High Doses of IV Vitamin C Fight Cancer

September 12, 2005

High doses of vitamin C administered intravenously can fight cancer -- at least in the laboratory, researchers report. They took another look at the vitamin years after studies first suggested in the 1970s that high doses of ascorbate or vitamin C may help fight cancer. In the wake of those studies, additional studies using the same high doses found no benefit, although some of them used only oral vitamin C, not intravenous doses of the vitamin. After those initial, failed studies using oral vitamin C, "the conclusion was that this therapy should be shelved, that it doesn't work," said lead researcher Dr. Mark Levine, chief of the molecular and clinical nutrition section and senior staff physician, National Institute of Diabetes & Digestive & Kidney Diseases. But Levine and his team took another look at the therapy after working for the federal government on the latest recommended daily intake levels for vitamin C. As part of those studies they examined the body's absorption of the nutrient and found that while oral intake does reach a saturation point, "when you give doses intravenously they go through the roof in the blood and then they are cleared," Levine explained. According to Levine, a 10 gram dose of vitamin C given intravenously produces bloodstream concentrations more than 25-fold higher than concentrations achieved from the same oral dose.

Since high-dose IV Vitamin C is becoming more widely employed today, as an OXIDATIVE THERAPY for serious health conditions including HEPATITIS and CANCER, ACAM currently offices a COURSE on OXIDATIVE THERAPIES.

A powerpoint presentation from the course is able to be viewed at www.gordonresearch.com under presentations

J Nutr. 1994 Jun;124(6 Suppl):981S-986S.

Maternal low level lead and pregnancy outcomes

West WL, Knight EM, Edwards CH, Manning M, Spurlock B, James H, Johnson AA, Oyemade UJ, Cole OJ, Westney OE, et al.
Department of Pharmacology, College of Medicine, Howard University, Washington, D.C.

We examined the relationship between the concentrations of blood lead and pregnancy

A human study, evaluating blood lead levels in pregnant women, found that 1,000 mg vitamin C per day, in addition to a prenatal multivitamin supplement, significantly lowered blood lead levels from a mean of 5.1 to 1.1 ug/dL during the course of pregnancy.

with gestational age, Ponderal Index, infant orientation, and hematologic values. In the total subset, the three trimester sample means for maternal blood lead concentrations were not significantly different for mothers of infants who weighed less than 2500 g (low birth weight) and those who were delivered infants who weighed 2500 g or more. Clinically, nutrition may play a role in the reduction of potentially adverse effects from lead during pregnancy, i.e. protection of the fetus against lead toxicity and/or free radical damage through the antioxidant actions of vitamin E and ascorbic acid.

FDA APROVED VITAMIN C/VITAMIN K3 COMBINATION CANCER DRUG!

Apatone® is an investigational new drug undergoing clinical trials in the US. First approved for human study in 2005, the drug includes two vitamin small molecules that target and treat inflamed cells. (VK3 and VC)

In mid-2007 the drug was granted Orphan drug status by the FDA's Office of Orphan Products for treatment of late stage urinary bladder cancer. The mechanism of action relies on inflammatory targeting and intercellular redox unique to non-vitamin moieties of combined vitamins C and K3. Apatone selectively targets inflamed cells and inhibits NF-KB, a nuclear factor kappa-light-chain-enhancer of activated B cells.

Through receptors on the cell surface Apatone targets the same cells that are illuminated by Positron Emission Tomography (PET). In this way the drug selectively targets and then treats inflamed cells. The current study is designed to examine Apatone's effect on specific inflammatory factors known to degrade bone, a critical part of joint disease, some cancers and other indications.

IC-MedTech http://www.ic-medtech.com/index.php

PubMed.gov

Altern Med Rev. 2010 Dec;15(4):345-51.

The vitamin C:K3 system - Enhancers and inhibitors of the anticancer effect.

Lamson DW, Gu YH, Plaza SM, Brignall MS, Brinton CA, Sadlon AE.

Abstract
The oxidizing anticancer system of vitamin C and vitamin K3 (VC:VK3, producing hydrogen peroxide via superoxide) was combined individually with melatonin, curcumin, quercetin, or cholecalciferol (VD3) to determine interactions. Substrates were LNCaP and PC-3 prostate cancer cell lines. Three of the tested antioxidants displayed differences in cell line cytotoxicity. Melatonin combined with VC:VK3 quenched the oxidizing effect, while VC:VK3 applied 24 hours after melatonin showed no quenching. With increasing curcumin concentrations, an apparent combined effect of VC:VK3 and curcumin occurred in LNCaP cells, but not PC-3 cells. Quercetin alone was cytotoxic on both cell lines, but demonstrated an additional 50-percent cytotoxicity on PC-3 cells when combined with VC:VK3. VD3 was effective against both cell lines, with more effect on PC-3. This effect was negated on LNCaP cells with the addition of VC:VK3. In conclusion, a natural antioxidant can enhance or decrease the cytotoxicity of an oxidizing anticancer system in vitro, but generalizations about antioxidants cannot be made.

The VC:VK3 combination generates H2O2 efficiently by redox cycling, such that a high level of VC by the intravenous route may not be necessary for cancer cell death. Since the VC:VK3 combination increases the cytotoxicity by six- to seven-fold over individual vitamin use, the oralroute might suffice. Research on this concept proceeded through the usual route from *in vitro*, to *in vivo*, to human trial.

The VC:VK3 system has performed positively *in vitro* for prostate cancer, breast cancer, ovarian cancer, bladder cancer, hepatocarcinoma, and some leukemias.

http://www.ncbi.nlm.nih.gov/pubmed/21194250

PubMed.gov

Anticancer Res. 1996 Jan-Feb;16(1):499-503.

Potentiation of radiotherapy by nontoxic pretreatment with combined vitamins C and K3 in mice bearing solid transplantable tumor.

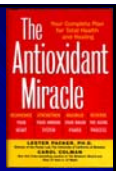
Taper HS, Koyeux A, Roberfroid M.
Département des Sciences Pharmaceutiques, Université Catholique de Louvain, Brussels, Belgium.

Combined vitamins C with K3 most probably constitute a redox-cycling system producing hydrogen peroxide and other active oxygen species to which cancer cells are selectively sensitive due to their frequent deficiency in enzymatic defense system against free oxyradicals agression.

CONCLUSIONS: A possible introduction of such nontoxic and selective potentiation procedure into classical protocols of human cancer therapy appears to be generally accessible and without any additional risk for patients.

PMID: 8615662 [PubMed - indexed for MEDLINE]

Using Multiple Pathways A Possible Explanation



1. Normally Glucose and Vitamin C are taken up by the Glucose pathway; as adapted from Lester Packer - *The Vitamin E. Ascorbate and Alpha Lipoate Antioxidant Defense System.* "Glucose and Vitamin C are taken up into the cells by the same transport system."
2. It is theorized by more than one researcher that some forms of C with **GMS Ribose** and **B.E.E.T.™** Metabolites do not use the Glucose pathway exclusively for transport but use multiple, entirely different, separate and unique pathways to the cell. Many nutrients utilize the Glucose pathway for absorption, however it appears that some forms of C do not have to "**WAIT IN LINE**" to be absorbed into the cell.

8 Essential Sugars - Glyconutrients

Glyconutrients are known as the 8 essential sugars needed for optimal health and functioning in humans.

Nutritional scientists and glycobiologists have identified over 200 glyconutrients found in nature but only 8 are essential for cell-to-cell communication in people.

All of the 8 essential sugars (saccharides) aid in intercellular communication, but each glyconutrient also has special properties as well on a cellular level.

Here is a list of the 8 essential sugars:

1. Glucose
2. Mannose
3. Galactose
4. Fucose *(not to be confused with fructose)*
5. N-AcetylGalactosamine
6. N-AcetylGlucosamine
7. N-AcetylNeuraminic Acid
8. Xylose

Glyconutrients are plant carbohydrates (monosaccharides). There are over 200 carbohydrates or sugars but only 8 are essential to bodily function. They help your digestive system know which food components to absorb into the blood stream and which to ignore… which cells to attack and destroy, and which to protect and nurture.

Glyconutrient & Glyco Science Validation

Royal Society of Medicine

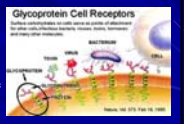
Certain carbohydrates (glyconutrients) are vital for the correct structure, function relationship of the following:

- Cells
- Membranes
- Enzymes
- Hormones
- Signaling
- Messenger molecules
- Tumor spread
- And at biological systems
- Every cell in your entire body

Your body will repair itself, regenerate itself, restore itself, and defend itself as long as you provide your body with the right tools it requires to function correctly.

Glycoforms, with their hair like cell surface structures, interact and communicate with other cell surfaces.

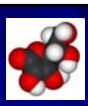
Science is validating that virtually every disease has altered and missing structures of glycoforms on the cell of the person affected with the specific disease… where a healthy person has the proper structure and assembly of glycoforms coating their cells.



Medical Hypotheses; May 1991: 35:32-37

A UNIQUE FUNCTION FOR ASCORBATE

By Dr. Robert F. Cathcart, M.D.
Allergy, Environmental, and Orthomolecular Medicine



Vitamin C is a reducing substance, an electron donor.
When vitamin C donates its two high-energy electrons to scavenge free radicals, much of the resulting dehydroascorbate is rereduced to vitamin C and therefore used repeatedly.

Conventional wisdom is correct in that only small amounts of vitamin C are necessary for this function because of its repeated use. The point missed is that the limiting part in nonenzymatic free radical scavenging is the rate at which extra high-energy electrons are provided through NADH to rereduce the vitamin C and other free radical scavengers. When ill, free radicals are formed at a rate faster than the high- energy electrons are made available. Doses of vitamin C as large as 1 to 10 grams per 24 hours do only limited good. However, when ascorbate is used in massive amounts, such as 30 to 200+ grams per 24 hours, these amounts directly provide the electrons necessary to quench the free radicals of almost any inflammation.

Additionally, in high concentrations ascorbate reduces NAD(P)H and therefore can provide the high-energy electrons necessary to reduce the molecular oxygen used in the respiratory burst of phagocytes. In these functions, the ascorbate part is mostly wasted but the necessary high-energy electrons are provided in large amounts.

WHAT'S HYDROGEN GOT TO DO WITH IT?

Albert Szent-Gyorgyi, the Hungarian Nobel Prize-winning biochemist who discovered Vitamin C, said that hydrogen rather than oxygen, is the fuel of life.

Most of us have heard of the so-called Carbon Cycle in nature but it's really a Hydrogen Cycle.

