**Gender, Life Extension and Terror management: Evidence for Life Extension Technologies Reduces Death Thought Accessibility Among Males**

**Supplementary Materials File**

Authors Names Masked for Review

**Appendix 1: Article manipulations for Indefinite Life Extension, Afterlife and Teleportation.**

**Do You Want to Live Forever?**

By [Sherwin Nuland](http://www.technologyreview.com/contributor/sherwin-nuland/) on June 1, 2013

Believe it or not, it’s now a scientific fact is that biological immortality is within our reach. Scientific developments in the last few decades have laid the foundation for a new class of medicines: rejuvenation biotechnologies. Rejuvenation biotechnologies are targeted therapies that apply the principles of regenerative medicine across the entire scope of the damage of aging. In other words, instead of merely slowing down the accumulation of aging damage in our tissues, rejuvenation biotechnologies will remove, repair, or replace the damaged cellular and molecular machinery. This means that with every round of therapy, a person’s eyes, hearts, arteries, and bones will not just suffer less ongoing degradation of their structures, but could actually become more youthful and healthy in their structure and function. Scientists from various disciplines now believe that with these new technologies, people who are now under 30 years of age will be able to live up to a 1000 years!

[SENS](http://www.sens.org/) (Strategies for Engineered Negligible Senescence) is a huge anti-aging plan incorporating many different therapies to be applied simultaneously to people, thereby rejuvenating all organs at the cellular and molecular level. SENS is based on stem cell and gene therapy technology, as well as on the big advances that were made in tissue engineering for the past 5 years (e.g., Rosenblatt et al, 2009). Furthermore, SENS includes some very radical new technologies like finding bacterial enzymes that can degrade unusual compounds.

In his recent work [“*Programmed differentiation of mouse embryonic stem cells using artificial signaling pathways*”](http://parts2.mit.edu/wiki/index.php/Princeton:Project_Summary) Professor David Weiss from the department of biological engineering at MIT, forms the proof of principle that stem cells can be differentiated into different types of cells by using standard interchangeable parts (BioBricks) and standardized cell-to-cell signaling mechanisms. In one of these studies, Weiss and colleges (2012) used this method to prolong the lifespan of rats in 18 months (that’s a 90% increase!). Furthermore, a company called Alteon, in Parsippany, NY, has run clinical trials of molecules that reliably reverses the effects of some conditions associated with aging in humans.

Scientists such as Dr. Aubrey De Grey of Cambridge University and Gil Hershberger of Harvard medical school, predict that there is a good chance of giving 30 years of extra healthy life to those who are already in middle age, within 25-30 years from now (e.g., de Gray, 2007; 2013; Hershberger & van Knippenberg , 2011). Moreover, after the first treatments produce positive results, scientist will be able to improve the SENS therapies thereafter, so that they give the same people (beneficiaries of the 30 extra years) another 30, and another, to infinity. This is what they refer to as “longevity escape velocity” (de Gray, 2013)

**So how does** [**SENS**](http://www.sens.org/) **work?**

Decades of research in aging people and animals has established that there are seven major classes of such cellular and molecular damage: cell loss and tissue atrophy, nuclear mutations, mutant mitochondria, death-resistant cells, tissue stiffening, extracellular aggregates and intracellular aggregates.

For each major class of aging damage, a prototype strategy for its removal or repair either already exists, or is foreseeable from existing scientific developments. Below are the specific “Rejuvenation Biotechnology” listed for each kind of aging damage in the table (de Gray, 2013)

