

The Consequences of Physical Immortality:

Can Humans Cope with Radically Extended Lifespans?

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Bruce J. Klein considers himself to be a fairly average homosapien, yet he believes his DNA is suicidal. In order to overcome this problem, Klein hopes to eventually shed his biological body for a more robust posthuman form.

Kharin: How well are infinite lifespans matched to finite environmental resources? Given popular resistance to the most basic forms of genetic modification, can we rely on science and technology to keep pace with expanding lifespans?

In short, Yes. I think we can keep pace with population growth and we can steward environmental resources successfully. Chiefly because we've already been successful thus far. Looking forward, because of greater fine tuning and skill at the manipulation of matter, we will improve.

Creativity and ingenuity are infinite in capacity. So long as we have something to do and are alive, there will always be problems to solve and better ways to solve them. As humans strive for a better life, this drive will propel technology and requisite efficiency gains further into the future.

Granted, this doesn't preclude the possibility of some catastrophic or unforeseen external or internal event happening. Life, of course, has been devastated on numerous occasions by asteroid impacts and we seem to have the dangerous urge to blow each other up. Yet, the 'engine' of creation¹, as Eric Drexler's writes, continues to hum along. And as Ray Kurzweil² rightly points out, it's all happening at an accelerating rate.

Yet, social resistance to change is persistent. There will always be some degree of resistance because of our evolutionary heritage. Our ancestors were successful reproducers not because they took great risks. They were successful on the whole because they were risk averse. Thus, evolution has selected for humans who were somewhat resistant to change but not totally closed to opportunity. Once the benefits are made obvious however, resistance turns quickly to support.

Remember the clamoring³ over "test tube babies"? In the early 1970's, nearly all bioethicists warned against in vitro fertilization (IVF) and 80% of the American public opposed test-tube babies. Today, over 100,000 babies exist - 200,000 worldwide, from IVF. And now about 80% of Americans support IVF.

Kharin: In the event that finite resources and infinite lifespans conflict with one another, to what extent is there likely to be a trade-off between increasing lifespans and increasing birthrates? Can we rely on the European pattern of falling birthrates and increasing lifespans being repeated elsewhere?

Well, this question implies there is some inherent "finite resource" problem. I tend to disagree. As alluded to in the first response, as long as humans seek a better life, creativity and innovation will necessitate and result in more efficiency and greater degrees of fine-tuning. This will lead to even more innovation, creation and efficiencies. Pretty much what we see now, just more of it.

Extrapolate this pattern of improvement towards some possible conclusion, and one can make some

pretty far out predictions. One is that we'll eventually have control over every atom in the universe. Moravec, Tipler, Perry and others have postulated these futures, but I'll just say here that I believe it is theoretically possible. I would also like to note that I believe we'll experience a "Singularity"⁴ from this process. But that's another topic.

Also, while answering this question I happened upon the following quote from a U.S. News article by Jerry Taylor,⁵ a resource specialist at the free-market Cato Institute:

While it is counterintuitive to many people, natural resources are not fixed and finite; they are created by mankind, not by Mother Nature. Since resources are a function of human knowledge, and our stock of knowledge has increased over time, it should come as no surprise that the stock of physical resources has also been expanding.

Taylor goes on to give examples from the oil industry, but I believe his overall assessment is correct and applicable to all areas of human achievement.

In answer to your question about birth rates, first if all, humans may not always want to have children, or at least at such a fast and furious clip. If people knew they could live for hundreds even thousands of years in good health, the drive to have children would certainly decline.

Importantly, the introduction of the birth control pill in the 1960s has given women a choice and gives us a hint at what is to come. If not specifically because of increased lifespan in the past few centuries, but surely a contributing factor, women are choosing to have fewer children later in life. Also the children they have are for the most part surviving. This is a big advance over the past when many children died before their first birthday. Today, the need to have many children to ensure that at least some will survive is not as important as it used to be.

Overall the trend looks promising, especially in the lesser developed countries where we see a rise in the standard of living because of free market expansion. Chiefly powered by a

growing entrepreneurial drive, goods are now being produced more cheaply and productivity gains are being realized as centralized governments tend to sell their monopolies businesses and assets to the private sector.

Economist Fredrick Hayek said it best in "The Road To Serfdom"⁶:

Only since industrial freedom opened the path to the free use of new knowledge, only since everything could be tried - if somebody could be found to back it at his own risk -- has science made the great strides which in the last 150 years have changed the face of the world. The result of this growth surpassed all expectations. Wherever the barriers to the free exercise of human ingenuity were removed, man became rapidly able to satisfy ever-widening ranges of desire.

Kharin: How much of a problem is access to the technologies that are the "gateway" to immortality, given the likely expense? In particular; won't economic inequality always bar access for certain sections of the population? And in areas like Europe and Canada with state funded health services what is the likelihood of them even being offered?

