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by Karin Ritzmann, J.D.

Just to be clear, we're not talking about palmistry, the practice of examining the lines, marks and patterns of the palms of the hands to predict fortunes. Some people consider palmistry a novel form of carnival entertainment at best, whereas others consider it a legitimate craft. Whatever the value or significance of palmistry, there is a new form of "palm reading" that unquestionably can help improve athletic performance and quality of life.

A recent technological development, based on a Nobel Prize-awarded discovery, is now being used to accurately, quickly, and painlessly determine the overall nutritional status of athletes and anyone else who takes their health seriously. It's the Pharmanex BioPhotonic Scanner, developed by scientists at the University of Utah. The technology rapidly and accurately tests antioxidant levels, a good indicator of general nutrition, by flashing a painless beam of light at the palm of your hand.

One of the most knowledgeable scientists in the field of scanner technology is Dr. Mark Bartlett. Dr. Bartlett came to the US 11 years ago from Australia to work for the National Cancer Institute. In 1996 he became a leading researcher in the science division of a company that in 1998 became Pharmanex, IDN, a specialty nutrition company. Pharmanex has licensed the scanner technology from the University of Utah and has been bringing the technology to schools, institutions and doctors' offices for the last two years.

Dr. Bartlett took time out from his busy schedule to grant BFS an exclusive interview to explain how the scanner works and how it can revolutionize the way we look at nutrition.

Panning for Gold — Make That Scanning for Orange
According to Dr. Bartlett, the technology that the scanner implements was first discovered by Indian scientist C.V. Raman, who was awarded the Nobel Prize in physics. For years, the technology has been used in science labs everywhere to measure the light absorbed by various chemicals, indicating the levels of the evaluated chemicals present. But none of those measurements was as yet helpful in the area of nutrition.

The lasers used in the original device were expensive, and sophisticated computers were needed to evaluate the data. Additionally, the device measured a lot of "noise," which is the scientific jargon for readings that are polluted somewhat with additional data, making them difficult to interpret accurately. Recently, however, scientists at the University of Utah figured out how to put the technology into an accurate, easy-to-use scanner that can correctly evaluate the level of carotenoids in one's skin.

Carotenoids are chemicals in food that have particular and extraordinarily beneficial effects on health, from fighting cancer of all types, to protecting the skin and eyes against damage from light and UV radiation (sunlight). Some are orange colored, some are reddish (in green vegetables, the green color of chlorophyll masks the carotenoids' color), but they are all beneficial to health.



According to Dr. Bartlett, there are about 500 different carotenoids in nature, but there are only about 5 or 6 that appear critical to diet and which are typically eaten.

The portable scanner determines the amount of carotenoids in the skin of a person's palm by directing monochromatic light on the skin and then measuring the energy that the molecules in the carotenoids give back after being excited by the light beam. This is translated into a readable level of actual carotenoids in the skin, since all carotenoids give off light that the scanner can read. The results are then indicated by a score. A score of 40,000 would be considered optimal, whereas a score of 20,000 (a level that BFS has found is alarmingly common among high school teenagers measured thus far) indicates severe problems in an individual's diet.

Many of the foods we eat contain carotenoids. For example, tomatoes are loaded with a carotenoid called

lycopene, which has health benefits including protection against prostate cancer, heart attacks and cardiovascular disease in general, as well as the ability to decrease the levels of harmful LDL. Beta-carotene, the chemical that gives carrots and apricots their orange color and which is converted to vitamin A in the body, appears to be critical in protecting against other types of cancers. Lutein, another helpful carotenoid (found in dark green leafy vegetables, fruit, corn and egg yolks), is essential to protect the eyes from degenerative disease caused by long-time exposure to light. Other important carotenoids include zeaxanthin (plentiful in leafy greens), and alpha-carotene (best sources are carrots and pumpkins).

When you eat foods containing carotenoids, your body takes these natural chemicals to where they are needed most and they are used up in protecting the body. Ideally, you maintain a reserve to protect against damage to your body (more about how this works in a minute). The reserves are scattered throughout your body, including in the palms of your hands.

The scanner is able to flash a light on your hands and detect the reaction of the carotenoids to this light and measure how strong the response is. A strong response means lots of carotenoids are available to protect your body. A low reading means that you don't have sufficient protection, and one of many typical daily assaults from

pollution, sunlight, harmful chemicals, and so on will be able to damage your body and impair your health and your performance. Having a reserve of carotenoids stored throughout the body is extremely important. Previously, levels of carotenoids in the body could be determined only by a blood test, and that meant a painful needle stab! Now, that's all history. When the scanner flashes light on your hand, there is no pain at all.