Here's how it works:

- **Plants take water and sunlight and break the water down into hydrogen and oxygen using sunlight and the hydrogen is used to make carbohydrates, lipids and proteins and the oxygen is emitted into the air and we breathe it.**
- **We eat the plant material, and enzymes in the body called dehydrogenators remove the hydrogen from the food that the plant makes for us. We burn the hydrogen with oxygen and emit carbon dioxide into the air which the plant absorbs.**
- **Carbohydrates are 1/3 carbon, 1/3 hydrogen and 1/3 oxygen. When the dehydrogenators release the hydrogen from the carbohydrates, it's burned with oxygen to create energy (fuel) for the body and the carbon and oxygen form the carbon-dioxide which is breathed out of the body.**

Hydrogen is the body's most needed nutrient.

Everyone is deficient in H-. A machine called the BTA or Biological Terrain Analyzer developed by a Dr. Morrell which tests blood, saliva and urine for H+, H- and minerals found 100% of people low in H-, especially as they got older. They were all over-oxidized. The absence of electrons causes numerous diseases.

When you hydrate the cells they plump and become healthy and the body goes into an anabolic state - when the cells become dehydrated, the body goes into a catalytic state and eats its own muscles.

Our bodies store hydrogen in "hydrogen pools" in the organs with the greatest amount stored in the liver which is the body's chemical factory and our most important organ for protection and self-defense. The liver detoxifies poisons to prevent them from getting into the body. Then hydrogen is stored in the intestine, then the lungs, then the spleen.

The hydrogen atom is the smallest atom known with only one electron. If hydrogen is ionised, it becomes H- which is hydrogen with one extra electron very loosely attached that it gives up easily. Electrons don't move in the body unless they are associated with hydrogen. A body in good health has abundant H- ionised molecules as does fresh organic orange juice and grapefruit juice (but which disappears very quickly).

The Effect of Hydrogen Ions on Humans

by John Brennan – April 2011

The juice in these oranges contains more hydrogen ions than hydroxide ions.

When a type of substance called a Bronsted acid dissolves in water, it releases hydrogen ions, increasing the hydrogen ion concentration. Chemists measure hydrogen ion concentration as pH: the lower the pH, the more hydrogen ions.

Hydrogen ion concentration, or pH, plays a variety of important roles in human physiology.

Proteins are large molecules that carry out many of the most important tasks in your body. Their structure is shaped partly by special bonds called hydrogen bonds that can form between different amino acids in the protein molecule. Compartments inside your cells maintain different pH levels. Lysosomes are compartments inside your cells that maintain a low pH within them; this low pH, or high hydrogen ion concentration, helps the lysosomes break down worn-out cell components.

Stomach lining parietal cells secrete hydrogen and chloride ions – or hydrochloric acid. This strong acid dramatically reduces the pH of the contents of your stomach, which helps to kill bacteria and break down molecules in your food. The hydrogen ions also affect digestion by ensuring that an enzyme called pepsin assumes the proper configuration it needs to do its job. Pepsin breaks up proteins in the food you eat for better digestion.

http://www.ehow.com/info_8275765_effect-hydrogen-ions-humans.html

Hydrogen ions affect the electrical potential within cell membrane walls.

The Effect of Hydrogen Ions on the Cell Walls

By Jacquelyn Jeanty – ehow Health Aug 2011

Cell walls play a vital role in moving nutrient materials into cells and moving waste materials out. In order to do this, pumps and channels situated along cell membrane walls work together to target specific materials for transport. Hydrogen ions assist in maintaining the electrical balance that enables cell structures to communicate and function properly.

The materials responsible for maintaining this balance include potassium, calcium, sodium, chloride and hydrogen ions. Ion materials naturally carry an electrical charge since they're missing one or more electrons. In effect, the charges they carry alter cell wall gradients whenever an ion passes through it.

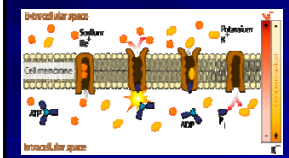
As hydrogen ions move across cell walls, certain conditions may speed up or slow down the rate at which they cross. Ions can flow freely across a membrane when there's a low concentration of them on the other side in a *passive transport mechanism*.

Ion flow can also move at a slower rate if high positive charges already exist on the other side of the wall. In this case, additional energy may be needed to move hydrogen ions against the natural flow.

http://www.ehow.com/about_6681088_effect-hydrogen-ions-cell-walls.html

Trans-Membrane Potential - TMP

In a study on Chronic Fatigue Syndrome and Electro-medicine, Thomas Valone, Ph.D, showed that damaged or diseased cells present an abnormally low TMP, about 80% lower than healthy cells. This signifies a greatly reduced metabolism and, in particular, impairment of the electrogenic Na+/ K+ pump activity associated with reduced ATP (Adenosine Tri-Phosphate) production.



The Na+/ K+ pump within the membrane forces a ratio of 3Na+ ions out of the cell for every 2K+ ions pumped in for proper metabolism. The sodium-potassium pump uses energy derived from ATP to exchange sodium for potassium ions across the membrane.

An impaired Na+/ K+ pump results in edema (cellular water accumulation) and a tendency toward fermentation, a condition known to be favorable toward cancerous activity.

Health Benefits of Hydrogen Water

Hydrogen tablets are the latest development for adding the amazing properties of Active Hydrogen to pure water. Active Hydrogen provides abundant negative hydrogen ions which were the original antioxidant of primordial life.

One tablet dissolved in 1 litre of pure water provides 700 mV ORP [10,000,000,000,000,000,000 (10^{19})]

The determination of the number of free-radical scavenging electrons was established by the scientific formula known as the Relative Hydrogen Score:
rH = {(ORP+200) / 30} + (2 x pH)

This incredible number of electrons far exceeds what would be supplied by literally thousands of bottles of superfood drinks!

- **Increases cellular hydration**
- **Regular use heightens physical and mental energy**
- **Supports mitochondrial ATP production**
- **Alkalizing minerals including magnesium**
- **Can be added to "fresh" bottled juices to re-establish antioxidant potency**

24 – Medical Applications of Zeolite

Kresimir Pavelic and Mirko Hadzija
Ruder Boskovic Institute, Zagreb, Croatia

Zeolites are among the most important inorganic cation exchangers. The aluminosilicate structure is negatively charged and attracts cations that come to reside inside the pores and channels. Zeolites have large empty spaces, or cages, within their structures that can accommodate large cations, such as Na+, K+, Br+, and Ca+, and even relatively large molecules and cationic groups, such as water, ammonia, carbonate ions, and nitrate ions. The basic structure of zeolites is biologically neutral (pg 1141).

24 – Medical Applications of Zeolite (cont.) from pg 1146

IV. Removal Of Heavy Metals and Organopoisoning

Heavy metals released in wastewater are among the most worrisome pollution problems due to their cumulative effects along the food chain. The natural zeolites clinoptilolite, phillipsite, and chabazite are particularly useful in selectively eliminating ammonia and heavy metals such as Cd^{2+}, Pb^{2+}, Zn^{2+}, Cu^{2+}, and particularly Cr^{3+}. Generally, clinoptilolite is stable in an acidic environment and shows high selectivity for many heavy metals.

The preventative effect of zeolites (zeolite tuff containing 61% clinoptilolite) has been shown to prevent and eliminate organophosphate poisoning. The organophosphate poison substance XX can strongly inhibit enzyme cholinesterase in erythrocytes, and in the stomach, brain and liver. This effect can be strongly diminished after pretreatment with zeolite ((1 g/kg 5 min before intoxication).

24 – Medical Applications of Zeolite (cont.) from pg 1147

V. Antimicrobial Effects

Metal exchanged zeolites have been proposed in the last decade for controlled release of agents against microbial pollution. Zeolites containing copper ions exhibit good antibacterial activity for both gram-negative and gram-positive bacteria, and the effect developed in a short period of time.

Tissue conditioners containing silver-exchanged zeolite showed a strong in-vitro antimicrobial effect on *Candida albicans*, and also on nasocomial respiratory infections of *S. aureus* and *P. aeruginosa*. All microbes were killed whether they have been immersed in saliva or not.

A new type of antibacterial temporary filling material in dentistry was incorporated into urethane acrylate monomer paste. These materials exhibited prominent in-vitro antibacterial activity against *Streptococcus mutans* and *Streptococcus mitis*.

ZEOLITE (Hydrated alkali aluminum silicate)

Memorial Sloan-Kettering Cancer Center

Zeolites are a group of chemically related mineral substances that contain mainly hydrated aluminium and silicon compounds. They occur naturally in volcanic rock and ashes. Zeolites have a fine porous cage-like structure and are often used as adsorbents, desiccants, detergents, and as water and air purifiers. They are applied in medicine as an external hemostatic dressing, for diarrhea, diabetes and as suspending agents. The effect of zeolites for autism is under investigation. Zeolites have been marketed as dietary supplements for hangover, and as adjuvant therapy for cancers.

Purported Uses of Zeolite:

- **Treatment of diarrhea**
  A drug containing zeolite was developed for diarrhea in Cuba.
- **Anticancer therapy**
  In vitro and animal studies suggest anticancer properties, but there is no clinical data to validate use of Zeolites for cancer.
- **Antioxidant**
  Animal studies showed that Zeolites may have antioxidant properties.
- **Immunoenhancer**
  Data from animal studies demonstrated that zeolites can both stimulate and suppress the immune system.
- **Hangover Cure**
  Rapidly detoxifies the toxins alcohol produces in the stomach and intestines.

See Memorial Sloan-Kettering Cancer Center web site for additional info
http://www.mskcc.org/mskcc/html/69424.cfm

NaturalNews.com — Zeolite - is it the next big thing in nutritional therapies for cancer and chronic disease?

1. **Zeolite may reduce cancer risk.** Although only one small human trial has been conducted, the results were intriguing: 78% full remission for stage 4 cancer patients (with various types of cancer), due to zeolite's ability to induce tumor suppressor genes that cause the body to not only halt the growth of tumor cells, but actually destroy such tumors.
2. **Acts as an antioxidant.** Thus, it counters free radicals and helps the body defend itself against free radical / DNA damage.
3. **Traps and nullifies nitrosamines in the digestive tract.** Nitrosamines are potent cancer-causing agents acquired from processed meats. Pancreatic cancer rates shoot up 68%, and colon cancer rates are similarly heightened. Leukemia and brain cancers are also strongly correlated with processed meats consumption.
4. **Chelates and removes heavy metals from the body.** Known to remove mercury, cadmium, and lead, all of which are strongly correlated with various neurological disorders such as autism, Alzheimer's disease, dementia, etc.
5. **Supports healthy immune system function** which, of course, helps protect the body from a number of diseases and health threats.
6. **Acts as a broad spectrum antiviral agent** by helping reduce the viral load in conjunction with other, more direct treatments.
7. **Balances pH levels.** Optimum pH of the body should be slightly alkaline, around 7.4. Bacteria, Candida yeast fungi and viruses thrive when the pH of the body is acidic (pH 6.9 and below), thus removing or reducing the toxic load may result in a more alkaline system.