There will always be differing degrees of quality in service and accessibility to health care. Providing advanced health care services is an expensive business and we're starting to see some strain on the system as we grow older and live longer. However, the goal should not to achieve some sort of perfect parity, rather we should work for a competitive balance. We should allow the system to work to improve itself. We should allow for competition, not impose overbearing regulation. Granted, a certain amount of regulation is needed, but the balance is always safer on the side of less, especially in the long run.

But more specifically to the question of "gateway" technologies and immortality; looking to examples in the past as a guide can be helpful. While, automobiles were only for the rich at the turn of the century; today, most Americans of legal driving age have a car. I believe health and longevity care to be no differ-

ent. Having access to health and life extension technologies will be a universal want, because of this, the cost on a per person basis will drop with demand. Free market forces are powerful and work, just as they have worked with other technologies (i.e. cars, televisions, computers, you name it).

Kharin: Finally, inequality and social instability have always been closely linked and some have predicted that technologies like genetic modification may lead to social unrest. How much of a concern is this?

As suggested above, a free market economy with few restrictions will allow human innovation to help with the dispersal of wanted goods. Social unrest in the past was largely due to overburdening regulations by governments. Large corporate monopolies are a worrisome possibility as well. I would not count out a scenario where one biotech company could possess the elixir for immortality. But the chances are slim for a couple of reasons.

- a) The problem of aging is a complex one. The disease of aging it's a multifaceted intercellular problem. No one genetic, hormone, or stem cell therapy could possibly solve the problems of aging. So, no one company would likely have enough resources and manpower to corner the market.
- b) The current system of government is sensitive to monopoly power (i.e. Microsoft) and would quickly conspire, especially with public support, to break up any life extension monopolies.

Kharin: Cryonics seems to be a key theme for the immortality institute. However, this is a controversial area. In particular, it is argued that not only are suspension procedures not meaningful currently and that current cryonics facilities are therefore essentially identical to Sutton Hoo or the Pyramids: elaborate tombs constructed with a false expectation of an afterlife. Is this a fair view, and if so do you feel such facilities damage the work of the Immortality Institute?

Not at all. Cryonics is a cornerstone in the foundation of the modern immortalists' movement. Cryonics is a legitimate, tangible manifestation of the human desire for continuance.

There is nothing wrong with cryonics from

my point of view. There is justifiable concern, however, for its effectiveness. For instance, there is a point after death where cellular damage is to overwhelming and cryonics is useless. Some have speculated this point to be two hours, maybe more. I'm not sure. But, as a safety net, nothing is better than cryonics at preserving the information of the brain after death. As Ralph Merkle⁷ says, "Would I rather be in the control group, or the experimental group?"

Also, cryonics is important for bringing the debate of immortality to a larger audience. When the Ted Williams⁸ story hit, I believe it was overall good for cryonics. It gives people a common starting point, a common person to associate with an idea. It has also raised important questions as to why someone would want to preserve their body after death in the first place.

Kharin: Another issue is that even with nanotechnology to repair tissue damage; suspensions may remain, since the charge fields used to store memory decay as entropy sets in during cryonic preservation, so that any re-animation would be of a being devoid of memory, and by extension personality. How significant an issue do you think this really is?

The most powerful argument for the success of cryonics is that nearly all decay stops when molecules are suspended in liquid nitrogen.

If preserved as soon after death as possible, the tissues & brain cell (the information) when held at temperatures of -196 degrees Centigrade, will last for thousands of years. If we haven't found a solution by then, it's probably safe to assume something very bad happened and concerns for cryonics patient will parish as well.

Kharin: Nanotechnology and genetics both seem important themes for the Institute, but both are very politically sensitive areas. Realistically, surely political and legal changes will always be one step ahead of scientific changes? Will these technologies survive regulation? How much of a problem is it that advances in fields like cloning may be left to countries like China?

Notoriously, politicians and lawyers fall behind when it comes to advancing technology.

Only after public outrage or perhaps sensational episodes do we push to enact promotive or prohibitive legislation (i.e. Raelians & cloning).

There is relatively little legislation controlling the really important technologies. The internet, for example while profoundly important, remains untaxed. More importantly, AI research is mostly overlooked for now, but its impact will be enormous. There has been no public outcry to ban a potential "Hal", for example, except from the likes of Bill Joy⁹ and a few others. AI represents much more of a threat and/or benefit to humans than cloning ever will.

Kharin: John Wyndham suggested that short term lifespans lead to short-term perspectives - how would we expect our conception of the world and ourselves to change with expanded lifespans? One consequence of immortality might well be stasis, that it is the waxing and waning of the generations that brings change and progress, for example. Wouldn't even Einstein or Shakespeare run out of ideas eventually?

I doubt Einstein would have ever run out of good ideas. He was still working on a unified theory in the last day so of his life in 1955? We still haven't found a unified theory nearly 50 years later. Would we expect Einstein, and those like him, if still alive, to simply stop asking questions?

Interestingly, let's say we somehow succeeded in solving all the problems of the universe. Wouldn't this lack of problems be a problem itself?

