

LE Magazine June 2000

AS WE SEE IT

Reversing Aging?

By William Faloon

Future medicine is rapidly becoming today's reality. A study published in the journal *Science* (April 28, 2000) suggests that it may soon be possible to create an army of youthful embryonic stem cells using our own DNA as a blueprint. These stem cells could be transformed into young neurons, muscle cells or any other cell type, and then implanted into our bodies to treat age-related diseases and reverse some aspects of the aging process.

This pioneering work is being directed by Dr. Michael West, a scientist who many believe has the greatest potential to control human aging in our lifetime. In an exclusive interview with Dr. West, Life Extension magazine reveals how we may be able to treat the diseases of aging through a process that seemed like science fiction only a few years ago.

Dr. West has succeeded in manipulating DNA through cloning to cause cellular development to go in reverse, something that never occurs in nature. Scientists in his laboratory have transformed aging somatic cells into youthful embryonic stem cells capable of being turned into every type of cell in the body. Dr. West is now working on techniques to turn these stem cells into young specialized cells capable of replacing aging and diseased cells without being rejected by the immune system.



The implications of this research are astonishing. In the foreseeable future, old humans could be injected with young, healthy cells engineered from their own DNA. This approach to tissue regeneration could result in an older person becoming younger.

To quote Dr. West:

"We are talking about saving lives, alleviating human suffering, allowing fathers to go back to their children and children to go back to their families."

Dr. West's research has been financially supported in part by dedicated members of The Life Extension Foundation. The Life Extension Foundation is working with Dr. West to make this potential age-reversal therapy available to Foundation members as soon as possible.

The title of Dr. West's interview is "Conquering Aging With Cloning." As Dr. West explains, his newly developed approach called "therapeutic cloning" should cause the word "cloning" to take on new meaning. Dr. West is not proposing to make whole-body human "clones," but instead to use the cloning process to create young stem cells, which may be able to be transformed into specialized cells and tissues to treat diseases and reverse aging.

Mainstream medicine attacks dietary supplements



Organizations representing conventional medicine and the FDA have engaged in attacks against dietary supplements for most of the year 2000. These organizations are sending out press releases that distort the results of scientific studies to create a false impression that supplements are ineffective and may even be dangerous.

The media is taking these press releases at face value, and is disseminating stories that cause the uninformed to avoid supplements that were long ago shown to reduce the risk of degenerative disease. If we are to live long enough to take advantage of Dr. West's potential to reverse the aging process, it is critical that we protect ourselves against the risks of dying from age-related diseases today.

The Life Extension Foundation is methodically dissecting mainstream medicine's assault on dietary supplements beginning with a rebuttal that appears in this issue to the allegation that vitamin C may contribute to carotid artery atherosclerosis.

This vitamin C scare started at a meeting of the American Heart Association held on March 2, 2000. A presentation was made at this meeting of an unpublished work indicating that those who consumed vitamin C supplements had increased carotid artery intimal wall thickening. This presentation directly contradicts previous published studies showing that vitamin C protects against carotid atherosclerosis and intimal wall thickening.

Rather than just cite the previously published research to refute this unpublished presentation, The Life Extension Foundation conducted its own study using the exact same high-resolution carotid ultrasound test used in the presentation to determine if those who are taking high doses of vitamin C have any indication of carotid artery pathology. The Foundation tested 30 people over age 45 who had been taking high doses of vitamin C for an extended period of time. The results of this pilot study can be found in "The Vitamin C Controversy" article in this month's issue.



Another unpublished report coming out of Memorial Sloan-Kettering in New York and presented at a meeting of the American Cancer Society cautioned cancer patients undergoing radiation therapy to avoid vitamin C supplements. This report was not based on any kind of study, but merely reflected the speculation of Sloan-Kettering doctors on what might happen to cancer patients undergoing radiation therapy who also took vitamin C. This speculation is contradicted by published work showing that vitamin C may increase the cancer-cell-killing effects of radiation therapy and definitely reduces damage to adjacent tissue. We will be addressing the complex issue of what supplements cancer patients should take during radiation therapy in coming months.