NO SAFE LEVEL OF LEAD!

NCBI

Blood lead levels and mortality

Archives of Internal Medicine (AMA Official Journal)
2002 Nov 25;162(21)):2443-9
Lustberg M. Silbergeld E.
Department of Epidemiology and Preventive Medicine, University of Maryland

Despite declines in blood lead levels during the past 20 years, lead exposure continues to be a public health concern. Studies have linked lead exposure with increased risk for diverse health outcomes. Few studies have evaluated the association of lead exposure and mortality in the general population. METHODS: To evaluate the association of lead exposure and mortality in the United States, we used the recently released mortality follow-up data for participants of the Second National Health and Nutrition Examination Survey, a national cross-sectional survey of the general population conducted from 1976 to 1980. Survey participants aged 30 to 74 years with blood lead measurements were followed up through December 31, 1992 (n = 4292). RESULTS: After adjustment for potential confounders, individuals with baseline blood lead levels of 20 to 29 microg/dL (1.0-1.4 micromol/L) had 46% increased all-cause mortality (RR, 1.46; 95% confidence interval [CI], 1.14-1.86), 39% increased circulatory mortality (RR, 1.39; 95% CI, 1.01-1.91), and 68% increased cancer mortality (RR, 1.68; 95% CI, 1.02-2.78) compared with those with blood lead levels of less than 10 microg/dL (<0.5 micromol/L).

Subsequent Cardiac and Stroke Events in Patients with Known Vascular Disease Treated with EDTA Chelation Therapy

A Retrospective Study

L. Terry Chappell, Rakesh Shukla, Jun Yang, Rene' Blaha, Tammy Born, Claus Hancke, William Mitchell, Efrain Olszewer, Peter van der Schaar and James Ventresco

Context: Myocardial infarction (MI) and strokes are leading causes of death in the US. Surgical and medical treatments can be helpful, but carry risks of morbidity and mortality.

Objective: To evaluate whether cardiac events were reduced for patients with known vascular disease who were treated with intravenous ethylene diamine tetra-acetic acid (EDTA) chelation therapy.

Results: According to the meta-analysis, expected outcomes in a 3-year follow-up period for 220 patients with coronary artery disease treated only with conventional therapies would be 15 MIs and six deaths. There were no deaths and no MIs in this group of patients who received chelation therapy. Four patients had strokes but recovered well. There were two angioplasties and six CABG procedures. Compared with similar patient populations treated with conventional therapies, patients who also were chelated had a 93.6% lesser need for angioplasty and a 62.5% reduced need for CABG. Of the patients that initiated treatment with symptoms, 68.7% had complete resolution of symptoms.

Malondialdehyde-modified, low-density lipoprotein (MDA-LDL, ox-LDL)

Circulating ox-LDL and malondialdehyde-modified LDL (MDA-LDL) have been reported to be useful markers for identifying coronary artery disease (CAD).

Additionally, it has been proposed that modified LDL might trigger an immune response leading to the production of autoantibodies and subsequently to the formation of immune complexes (IC). MDA-LDL and LDL-IC are risk factors for increased risk of atherosclerosis in patients with RA.

Furthermore, inflammation was associated with elevated levels of MDA-LDL and LDL-IC and may play an important role in the pathogenesis of cardiovascular disease particularly in atherosclerosis.It has also been reported that circulating oxLDL levels, including MDA-LDL, not only serve as a marker of oxidative stress, but can also be used as a marker of plaque destabilization.

Mediators of Inflammation
Volume 2011 (2011), Article ID 891752, 7 pages
doi:10.1155/2011/891752

Clinical Study: Malondialdehyde in Exhaled Breath Condensate as a Marker of Oxidative Stress in Different Pulmonary Diseases

M. L. Bartoli, F. Novelli, F. Costa, L. Malagrinò, L. Melosini, E. Bacci, S. Cianchetti, F. L. Dente, A. Di Franco, B. Vagaggini, and P. L. Paggiaro

Oxidative stress plays an important role in the pathogenesis of many chronic inflammatory lung disorders, particularly in COPD and asthma, where it is an important consequence of irritant-induced damage of bronchial epithelial cells…

Among the many biological targets of oxidative stress, membrane lipids are the most commonly involved class of biomolecules. Lipid peroxidation yields a number of secondary products able to boost oxidative damage. In addition to their cytotoxic properties, lipid peroxides are increasingly recognized as being important in signal transduction for a number of events in the inflammatory response.

Malondialdehyde (MDA) has been widely studied as a product of polyunsaturated fatty acid peroxidation. High MDA levels have been observed in several biological fluids from patients with different airway diseases including asthma, COPD, and bronchiectasis.

Biomarkers in exhaled breath condensate: a review of collection, processing and analysis

N M Grob,1,2,3 M Aytekin,2 and R A Dweik1,2,4
J Breath Res. 2008 September; 2(3): 037004.
doi: 10.1088/1752-7155/2/3/037004

Exhaled breath condensate (EBC) is a potential rich source for countless biomarkers that can provide valuable information about respiratory as well as systemic diseases.

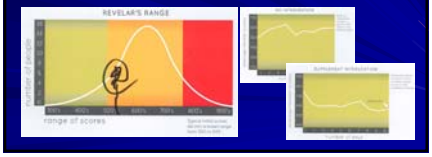
EBC has been studied in a variety of diseases including allergic rhinitis, asthma, chronic obstructive lung disease, cystic fibrosis, lung cancer, and obstructive sleep apnea syndrome. Although numerous biomarkers have been discovered and studied in EBC, the methods of collection and biomarker detection have not been fully standardized.

While leaving standardization methods up to individual labs for the present time is optimal for the continued discovery of new biomarkers in EBC, this decreases the reproducibility and generalizability of the findings. In this review we will discuss specific biomarkers studied in specific diseases as well as some of the related technical issues including collection, processing and analysis.

REVELAR™

Antioxidant supplements can protect us from free radical damage. But which supplements and regimen really work?

Revelar provides the first accurate aldehyde measurement system that both detects and measures aldehydes in the breath. Aldehydes are known to be indicators of free radical damage also known as oxidative stress.



Why Porter, Dr. Eifrig, and I are testing the "$10,000 Pill" *on ourselves*

The 10,000 dollar pill has the potential to predict, treat, and in some cases cure diseases before they ever manifest in your system.

According to Leroy Hood, cofounder of Institute for Systems Biology in Seattle, "It's not a stretch to say that we could increase our productive life spans by at least a decade."

"Suddenly we have the tools to apply to any problem: cancer, diabetes – a huge list of diseases.... But this isn't a "magic cancer bullet"...

Rather, this is a medical technology which has the potential to affect a multitude of illnesses and diseases: Type 2 diabetes, Crohn's disease, ALS, kidney cancer, Colorectal cancer, breast cancer, basal cell carcinoma, Hodgkin's Lymphoma, Alzheimer's... even cardiovascular disease.

It's been used to diagnose and treat rare intestinal disorders too.

The "$10,000 Pill" is a technology that allows a company to read your DNA structure and pinpoint the genetic conditions or diseases you might have... or are likely to contract.

EXPERIMENTAL MAN: What One Man's Body Reveals About His Future, Your Health, and Our Toxic World

(Wiley. March, 2009)

Duncan takes "guinea pig" journalism to the very edge of science, building on award-winning articles he wrote for *National Geographic* and *Wired*, in which he was tested for hundreds of chemical toxins – from pesticides to plastic additives – and for millions of genetic markers associated with disease, emotions, and other traits.

Expanding on these tests, he examines his genes, environment, brain, and body, exploring what they reveal about his and his family's future health, beliefs, attitudes, and behavior, and his ancestry, as well as the profound impact of this new self-knowledge on what it means to be human.

smart DNA

Genetic testing for 70+ specific markers

* Phase I and Phase II Detox (Anti-aging) * Oxidative Stress * Bone Health
* Lipid Profiling * Diabetes * Inflammation * Nutria-gen * Lactose Intolerance
* Weight & Exercise Management

Increase cellular nutrient/supplement uptake

Reported PEMF Benefits:

- Reduced pain
- Reduced inflammation
- Increased range of motion
- Faster functional recovery
- Reduced muscle loss after surgery
- Increased tensile strength in ligaments
- Faster healing of skin wounds
- Enhanced capillary formation
- Accelerated nerve regeneration
- Reduced tissue necrosis

Brief PEMF Background

Benefits of Pulsed Electro-Magnetic Field ("PEMF") therapy have been demonstrated through more than 2,000 University level, double-blind, medical studies done in many countries with many different PEMF therapy devices.

Positive effects of PEMF therapy were well established by the mid 1900's.

First commercial low power PEMF device entered the market in the early 1900s. These were used for studies and experimentation in healing and cellular wellness. They were sold to both consumers and as medical devices to doctors.

First commercially produced high power PEMF devices entered the market around 1975. They focused on the health of bones, muscles, nerves, tendons, ligaments and cartilage, on reducing pain and on cellular and tissue regeneration.

US FDA accepted the use of PEMF devices in the healing of non-union bone fractures in 1979, urinary incontinence and muscle stimulation in 1998, and depression and anxiety in 2006.

Israel has accepted the use of PEMF devices for migraine headaches. Canada has accepted PEMF devices for many uses. The European Union has many acceptances for the use of PEMF therapy in many areas including healing and recovery from trauma, degeneration and the treatment of the pain associated with these conditions.

Differences in PEMF Therapy Devices

Power Level

The magnetic energy produced by the various PEMF devices can be as little as that of the Earth's magnetic field to more than 10,000 times as powerful. The lower power devices are generally used for cellular health and bone healing. The higher power devices are generally used for recovery of trauma from accidents, sports injuries and surgery, as well as for control and improvement of degenerative diseases. Both low power and high power devices help reduce pain, but the higher power devices are more effective in doing so.

Continuous or Pulsed Waveform

Although there are exceptions in both types, most low power PEMF devices have a continuous waveform while most high power PEMF devices have a pulsed waveform.

Shape of Waveform
The continuous waveform PEMF devices can produce a square, a saw tooth, a sine or a custom waveform. The pulsed output PEMF devices usually produce a biphasic short duration pulse.