Fittingly, Hans Moravec writes in his prelude to his book "Mind Children"¹⁰:

A mind would require many modifications to operate effectively after being rescued from the limitations of a mortal body. Natural human mentality is tuned for a life span's progression from impressionable plasticity to self-assured rigidity, and thus is unpromising material for immortality. It would have to be reprogrammed for continual adaptability to be long viable. Whereas a transient mortal organism can leave the task of adaptation to the external process of mutation and natu-

ral selection, a mind that aspired to immortality, whether it traces its beginnings to a mortal human being or is a completely artificial creation, must be prepared to adapt constantly from the inside.

I agree with Moravec. Biological minds are at a huge disadvantage. We have a hard time with change and self-improvement. It takes 10 to 26 years of expensive education for humans to become educated in order to of benefit to society. Computer on the other hand, can learn (download) new skill in seconds.

Will a biological mind be incapable of living forever? I don't know for sure, it doesn't seem impossible. Some people feeling more comfortable keeping their biological bodies. Yet, they'd likely need nanobots¹¹ residing within them to fix oxidation damage, cancer and a myriad of other problems associated with old age. There's also the risk associated with walking around in delicate biologic bodies as well. Personally, I opt out of biological bodies for an existence in a more durable substrate.

Kharin: To what extent would someone be the same person after living for hundreds of years? Do you envisage a limit to our capacity for self-reinvention?

No, there's no limit as far as I can tell. We're different by the second, by the day, by the year without detrimental effect. Some of us even get better with time. Others get worse. But who's to judge really? It's a choice that should be left up to the individual. If they decide that they've had enough life, that's fine. It's their choice. No organization should have the power to keep anyone alive against his or her will. However, organizations should have the freedom to offer information and suggestions about how to live longer.

Kharin: The entire idea of evolution is the continual adaptation of organisms to their environment. Doesn't immortality run the risk of leaving us progressively more poorly adapted to a changing environment?

Evolution is painfully slow and brutal. On the other hand, we have information technology, biotechnology, and now nanotechnology that offers an alternative. I believe transhuman-

ism is the logical progression in our evolutionary road toward greater intelligence and understanding of the world.

Think of it. We are humans creating technology of the physical world around us to improve our lives in that physical world. Is that inherently bad? Should we not try to improve our lives? How far do we go in either direction? Can we just stop where we are now and say fine this is enough? As Bill Mckibben¹², author of the book titled "Enough", would suggest:

It is clear that these revolutionary technologies are being driven by people with immortality, or something very near it, on their minds. In genetic engineering circles, much talk in the last year has centered on the promise of longer lives. As Danny Hillis, a computer scientist, says, "I'm as fond of my body as anyone, but if I can be 200 with a body of silicon, I'll take it." One odd thing is that it is precisely this same class of thinkers - hyper-rationalist scientists, who have long sneered at religion as the refuge of the weak - who can't face the fact of their own mortality. But clearly their own discomfort with mortality goes so deep that they will risk not only the dangers that come with genetic engineering, but even the loss of meaning that will attend this post-human future.

Kharin: Would not a society run by four hundred-year-olds become extremely conservative? For example, would Jefferson have been able to deal with gay rights? Would Lord Palmerston have been able to make decisions on contraception?

Thomas Jefferson was president for two terms, mainly in gratitude to Washington's example. All presidents, except for Franklin D. Roosevelt, followed this example. The 22nd amendment made this a law.

A society run by stodgy, inept 400 year olds would reflect badly on the underlying system not necessarily the individuals running the system. I expect that over time there will be safe mechanisms in place to replace bad leaders with good ones. Much like what we have today with on-violent presidential elections.

Longer life is an overall good for society.

Acquired knowledge is gained by individuals and thus retained for more years in tangible form. Knowledge can be passed on to younger generations in books, while at the same time retained in primary sources (authors).

Life is much better by most measures since we've started to live longer. As we keep markets free and government corruption to a minimum, the system works and improves itself.

Kharin: The question of immortality raises questions about predicting our future development. For example, the development of AI to assist with nanotechnology. Assuming that the AI is self-adaptive and evolutionary (and has greater capability than humans), would not the imposition of constraints as envisaged by Eliezer's Friendly AI theory be interpreted as a means of subjugation, thereby creating precisely the grounds for breaking the constraint? What are the prospects for immortality as set against the prospect of an AI Sapiens at odds with the Neanderthals?

The question of AI is an important one. Our success or failure in designing a self-improving program will likely decide the future success or failure of all life on earth. I agree with Eliezer's Friendliness theory.¹³ We must get this right the first time around.

The question of subjugation and constraint is wrapped up in the discussion of creating AI. There is much contention about what is moral and ethical. I maintain however, that AI's development is inevitable. And as such it is imperative upon us that we find some way to create it and stay alive in the process.

As for immortality and AI, I would speculate that a successfully created AI would keep in mind the wants of humans. I speculate that the greatest of all human wants is the desire to stay alive.

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