Norma Harnack, a leader in the holistic health care field, sees herself as a nurse who practices ***Integrative Wellness*** striving to bridge the gap between conventional and traditional medicine. As an advocate for health, she believes you don't have to settle for living with pain or low levels of health and energy. With her extensive background in nursing and alternative and complementary therapies, she helps people sort through the diverse and sometimes confusing array of health and wellness opportunities to discover the best methods of regaining, attaining, and maintaining their own unique level of wellness

Norma is currently authorized by the **International Kinesiology College** (Zurich, Switzerland) to certify Touch For Health instructors in the USA. She has designed and conducted research in complementary health including a study on ***Meridian Massage Technique*** at the Jewish Center For the Aged (St. Louis, MO) that was funded by the United Way Foundation. In 2002 she was selected to participate in the **Institute for Johns Hopkins Nursing,** Leadership Academy for End of Life Care A popular guest lecturer, she has lectured at various colleges and universities and on local radio and television. She has served on various committees to explore alternative health options and presented workshops to physicians and nurses in the U.S., Europe and Russia on topics ranging from kinesiology to acupressure.

A member of the American Holistic Nurses Association, the American Nurses Association, the National Association of Nurse Massage Therapists, the International Massage School Association and a life-time member of the Touch for Health Association, she is devoted to the spread of Health.

USING TOUCH FOR HEALTH and SIMPLE MUSCLE TESTING TO MONITOR THE ENERGY PRODUCTION OF MITOCHONDRIA

Abstract: This article aims to provide adequate hypothesis to encourage the rigorous study of the effect and efficacy of using **Touch for Health** muscle balancing to affect and improve the health of people suffering from various diseases where the biochemistry of the illness lies in the dysfunction of mitochondria in producing ATP (adenosine triphosphate), the energy currency for all body functions, and recycling ADP (adenosine diphosphate) to replenish the ATP supply as needed.

There is also considerable evidence that dysfunctional mitochondria are present in multiple diseases where the energy in our **muscles** is affected. The **Mitochondria** are vital to life and have a profound impact on our **energy** and our health. Implications are for the regular use of the **14 muscle TFH balancing** for sustaining and improving mitochondrial energy response and to help prevent diseases such as diabetes, cardiovascular disease, cancer, Alzheimer's disease and Parkinson's, all diseases involving the mito-chondria. and drugs.

Current studies focus on relieving the symptoms with remedial actions such as dietary supplements, medically guided detoxification The expense of purchasing prescription analgesics (which include narcotic analgesics, non-steroidal anti-inflammatory drugs, Cox-2 inhibitors, among others) to treat aches and pains, symptoms associated with mitochondrial dysfunction, increased from $4.2 billion in 1996 to $13.2 billion in 2006 according to the Agency for Healthcare Research and Quality. AHRQ also reported that from 1996 to 2006 the average annual expenditure jumped from $83 to $232 for people who purchased one or more prescription analgesics; the average expenditure for each analgesic rose from $26 to $57 while the total number of prescription purchases increased from about 164 million to 231 million. These remedies may or may not relieve pain associated with the various diseases or the symptoms. While some people may benefit from current conventional medical intervention what is missing is low cost, minimally invasive effective treatment to relieve pain and alleviate symptoms. While the **14 muscle balance** from TFH lacks documented empirical support the potential for beneficial and measurable outcomes is indicated and cost effective. This is a great opportunity to put TFH in the forefront of preventive medicine while providing a soothing affect on health care cost.

Key words: energy, mitochondria, muscles, balance, 14 muscle TFH balancing

The Mitochondria and Touch For Health

Behind every move you make are millions of organelles known as **mitochondria.** The mitochondria are the power plants of our cells," according to Simon Melov, Director of the Genomics Core at the Buck Institute for Age Research in Novato, California. "They convert food into **energy**, which the body uses to live." While most cells in the human body contain somewhere between 500 to 2,000 mito-chondria, the mitochondria in muscle cells account for as much as 60 percent of the volume of the cell! **Mitochondria** are responsible for almost ev-ery essential process in cells. You can trace almost any condition that has to do with **energy balance** in part, to problems with the **mito-chondria.**

