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From the Baltimore Sun

Fountain of youth?

Injections of human growth hormone are being used to ward off the effects of aging. But the science is inconclusive

By David Kohn
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April 7, 2006

Two years ago, Richard Casey was feeling his age. At 48, he was tired, gaining weight and suffering from a growing number of aches and pains. On top of that, his libido had decreased.

"I could see the distance between my 40s and my 20s," he says. "As I looked ahead, it was all downhill. That's depressing."

Looking for relief, he found a Chicago doctor named Paul Savage, who focuses on adjusting hormone levels in older patients. Savage modified Casey's diet and workout, and prescribed several hormones, including human growth hormone.

Since then, Casey's physical condition has improved significantly. He says he has lost fat, added muscle, feels more lively, and has a stronger sex drive. He is convinced growth hormone played a key role.

"It gives you the feeling of a more hopeful tomorrow," says Casey, a computer executive in Parsippany, N.J. "I get up in the morning, I'm alert, and I have steady energy through the day."

Long used to help very short children catch up to their peers, growth hormone has gained recent notoriety as a drug of abuse among elite athletes. Baseball superstar Barry Bonds allegedly injected it regularly, as did Olympic sprinter Ben Johnson. Users believe it boosts strength and endurance.

But more and more, another group is taking growth hormone - aging but relatively healthy people who hope to improve the quality, and perhaps the length, of their lives. Patients such as Casey say growth hormone helps make them feel decades younger, with few, if any, side effects.

Some practitioners have turned the promise of hormonal rejuvenation into a booming business. Savage, for example, has opened seven clinics around the country, all focusing on people concerned about low hormone levels.

But skeptics say using growth hormone to battle aging is unproven, potentially dangerous and illegal. They say proponents are taking advantage of baby boomers' unrealistic desire to permanently stave off aging.

"There's no science behind it. It's all marketing, in my opinion," says Boston University geriatrics professor Dr. Thomas Perls, a leading critic.

Scientists discovered human growth hormone in 1956. Twenty years ago, researchers devised a method to create it synthetically - before that the substance was only available by harvesting it from cadavers.

Because the gastrointestinal tract breaks down the growth hormone molecule, users can't take the drug by mouth - it must be injected. About a half-dozen drug companies make growth hormone, which is legally available only by prescription.

Growth hormone acts as a kind of master switch for other hormones, including testosterone, estrogen and Insulin-like Growth Factor-1. Studies show that the substance can increase growth of bone, muscle and other tissues.

"Growth hormone is a potentiator of other hormones," says Los Angeles physician Mark Gordon, who has been prescribing it to adults for eight years. So far, Gordon has opened clinics in Los Angeles and Phoenix, as well as two in Russia.

At first, the substance was used primarily to treat children who were extremely short because of a growth hormone deficiency. As the name implies, it can often trigger a growth spurt, enabling patients to reach normal height.

But during the past decade, growth hormone has increasingly been used by athletes, as well as other adults who want to look and feel better.

It is difficult to estimate the number of users, particularly because many doctors who prescribe it, and patients who take it, are wary of publicity. But leading proponents estimate that 50,000 to 100,000 healthy adults in this country now use growth hormone.

'Quality of life'

Supporters say the practice makes good medical sense. They note that between the ages of 20 and 60, growth hormone levels typically drop by 50 percent to 65 percent. Replacing this lost production, they say, can significantly improve health.

"Growth hormone is integral to quality of life, and it may affect quantity of life," says Chicago physician Ronald Klatz, a leading practitioner of what is sometimes called anti-

aging medicine.

Another believer is Dr. Alan Mintz, founder of the Cenegenics Medical Institute in Las Vegas. Originally a radiologist, Mintz made millions from a medical management company, then sold that firm and started Cenegenics, which has clinics in Hong Kong; Seoul, South Korea; Tokyo; and Charleston, S.C.

Cenegenics patients pay \$2,000 for a seven-hour evaluation, followed by a comprehensive set of dietary and exercise recommendations. Most also begin a course of hormone therapy.

Mintz, 67, says he's taken hormones, including growth hormone, for decades. Until recently he was a competitive bodybuilder.