At this point you might be asking yourself

whether a measurement of the carotenoid level in the palm of your hand is truly representative of the level throughout your body. In fact, it is. According to various studies, including those by Hata in the *Journal of Investigative Dermatology*, the level of carotenoids in the palm does correlate accurately to levels throughout the body. Studies by Drs. Smidt, Gellerman, and Zidichouski confirm the correlation between palm carotenoid readings and blood-level readings and show that the scanner does make accurate readings of carotenoid levels in the body.

Dr. Bartlett referred me to studies that showed how carotenoid levels are significant indicators of your nutritional



All carotenoids have the same basic chemical structure, with just minor differences making each type unique in the way it looks and the way it behaves in the body. Taken together as a class, these compounds are phenomenal protectors of health, and eating enough of them each day is of critical importance.

Antioxidant Insurance

Dr. Bartlett explained that the Pharmanex BioPhotonic scanner measures the entire class of carotenoids. The scanner could measure each type of carotenoid separately, as well, but it is specifically tuned to detect overall levels of the whole class to determine whether you are getting enough of all of them or not.



health in general. Here's how it works: When a damaging chemical reaction takes place in your body, it negatively affects the cells throughout your body. For example, if you smoke, the smoke produces something called free radicals in your body. These are molecules that are missing an electron. These molecules desperately want one more electron, so they can become, in effect, balanced—so they have a pair of electrons. That means that they have to steal their desired electron from somewhere else. That somewhere else will be the cells in your body.

Your cells will readily give up an electron from their membranes, thereby impairing their functioning, or from their DNA, and we don't want to even think about what messing with your DNA can do. Your body keeps a supply of chemicals called antioxidants around just for this type of crisis.

The antioxidants easily give up one of their electrons to the free radicals, to make them inert, or nonreactive, and to prevent damage or stop a damaging chain reaction. Antioxidants come in thousands of types. Some are more efficient than others, easily giving up electrons while still remaining stable. Others help more for water-based elements of the body, and still others are more effective for fat-based elements of the body.

The fantastic thing about carotenoids,

which are "super-antioxidants," is that they easily give up electrons to stabilize the free radicals while still remaining quite stable. In fact, they can take about 20 free-radical "hits" before becoming spent and no longer effective. "And perhaps, even more importantly, carotenoids are the first line of defense, meaning that they help spare other antioxidants that normally work together synergistically throughout the body. So, if you have carotenoid reserves, you definitely have enough of all the other types of antioxidants because the carotenoids have protected them from oxidation," says Bartlett.

That's why the scanner reading of carotenoid levels really can accurately show your overall antioxidant nutritional status, not just that of carotenoids. If your carotenoid level is low, you are depleted of all antioxidants and must improve your diet immediately to protect your health. The goal is to eat enough antioxidants of every type to spare the carotenoids and allow your body to build up reserves. These reserves, of course, will show up in your palms.



Dr. Mark R. Bartlett, Ph.D.

The correlation between levels of carotenoids and the levels of other antioxidants in the body was proven in a study by Dr. Svilaaf. He wondered if the levels of carotenoids did in fact have relevance to other antioxidants and found that carotenoid levels remained higher if there were sufficient levels of other

antioxidants. He found that carotenoids acted in a sacrificial manner, protecting other antioxidants in the antioxidant network throughout the body.

Now, don't think that if you are a nonsmoker and are otherwise fit, you don't need to be concerned. Keep in mind that as beneficial as physical activity is, it does create free radicals, as do harmful chemicals in air, pollution in water and food, and exposure to heavy metals such as lead and cadmium. Even being overweight exposes one to a higher level of free radicals compared to a person of normal weight. But the exertion and energy-burning activity of heavy physical exercise definitely increases your need for antioxidants in general.

Scientists are even discovering that high levels of antioxidants seem to be protective against damage to your arteries in that they stop fats and cholesterol in the blood from damaging the walls, which then do not respond to damage by building up plaques of cholesterol and calcium on the arterial walls. That means they stay open and flexible, the way they should be.