Control of Frequency
Many low power PEMF devices have preset frequencies to choose from according to the various manufacturers' individual theories. Most high power PEMF devices have a user variable control of the frequency.

Duration of Treatment
Depending on the power level of the PEMF device, the treatment duration can be from three minutes to hours.

In the **"Beneficial effects of electromagnetic fields"**, Bassett C. (*Bioelectric Research Center, Columbia University, NY, 1993*)

Study applied time-varying pulsed magnetic fields designed to induce voltages similar to those produced normally during the dynamic mechanical deformation of connective tissues in an effort to control cellular function and understand the mechanisms by which PEMF treatment operates and concluded:

"As a result, a wide variety of challenging musculoskeletal disorders has been treated successfully over the past two decades... Many of the athermal bioresponses, at the cellular and subcellular levels, have been identified and found appropriate to correct or modify the pathologic processes for which PEMFs have been used... As understanding of mechanisms expands, specific requirements for field energetics are being defined and the range of treatable ills broadened. These include nerve regeneration, wound healing, graft behavior, diabetes, and myocardial and cerebral ischemia (heart attack and stroke), among other conditions. Preliminary data even suggest possible benefits in controlling malignancy".

Attributes of PEMF
How Does PEMF Work?

1. **Atomic excitement/electron spin** to increase and store energy.
2. **Molecules tend to align slightly with each magnetic pulse,** making them easier to combine, especially when excited.
3. **The pH goes a hundred times more alkaline,** which allows better oxygen uptake, and suppresses some harmful entities.
4. **The viscosity shifts on the order of 16 fold,** allowing liquids to flow into cell gates, or lymph to thin and flow.
5. **Red blood cells separate** (probably all take a positive charge and repel each other) in minutes, allowing more surface area to transport oxygen.

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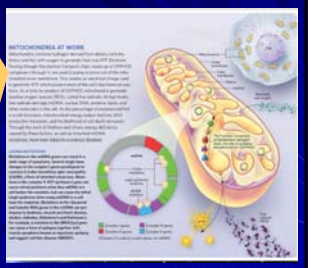
6. **Relaxing of the vascular system** within minutes of completing a session, which drops blood pressure by up to twenty percent 30 minutes after.
7. **Wound healing increases by 30%.** There is systemic response to the sessions as though the body's functions have been fine tuned, or turbo charged. Many different problems get better, often not the targeted problems only, but things not expected to get better.
8. **Bone mending, the quality of calcium,** is one-third normal time, and the skin of the bone seems to develop cells more like the DNA dictates.
9. **Electroporation** is the phenomena wherein the cells gates open to allow more passage of solvent (H20) to dissolve toxins, or allow better delivery of a medicine or herbs.
10. **Sodium potassium exchange,** which is documented in a US Army study to reduce pain, often within minutes of treatment.

Mitochondria – The Body's Powerhouse

Mitochondria combine hydrogen derived from dietary carbs and fats with oxygen to generate heat and ATP.

Electrons flowing through the electron transport chain, made up of OXPHOS complexes I through V, are used to pump protons out of the mitochondrial membrane.

This creates an ELECTRICAL CHARGE used to generate ATP, which powers most of the cell's biochemical reactions.



http://images.the-scientist.com/content/images/articles/58132/mitochondria_at_work.jpg

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Pappas' equation of nuclear fusion

on the level of the living cell, indicating its relation to the involved vital energies as an exothermic reaction:

$_{11}Na^{23} + _{8}O^{16}$ + Electrical Excitation + ATP Energy = $_{19}K^{39}$ + Bio Energy

The Sodium-Potassium pump is assumed a molecular exchange, but actually it is a nuclear process of fusion under electrical excitation of Na nucleus, firstly by the charged cell membrane, and secondly via an endothermic catalytic action of ATP.

The electrical excitation of the Na nucleus *may be assisted externally by appropriate strong electrical nanopulses.*

The nuclear fusion of Na to K by Oxygen seems to be the most important function of the cell and the key to its life and metabolism. A great number of other biological and medical functions and malfunctions are better understood by standard osmosis related mechanisms alone, and via the above nuclear fusion as well the equivalent to its reverse for example:

$_{19}K^{39} = _{11}Na^{23} + _{8}O^{16}$ - Electrical Current Energy

http://www.papimi.com/PAPIMI%20STUDIES/Pappas%20Pysiology%20of%20the%20cell%20manual.pdf

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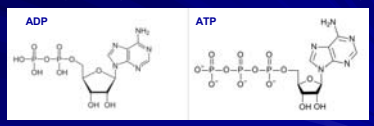
PEMF Therapy Increases Energy Storage and Cellular Activity

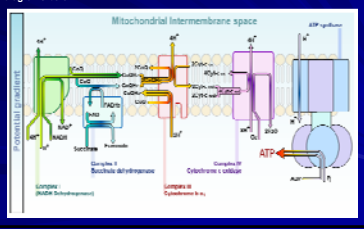
At the sub-atomic level, as the pulsed fields expand and collapse through a tissue, the protein molecules, such as the cytochromes in the cells' mitochondria, gain electrons and, in doing so, store energy.
The average total energy transmitted to the tissues does not create heat within the cells, nor cause the cells' atoms to vibrate much causing a thermal increase, nor cause an electron to jump to a higher orbit and emit heat as it returns to its orbit of origin.



There is only sufficient average energy for the electron-spin to be increased, thus, energy gets stored in the cells' mitochondria by converting ADP (Adenosine Di-Phosphate) to ATP molecules more rapidly by the addition of the phosphate radical to the ADP.

The ATP molecules store and transport the energy that is then used in the many chemical processes within the cell that participate in all the metabolic functions of living cells.

This phenomenon is referred to as the *electron transport chain* and is described in the diagrams below.



PEMF Therapy and Nitric Oxide Production

Many cells in the body produce nitric oxide; however, its production by the vascular endothelium is particularly important in the regulation of blood flow. Abnormal production of nitric oxide, as occurs in different disease states, can adversely affect blood flow and other vascular functions. Nitric oxide is one of the few gaseous signaling molecules known and is additionally exceptional due to the fact that it is a radical gas. It is a key vertebrate biological messenger, playing a role in biological processes.

The March/April 2009 Aesthetic Surgery Journal published a study:

"Evidence-Based Use of Pulsed Electromagnetic Field Therapy in Clinical Plastic Surgery" that summarizes the evolution in the understanding of the physiological effects of PEMF therapy on cells and tissues.

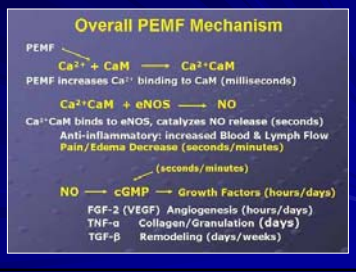
Studies emerged suggesting that PEMF could modulate the production of growth factors and began to focus on enzyme systems with well-characterized calcium (Ca2+) dependence.

By the mid-1990s, researchers were investigating the effects of electrical and PEMF signaling on intracellular Ca2+, specifically the binding of Ca2+ to calmodulin (CaM), using the knowledge that CaM dependent cascades were involved in tissue repair. The most recent studies of the PEMF transduction pathway have concentrated upon the Ca/CaM-dependent nitric oxide cascades, the growth factor cascades involved in tissue healing. It is within this system that the effectiveness of PEMF is now understood to function. PEMFs modulate the calcium-binding kinetics to calmodulin.

Calcium/calmodulin (Ca/CaM) then activates nitric oxide synthase (NOS) in several different isoforms. When injury occurs, large amounts of nitric oxide are produced by long-lived inducible nitric oxide synthase (iNOS). In this cascade, tissue levels of nitric oxide persist and the prolonged presence of this free radical is proinflammatory, which accounts for the leaky blood vessels associated with pain and swelling.

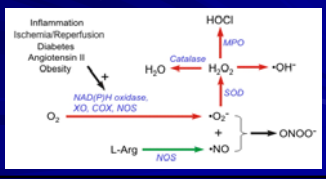
Therapies that could accelerate Ca/CaM binding, therefore, should impact all phases of tissue repair, from initial pain and swelling to blood vessel growth, tissue regeneration, and remodeling.

As shown in the following diagram, this mechanism has been proposed as a working model for PEMF therapeutics.



Nitric oxide, known as the 'endothelium-derived relaxing factor', or 'EDRF', is biosynthesized endogenously from L-arginine, oxygen and NADPH by various nitric oxide synthase (NOS) enzymes. The endothelium (inner lining) of blood vessels uses nitric oxide to signal the surrounding smooth muscle to relax, thus resulting in vasodilation and increasing blood flow. Under normal conditions, nitric oxide is continually being produced by cNOS in the blood vessels.

The activity of iNOS is stimulated during inflammation by bacterial endotoxins or cytokines such as tumor necrosis factor (TNF) and interleukins. During inflammation, the amount of nitric oxide produced by iNOS may be a 1,000-fold greater than that produced by cNOS.

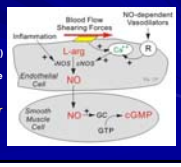


Intracellular Mechanisms

When nitric oxide forms, it is highly reactive (having a lifetime of a few seconds), yet diffuses freely across membranes, primarily because superoxide anion has a high affinity for nitric oxide. Superoxide and its products can have vasoactive activities in addition to their tissue damaging effects.

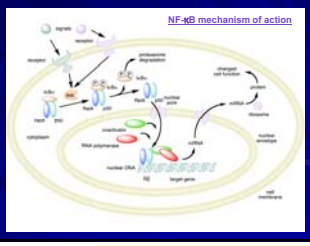
Nitric oxide also avidly binds to hemoglobin (in red blood cells) and the enzyme guanylyl cyclase, which is found in vascular smooth muscle cells and most other cells of the body. It also diffuses into the vascular smooth muscle cells adjacent to the endothelium where it binds to and activates guanylyl cyclase. This enzyme catalyzes the dephosphorylation of GTP to cGMP, which serves as a second messenger for many important cellular functions, particularly for signaling smooth muscle relaxation.

Because of the central role of cGMP in nitric oxide mediated vasodilation, drugs (e.g., Viagra®) that inhibit the breakdown of cGMP (cGMP-dependent phosphodiesterase inhibitors) are used to enhance nitric oxide mediated vasodilation, particularly in penile erectile tissue in the treatment of erectile dysfunction.
Increased cGMP also has an important anti-platelet, anti-aggregatory effect. (*Cardiovascular Physiology Concepts by Richard E. Klabunde, PhD, published in 2005, www.cvphysiology.com updated in 2008*)



Nitric oxide is also generated by phagocytes (monocytes, macrophages, and neutrophils) and, as such, is part of the human immune response. **Nitric oxide has been demonstrated to activate NF-κB in peripheral blood mononuclear cells**, an important protein complex that controls the transcription of DNA and a transcription factor in iNOS gene expression in response to inflammation.

