

Research on Ageing and Stem Cells. Intimations with Indefinitely Prolonged Lives (IPLs)

YAŞLANMA VE KÖK HÜCRE ARAŞTIRMALARI. BELİRSİZ UZUN SÜRELİ YAŞAMLARLA YAKINLAŞMALAR HAKKINDA ARAŞTIRMA

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Abstract

This paper argues that continuous research may unveil the ageing process and lead, perhaps, to finally controlling this process altogether. Equally, stem cells, with their ability to replace damaged tissues and organs may open new horizons for prolonging-life therapies. The paper suggests that stopping this research is improbable, but also undesirable, because if successful, millions of people will greatly benefit. On the other hand, this progression in curing disease may result in prolonging life, maybe indefinitely. This paper explores notions of human indefinitely prolonged life [IPL] - assuming that IPL maintains people's health and full capabilities - and suggests that existing claims against IPL, such as overpopulation, reduced brain capacity and possible personal boredom, do not justify avoiding IPL when, and if it becomes available. Nor does global justice require people from developed societies to give up their lives. It concludes however, that, although we should not prevent people from living longer lives, new schemes of morality should be developed with this perspective.

Key Words: Ageing, longevity, stem cells research, indefinitely prolonged lives [IPL]

Özet

Bu çalışma, devam eden araştırmaların yaşlanma sürecini ortaya çıkarabileceği ve belki de sonunda bu süreci bütünüyle kontrol edebileceğini tartışmaktadır. Kök hücre, zarar görmüş doku ve organların yerine geçerek yaşamı uzatma terapileri için yeni ufuklar açabilir. Çalışma, bu araştırmayı durdurmanın imkansız aynı zamanda istenmeyen bir durum olduğunu, çünkü, eğer başarılı olursa, milyonlarca insanın büyük oranda fayda göreceğini belirtmektedir. Diğer taraftan, hastalık tedavisindeki bu gelişme, kesin olmasa da yaşamın uzamasıyla sonuçlanabilir. Bu makale, belirsiz uzun süreli insan yaşamı (IPL) düşüncesini –insanın sağlığını ve tüm yeteneklerini koruduğu varsayılarak – inceler ve nüfus fazlalığı, azalan beyin kapasitesi gibi varolan karşı iddiaları ortaya koyar. Evrensel adalet de, gelişmiş toplumlardaki insanlardan kendi yaşamlarından vazgeçmelerini beklemez. İnsanların uzun yaşam sürmeleri önlenemese de, bu bakış açısıyla ahlakta yeni düzenlemeler geliştirilebilir.

Anahtar Kelimeler: Yaşlanma, Uzun Yaşam, Kök Hücre Araştırmaları, Belirsiz Uzun Süreli Yaşamlar

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Being-in-the-world is also being been delivered over to death, as Heidegger reminds us. He also observes, that death is 'a way to be' and in fact, as soon as man comes to life, "he is at one old enough to die". Heidegger believes that there is a lack of totality, in Being, which finds an end in death. But he also addresses the *temporality of our notions*, for he writes, "so far as one knows, all man 'die'" (Heidegger.¹ Religions have also preached resignation to the fact that we must die someday, but on the other hand, finding ways of curing diseases and actually curing the sick, has been a central element of

religion concerns and even a central *imperative*. Finding cures and curing, paradoxically, mean interventions that *impede* dying. These interventions have only *postponed* the time we die. But we may find ourselves doing curative interventions using stem cells that might have the 'side effect' of postponing dying *indefinitely*.²

Ageing, Stem Cell Research and IPLs

Today, there is a huge amount of research effort, both by human and monetary means, in order to unveil and further prevent the process of ageing; the result of which could be the prolonging of full human capacities in good health. Efforts have focused on ageing at the cellular level, hoping that this study would lead eventually to understanding the process of ageing at the organism level. Several years ago it was found that the telomeres, DNA sequences that protect the ends of their chromosomes, get progressively shorter and this shortening affects ageing in cells (Kipling and Faragher 1999; Chang et al 2000). Control-

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ling the shortening of telomeres has since become central to current research.