Goodbye, Guesswork—Hello, Confident Nutrition

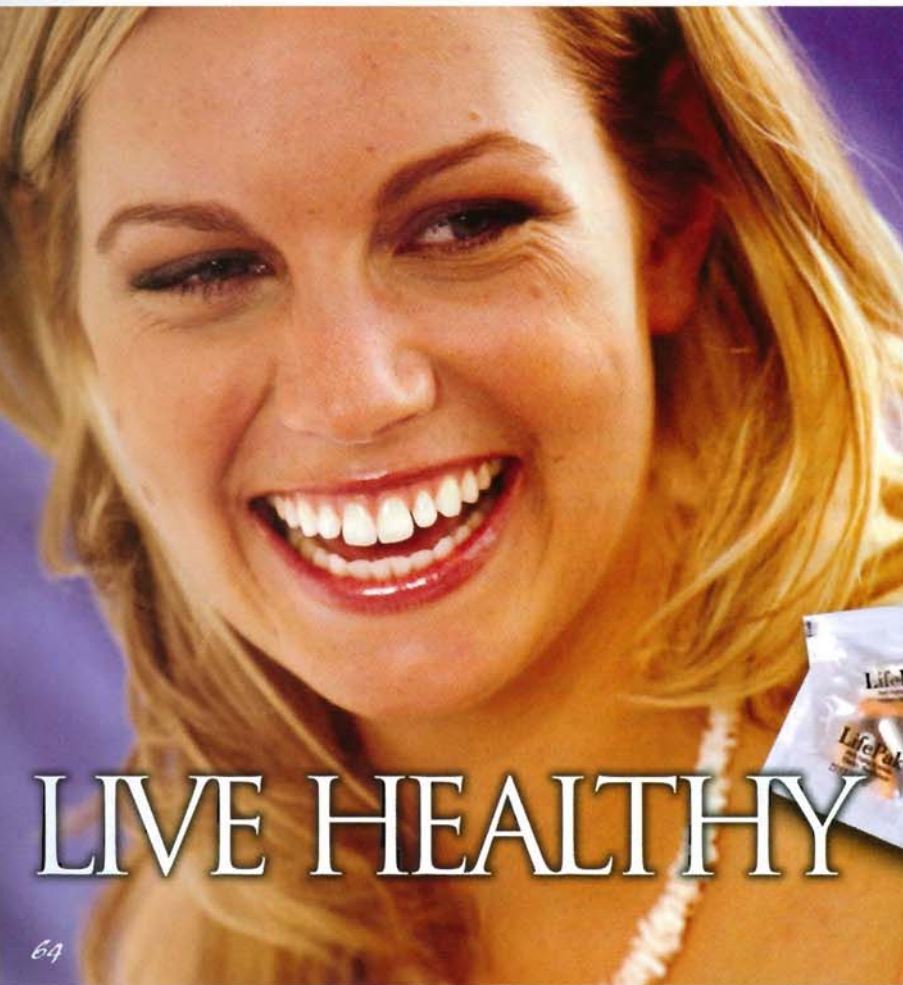
As we always stress at BFS and as Dr. Bartlett agrees, a good diet is your best protection against poor health and poor performance on the field and in the weightroom. Eat a good variety of fresh food. Be sure to get several servings of fruits

and vegetables every day and in every meal. Eat loads of green, leafy vegetables, especially, to give you every advantage in getting enough carotenoids. Have fruit and vegetable snacks. Then measure how you're doing to see where you might need to improve. If your levels are still too low, BFS recommends a pharmaceutical-quality, balanced nutritional aid such as Pharmanex's Life Pak or G3 to fill any gaps.

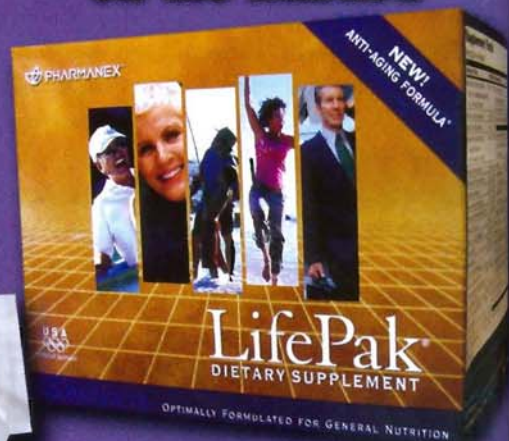
BFS has Pharmanex BioPhotonic scanners available for use by schools to evaluate students and coaches on how they are doing in meeting their team- and individual nutritional goals. Scanning also helps evaluate the effectiveness of nutritional aids the person is taking — many antioxidant nutritional aids don't live up to their claims. Further, because soil quality has decreased significantly over the past several decades, simply adding additional fruits and vegetables to your diet may not be enough to ensure adequate antioxidant protection.

With the BioPhotonic scanner, it's the end of nutritional guesswork. You now have the means to clearly see just how you are doing from a nutritional standpoint, just as you can evaluate your physical development in every other area, whether on or off the field.

So, when will you get your palm read? 



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