NF-κB mechanism of action



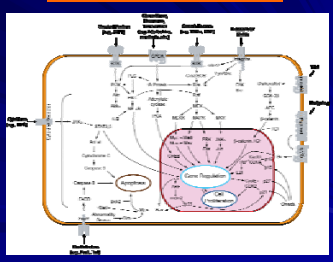
The Dynamics of Pain and PEMF Therapy

For most individuals, aside from the multiple benefits of the therapy, one of the most relevant effects of PEMF therapy is the improvement of painful conditions regardless of their origin. Pain mechanisms are complex and have peripheral and central nervous system aspects.

During the last 100 years, theories of pain mechanism have evolved from specificity and summation models to the popular Gate Control Theory. The latter pain theory, proposed by Melzack/Wall/Casey (*Wall and Melzack, 1989*) has become the most important development in the field of pain management. Pain perception is no longer a straightforward afferent transmission of pain signal.

In biology, signal transduction is a mechanism that converts a mechanical or chemical stimulus to a cell into a specific cellular response. Signal transduction starts with a signal to a receptor, and ends with a change in cell behavior. Transmembrane receptors move across the cell membrane, with half of the receptor outside the cell and the other half inside the cell. The signal, such as a chemical signal, binds to the outer half of the receptor, which changes its shape and conveys another signal inside the cell.

Overview of signal transduction pathways



PEMF Therapy Reduces Pain

Many studies have demonstrated the positive effects of PEMF therapy on patients with pain, even as opposed to receiving traditional treatment as well as against a placebo group getting no treatment. Some studies focused on the rapid, short-term relief while others demonstrate the long-term effects. The effectiveness of PEMF therapy has been demonstrated in a wide variety of painful conditions.

In a March, 2003 publication on Pain Management with PEMF Treatment, Dr. William Pawluk explains:

> *"Magnetic fields affect pain perception in many different ways. These actions are both direct and indirect. Direct effects of magnetic fields are: neuron firing, calcium ion movement, membrane potentials, endorphin levels, nitric oxide, dopamine levels, acupuncture actions and nerve regeneration. Indirect benefits of magnetic fields on physiologic function are on: circulation, muscle, edema, tissue oxygen, inflammation, healing, prostaglandins, cellular metabolism and cell energy levels... Short-term effects are thought due to a decrease in cortisol and noradrenaline, and an increase in serotonin, endorphins and enkephalins. Longer term effects may be due to CNS and/or peripheral nervous system biochemical and neuronal effects in which correction of pain messages occur; and the pain is not just masked as in the case of medication".*

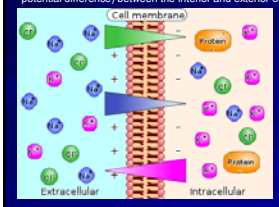
PEMF Therapy Blocks Pain

PEMF therapy has shown to be effective at reducing pain both in the short-term and in the long-term. The ways by which PEMF therapy relieves pain include pain blocking, decreased inflammation, increased cellular flexibility, increased blood and fluids circulation, and increased tissue oxygenation.

The trans-membrane potential, ("TMP") is the voltage difference (or electrical potential difference) between the interior and exterior of a cell. An electrochemical gradient results from a spatial variation of both an electrical potential and a chemical concentration across a membrane. Both components are often due to ion gradients, particularly proton gradients, and the result is a type of potential energy available for cellular metabolism. This can be calculated as a thermodynamic measure, an electrochemical potential that combines the concepts of energy stored in the form of chemical potential, which accounts for an ion's concentration gradient across a cellular membrane, and electrostatics, which accounts for an ion's tendency to move relative to the TMP.

Differences in concentration of ions on opposite sides of a cellular membrane produce the TMP.

TMP - transmembrane potential is the difference in voltage (or electrical potential difference) between the interior and exterior of a cell (*Vinterior − Vexterior*).



The membrane potential has two basic functions. First, it allows a cell to function as a battery, providing power to operate a variety of "molecular devices" embedded in the membrane. Second, in electrically excitable cells such as neurons, it is used for transmitting signals between different parts of a cell. Opening or closing of ion channels at one point in the membrane produces a local change in the membrane potential, which causes electric current to flow rapidly to other points in the membrane.

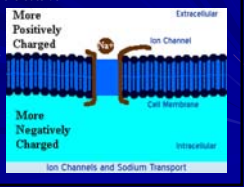
Differences in concentration of ions on opposite sides of a cellular membrane produce a voltage difference called the membrane potential. The largest contributions usually come from sodium (Na+) and chloride (Cl–) ions which have high concentrations in the extracellular region, and potassium (K+) ions, which along with large protein anions have high concentrations in the intracellular region. http://en.wikipedia.org/wiki/Membrane_potential

In electrically excitable cells such as neurons, the TMP is used for transmitting signals from one part of a cell to another.

In non-excitable cells, and in excitable cells in their baseline states, the TMP is held at a relatively stable value, called the resting potential.

For neurons, typical values of the resting potential range from -70 to -80 mV (mill Volts); that is, the interior of a cell has a negative baseline voltage. Each axon has its characteristic resting potential voltage and in each case the inside is negative relative to the outside.

Opening and closing of ion channels can induce a departure from the resting potential, called a depolarization if the interior voltage rises (say from -70 mV to -65 mV), or a hyper polarization if the interior voltage becomes more negative (for example, changing from -70 mV to -80 mV). Special types of voltage-dependent ion channels that generate action potentials but remain closed at the resting TMP can be induced to open by a small depolarization.



Ion Channels and Sodium Transport

PEMF Therapy Reduces Inflammation

Several factors may contribute to inflammation including injury, tissue damage, a poor localized circulation with the formation of edema. Inflammation causes pain. Swelling and bruising is an inflammation and discoloration of soft tissue caused by an impact injury or trauma. It can also result from surgery.

Tissue cells are inherently like tiny electrically charged machines. When a cell is traumatized, the cell's electrical charge is diminished; this causes normal cell functions and operations to shut down. Cells that are scarred or fibrotic with adhesions have a TMP charge of approximately -15 mV, degenerative or immune-compromised cells average -30 mV, both low TMPs.

With the raised TMP, the body releases chemical signals that cause inflammation swelling and bruising resulting in pain and inhibiting the cell communication pathways necessary for healing to begin. Numerous clinical studies have demonstrated that PEMF therapy has been successful in reducing inflammation.

PEMF therapy treats the cellular source of swelling by recharging the cells with a mild electromagnetic current. This stops the release of pain and inflammatory mediators, reduces inflammatory fluids and allows an increase in blood flow, therefore increased oxygen intake, to help the cells heal faster with less swelling, pain and bruising.

PEMF Therapy Increases Cellular Membrane Permeability and Cellular Metabolism

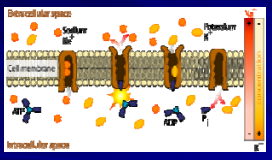
As early as 1940, it was suggested that magnetic fields affect the TMP and the flow of ions in and out of the cells and might therefore influence cellular membrane permeability.

It has since been established that magnetic fields can influence ATP (Adenosine Tri-phosphate) production; increase the supply of oxygen and nutrients via the vascular and lymphatic systems; improve the removal of waste via the lymphatic system; and help re-balance the distribution of ions across the cell membrane.

Healthy cells in tissue have a voltage difference between the inner and outer membrane referred to as the membrane resting potential that ranges from -70 to -80 mV. This causes a steady flow of ions through its voltage-dependant ion channels.

As the magnetic field created fluctuates, it induces an electron flow or a current in one direction through the living tissue. As electrons always flow from a negative (cathode) to a positive (anode) potential, when the magnetic field vanishes, the direction of the electron flow is reversed. Therefore such induced polarized currents stimulate the exchange of ions across the cell membrane.

In a study on Chronic Fatigue Syndrome and Electro-medicine, Thomas Valone, Ph.D, showed that **damaged or diseased cells present an abnormally low TMP, about 80% lower than healthy cells.** This signifies a greatly reduced metabolism and, in particular, impairment of the electrogenic Na+/ K+ pump activity associated with reduced ATP (Adenosine Tri-Phosphate) production.



The Na+/ K+ pump within the membrane forces a ratio of 3Na+ ions out of the cell for every 2K+ ions pumped in for proper metabolism. The sodium-potassium pump uses energy derived from ATP to exchange sodium for potassium ions across the membrane.

An impaired Na+/ K+ pump results in edema (cellular water accumulation) and a tendency toward fermentation, a condition known to be favorable toward cancerous activity.

Damaged cells are energy deficient…

They have low oxygen levels, are high in sodium levels, and have a faltered electrochemical gradient. By inducing a mild electrical current into damaged cells, **PEMF therapy slows or stops the release of pain and inflammatory mediators, increases blood flow, and re-establishes normal cell interaction.**

PEMF stimulates and restores the electrochemical gradient, the cell starts pumping sodium out, potassium enters the cell, the swelling resolves, oxygen starts flowing back in, and pain improves. Due to the density of the cell tissue, change requires stronger pulsed magnetic fields to be able to restore the healthy TMP to its optimal -70 mV.

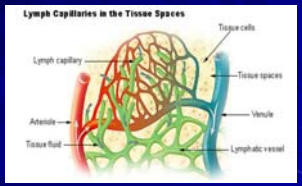
Several factors influence tissue inflammation and the processes by which PEMF therapy operates to reduce inflammation include complex mechanical, chemical, electrical and magnetic processes along with increased circulation, oxygenation and cellular activity.

With reduced inflammation, pain decreases and faster tissue healing occurs.

PEMF Therapy Increases Blood and Lymphatic Circulation

The arterial and venal blood vessels are intimately associated with the lymphatic system.. As the blood and lymphatic vessels bring oxygen and nutrients to the cells and remove their waste products, they are nourishing and detoxifying the cells, tissues and body.

As PEMF therapy mechanically stimulates blood vessels and blood flow, the blood vessels pump blood and oxygen into the cells.



Simultaneously, PEMF therapy mechanically stimulates the lymphatic vessels and waste products are hauled away from the cells more efficiently. PEMF therapy supports immune health by mechanically stimulating lymphatic drainage and blood flow.