|  |  |  |  |
| --- | --- | --- | --- |
| **Aging Damage** | **Year Discovered** | **Rejuvenation Biotechnology** | **SENS Strand** |
| Cell loss, tissue atrophy | 19551 | Stem cells and tissue engineering | [RepleniSENS](http://www.sens.org/research/introduction-to-sens-research/repleni) |
| Nuclear [epi]mutations (only cancer matters) | 19592, 19823 | Removal of telomere-lengthening machinery | [OncoSENS](http://www.sens.org/research/introduction-to-sens-research/onco) |
| Mutant mitochondria | 19724 | Allotopic expression of 13 proteins | [MitoSENS](http://www.sens.org/research/introduction-to-sens-research/mito) |
| Death-resistant cells | 19655 | Targeted ablation | [ApoptoSENS](http://www.sens.org/research/introduction-to-sens-research/apopto) |
| Tissue stiffening | 19586, 19817 | AGE-breaking molecules; tissue engineering | [GlycoSENS](http://www.sens.org/research/introduction-to-sens-research/glyco) |
| Extracellular aggregates | 19078 | Immunotherapeutic clearance | [AmyloSENS](http://www.sens.org/research/introduction-to-sens-research/amylo) |
| Intracellular aggregates | 19599 | Novel lysosomal hydrolases | [LysoSENS](http://www.sens.org/research/introduction-to-sens-research/lyso) |

Nevertheless, even after we have used these new therapies to repair an aging tissue, metabolic processes will continue to cause new damage. This simply means that rejuvenation biotechnologies are not a one-off fix, but will need to be periodically repeated to preserve youthful function. With this type of groundbreaking SENS research, aging will never be the same again.

Read more: http://www.technologyreview.com/featuredstory/403654/do-you-want-to-live-forever/page/3?page=2%2C2&mittr\_page=2&nopaging=1#ixzz2UeeeMiGa

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**New scientific evidence for consciousness after death**

By [Sherwin Nuland](http://www.technologyreview.com/contributor/sherwin-nuland/) on June 1, 2013

One of the most exciting scientific developments of the past decade has been the findings from rigorous scientific investigation of the near-death experience. Although scientists were initially skeptical of these reports, recent studies conducted by leading researchers at Harvard Medical School and Princeton University very strongly suggest that these experiences are very real indeed, and may suggest that some sort of existence does in fact continue after the physical death of the body. The following is a summary of the major points made in a recent summary of this research, reported by Dr. Henry Zimmerman of the Harvard Medical School.

There is remarkable similarity in the reports of over 600 separate people who were declared clinically dead but were then revived and regained consciousness, including the following: (a) an out-of-body experience in which the person experiences the sensation of floating above the room and observing medical attempts to revive his or her body, (b) a feeling of moving through a tunnel of bright light toward an even greater source of light, (c) an absolute feeling of comfort and safety and an absence of fear or pain, and (d) some form of contact with previously departed loved ones or other caring persons. These same experiences were reported by virtually all people, regardless of religious background or belief. Even avowed atheists have reported this experience.

In one famous case, a psychologist who had written articles critical of previous reports of this experience reported nearly identical events after nearly dying after a swimming accident; this of course led to a dramatic change in his opinions about the meaning of the near-death experience (Hirchberger et al, 2010).

A large scientific study - called the AWARE Study (see De Grey et al, 2011) that was conducted across Europe and America determined that in the cases where careful physical measurements could be taken, there were no signs of physical brain activity during this period, even when the most modern equipment was used. This shows that the body had clearly stopped its physical functioning while these experiences were occurring.

Perhaps most remarkably, people have been able to report the physical details of the room in which this occurred that could be seen only from the perspective of above the room. In other cases, detailed reports of conversations had in the room by medical personnel have been made. A total of 98% of people who have this experience return absolutely convinced that death is not the end of existence.

Dr. Carl Becker, a Professor of Bioethics and Comparative Religion at Kyoto University, Kyoto, Japan has researched near death experiences in Japanese and American hospitals for 30 years.. Becker examined four ways in which near death experiences may be considered objective:

(1) Paranormal knowledge that is later verified

(2) The similarity of deathbed events in different cultures

(3) Differences between religious expectations and visionary experiences

(4) Third-party observations of visionary figures, indicating that they were not merely subjective hallucinations (Becker, 1984).

Although additional research on this topic is clearly needed, the majority of medical authorities now acknowledge that these experiences provide serious evidence for the possibility that existence continues after the point of physical death.