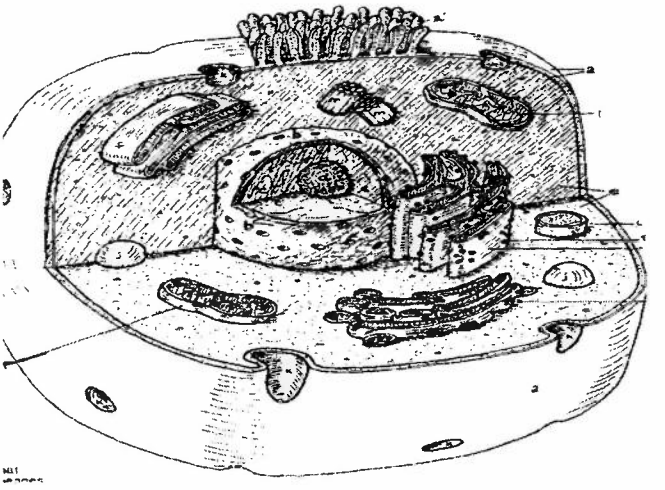
Mitochondria are unusual among the structures within cells because they have their own genes and DNA. (All other DNA is found in-side the cell's nucleus.) The mitochondria are the place within the cell where the nutrients - carbohydrate, fat, and protein, are turned into the energy of the body. Those tiny energy generators are located in all of our cells that use nutrients (the food we eat) for fuel. The mitochondrial DNA is most susceptible to the stress of everyday living. Possibly because the mito-chondria is expected to work all the time - 24/7 - producing around-the-clock energy for the cell to function all day and all night; and, because the same process that generates energy also generates "free radicals" that can cause energy imbalance. Free radicals are molecules that over time damage the mitochondria's DNA and membranes. Some scientists speculate that the damage to the mitochondria may ultimately be the cause of aging. As we age, the mitochondria appear to mutate and eventually slow down the work of mitochondria in all our tissues.

Dysfunctional mitochondria can also lead to disease. "It's possible that weakened mitochondria leave people more susceptible to Parkin-son's disease or accelerates the progression of Alzheimer's disease," notes Mark Mattson, chief of the Cellular and Mo-lecular Neurosciences Section of the National Institute on Aging.

Protecting and monitoring mitochondria with muscle testing.
Structural details and the number of mitochondria per cell are dictated by the typical energy requirements of the cell. Cardiac and skeletal muscle cells, liver and brain cells contain the highest numbers of mitochondria. The muscle ends tend to have the most mitochondria with the quadriceps being the leader of the skeletal muscle. Athletic trainers, athletes and people involved with exercise physiology are aware that when worked hard, energy starved cells can create more mitochondria. The mitochondria of trained athletes become more efficient because the athlete is focusing on the development of muscles by isolating muscles, exercising the particular muscles to create more mitochondria. With more mitochondria the muscles can maintain a high level of function without creating extra demands on the heart and lungs. Even the US Military are looking for ways to improve the functioning of the mitochondria especially for the foot soldiers.
Focused endurance exercise is associated with the growth of mitochondrial enzymes. The increase in mitochondrial density is associated with an increase in the length of time a muscle can perform. A large body of research suggests that the enhancement of mitochondrial density in skeletal muscle is a key component in the development of muscle performance in athletes. In a sense, building more mitochondria allows an athlete to function closer to their potential.

How does one ramp up mitochondrial density? First, let's take a quick look at what tells mitochondria to up-regulate. Research suggests that simply an increase in the concentration of calcium within the cells of skeletal muscle, something which happens any time a muscle is contracted, is capable of inducing mitochondrial protein synthesis.

Changing your muscle make-up involves both a chemical and physical process. Muscles are made of very thin, stretchy fibers called myofibrils. They are so thin that a square centimeter of myofibril can contain up to 1 million fibers. Within those fibers are nerve cells that relay to the muscles when they should contract or expand.



Mitochondria, cells that live in your muscle fibers, convert stored energy into useable energy. The more you flex your muscles, the more the mitochondria are activated and expend energy. Your muscle fibers use the mitochondria to increase in size and durability. In other words, the more you use your muscles, the stronger they will get.

What can TFH offer?

In TFH, we attempt to focus on a muscle by isolating and contracting the muscle. Using very simple muscle tests, we assess its ability to function. The ability of the isolated muscle to hold the limb in a specific position for a very brief amount of time is observed by both the tester, person applying the test and the testee, person being tested. The person being tested describes whether the limb and the "isolated" muscle are functioning by deciding if the muscle is weak, strong, could be better or if the effort of the muscle is the same on both sides. Any answer that is different from strong and the same on both sides, invites the application of a technique to stimulate the energy of the mitochondria of that muscle. What we're actually trying to determine is whether the energy that is being generated in the mitochondria of the muscle is sufficient. In other words we are saying "How are your mitochondria?"