PEMF Therapy Increases Cellular Membrane Flexibility and Elasticity

A study entitled **"Modulation of collagen production in cultured fibroblasts by a low-frequency pulsed magnetic field" by Murray *et al.* (*Biochim Biophys Acta*)** shows that the total protein synthesis was increased in confluent cells treated with a pulsed magnetic field for the last 24 h of culture as well as in cells treated for a total of 6 days. However, in 6 day-treated cultures, collagen accumulation was specifically enhanced as compared to total protein, whereas after short-term exposure, collagen production was increased only to the same extent as total protein. These results indicate that a pulsed magnetic field can specifically increase collagen production, the major differentiated function of fibroblasts, possibly by altering cyclic-AMP metabolism.

PEMF therapy successfully increases membrane flexibility by increasing the synthesis of collagen, a crucial protein that supports membrane elasticity, within the fibroblasts. In doing so, PEMF therapy increases tissue and muscle flexibility and, in doing so, increases range of motion.

PEMF Therapy Stimulates Cellular Communication and Replication

DNA synthesis is linked to pulsed, low intensity magnetic fields (*Liboff et al., 1984; Rosch et al., 2004*). Proteins are conductors of electricity. When exposed to strong fields, proteins are subject to electrophoresis.

The Ribonucleic Acid ("RNA") messengers that are synthesized from a Deoxyribonucleic Acid ("DNA") template during transcription mediate the transfer of genetic information from the cell nucleus to ribosomes in the cytoplasm and serve as a template for protein synthesis.

Since RNA mechanically influences the DNA and encoded proteins influence RNA, the flow of information to and from genes may be linked to changing magnetic fields (*Einstein, 1977; Goodman et al., 1983*).

Since magnetic fields interact with changing electrical charges and recent studies (*Dandliker et al., 1997*) show that DNA conducts electrons along the stacked bases within the DNA double helix, electro-magnetic fields may initiate transcription of the precursor mRNA by accelerating electrons moving within the DNA helix (*McLean et al., 2003*).

PEMF Therapy Increases Cellular Genesis (Cellular Growth and Repair)

The many intra and inter cellular processes and activity stimulated by PEMF therapy lead to faster cellular and tissue regeneration. This fact is shown by the results of many studies on a variety of tissues, including bones, spine, cartilage, intestines, blood vessels, nerves, brain, and muscles.

In December 2004, the Swiss Medical Tribune stated that PEMF therapy provided:

"improvement of blood circulation, relief from pain, improvement of bone healing and the stimulation of nerve cells. Not only is the PEMF therapy effective in disease condition: it is an excellent means of preventing stress, assisting regeneration and recovery after sports exertion... Through metabolic activation and blood circulation more nutrients and oxygen are available to muscle cells, less damage is experienced, and efficiency is improved."

PEMF and the spine

In a long-term study entitled: **"Spine fusion for discogenic low back pain: outcome in patients treated with or without pulsed electromagnetic field stimulation"**, Marks RA. (*Richardson Orthopaedic Surgery, TX, USA*) randomly selected 61 patients who underwent lumbar fusion surgeries for discogenic low back pain between 1987 and 1994 and had failed to respond to preoperative conservative treatments. Average follow-up time was 15.6 months postoperatively.

Fusion succeeded in 97.6% of the 42 patients who received PEMF stimulation for only 52.6% of the 19 patients who did not receive electrical stimulation of any kind.

A similar study by Richard A. Silver, M.D. (*Tucson Orthopaedic & Fracture Surgery Associates, Ltd., Tucson, AZ, USA*) with 85 patients who had undergone surgery of posterior lumbar interbody fusion (PLIF) and had risk factors associated with a poor prognosis for healing, including smoking, prior back surgery, multiple spinal levels fused, diabetes millitus, and obesity, roentgenographic examination and clinical evidence indicated that all but two patients achieved successful fusion. Of the 83 patients with successful spinal fusion, 29 (34.9%) were assessed as "excellent," 45 (54.2%) as "good," 3 (3.6%) as "fair", and 6 (7.2%) as "poor".

Adjunctive treatment with PEMF appeared effective in promoting spinal fusion following PLIF procedures across all patient subgroups.

PEMF, cartilage and bones

In a study entitled: **"Modification of biological behavior of cells by Pulsing Electro-magnetic fields"**, 20 subjects of ages between 57 and 75 years with decreased bone mineral density as defined by a bone densitometer, were treated with PEMF therapy during a period of 12 weeks by Ben Philipson, Curatronic Ltd. (*University of Hawaii School of Medicine, HI, USA*). After a period of 6 weeks, the bone density rose in those patients with an average of 5.6%.

Properly applied pulsed electromagnetic fields, if scaled for whole body use, have clear clinical benefits in the treatment of bone diseases and related pain, often caused by micro-fractures in vertebrae. In addition, joint pain caused by worn out cartilage layers can be treated successfully, through electromagnetic stimulation.

PEMF application promotes bone union by electric current induction, which changes the permeability of cell membrane allowing more ions across, affects the activity of intracellular cyclic adenosine monophosphate (cAMP) and cyclic guanosine monophosphate (cGMP), and accelerates osteoblast differentiation by activation of p38 phosphorylation.

PEMF stimulation also increases the partial oxygen pressure and calcium transport. Repair and growth of cartilage is thus stimulated, preventing grinding of the bones.

Bone Has Electrical Qualities

Bone has electrical qualities in its healthy physiological condition. Healthy bone maintains a dynamic balance between positive and negative charges.

A bone fracture changes the polarity at the fracture site to an electronegative environment. This negative polarity indicates that the body's natural repair process has begun.

When human bone is bent or broken, it generates an electrical field. This low-level electrical field activates the body's internal repair mechanism, which in turn stimulates bone healing.

In some patients, this healing process is impaired or absent. The fracture fragments may not mend properly, and a nonunion results.

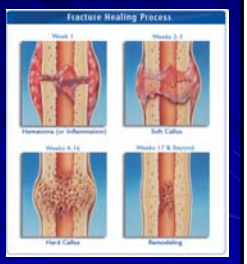
http://www.bonestimulation.com/physio/how_it_works.html

PEMF Bone Growth Stimulation

Electrical currents have been used to heal broken bones since the mid 1800s. However, it wasn't until the 1950s that scientists made an important discovery.

PEMF enhances the electrical polarity by inducing an electrical field at the fracture site which supports the natural healing process and stimulates fracture repair.

PEMF bone growth stimulation generates a time varying magnetic field within the body. The electric potential created by PEMF stimulates fracture healing.



http://www.bonestimulation.com/physio/how_it_works.html

J Biomed Eng. 1988 Jul;10(4):301-4.

Treatment of delayed- and non-union of fractures using pulsed electromagnetic fields.

Colson DJ, Browett JP, Fiddian NJ, Watson B.
Department of Medical Electronics, St Bartholomew's Hospital, London, UK.

Abstract

A prospective series of 32 consecutive patients, with 33 long-bone fractures suffering from delayed- or non-union were treated by pulsed electromagnetic fields (PEMF) or by PEMF with surgery. The management regime for the PEMF treatment was simpler and less rigid than that reported by Bassett et al. and our stimulation waveform was also different.

Nineteen fractures (100%) treated with surgery and PEMF united within nine months of the commencement of PEMF treatment. Fourteen fractures were treated with PEMF alone. Twelve (86%) united within ten months and two failed to unite.

The results of this study suggest that the stimulating waveform is less critical than is claimed by Bassett et al. and that a simpler and easier management regime for PEMF treatment can be just as effective. Alternatively PEMF may have no effect on fracture healing.

PMID:3266275[PubMed - indexed for MEDLINE]

Orthopedics. 1992 Jun;15(6):711-9.

Treatment of ununited tibial fractures: a comparison of surgery and pulsed electromagnetic fields (PEMF).

Gossling HR, Bernstein RA, Abbott J.
Department of Orthopedic Surgery, University of Connecticut Health Ctr

Abstract

The use of pulsed electromagnetic fields (PEMF) is gaining acceptance for the treatment of ununited fractures. The results of 44 articles published in the English language literature have been compiled to assess the effectiveness of PEMF vs surgical therapy.

After multiple failed surgeries, the success rate of PEMF is reported to be greater than with surgery; this discrepancy increases with additional numbers of prior surgeries. In infected nonunions, the results of surgical treatment decreased by 21% and were less than the results utilizing PEMF (69% vs 81%). In open fractures, surgical healing exceeded PEMF (89% vs 78%), whereas in closed injuries PEMF cases healed more frequently (85% vs 79%).

In general, PEMF treatment of ununited fractures has proved to be more successful than noninvasive traditional management and at least as effective as surgical therapies. Given the costs and potential dangers of surgery, PEMF should be considered an effective alternative. Experience supports its role as a successful method of treatment for ununited fractures of the tibia.

PMID:1608864[PubMed - indexed for MEDLINE]

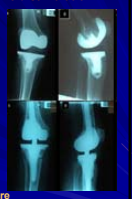
Case Report

Management of a tibial periprosthetic fracture following revision knee arthroplasty using a pulsed electromagnetic field stimulation device: a case report

Ashtin Doorgakant, Mohammed A Bhutta and Hans Marynissen
Trauma and Orthopaedics, North Western Deanery, East Lancashire Hosp UK
Cases Journal 2009, 2:8706doi:10.4076/1757-1626-2-8706

Periprosthetic fractures associated with total knee arthroplasty are rare but present a challenging problem particularly when associated with revision arthroplasty. Fractures around tibial stems are particularly difficult with no accepted technique in their management.

This case describes a tibial periprosthetic fracture following a revision knee arthroplasty, which was successfully managed with a Pulsed Electro-Magnetic Field (PEMF) bone stimulation device. We believe this to be first reported use of a bone stimulation device in this clinical environment.



Eight months from sustaining the periprosthetic fracture and 7 months from the application of the PEMFD complete bony union was achieved clinically and radiologically (Figure 2C &2D). At 21 months from fracture and 14 month from bony union the patient is mobilising fully weight-bearing and is asymptomatic.

http://www.casesjournal.com/content/2/1/8706

The crisis of low energy is reflected in the following general chain reactions and results :

- low transmembrane potential
- increased accumulation of sodium ions inside the cell : Hypernatremia
- increased water molecules attached to sodium molecules inside the cell associated to hypernatremia
- inflammation
- increased volume of the cell and osmotic pressure inside the cell, damaging
- the cell membrane
- swelling of cell, followed by thinning of the cell membrane
- cell division

The above conditions further obstruct cell metabolism. When transmembrane potential drops below 15 mvolts, it leads to cell division and eventually causes cancerous cells to over populate.