The most highly publicized media report came from the National Academy of Sciences on April 10, 2000. The Academy's 512-page report provides a basis for using supplements to reduce the risk of disease, but the contradictory press release issued about the report made it appear that there was "insufficient evidence" to justify vitamin supplementation at this time. There has been a long-standing debate as to what constitutes "sufficient evidence" to warrant recommending dietary supplements to the public. Health enthusiasts look at the thousands of studies showing definitive disease risk reduction benefits, while some mainstream scientists demand a level of absolute proof that is virtually impossible to obtain in human populations. There were glaring omissions of positive studies, along with egregious contradictions in this National Academy of Sciences report that The Life Extension Foundation will soon reveal to the world.

While the National Academy of Sciences states there is "insufficient evidence" to support claims that dietary antioxidants can prevent chronic diseases, their report does call for "increases in daily intakes of vitamins C and E to exploit their role in maintaining good health, and recommends an even larger amount of vitamin C for smokers."

The most significant recommendation in the National Academy of Science report was to increase the safe upper limits of vitamin C to 2000 mg a day (more than that causes diarrhea according to the report), vitamin E up to 1500 IU a day (more than that risks hemorrhage says the report), and selenium to 400 mcg a day (more than that risks selenium toxicity says the report). Considering the fact that previous government reports stated that any amount of dietary supplementation poses health risks, these new relatively high upper limits of safety refute the false allegations the government has disseminated in the past. Life Extension will carry a complete review of this 512-page National Academy of Sciences report in a future issue, with a preliminary version available now on the Foundation's website (www.lef.org).

For those looking to medical science to significantly prolong life span, we are living in the best of times. The Life Extension Foundation is committing enormous economic resources to make new research findings available to Foundation members as soon as possible.

A handwritten signature in black ink, appearing to read "W Faloon". The signature is fluid and cursive, written on a white background.

William Faloon
Vice President, Life Extension Foundation

Anti-Aging Breakthrough Makes Headline News

If you watched CNN or read the newspaper on April 28, 2000, you would have most likely seen reports about Dr. West's remarkable research breakthrough that was published in the prestigious journal *Science* that day. Below is an excerpt from an article that appeared in *The Miami Herald*:

A FRIDAY, APRIL 28, 2000 The Miami Herald 31A

Scientists reverse aging process in laboratory cloning experiment

Researchers say they have found a way to reverse the aging process in the cells used to create cloned calves, potentially overcoming one of the biggest obstacles to cloning human organs, from replacement hearts to new brain cells for victims of Alzheimer's disease.

Until now, experiments such as the creation of Dolly the cloned sheep have produced offspring whose cells were biologically as "old" as the original, raising fears that clones could be doomed to premature decline and death.

But six young calves cloned by researchers at Advanced Cell Technology in Worcester, Mass., not only show no signs of premature aging, their cells in fact appear to be 50 percent younger than other calves born at the same time.

It remains to be seen if the animals, now ranging in age from several months to a year old, will have prolonged life spans. But the report in the current issue of the journal *Science* vastly reassures scientists who had worried that clones might be born with prematurely aged cells.

Judging by the new results, said Dr. Robert Lanza, vice president for research at ACT, "you might be able to produce young, healthy cells by the billions or trillions-enough to make a patch for a damaged heart, or even a whole heart itself."

The key issue tackled by the ACT research has to do with the way living cells age. The long strands of chromosomes inside each cell are capped on each end by structures called telomeres, which resemble the tips of shoelaces. Each time the cell reproduces, the telomeres get shorter until they wear out completely and the cell dies.

Michael West, president and CEO of ACT, said the results confirm that "cloning [from aged cells] is possible, and that you can run the biology in reverse" to transform old, worn-out cells into pristine embryonic cells with a normal-or perhaps even extended-lifetime ahead of them.

"We now have this really elegant story that tells us we can take cells from mature individuals and reset their telomere clock" to rejuvenate them, said Dr. Ronald DePinho, a Harvard and Dana-Farber Cancer Institute researcher.

The Miami Herald, April 28, 2000. Reprinted with permission.

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