

No proof that growth hormone therapy makes you live longer, study finds

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Surveyors of anti-aging elixirs tout human growth hormone as a remedy for all things sagging-from skin to libidos - and claim it can even prevent or reverse aging. But researchers at the Stanford University School of Medicine say there's no evidence to suggest that this purported fountain of youth has any more effect than a trickle of tap water when it comes to fending off Father Time.

"There is certainly no data out there to suggest that giving growth hormone to an otherwise healthy person will make him or her live longer," said Hau Liu, MD, a research fellow in the division of endocrinology and in the Center for Primary Care and Outcomes Research, and first author of a review study to be published in the Jan. 16 issue of *Annals of Internal Medicine*. "We did find, however, that there was substantial potential for adverse side effects."

Those negative side effects included joint swelling and pain, carpal tunnel syndrome and a trend toward increased new diagnoses of diabetes or pre-diabetes. "You're paying a lot of money for a therapy that may have minimal or no benefit and yet has a potential for some serious side effects," Liu said. "You've got to really think about what this drug is doing for you."

Growth hormone is widely promoted on the Internet and its use as a purported anti-aging drug has caught the attention of the popular media, ranging from the "Today Show" to Business Week.

Between 20,000 and 30,000 people in the United States used growth hormone as an anti-aging therapy in 2004, a tenfold increase since the mid-1990s, according to the authors of an unrelated study published in the Journal of the American Medical Association in 2005. This increase comes despite both the high cost of such therapy - often more than \$1,000 a month - and the illegality of distributing growth hormone for anti-aging therapy in this country. Those numbers prompted Liu and some colleagues to see if the medical literature provided any support for such therapy.

Growth hormone is naturally produced by the pituitary gland, a pea-sized organ at the base of the brain. Production is highest during childhood and the hormone-drenched adolescent years, then typically starts tapering off around age 30, continuing to decline into old age. Growth hormone is critical to proper development in children, particularly their height, and injections of growth hormone are considered a legitimate treatment for short children and for adults whose pituitary glands don't produce enough growth hormone to maintain normal metabolism. But most promoters of growth hormone as an anti-aging therapy target the healthy elderly.

Liu's team undertook a systematic review and analysis of published studies, excluding any that looked at diseases for which growth hormone is an accepted therapy. They focused solely on studies using growth hormone to treat the elderly, specifically those whose main maladies were nothing worse than age and being mildly to moderately overweight. They also included only studies that evaluated the use of the hormone in randomized, controlled clinical trials.

Of all the papers contained in two of the largest databases of medical literature in the world, only 31 met the team's criteria. The 31 studies had a combined total of slightly more than 500 participants, and the average duration of therapy was about a half-year, said Liu, adding that

he was surprised at the limited amount of data in the literature.

"These studies were designed to look at what happens when you give growth hormone to a healthy elderly person," said Liu. "For example, what happens to their bone density, to their exercise levels and to their exercise capacity."

The researchers found that growth hormone had a modest effect on body composition, increasing lean body mass, or muscle, by slightly more than 2 kilograms and decreasing body fat by roughly the same amount.

But, Liu said, "It did not change other clinically important outcomes, such as bone density measurements, cholesterol and lipid measurements, and maximal oxygen consumption." In short, the studies provided no real evidence that the therapy resulted in increased fitness.

"From our review, there's no data to suggest that growth hormone prolongs life, and none of the studies makes that claim," said Liu.

That finding, according to Liu, highlights one of the fundamental problems in the whole debate over the use of growth hormone to combat the effects of aging-misinterpretation of the data.

The promotion of growth hormone as an anti-aging treatment took off in 1990 when a paper published in the New England Journal of Medicine presented results of a small study in which 12 men over the age of 60 were injected with growth hormone three times a week for six months. At the end of treatment, they had statistically significant increases in lean body mass and bone mineral, unlike a group of nine men who had received no treatment.

The authors of that study made no claims that the treatment had reversed the aging process and stated that many questions remained unanswered,

but they did note that the increase in muscle and decrease in fat were "equivalent in magnitude to the changes incurred during 10 to 20 years of aging."

That statement triggered a wave of misinterpretation-inadvertent or otherwise-that persists to this day, despite repeated efforts by the journal to play down the sensational claims now made for growth hormone or growth hormone "releasing agents" widely sold on the Internet. The original study was accompanied by an editorial warning against the general use of growth hormone as a therapy in adults.

In 2003 another NEJM editorial specifically addressed the issue again, as the 1990 paper was receiving as many online "hits" in a week as other 1990 articles got in a year, owing largely to promoters of growth hormone citing it as supporting evidence.

Source: Stanford University Medical Center

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