So, we see naturally why the tumor grows or diffuses to adjacent areas and tissues, **a phenomenon known as "cancer diffusion"**, i.e., cancers ability to diffuse to adjacent healthy cells and tissues.

http://www.papimi.com/PAPIMI%20STUDIES/Pappas%20Pysiology%20of%20the%20cell%20manual.pdf

Alternating electric fields arrest cell proliferation in animal tumor model and human brain tumors

Yale University School of Medicine, New Haven, CT, April 5, 2007

We have recently shown that low intensity, intermediate frequency, electric fields inhibit by an anti-microtubule mechanism of action, cancerous cell growth *in vitro*. Using implanted electrodes, these fields were also shown to inhibit the growth of dermal tumors in mice. The present study extends these findings to additional cell lines [human breast carcinoma; MDA-MB-231, and human non-small-cell lung carcinoma (H1299)] and to animal tumor models (intradermal B16F1 melanoma and intracranial F-98 glioma) using external insulated electrodes. These findings led to the initiation of a pilot clinical trial of the effects of TTFields in 10 patients with recurrent glioblastoma (GBM). Median time to disease progression in these patients was 26.1 weeks and median overall survival was 62.2 weeks. These time to disease progression and OS values are more than double the reported medians of historical control patients. No device-related serious adverse events were seen after >70 months of cumulative treatment in all of the patients. The only device-related side effect seen was a mild to moderate contact dermatitis beneath the field delivering electrodes.

We conclude that TTFields are a safe and effective new treatment modality which effectively slows down tumor growth *in vitro*, *in vivo* and, as demonstrated here, in human cancer patients.

Fundamental principle for cancer in relation to the physical energy condition of a cell.

Cancer , is a critically low state of energy within a cell and with a critically low metabolism , in which the cell is being "trapped" for various reasons.

This critically low energy and metabolism state is manifested by a low transmembrane potential (TMP) of 15 mvolts, which causes a "chain " of specific malfunctions for the cell, and a general state of ischemia (low energy) for the organism .

When a cell is in this particular low energy/metabolism state and has below TMP of 15 mvolts that is responsible for cell metabolism (Nobel Laureate Albert Szent-Gyorgyi, Cone and others). The extremely weak TMP of 15 mvolts cell divides in two identical parts in an attempt to survive in larger numbers as a species.

http://www.papimi.com/PAPIMI%20STUDIES/Pappas%20Pysiology%20of%20the%20cell%20manual.pdf

Constructive Methods for Treating Cancer

Considering the following are fundamental conditions leading to cancer…

A. Cancer is a panic state of low metabolism, leading to starvation, leading to a death threat, leading to multiplication for survival.

B. Self organization.

C. Problems of vital functions.

Chemotherapy, radiation and surgery actually contribute to (A) low metabolism and damage of cells and tissues, as well as (C) vital functions. This explains the relative known failure of the destructive methods which in many cases after these treatments, new cancerous and more aggressive situations appear, making cancer to be widely considered an incurable disease.

However, PEMF has been proven to assist in restoring cellular membrane function, increase energy levels, and enhance immune function, which results in working against the conditions need for cancer to develop or thrive.

http://www.papimi.com/PAPIMI%20STUDIES/Pappas%20Pysiology%20of%20the%20cell%20manual.pdf

Technol Cancer Res Treat. 2011 Jun;10(3):281-6.

Differential sensitivities of malignant and normal skin cells to nanosecond pulsed electric fields.

Yang W, Wu YH, Yin D, Koeffler HP, Sawcer DE, Vernier PT, Gundersen MA.
Ming Hsieh Department of Electrical Engineering, Viterbi School of Engineering (VSoE), University of Southern California (USC), Los Angeles, CA 90089, USA.

Abstract

Pulsed electric fields with nanosecond duration and high amplitude have effects on biological subjects and bring new venue in disease diagnosis and therapy. To address this respect, we investigated the responses of paired tumor and normal human skin cells - a basal cell carcinoma (BCC) cell line, and its sister normal cell line (TE) - to nanosecond, megavolt-per-meter pulses. When BCC (TE 354.T) and TE (TE 353.SK) cells, cultured under standard conditions, were exposed to 30 ns, 3 MV/m, 50 Hz pulses and tested for membrane permeabilization, viability, morphology, and caspase activation, we found that nanoelectropulse exposure: 1) increased cell membrane permeability in both cell lines but to a greater extent in BCC cells than in normal cells; 2) decreased cell viabilities with BCC cells affected more than normal cells; 3) induced morphological changes in both cell lines including condensed and fragmented chromatin with enlarged nuclei; 4) induced about twice as much caspase activation in BCC cells compared to normal cells.

We concluded that in paired tumor and normal skin cell lines, the response of the tumor cells to nanoelectropulse exposure is stronger than the response of normal cells, indicating the potential for selectivity in therapeutic applications.

PMID:21517135 [PubMed - in process]

Physiol Meas. 2004 Aug;25(4):1077-93.

Nanosecond pulsed electric fields modulate cell function through intracellular signal transduction mechanisms.

Beebe SJ, Blackmore PF, White J, Joshi RP, Schoenbach KH.
Center for Pediatric Research, Eastern Virginia Medical School, Children's Hospital for The King's Daughters, Norfolk, VA, USA.

These studies describe the effects of nanosecond (10-300 ns) pulsed electric fields (nsPEF) on mammalian cell structure and function. As the pulse durations decrease, effects on the plasma membrane (PM) decrease and effects on intracellular signal transduction mechanisms increase.

NsPEF with durations and electric field intensities that do or do not cause PM electroporation, induce apoptosis in mammalian cells with a well-characterized phenotype typified by externalization of phosphatidylserine on the outer PM a activation of caspase proteases.

Jurkat cells were transfected by electroporation and then treated with nsPEF, green fluorescent protein expression was enhanced compared to electroporation alone.

The results indicate that nsPEF activate intracellular mechanisms that can determine cell function and fate, providing an important new tool for probing signal transduction mechanisms that modulate cell structure and function and for potential therapeutic applications for cancer and gene therapy.

PMID:15382843 [PubMed - indexed for MEDLINE]

Karen suffers from Guillian Barre Syndrome, a debilitating autoimmune disease that causes severe nerve damage and paralysis. She was wheelchair bound for 9 years, was in constant pain, had no feeling in her hands and fingers, was unable to care for herself or her family, and was suffering from chronic depression as well.

After daily treatments using Pulsed Electro Magnetic Field (PEMF), Karen is walking again.

She is no longer in constant pain and has regained sensation in her hands and fingers. She can cook and care for herself and her family, and is happy to be able to read a book once again… a favorite past-time that she was unable to do before PEMF because she couldn't hold a book or feel to turn the pages.

Karen is also free from her chronic depression, which is also an indicated and FDA approved therapy that PEMF offers.

View Karen's story at http://www.gentlemethod.com/PEMF_Therapy.html or On You Tube at http://www.youtube.com/watch?v=InUQaqZByfM&feature=player_embedded

PEMF and multiple sclerosis

At the Biologic Effects of Light 1998 Symposium, Richards *et al.* explain the effects of pulsing magnetic field on brain electrical activity in multiple sclerosis:

Recently, a histologic study has also shown that widespread axonal damage occurs in MS along with demyelination. What is the possible connection between MS and bio-electromagnetic fields? We recently published a review entitled "Bio-electromagnetic applications for multiple sclerosis," which examined several scientific studies that demonstrated the effects of electromagnetic fields on nerve regeneration, brain electrical activity (electro-encephalography), neurochemistry, and immune system components. All of these effects are important for disease pathology and clinical symptoms in MS".

MS patients were exposed to a magnetic pulsing device that was either active (PEMF) or inactive (placebo) for two months. Each MS patient received a set of tests to evaluate MS disease status before and after wearing the device.

There was a significant improvement in the performance scale combined rating for bladder control, cognitive function, fatigue level, mobility, spasticity, and vision. There was also a significant change between pre-treatment and post-treatment in alpha EEG magnitude during the language task.

PEMF and the Brain

A four-week double-blind, placebo-controlled study conducted by Uni der Bundeswehr (*Munich, Germany*) assessed the efficacy of PEMF Therapy for Insomnia. One hundred one patients were randomly assigned to either active treatment (n = 50) or placebo (n = 51) and allocated to one of three diagnostic groups: sleep latency; interrupted sleep; or nightmares. The results showed 70% (n = 34) of the patients given active PEMF treatment experienced substantial or even complete relief of their complaints; 24% (n = 12) reported clear improvement; 6% (n = 3) noted a slight improvement. Only one placebo patient (2%) had very clear relief; 49% (n = 23) reported slight or clear improvement; and 49% (n = 23) saw no change in their symptoms. No adverse effects of treatment were reported.

Stunning results were obtained in a study entitled "Protection against focal cerebral ischemia following exposure to a pulsed electro-magnetic field", Grant G *et.al* (1994 *Department of Neurosurgery, Stanford University, CA, USA*) stated: *"There is evidence that electro-magnetic stimulation may accelerate the healing of tissue damage following ischemia. Exposure to pulsed electro-magnetic field attenuated cortical ischemia edema on MRI at the most anterior coronal level by 65%. On histological examination, PEMF exposure reduced ischemic neuronal damage in this same cortical area by 69% and by 43% in the striatum. Preliminary data suggest that exposure to a PEMF of short duration may have implications for the treatment of acute stroke".*

Pulsed Electro Magnetic Field Therapy and Depression

Transcranial Magnetic Stimulation (TMS) Therapy and Depression/UCLA/NeuroStar®
http://www.tmslosangeles.com/

Neuronetics® Uses Magnetism to Lift Depression
http://www.businessweek.com/globalbiz/content/sep2010/gb20100901_265881.htm

Sustained Use Of Anti-Depressants Increases Cell Growth And Protects Cells In The Brain
http://www.sciencedaily.com/releases/2000/12/001215081931.htm

Popular Anti-depressants Boost Brain Growth, Hopkins Scientists Report
http://www.hopkinsmedicine.org/Press_releases/2005/12_19_05.html

Newly-Identified Exercise Gene (VGF) Could Help With Depression
http://www.sciencedaily.com/releases/2007/12/071202155304.htm...

VGF, a New Player in Antidepressant Action?
http://stke.sciencemag.org/cgi/content/abstract/sigtrans;1/18/pe19

PEMF affects tissue and muscle in same manner as exercise (and in some cases, anti-depressants) with respect to treatment of depression... but also helps treat all other conditions, illnesses and disease.
Electro magnetic therapy stimulates cell growth and gene expression (without negative side effects of drugs) re-establishing and balancing the body's natural energy fields/exchanges, that have been lost and/or negatively impacted by weakened terrestrial magnetic field, and proliferation of modern electric devices.
The body's weakened magnetic field and interrupted/blocked energy flow is a common deprivation that we all suffer from, and is the missing link behind ineffective and/or failed treatment modalities.