Read more at: <http://www.wired.com/wiredscience/?p=155740>

**Would you like to use teleportation?**

By [Sherwin Nuland](http://www.technologyreview.com/contributor/sherwin-nuland/) on June 1, 2013

Teleportation involves dematerializing an object at one point, and sending the details of that object's precise atomic configuration to another location, where it will be reconstructed. What this means is that time and space could be eliminated from travel -- we could be transported to any location instantly, without actually crossing a physical distance.

Many of us were introduced to the idea of teleportation, and other futuristic technologies, by the short-lived Star Trek television series (1966-69) based on tales written by Gene Roddenberry. Viewers watched in amazement as Captain Kirk, Spock, Dr. McCoy and others beamed down to the planets they encountered on their journeys through the universe.

In 1993, the idea of teleportation moved out of the realm of science fiction and into the world of theoretical possibility. It was then that physicist Charles Bennett and a team of researchers at IBM confirmed that quantum teleportation was possible, but only if the original object being teleported was destroyed. This revelation, first announced by Bennett at an annual meeting of the American Physical Society in March 1993, was followed by a report on his findings in the March 29, 1993 issue of Physical Review Letters. Since that time, experiments using photons have proven that quantum teleportation is in fact possible.

Today, far from being a science fiction dream, teleportation happens routinely in laboratories all around the world in the form of quantum teleportation. This is restricted at present to tiny particles, such as individual photons, or to quantum properties of atoms. But the question naturally arises as to whether it will ever be possible to teleport larger objects and even human beings.

Teleportation can be realized with either photonic qubits or matter qubits. In 2010, scientists were able to successfully teleport the quantum state of an atom without any physical link (e.g., Davis et al, 2010). In 2012, physicists teleported photonic qubits a record distance of 143 km (Yin et al, 2012). Teleporting matter qubits over long distances is more difficult than teleporting photonic qubits because it requires quantum memories and a strong interaction between light and matter. In a previous experiment, scientists have performed material teleportation without a strong light-matter interaction, and achieved a distance of 1 m. However, the low photon-collection efficiency in free space prevents scaling of that approach to larger distances.

So how much closer are we now to human teleportation Since first understanding quantum entanglement nearly six years ago? It sounds like we're not that much closer. Scientists have been focusing more on transferring the atomic state of one atom to another in a different physical location. However, since the process of transmission destroys the original atom, multiple copies of the atom are not being created. That said, Star Trek style teleportation may not even require complete transmission of the quantum state. Charles Bennett, of IBM Research, believes that in principle, human teleportation would be possible by scanning the bio-molecular structure. He states that the "teleported person would end up slightly different, but not in a biologically important way."

The issue here is one of complexity. Teleporting an electron or an atom is one thing, but an average human body is made up of about 7,000 trillion atoms. How could the instantaneous quantum states of so many specks of matter be made to dematerialize and reappear perfectly in a different place? Another major obstacle here is computing power. The American National Institute of Health estimates that it would take 1023 bits (yes, that’s 24 zeros) to ‘record’ every detail of a human body down to 1mm precision. And with today’s best optical fibers it would take a hundred million centuries to transmit this information.

It seems that human teleportation isn't going to happen tomorrow, or, barring some stupendous breakthrough, in the next few decades. However, that needn't stop us from thinking about the consequences if it ever does become possible. So, while theoretically possible, scientists are pessimistic about teleportation's realistic feasibility. For now, it looks like the only teleportation we'll be seeing is on television -- but then again, never underestimate the ingenuity of inventors and entrepreneurs.

Read more at: <http://phys.org/news/2013-04-physicists-quantum-teleportation-qubits.html#jCp>

**Appendix 2:** Filler non-scientific article

**The Growing Stone**

The automobile swung clumsily around the curve in the red sandstone trail, now a mass of mud. The headlights suddenly picked out in the night—first on one side of the road, then on the other—two wooden huts with sheet metal roofs. On the right near the second one, a tower of course beams could be made out in the light fog. From the top of the tower a metal cable, invisible at its starting-point, shone as it sloped down into the light from the car before disappearing behind the embankment that blocked the road. The car slowed down and stopped a few yards from the huts.