But the notion of IPLs, - in good health and shape – was seriously boosted by stem cell research which shows that these cells may grow into different tissue and organs that may be used for replacing tissue and organs that have worn out.³ Since their discovery in 1998, stem cells have been one of the hottest scientific issues. Because they can be coaxed to differentiate into any type of cell in the body, they open new possibilities, for lab-grown tissues and/or replacement organs to treat a variety of human ills, from diabetes to Alzheimer's.

The main empowerment of this research results from the fact that over 100 million of Americans suffer from illnesses that might be alleviated by cell transplantation technologies that use these cells.⁴ Since human stem cells (HSC) may provide an unlimited source of replacement tissues for treating terrible human diseases^{5,6} this has also become one of the hottest areas in biotechnology, where several private companies have 'jumped in' to try to exploit HSCs commercially. These private companies have already produced cardiac muscle cells and nerve cells from stem cells. They have also had a partial success in introducing new genes into stem cells to control their differentiation into specialized cells identifying genes that either initiate, or help maintain, the development of specific cell types.⁷ Failures in treatment would probably occur more than once. However, there is a clear congruence of desires arriving first, from sick people of any age hoping to be cured, then from researchers, and, finally, the biotechnology industry.

We may end up endlessly preventing and treating heart disease, cancer and other present major killers in the developed world, by growing 'spare tissues' and 'organs' and by doing successive cures and replacements. Hence, it is not impossible to envisage a scenario on which by continued 'repairs' and 'fixes' we may end up with indefinitely prolonged lives.⁸

IPL however, does not mean invulnerability; death could still occur for unpredictable causes such as accidents or other reasons; the novelty would be an open-ended 'when' for the certainty of death. However, if ageing finally becomes neither inevitable nor necessary as Tom Kirkwood suggests⁹ we should start to work out afresh under this perspective the huge challenge this new prospect poses to society.

Although the limitations of perspective of our present 'normal' life span are obvious, this paper attempts, to explore claims raised against the notion of unrestricted longevity, when and if it is achieved by successive therapy. Demography; fresh people; brain storage capacity; boredom; and justice, local and global, are discussed.

Demography

The first problem raised by the prospect of IPLs is that in this scenario future children will have to compete with previous generations for jobs, space, and everything else.² Hans Jonas also observes that the dying of the old in order to make room for the young is a rule which becomes more stringent as our numbers push or already exceed the limits of environmental tolerance.

Till now, making place for the young had one solution which was the dying of the old. This has been both inevitable and reasonable because of the infirmity of age. IPL, however, does not mean prolonging the state of physiological elderliness but, on the contrary, *postponing* body and mind *decay*. In this case, if we actually achieve the blocking of bodily decline, then the reasonableness of the dying of the old in order to make room for the young becomes less obvious.

We cannot indefinitely add IPL people to the world however the frequency of replacement might slow down. This is already spontaneously occurring in certain parts of the developed world where people now living longer, choose having children in their late 30s. In developed societies, people also choose to produce fewer children owing to the fact that the life 'lottery' has almost disappeared and therefore, a couple may have fewer children without fearing their premature death. Europe shows even signs of negative replacement rate.

Even so, today, *globally*, the main problem of overpopulation is more than that of those who do not die but rather how many children are born. And yet most countries do not interfere with *natality* rates even if these are *also* raising the specter of overpopulation. This is the case in developing countries in which the number of children dying from diseases is high. But this is also the case among religious orthodox groups in developed countries that avoid contraceptives because this opposes their faith; countries where the rate of mortality of children is almost non-existent.¹⁰

If we start from the point that any one who finds IPL desirable may get life prolonging therapy without reproductive constraints then we could be in a difficult situation. This will be one person getting the best of both worlds. Hence, John Harris suggests that society could offer people life prolonging therapies only on condition that they do not reproduce, except perhaps posthumously. The problem is that cancer, for example, is a disease that is mostly age related, as are most of the plagues of the twentieth century in the developed world. Since these are late onset diseases, people needing such therapies when and if they become available, would most probably have already procreated.

The other possibility, Harris suggests, is that they agree that if they did reproduce then they have disqualified

themselves from subsequent therapies. Yet, such a possibility does mean again, that nobody will get these therapies when/if become available, because everybody had, most probably, reproduced already. What might happen is that people in the future may opt to avoid having children in the first place, in order to have a prolonged future.