Another Cenegenics doctor is Jeffry Life, who has been taking growth hormone since 2003.

A serious weight lifter, the 67-year-old began injecting himself after noticing that he was losing strength. He says his bench press subsequently improved from 195 pounds to 260 pounds.

With the rippled physique of a much younger man - he has just 8 percent body fat - Life says growth hormone not only increased his strength, but also improved his mood and libido, and made his skin more supple.

Life and Mintz say that about a quarter of Cenegenics' patients are doctors and their families. "People that are medically knowledgeable have decided that they want to be proactive in their aging," Life says.

But critics say there's little research to back up these claims.

A 1990 trial cited widely by supporters found that growth hormone reduced fat and increased muscle among a group of 12 older men. But since then, other studies have produced mixed results. Some found growth hormone had little effect, while others showed some benefits - as well as significant side effects.

"Growth hormone may have some utility. But there's not enough research. We don't know enough about the long-term risks," says Dr. Marc Blackman, an endocrinologist at the National Institutes of Health.

After two decades studying the topic, Blackman has concluded that declining growth hormone levels after the age of 30 may contribute to decreased muscle mass, increased fat and other physical changes.

At the same time, he has doubts that taking extra growth hormone can counteract these effects - and questions whether higher levels are even safe.

Mixed results

In a study published four years ago, Blackman gave regular injections of growth hormone to 125 men and women. On average, they lost fat and gained muscle, but they didn't get any stronger.

Their cholesterol levels also improved, but many subjects experienced serious side effects, including excess salt and water retention, joint pain and significant increases in blood sugar. Some developed diabetes. All the side effects disappeared once the injections were stopped.

In addition to diabetes, growth hormone may also increase the risk of cancer. Just as it spurs muscle development, it may trigger tumor growth. Some studies have found increased levels in animals and humans with breast, prostate and colon cancer.

Skeptics also argue that growth hormone may speed the aging process. "Mice that make too much growth hormone seem to die earlier. Mice that make less than normal seem to live longer," says Dr. Mitch Harman, director of the Kronos Longevity Research Institute in Phoenix. He co-authored the 2002 study with Blackman.

Concerned about the overuse of growth hormone by relatively healthy adults, Perls recently co-wrote an article for the *Journal of the American Medical Association*, saying that the drug's risks greatly outweigh its benefits.

The paper also argues that prescribing growth hormone to slow aging is illegal under an obscure 1990 federal statute enacted to limit the abuse of the drug by athletes. Perls says the law bans the use of growth hormone except to treat short children and a few other relatively uncommon conditions.

Proponents of growth hormone say that the risks have been overstated, and that side effects tend to occur only at higher doses. The key to safe use, they say, is making sure that hormones don't exceed normal levels.

Many who prescribe the substance say they try to maintain levels in the upper quarter of the patient's age range. In other words, a 60-year-old patient would inject only enough growth hormone to raise his hormone level above 75 percent of the average level for 60 year olds.

Gordon, for example, says he gives patients only one International unit a day, and often less. By contrast, bodybuilders and athletes sometimes inject 10 to 20 times that amount.

"That's why this has such a bad reputation," Gordon says. "They're using significantly more than the body makes. That's where you run into problems."

Gordon and others also emphasize that growth hormone is just one of many potentially beneficial hormones, including testosterone, estrogen and an alphabet soup of substances with names such as HCG, DHEA and DHT. Gordon says that he prescribes

growth hormone to less than 10 percent of his patients.

"You have to think of this as a symphony orchestra," Mintz says, "and not one instrument by itself."

Both sides agree on one point: Growth hormone is expensive. The medicine is still under patent, so generic versions do not exist. It usually costs \$30 to \$40 a unit, and insurance companies rarely cover treatment for relatively healthy people.

Patients must take it regularly, and it is not unusual to pay between \$500 and \$800 for a monthly supply.

Casey, the New Jersey computer executive, spends about \$500 a month on hormones and vitamins. For him, it is money well spent.

"People spend that on a car. My body is worth a hell of a lot more than a car," he says. "I feel fantastic."

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