PEMF and Stem Cells - Research

Stimulation of osteogenic differentiation in human osteoprogenitor cells by pulsed electromagnetic fields: an in vitro study.
Jansen JH, van der Jagt OP, Punt BJ, Verhaar JA, van Leeuwen JP, Weinans H, Jahr H.
BMC Musculoskelet Disord. 2010 Aug 23;11:188.PMID: 20731873 [PubMed - in process]

Modulation of osteogenesis in human mesenchymal stem cells by specific pulsed electromagnetic field stimulation.
Tsai MT, Li WJ, Tuan RS, Chang WH.
J Orthop Res. 2009 Sep;27(9):1169-74.PMID: 19274753 [PubMed - indexed for MEDLINE]

Effect of pulsed electromagnetic field on the proliferation and differentiation potential of human bone marrow mesenchymal stem cells.
Sun LY, Hsieh DK, Yu TC, Chiu HT, Lu SF, Luo GH, Kuo TK, Lee OK, Chiou TW.
Bioelectromagnetics. 2009 May;30(4):251-60.PMID: 19204973 [PubMed - indexed for MEDLINE]

Osteoprotegerin (OPG) production by cells in the osteoblast lineage is regulated by pulsed electromagnetic fields in cultures grown on calcium phosphate substrates.
Schwartz Z, Fisher M, Lohmann CH, Simon BJ, Boyan BD.
Ann Biomed Eng. 2009 Mar;37(3):437-44. Epub 2009 Jan 13.PMID: 19139991 [PubMed - indexed for MEDLINE]

Pulsed electromagnetic fields enhance BMP-2 dependent osteoblastic differentiation of human mesenchymal stem cells.
Schwartz Z, Simon BJ, Duran MA, Barabino G, Chaudhri R, Boyan BD.
J Orthop Res. 2008 Sep;26(9):1250-5.PMID: 18404656 [PubMed - indexed for MEDLINE]

http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed&cmd=DetailsSearch&term=PEMF+stem+cells&log$=activity

EIGHTEEN YR-OLD YOUNG MAN RECOVERING FROM AUTISM WITH PEMF THERAPY!

Christian was diagnosed with Cerebral Palsy, Autism and ADHD. He had anxiety and anger issues stemming from associated problems including limited verbal and communication skills, stuttering, inability to focus or look people in the eye. He also had physical difficulty walking and maintaining his balance.

After just a month and a half of PEMF treatments, Christian no longer stutters or loses his balance. He is calmer, more peaceful, has energy and focus and feels like he has awakened from a long sleep. His mom Christine says "he even has a girlfriend now!"

View Christian's story here: http://www.pemf.us/autism-video/

Alzheimer's disease: improvement of visual memory and visuoconstructive performance by treatment with picotesla range magnetic fields.

Sandyk R.
NeuroCommunication Research Laboratories, Danbury, CT 06811.

Abstract
Impairments in visual memory and visuoconstructive functions commonly occur in patients with Alzheimer's disease (AD). Recently, I reported that external application of electromagnetic fields (EMF) of extremely low intensity (in the picotesla range) and of low frequency (in the range of 5Hz-8Hz) improved visual memory and visuoperceptive functions in patients with Parkinson's disease. Since a subgroup of Parkinsonian patients, specifically those with dementia, have coexisting pathological and clinical features of AD, I investigated in two AD patients the effects of these extremely weak EMF on visual memory and visuoconstructive performance.

Treatment with EMF resulted in a dramatic improvement in visual memory and enhancement of visuoconstructive performance which was associated clinically with improvement in other cognitive functions such as short term memory, calculations, spatial orientation, judgement and reasoning as well as level of energy, social interactions, and mood. The report demonstrates, for the first time, that specific cognitive symptoms of AD are improved by treatment with EMF of a specific intensity and frequency.

http://www.pemf.us/docs/ScienStudies_Magnetic64.pdf

Electromagnetic Therapy
for energy production and cellular detoxification

In an article published in *Plos One*, November 2010, volume 5, issue 11 (Wang), page 4, Johns Hopkins' researchers found a **38% increase** in ATP production in P12 cells that were placed in a static magnetic field device that we supplied.

This increase could be much higher *in vivo* with the brain's pulsed DC electromagnetic field interacting with an enhanced earth-type field resulting in increased resonance of the mitochondria. All of this leading to enhance electron transfer in the creb cycle resulting in more ATP production.

↑ ATP equals ↑ Na+ K+ pump function which leads to ↑ charge of the cell wall and ↑ metal excretion.

"A World Without Cancer"
Kobayashi's Simple Detox Plan:

Dr. Kobayashi's advocates an integrative treatment, combining conventional Western medical treatments with ancient eastern practices.

▪ Thermal treatment	▪ Herbs
▪ Negative ion treatment	▪ Massage
▪ Tumor marker testing	▪ Acupuncture
▪ Diet modification	▪ Moxibustion

Kobayashi has shown that his holistic medical treatment approach can put some 70% of all his cancer patients in remission, even if they are in the last stage of the disease.

Changes in life-style (change in sleeping habits), change in diet (eating yellow and green vegetables every day), detoxification, supplementation of vitamins, smoking cessation, maintaining the life-style change, special refreshment therapy, and herbal medicines are all part of
My F.I.G.H.T. for Your Health Program.

F.I.G.H.T. For Your Health

utilizes all spheres within Complementary Alternative Medicine (CAM) - including Diet, Herbs and Vitamins, Homeopathy, Massage, Exercise, Relaxation, Energy and Magnetic therapies, etc.,.

The 5 Spheres of Complementary Alternative Medicine (CAM)

http://www.mydochub.com/blog/index.php/2008/12/20/basic-principles-of-complementary-and-alternative-medicine-cam/

Dr. Gordon's F.I.G.H.T. Program

This is the program we all need for OPTIMAL HEALTH, and no one achieves this without addressing all of these problems. ***Briefly, F.I.G.H.T. is an acronym that stands for:***

F = Food related aspect and leaky gut, and Focus (positive mental outlook): Acidophilus, Avoid food sensitivities (wheat, dairy) food supplements to include Vitamin C and D

I = Infection causing cancer, cardiovascular disease, autoimmune diseases: Ozone/UVB, HBO, Silver, Vitamins A, C and D including IV Vit C

G = Genetics and epigenetics and methylation issues needed for detoxing B-12, MSM, TMG, 5`MTHF

H = Heavy Metals and Hormones Daily detoxification of mercury, lead; Hormonal balance and support for both men and women: Oral Chelation, Zeolite, DHEA, HRT, Melatonin, GH Support, Thyroid

T = Toxins BPA, phtalates, and other toxins including household chemicals and everyday products: Exercise, IR/FIR Sauna, PEMF, Magnetics, Electrotherapy, cold (soft) lasers.

Circulation. 2011 Aug 15. [Epub ahead of print]

Atrial Sources of Reactive Oxygen Species Vary With the Duration and Substrate of Atrial Fibrillation: Implications for the Antiarrhythmic Effect of Statins.

Reilly SN, Jayaram R, Nahar K, Antoniades C, Verheule S, Channon KM, Alp NJ, Schotten U, Casadei B.
Department of Cardiovascular Medicine, University of Oxford, John Radcliffe Hospital, Oxford, UK.

Background- An altered nitric oxide-redox balance has been implicated in the pathogenesis of atrial fibrillation (AF). Statins inhibit NOX2-NADPH oxidases and prevent postoperative AF but are less effective in AF secondary prevention; the mechanisms underlying these findings are poorly understood. Rac1 and NADPH oxidase activity and the protein level of NOX2 and p22phox were significantly increased in the left atrium of goats after 2 weeks of AF and in patients who developed postoperative AF in the absence of differences in leukocytes infiltration.

Conversely, in the presence of longstanding AF or atrioventricular block, uncoupled nitric oxide synthase activity (secondary to reduced BH(4) content and/or increased arginase activity) and mitochondrial oxidases accounted for the biatrial increase in reactive oxygen species. Conclusions- Upregulation of atrial NADPH oxidases is an early but transient event in the natural history of AF. Changes in the sources of reactive oxygen species with atrial remodeling may explain why statins are effective in the primary prevention of AF but not in its management.

PMID: 21844076 [PubMed - as supplied by publisher]

Dr. Gordon's Personal List of Supplements taken daily...

- Acetyl L-Carnitine (558 mg) one daily
- Advanced Cellular Silver (ACS) 200 – 15 sprays daily, or more for infection
- Aloe Immune (4R Health) 500 mg one bid
- Beyond B12 Sublingual, one at night
- Beyond Chelation Improved (BCI) 2 packs daily
- Beyond GHS With Resveratrol, three at night
- Beyond Lithium, one daily
- Boluoke (Canada RNA) 20 mg caps, one bid
- DHEA 50 Milligram, one daily
- Doctor's Best Benfotiamine 80 mg, one daily
- 100% Chelated Magnesium Glycinate/Lysinate Chelate 100 Milligram – 2 Tablets Per Day, 1 bid.
- Doctor's Best Comprehensive Prostate Formula, one bid
- Doctor's Best Meriva Phytosome Curcumins, 500 mg, one bid
- Doctor's Best Ubiquinol (Co-Q 10) 50 mg one daily
- Doctor's Best Mena Q7/Vitamin K2, 45 mcg, one daily
- Doctors Best Cinnamon extract, one nightly after meal
- Doctors Best Quercetin Bromelain one bid
- Doctors Best Trans Resveratrol 200, one bid
- HRT (Herbal Remedy from Thailand) Plus, one daily
- Hyal-Joint, 20 mg, one daily
- Kyodophilus 9, one daily
- Kyolic Liquid Garlic,1 tsp bid
- Melatonin 3 mg, one daily
- N-Acetylcysteine 500-600 mg, one bid
- Nettle Root (Eclectic Institute) 250 mg, one daily
- Power Drink – BioEn'R'Gy C, Maca, Organic Greens, and Beyond Fiber, twice a day
- Pregnenolone, 50 mg Micronized, one at night
- Stabilized R-Lipoic Acid 100 mg, one daily or more if schedule is causing lack of sleep
- Testosterone/Progesterone/Chry-H 150/5/200 (Apothecure -Topical Application)
- Thyroid 2 Grains, once daily (Westhroid)
- Vitamin D3, 5,000 Units, one daily
- ZeoGold, zeolite capsules, 2-3 daily
- Hydrogen Water

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FACT is an online discussion group focusing on Advanced Alternative Medicine, with over 3000 practicing Healthcare Professionals participating and sharing their wisdom and experience with one another.

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