



# The Science of **HEALTH & WELLNESS**

By G.K. Sharman

HOME TO LEADERS IN THE FITNESS AND HEALTHCARE INDUSTRIES, ORLANDO LIES AT THE CROSSROADS OF TECHNOLOGY AND WELLNESS.

ILLUSTRATION BY JONATHAN SIMON

»» You count calories. You watch your fat intake. You exercise all the time. You do everything you're supposed to do, everything every expert has advised ... but it's not working.



COURTESY NATIONAL TRAINING CENTER

Step into the Human Performance Lab at the National Training Center (NTC) in Clermont, Florida, where exercise physiologist Sharlyne Rivera can hook you up to her computers and tell you exactly why you can't lose those last five pounds. Or why you're having trouble with your pitching arm. Or whether you're overtraining or are just what she terms "a flat-out wimp."

At the NTC, science and technology meet the world of health and wellness, to the advancement of both.

South Lake County, with its history as a triathlon training mecca, is flexing its muscles in the wellness arena.

That's no mean feat in Central Florida, which already sets the pace in the fields of science and health. Home to two of the nation's largest hospital systems and a major research center, our area also boasts a climate that lets us — and our visitors — take advantage of great outdoor activities year-round.

The NTC, part of a 300-acre-and-growing health-science city in south Lake, is the only facility of its kind in the world. Half of the facility caters to the community. About 3,000 local residents

enjoy such fitness-center amenities as a gym, pool, track and weight room, plus classes such as pilates and yoga. In the main corridor are stores selling fitness gear, and a smoothie shop. A physical therapy and rehab area sits off to one side. Out in the pool, some 200 kids participate in swim teams and camps in the summer.

Its other constituency is elite athletes of college level and above. About 10,000 Olympians and other top sports men and women train at the center each year. Spring break finds 40 or more college softball teams on the fields.

Outside the NTC's front door, the rest of the complex spreads across the low hills of Lake County. There's a campus of Lake-Sumter Community College, the headquarters of Special Olympics Florida and Brandy Johnson's Global Gymnastics.

The nucleus of this sports-wellness complex, however, is South Lake Hospital. Part of the Orlando Health network, the 100-bed hospital strives to keep its community well, not just treat illnesses.

Dr. Philip Wood at the Burnham Institute researches the role of genetics in the process of fat metabolism.



COURTESY BURNHAM INSTITUTE FOR MEDICAL RESEARCH

“The South Lake Hospital campus focuses on preventive health, wellness and education for the communities we serve,” says Leslie Longacre, South Lake Hospital Chief Executive Officer.

“Through our initiatives at the National Training Center, we are able to provide community members, as well as national and international athletes, with the tools and knowledge to become healthier and reach their fitness goals, whatever those may be.”

The hospital and NTC are a “living lab” for students at Lake-Sumter Community College (LSCC), says college President Dr. Charles Mojock.

LSCC has 37 students in its health/wellness program, where they study applied science — how muscles work, how to reach maximum sports performance, and how to avoid injuries — as well as legal issues, administration, coaching theory, and more.

Why study science and fitness? One reason, Mojock says, is “that’s where the jobs are.”

Operated in conjunction with the University of Central Florida, the program provides “a seamless transition for students from lower division to upper division,” says Dean of Programs Dr. Mary Jo Rager.

When students graduate — they can take their A.A. degree, though most go on to UCF — they’re prepared for jobs as coaches, in local recreation programs, or as therapists.

## The Magic of **GREEN SPACE**

We all know that exercising in the fresh air and sunshine improves our physical fitness. But it can do much more than that. It can make us feel better. It can make us feel safer. It can make our kids smarter — or at least improve their test scores. Researchers in numerous fields have been studying nature’s effects on us. Here’s a sampling of what they’ve found:

- » Areas of well-maintained trees and grass can increase the sense of safety in neighborhoods.
- » Proximity to parks increases the property values of nearby homes. Recent data indicate an economic boost for commercial properties, as well.

» Landscapes can reduce temperatures, remove air pollutants and improve water quality. Vegetation absorbs heat, provides oxygen and filters the air.

» Green space has been proven to promote emotional and physical healing and to have a positive effect on children with Attention Deficit Disorder (ADD). Research published in the *American Journal of Public Health* also found that young people with Attention Deficit Hyperactivity Disorder (ADHD) who participate in common outdoor activities are better able to stay focused and complete tasks.

The college also has a nursing program that averages more than 150 students countywide, with about 60 at the South Lake campus. The program's high-tech simulation models can be programmed to mimic diseases — a big plus for the aspiring nurses.

"The students get good practice without taking the chance of sticking a needle in the wrong place," Rager says.

## MOVE IT

Meanwhile, back at NTC's Human Performance Lab, Rivera goes over two of the most common tests she runs: the Lactate Threshold test and VO2max.

The lactate test measures lactic acid, a metabolic byproduct of carbohydrate metabolism. VO2max, as the lab's printed handout explains, is a function of the amount of blood pumped by the heart and the working cell's ability to extract oxygen from the blood.

The tests quantify how bodies work when they exercise, and therefore how

**There are no magic bullets in medicine, experts maintain, but physical activity comes close. People who are physically active can cut their risk of heart disease in half.**

they can be better at it — how athletes can train more economically, train at a faster pace without increasing blood lactate levels and strengthen the efficiency of their heart's ability to pump blood.

The reason the tests matter is that

people don't move nearly enough. Government studies have found that more than 70 percent of the U.S. population is not physically active. Our sedentary lifestyle is a huge public health problem, contributing to high rates of obesity, Type II diabetes, heart disease, high blood pressure and stroke.

There are no magic bullets in medicine, experts maintain, but physical activity comes close. People who are physically active can cut their risk of heart disease in half.

Moving is only part of the equation. Avoiding injuries — another factor that Rivera can assess in her lab — means moving your body the right way. Throwing a ball correctly, for instance.

It's all about the mechanics of human motion, and if anybody knows how to throw it's Dr. Dot Richardson.

The two-time Olympic gold medalist and surgeon is the NTC's medical director. In 1996, she hit the game-winning home run to win the gold in the

Atlanta Olympic Games, the year softball debuted as an Olympic sport. Today, in addition to her duties at NTC, she serves as vice chair of the President's Council on Physical Fitness and Sports.

A perfect pitch — or at least an accu-



**Dr. Dot Richardson, two-time Olympic gold medalist, heads the National Training Center.**

KELLY LEADBE

rate one that won't ruin a rotator cuff — starts with the stance. Keep your side to the target. Keep your throwing arm close to your body. Rotate your upper and lower body together and keep your elbow toward your target, advises Metro Orlando's most famous Olympian.

But true fitness goes beyond the mechanics of movement to the mental aspects of sports.

Fitness starts in the mind, Richardson maintains.

"The computer can tell you what your structure is doing," she says. "But it's about what your whole body is doing."

▶ A Congressional committee recommended environmental immersion as the number one strategy for improving U.S. schools.

▶▶ Students taking standardized tests score higher when they have a view of green space.

▶▶ The greener the neighborhood, the lower the risk of childhood obesity for inner-city kids. The Indiana University of Medicine study of 3,800 urban children between the ages of 3 and 18 found that "greener" neighborhoods were associated with slower increases in body mass index, regardless of age,

race or sex, which could reduce the risk of child obesity in the long term.

▶▶ Green space can help you feel younger. A 2001 study in the Netherlands found that a 10 percent increase in nearby green space decreased people's health complaints an amount equivalent to a five-year reduction in their age.

▶▶ A few minutes under the sun supplies bone-building Vitamin D.

▶▶ Studies show that hospital patients with a view of trees and grass recover faster, spend fewer days in

the hospital, need fewer painkillers and have fewer complications.

▶▶ Office workers with views of nature report lower stress, higher job satisfaction and fewer illnesses.

▶▶ Gardening helps reduce stress, encourages nurturing behavior and builds social networks. Horticultural therapy also is used in prisons and special-education classes, as well as in programs for the elderly and the developmentally disabled. Indoor plants help too — in offices, they can improve air quality and increase productivity.

The Burnham Institute in Lake Nona is at the forefront of diabetes and obesity research. Studies show that regular exercise can cut the risk of heart disease in half.



COURTESY BURNHAM INSTITUTE FOR MEDICAL RESEARCH



"There's more to the individual than just protoplasm."

## TEAM BURNHAM

On the other edge of the Orlando metro area, the Burnham Institute for Medical Research at Lake Nona focuses on the problems of obesity and diabetes.

Dr. Philip Wood researches the role of genetics — specifically the mitochondria — in the process of fat metabolism. He's also the author of a book on the subject, *How Fat Works*.

The questions he's trying to answer include: How does the body process the foods it takes in? At what point does

Using mouse models, he's zeroing in on the complex multi-gene interactions that underlie obesity-related traits found in pre-diabetic states. In short, he's looking for the exact spots in DNA that affect where fat-consumption happens — or where it goes awry.

Models are then genetically deconstructed in an effort to understand genetic predisposition and find the genetic tipping point in obesity-related diseases. In other words, if he can locate the defective steps in the genes, he and his team can rev up metabolism — or turn down other factors, as the case may be, to keep people healthier.

Anybody can participate in Florida Hospital's CREATION Health lifestyle program, which promotes the eight Adventist principles, to help people live longer and be happier.

fat consumption and the body's processing of it become a problem? And what can be done about the consequences, including obesity and Type II diabetes?

Mitochondria is "the powerhouse of the cell," he explains. When fatty acids come in and energy — in the form of exercise — goes out, the body works pretty smoothly. Intake and expenditure that are out of balance can lead to obesity and pre-diabetic and diabetic conditions.

If everybody could eat right and exercise, Wood admits he'd probably be out of a job, or at least a research specialty.

"If we knew how to change people's behavior on the front end," he says, "there wouldn't be much for us to do."

Reality, however, is more complicated. In addition to the science of weight and metabolism, there are other factors that affect why we pack on the pounds, including advertising, work that keeps most of us in our offices all day, subdivisions that require us to drive if we

COURTESY NATIONAL TRAINING CENTER



COURTESY BURNHAM INSTITUTE FOR MEDICAL RESEARCH

The science of wellness extends beyond the gym and into laboratories, as doctors study how to maximize longevity and quality of life.

want to go somewhere, and the fact that food is readily available and relatively cheap.

So finding other ways to reduce the burden of fat on the body will help improve people's lives, he says.

The emphasis on health and fitness doesn't stop at Burnham's front door. Sometimes it involves a little run around Disney World.

Team Burnham for Medical Research has run in the Disney Marathon, held at the Walt Disney World Resort in Orlando, for the past three years. The goal, says Elizabeth Gianini, vice president for external relations and a Team Burnham member herself, is to promote a healthy lifestyle and show the community that Burnham puts its research to practical use.

In the most recent race, 72 people started and all 72 crossed the finish line, Gianini says. Participants ranged in age from mid-20s to the 60s and included Burnham's top management, scientists and staff, as well as local leaders and celebs — including Mayors Rich Crotty and Buddy Dyer.

Membership on the team is open to anyone who can visualize the finish line and who will commit to raising money for Burnham Institute. Team Burnham provides the necessary training.

The marathoners join an elite group. Only 1 percent of 1 percent of the world's population will ever run 26 miles,

says Gianini, who has her sights on races in San Francisco and New York.

## PRINCIPLES OF LIVING

So what's the point of all this wellness? To live longer, of course.

Those who study longevity claim that there's no reason why humans can't hit 100 and be healthy doing it. The U.S. currently has the largest number of 100-year-olds in the world — more than 95,000 — according to census figures, in part due to population trends between 1890 and 1910 and the availability of long-term care facilities. Japan, with more than 36,000, is second, a figure experts attribute in part to the low-fat Japanese diet. France has the highest per capita centenarian rate: one for every 3,076 people.

One strategy is to live like a Seventh Day Adventist.

Adventists don't smoke. They consume a largely plant-based diet and eat nuts several times a week. They exercise regularly and, in general, maintain a healthy weight throughout their lives.

As a result, they live longer — about 89 years, compared to general American life expectancy of between 77 and 78 years. A pair of Adventist health studies has documented lower instances of lung, colorectal and breast cancer and heart disease.

But anybody can participate in

Florida Hospital's CREATION Health lifestyle program, which promotes the eight Adventist principles — choice, rest, environment, activity, trust, interpersonal relationships, outlook and nutrition — to help people live longer and be happier.

The Adventist-run hospital system — which marked its first 100 years last October — decided to celebrate by "imagining a healthy 100," says Des Cummings, president of the Florida Hospital Foundation.

The result is its "Healthy 100" initiative, set to begin this fall. Healthy 100 will have both national and personal benefits, Cummings says, with a focus on "how to age healthy and die without a long period of convalescence."

Healthy 100 hopes to enlist 100 companies in the program, which aims to improve the health of the working population and also lower healthcare costs by focusing on smoking cessation, fitness, weight management and reduction of stress in the workplace.

Breaking the age barrier is an attitude, he says, just as space exploration was in the previous century. "This is the health equivalent of going to the moon."

Cummings has more than a passing interest in longevity.

He turns 66 in August — though his real age, as measured on realage.com and through other criteria — is 12 to 15 years younger. As an Adventist, he could certainly expect to reach 89 — which he sees as only 11 short years from the century mark.

With a healthy lifestyle and science on his side, he may one day be the youngest centenarian in town. 