

MUSCLES IN A BOTTLE?

Most people don't want to do anything hard if they can get away with just taking a pill instead," observes researcher John Morley of St. Louis University. "That's just life. But there's really no effective drug for sarcopenia at this time."

That hasn't stopped consumers from turning to supplements (often thanks to a nudge from Madison Avenue)—or asking their doctors to prescribe hormones—to help stem or reverse muscle loss.

They may be getting more—or less—than they bargained for.

DHEA

DHEA (dehydroepiandrosterone) is made by our adrenal glands and is converted into testosterone and estrogen in our cells.

Ten years ago, DHEA hit the jackpot after a small study at the University of California, San Diego, claimed that DHEA pills boosted muscle strength in men (though not women).¹

But it has been pretty much downhill for

DHEA ever since. Seven more studies in four countries gave about 375 healthy older men and women 50 mg to 100 mg a day of DHEA for up to two years. All came up empty.

The latest study, conducted at the Mayo Clinic in Rochester, Minnesota,

gave 50 mg to 75 mg a day of DHEA to 56 men and women in their 60s and 70s.²

After two years, their muscle mass, muscle strength, exercise capacity, and quality of life were no different than those of 61 similar men and women who were given a placebo.

And you can't even count on the DHEA sold in stores to deliver DHEA. "Half of the DHEA available commercially is basically a

placebo," says Morley. "We and others have shown that DHEA is not well-absorbed from these products."

Testosterone

A surge of testosterone during puberty packs muscle on boys, but after young adulthood the levels of testosterone circulating in men begin a steady decline. Could taking testosterone add muscle a second time around?

In the latest study, researchers at the Mayo Clinic gave testosterone patches (supplying 5 mg a day) to 27 healthy men in their 60s and 70s and placebo patches to 31 similar men.²

After two years, the testosterone users had three more pounds of muscle than the placebo takers. But the extra pounds made no difference in the men's physical strength, endurance, or quality of life.

Doctors use testosterone to treat men who are losing muscle because their bodies produce abnormally low levels of the hormone.

"But if you haven't been diagnosed with these low levels, there's no evidence to support the usefulness of testosterone to rebuild muscle," notes Timothy Doherty of the University of Western Ontario.

In fact, giving extra testosterone to older men could increase their risk of prostate cancer or stimulate the growth of existing prostate tumors, according to the National Institute on Aging.

Growth Hormone

Human growth hormone (HGH), which is secreted by the brain's pituitary gland, helps regulate growth during childhood and metabolism during adulthood.

An estimated 20,000 to 30,000 American adults take HGH injections—at a cost of up to some \$15,000 a year—because they have been led to believe that HGH slows the aging process.

Others opt for far cheaper supplements like HGH Surge and Max-Hgh, which claim to stimulate the brain to release HGH.

More than likely, they're all wasting their money.

Even if those supplements did boost HGH, which is far from certain, "there's no good evidence that human growth hormone is more beneficial than harmful," says Doherty.

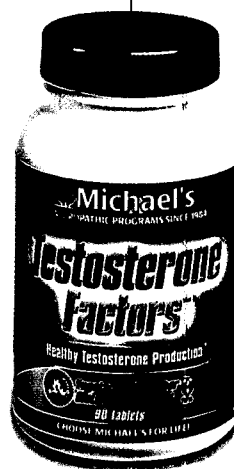
Earlier this year, researchers at Stanford University in Palo Alto, California, reviewed all of the good studies that gave HGH to healthy older adults. Their conclusion: any modest benefits aren't worth the downside.³

"Our biggest surprise was how little research has been done in this area," says Stanford researcher Hau Liu. Only 220 healthy men and women have been given HGH in studies.

The hormone increased their muscle by an average of four pounds, but "it had no other beneficial effects that we could see," says Liu. And the adverse effects were widespread.

Half of those who received HGH injections experienced edema (soft-tissue swelling), 21 percent suffered swollen and painful joints and bones, 19 percent were diagnosed with carpal tunnel syndrome, and 6 percent of the men developed enlarged breasts.

"Growth hormone appears to have modest or minimal benefit and the possibility of bad side effects," cautions Liu.



Creatine

The liver makes creatine and uses it to store energy in our muscles. Could creatine supplements help compensate for age-related muscle loss?

"There's some evidence that creatine is beneficial when it's combined with resistance training," says Doherty.

For example, 16 healthy men in their 70s who took creatine for three months while they were strength training put on more muscle and gained greater strength and endurance in their leg muscles than 14 similar men given a placebo.⁴

But those results may not apply to people who have lost more muscle. "I wouldn't recommend that the frail elderly take creatine because we don't have any evidence that it's more beneficial than diet and exercise in that population," says Doherty.

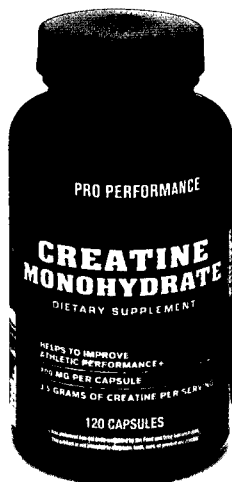
The Bottom Line

When you buy a bottle of DHEA or HGH Surge, or find a doctor who will prescribe testosterone or human growth hormone, you may be wasting your money or getting in over your head.

"We are opposed to self-medication with hormones or hormone-like substances like DHEA or HGH," says Chhanda Dutta of the National Institute on Aging.

"They may stimulate growth, and you have to be aware that they may stimulate the kind of growth that you don't want."

In other words, can they speed up the growth of tumors? That's a question you don't want to help answer.



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decline with age.

Also critical for muscles is insulin-like growth factor (IGF), which drops dramatically as we grow older, says Morley. But don't assume that taking hormones will reverse the effects of muscle loss (see "Muscles in a Bottle?").

■ **Changes in diet.** We eat less as we get older, says Morley. In particular, we eat less protein, the nutrient that builds muscle tissue.

■ **Loss of nerve cells.** "As we age, we lose not just brain cells, but also motor nerve cells in our spinal cord that send information out to the muscles," says Doherty. "By the time we're into our 60s and 70s, we've lost up to half our motor nerve cells."

Without nerve cells to stimulate them, muscles wither away. The remaining healthy motor nerve cells can compensate by adopting the "orphaned" muscle fibers.

"But the process is only partially adequate," says Doherty. "That's another reason why people lose muscle mass as they age."

DIFFICULT TO DIAGNOSE

"One of the problems in dealing with sarcopenia is that there is no easy way to diagnose it, like there is with osteoporosis," says Doherty.

Sometimes, he notes, "we know sarcopenia when we see it." But not everyone with muscle loss gets thin and frail. In fact, some people get fatter as their lost skeletal muscle is replaced by fat.

"Some people have this idea that a lot of these older folks who are obese are also very strong," says Doherty. "In many cases they're not."

NOT JUST STRENGTH

Losing strength can limit your life and land you in a nursing home. But muscle loss takes a toll on your health in other ways:

■ **Decreased metabolism.** Your muscles burn most of the calories your body uses, and muscle burns calories at a higher rate than fat tissue does.

So the less muscle you have, the fewer calories you burn, and the more calories your body stores as fat. (If you eat less food as you age, you won't gain weight, but you'll still replace muscle with fat.)

"And an increase in body fat puts you at greater risk for chronic conditions like

cancer and heart disease," says the National Institute on Aging's Chhanda Dutta.

■ **Muscle marbling.** Less muscle means more fat is deposited in muscle cells. "Marbling may be desirable for the taste of steak," says Dutta, "but when it happens to your own muscles, it's associated with insulin resistance."

And the risk of diabetes and heart disease rises in people who become less sensitive to insulin.

■ **Weaker bones.** "Muscles put stresses and strains on bones that make them stronger," says Dutta. That's why weight-bearing exercises help prevent bone loss. But less muscle means less healthy stress, and that translates into weaker bones.

■ **Poorer balance.** Muscles are crucial for maintaining balance. In a study that tracked 800 European men aged 50 to 85 for seven years, those who had lost the most muscle with age were also the most likely to suffer falls.¹

KEEPING MUSCLES STRONG

How can you avoid the damage done by muscle loss?

"Resistance exercise is what people should be doing before they think of anything else," says St. Louis University's John Morley.

The results can be dramatic.

"Women in their 40s and men in their 60s lose muscle strength at a rate of about 12 percent per decade," says Ben Hurley, a professor of exercise physiology at the University of Maryland in College Park. (Hurley is married to *Nutrition Action* senior nutritionist Jayne Hurley.)

But with two months of resistance training, they can increase their strength by 40 percent. "In other words, they can reverse two decades of typical muscle loss and three decades of typical muscle strength deterioration in 60 days," says Hurley.²

And strength building has other benefits. "Women who do strength training gain more self-confidence and self-esteem, they sleep better, and they're less likely to be depressed," says Tufts's Miriam Nelson.

"Strength training also makes aerobic exercise more enjoyable because you're fitter and less prone to injuries."

The key to stemming muscle loss with exercise is to strengthen the big muscles around the thighs, arms, shoulders, and back.



¹ *Clin. Endocrinol.* 49: 421, 1998.

² *N. Engl. J. Med.* 355: 1647, 2006.

³ *Ann. Intern. Med.* 146: 104, 2007.

⁴ *Med. Sci. Sports Exer.* 33: 2111, 2001.

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