When a weak muscle response is encountered we utilize one of various techniques from TFH to improve the muscle and the mitochondrial response of the muscle. The focus of the evaluation and any action taken is to stimulate the body to create its own energy. After applying a technique we re-test the muscle and re-evaluate the response. We repeat the re-test and re-evaluation until the muscle responds favorably or until all techniques for improving the muscle response are exhausted. TFH does not attempt to identify or treat any specific disease. Rather, it focuses on identifying the **energy** level of specific core muscles and whether that energy is sufficient or insufficient indicating whether the mitochondria are energy efficient. While the **14 muscle balance** from TFH lacks documented empirical support, the potential for beneficial and measurable outcomes is indicated in order to observe improvement in overall quality of life, global health, strength, sleep, self-esteem, depression, anxiety and tiredness.

Other ways to improve energy balance

Research shows that aerobic exercise can increase the number of mitochondria and **energy** in your muscle cells by 40 to 60 percent in a matter of weeks. Research-ers have known that-from studies in animals and hu-mans-for more than 30 years. To get the full benefit, you need to run, cycle, swim, walk briskly, or do other ex-ercises at maximum capacity for at least 15 to 20 minutes a day, three to four times a week. Within weeks you'll experience less exertion and more en-durance because mito-chondria are efficiently burning more fat, rather than carbohydrate, for **energy**. You can check your results using TFH. If you used TFH everyday along with your exercise regime the expected result would be that your ability to sustain **energy** would increase and fatigue would decrease.

There are specific supplements that can also affect the mitochondria. Quercetin boosts mitochondria, much like exercise does. The Department of Defense is looking at its capacity to increase the mi-tochondria. Using **the 14 muscle balance** from TFH would be less expensive. In 2006, Elizabeth Menshikova and her colleagues at the University of Pittsburgh School of Medicine published a study observing eight overweight and sedentary men and women in their late 60s walking outdoors or using tread-mills or stationary bicycles four to six days a week for 30 to 40 minutes each time. After 12 weeks, the mitochondria in their quadriceps increased by about 50 percent. Maintenance did require exer-cising at least two or three times a week to maintain the new level of mitochon-dria.

In a 2007 study, the genes in the quadriceps muscles of 14 healthy older men and women (average age: 70) were noted to be much less active than the genes in the quadriceps of 16 younger adults (average age: 26). After twice weekly strength-training sessions for six months, there was a re-markable reversal of the older people's ge-netic profile to more-youthful levels reported by the Buck Institute's Simon Melov. In other words, their quadriceps genes-many of which contain the instructions for making mitochondria-had become more active. Focusing on the quadriceps as a target muscle group for physical exercise yielded "younger" muscles. Using **the 14 muscle balance** from TFH to isolate the function of the quadriceps and monitor the progress of exercise efforts can help to further enhance fine tuning energy. Mitochondria may also help explain why people who exercise regularly have lower risk of type 2 diabetes and insulin resistance. When people are insulin resistant, their insulin can't efficiently move blood sugar into cells.

Excess fat can block the transport of blood sugar into cells. The most common cause of fat buildup is consuming more calories than we burn. People who are insulin resistant often have too much fat stored in the muscle and liver. Older mitochondria are less able to get rid of the fat. As we age mitochondria slow down and the rate of oxidation of fat and production of energy also slows down. Physical activity and consistent use of TFH may help slow or even halt, those changes. In Menshikova's exercise study on people in their 60s, insulin resistance declined as their mitochondria increased, even though they didn't lose weight or body fat. Suppose diabetes could be prevented by boosting mitochondria!

Regular use of the 14 muscle TFH balancing

Regular use of the 14 muscle TFH balancing with moderate aerobic exercise (such as walking) is one way to boost mitochondria. This may also help lower the risk of diseases that affect the mitochondria, such as diabetes. TFH balancing plus strength training may also boost mitochondria in older, less-active people. Having more mitochondria in your muscles means you have more energy.

Implications for regular use of the 14 muscle TFH balancing

The implications for improving mitochondrial response using TFH is huge. The elegance of using simple, cost effective interventions like TFH that can be applied to people in their homes, paired with moderate exercise. TFH can also help prevent diseases such as diabetes, cardiovascular disease, cancer, Alzheimer's disease, and Parkinson's since these are all diseases involving the mito-chondria. TFH can have a soothing affect on the people afflicted with diseases involving the mito-chondria as well as having a similar affect on lowering health care cost. This is a great opportunity to explore the possibilities for TFH as the vanguard of preventive medicine.