The man who emerged from the seat to the right of the driver labored to extricate himself from the car. As he stood up, his huge, broad frame lurched a little. In the shadow beside the car, solidly planted on the ground and weighed down by fatigue, he seemed to be listening to the idling motor. Then he walked in the direction of the embankment and entered the cone of light from the headlights. He stopped at the top of the slope, his broad back outlined against the darkness. After a moment he turned around. In the light from the dashboard he could see the chauffeur’s black face, smiling. The man signaled and the chauffeur turned off the motor. At once a vast cool silence fell over the trail and the forest. Then the sound of the water could be heard.

The man looked at the river below him, visible solely as a broad dark motion flecked with occasional shimmers. A denser motionless darkness, far beyond, must be the other bank. By looking fixedly, however, one could see on that still bank a yellowish light like an oil lamp in the distance. The big man turned back toward the car and nodded. The chauffeur switched off the lights, turned them on again, then blinked them regularly. On the embankment the man appeared and disappeared, taller and more massive each time he came back to life. Suddenly, on the other bank of the river, a lantern held up by an invisible arm back and forth several times. At a final signal from the lookout, the man disappeared into the night. With the lights out, the river was shining intermittently. On each side of the road, the dark masses of forest foliage stood out against the sky and seemed very near. The fine rain that had soaked the trail an hour earlier was still hovering in the warm air, intensifying the silence and immobility of this broad clearing in the virgin forest. In the black sky misty stars flickered.

**Appendix 3**: Filler questions regarding their liking of the articles framed as “Linguistic style”(see Appendix 2).

Linguistic style questions

1) Are you communicating in two or more languages?

* Yes (1)
* No (2)

2) Please list all languages you know, regardless of how well you know them:

3) Do you consider yourself to be “good” at learning new languages?

4) Do you consider yourself to be a "verbal" person, that is, do you enjoy learning new vocabulary and “playing” with language?

Yes (1) Maybe (2) No (3)

5) Have you had formal instruction in music, such as choir or a particular musical instrument?

* Yes (1)
* No (2)

reading Questions about the readings

1) Which of reading did you like more?

* The scientific article (1)
* The fictional passage (2)

2) Which reading did you think was better written?

* The scientific article (1)
* The fictional passage (2)

3) Regarding the scientific article, to what extent do you think the conclusions drawn in the article are factually correct?

* Not at all correct (1) …………………….. Completely correct (9)

4) Regarding the passage from the short story, how do you feel about the overall descriptive qualities of the story?

* Not at all descriptive (1)………….. Extremely descriptive (9)

R5 5) Regarding the passage from the short story, how realistic were the descriptions in the, story ?

* 1) Not at all realistic (1)…………….. Extremely realistic (9)

**Appendix 4: Death thoughts accessibility measure**

**SAMPLE WORD COMPLETION TASK**

We are simply pre-testing this questionnaire for future studies. Please complete the following by filling letters in the blanks to create words. Please fill in the blanks with the first word that comes to mind. Write one letter per blank. Some words may be plural. Thank you.

1. BUR \_ \_ D 14. CHA \_ \_

2. PLA \_ \_ 15. KI \_ \_ ED

3. \_ \_ OK 16. CL \_ \_ K

4. WAT \_ \_ 17. TAB \_ \_

5. DE \_ \_ 18. W \_ \_ DOW

6. MU \_ \_ 19. SK \_ \_ L

7. \_ \_ NG 20. TR \_ \_

8. B \_ T \_ LE 21. P \_ P \_ R

9. M\_ J \_ R 22. COFF \_ \_

10. P \_ \_ TURE 23. \_ O \_ SE

11. FL \_ W \_ R 24. POST \_ \_

12. GRA \_ \_ 25. R \_ DI \_

13. K \_ \_GS