Fresh People

Would this be the end of novel ideas? There is a belief that 'fresh people' mean also 'fresh ideas'. However, since youngsters are more easily malleable, they are prone to *continuity* rather than change. History shows that this is *mostly* the case. One good example – but certainly not the only one – is Galen's mistaken concept of the structure of the body, which survived him for fourteen centuries.¹¹ A quick and basic calculation gives the astonishing number of, at least, 56 generations of 'fresh people' who, nevertheless, sustained Galen's mistaken and outdated ideas. That Galen's theory retained its currency for so long shows that 'fresh people' are not always a *guarantee* of 'fresh ideas.'

If we finally achieve the prevention of bodily decay and the brain continues to work fully, then adding experiences and thus widening our perspectives may also radically change the world in which we live and, perhaps, for the better. Yitzhak Rabin for example, who was a general, reached the conclusion of a revolutionary peace process with the Palestinian people from the perspective of his *long experience* as a soldier. Unfortunately, he was assassinated. It might be said that he was lost before he could finalize his new enterprise for peace. But losing a person 'too soon' may also be the case with less dramatic events when we are unable to avoid losing well-trained minds to disease and death.

In any case, losing experienced and well-trained minds is clearly a waste of efforts and investment. Moreover, it seems rather that it is the open-mindedness (and courage) of an experienced person that may allow a 'fresh idea' to subside.

Brain Capacity

For how long our mind could remain 'open'? Hans Jonas has suggested that because we are finite beings, even if our vital functions continued unimpaired, there are limits to what our brains can store and keep adding to. He fears that it would be necessary periodically to clear the mind – like computer memory – of its old contents in order to make place for the new. This means we might end up being 'as empty vessels' losing our own identity.

If we follow the history of PCs, however, this shows that we do not erase computer memory easily. Instead, we keep generating and expanding memory capacity by adding both internal and external improved systems. PCs now

have huge memory space and CDs have now replaced diskettes; my new PC easily contains the memory of its predecessor.

Losing memory can change one's identity but this may be the case where loss of memory is extreme. I may not clearly remember what I did three or four years ago, or even twenty years ago, but this does not necessarily mean that my identity has changed. It does mean however, that I have *evolved*; I am not *exactly* the person I was two decades ago, my interests, and aims have certainly changed. And yet, I am still a very recognizable 'me'. My entity has not changed; it is rather *the story of my life* which has now evolved, widening my perspectives.

Besides, *external* memory storage has improved admirably as we now use photos and videos to remember better 'the story of our lives'. Using photos to remember my past does not necessarily make me a different person; adding more decades (and photographs) to my life, *if my brain keeps working fully*, does not seem different. 'Clearing' *certain* contents of our minds happens all the time, since we remember better exciting, pleasurable or traumatic events. Our mind loses recollection of events, unimportant or boring, and even skills we don't use. So it seems our mind erases memories, (or zips them?) *spontaneously*. How human memory works is still to be worked out but it is believed that we are not currently fully using our brain capacity.

One day stem cell replacement could become the way to add 'internal' memory. The main problem might be that injecting stem cells into the brain could erase memories altogether. If this is the case, it would be comparable to a traumatic event accompanied with extreme loss of memory. Would we want this? I suppose I would prefer to continue being 'me'. Nevertheless, we do accept life-saving brain surgery even if this has the risk of memory loss. Equally, we treat amnesia by helping people to 'remember'; we have the basic understanding that making new brain cell connections, or alternatively reopening old connecting paths does help people to remember. If new stem cells could finally connect to the data stored in old cells – this could make the 'trick'.

Boredom

For how long would we want to remember without feeling utterly bored? Writers have tried to imagine how life could be like whilst living for a few centuries and boredom is one of the features that appear under this prospect. The 'Makropulos case', for instance, is based in the story of Elina Makropulos [EM] who has lived to the age of 342 due to a magic elixir her father, a physician, prepared for her. She has now been drinking it for 300 years,

every year, making her immortal (Williams 1973). But for her, the prolongation of life means boredom, an existence that is worse than death. She refuses to take her elixir again and consequently she dies. The reason for her refusal, