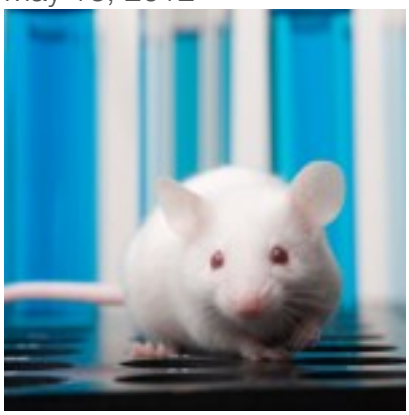
# Telomerase Stimulation Extends Lifespan in Mice

May 16, 2012



Stimulation of telomerase safely extends lifespan in mice, a new study shows.

In a landmark study demonstrating “proof of principle” of the feasibility and safety of “slowing or turning back the clock,” Spanish researchers gave aged mice a single treatment to stimulate genetic expression of telomerase that extended health and lifespan by up to 24 percent.

These new results serve as yet more validation of research performed by Isagenix Founder John Anderson in partnership with molecular biologist Bill Andrews, Ph.D., on inducing the expression of telomerase in humans with natural compounds for healthier aging and greater longevity. This research is what led to the creation of Isagenix product, Product B.

Although previous research has long suggested telomerase expression would maximize the potential for cells to replicate, Maria Blasco, Ph.D., and fellow researchers from the Spanish National Cancer Centre (CNIO) showed unequivocally that increasing this enzyme in aging mice improves health and extends lifespan safely without any increase in rates of cancer.

Dr. Andrews responded with excitement to this new research: “I

have been struggling with trying to debate the rumors that telomerase may cause cancer for almost 20 years. In the last 5 years there have been a large number of publications suggesting that telomerase, in fact, does not cause cancer. But, nothing shows it better than this publication by Dr. Maria Blasco that just came out."

More than just a testament to the safety, the authors of the just-released study report the thrilling implications of "delaying physiological aging and extending longevity in normal mice" through telomerase induction and demonstrating its feasibility as an aging intervention.

Since the discovery of telomerase and its potential to extend lifespan were unveiled, a number of studies have been performed investigating the potential therapeutic benefits. Manipulating gene expression to combat or potentially reverse aging has driven researchers into the field of telomeres.

Telomeres are the guards of the genetic material housed by the cell. These protein caps shelter the chromosome from damage during cell division (at least for the first 80 cycles). With time the telomere shortens and eventually cell death (what we recognize as aging) occurs. Telomerase lengthens telomeres, preventing erosion of the chromosome and damage to DNA—as the authors phrase it, this enzyme acts as a "longevity gene."

In the current study, a component of telomerase, mTERT, increased lifespan by 24 percent in mice treated at one years of age and by 13 percent in mice treated at two years of age. Researchers used an adeno-associated virus to introduce the mTERT gene therapy to the aged mice. Accessible to a large range of tissues, the authors reported significant improvements in many independent biomarkers of aging.

Bone mineral density increased significantly in both groups of mice. Physical appearance was bolstered by an improved retention of subcutaneous fat–a defining physical feature of youth. Even coordination and balance improved in mice that received the mTERT treatment. Moreover, insulin sensitivity and the ability to maintain blood sugar improved.

In each instance, telomerase appeared to be an agent of regeneration, contributing to more than an appearance of youthful aging. More cell cycles, as shown by the current study, can actually translate to a longer lifetime. The authors report that this telomerase gene therapy may "affect maximum longevity" and more importantly, do so without increasing risk for cancer. The potential, therefore, is currently limitless.

Telomere length is known to be influenced by a variety of factors. Engaging in stress reduction, meditation, physical activity, and diet can extend telomere length and potentially lifespan. Researchers are nearing the potential of tapping our own genes to promote healthier, longer lives. Telomerase could be the key for regeneration, rejuvenation, and "turning back the clock."

With enthusiasm, Dr. Andrews cites this paper as yet another example, "that lengthening telomeres extends the lifespans of mice and has remarkable beneficial effects on their health and fitness. It's a very exciting day for telomerase/telomere research. Telomeres are the key to longer, healthier lives. Everything that John Anderson and I are working on is fulfilling the promises that Maria's new publication forecasts. I'm excited!"

In previous research at Harvard Medical School, geneticist Ronald Dephino, Ph.D. and colleagues found that mice lacking telomerase aged much more rapidly, and died earlier, as an abundance of critically short telomeres developed. But when the enzyme was

reawakened in the mice, age-related symptoms disappeared and rejuvenation was seen in several organs including their brains.

**Reference**: de jesus BB, Vera E, Schneeberger K, Tejera AM, Ayuso E, Bosch F, and Blasco MA. Telomerase gene therapy in adult and old mice delays aging and increases longevity without increasing cancer. *EMBO Mol Med* 2012;4:1-14.DOI: 10.1002/emmm.201200245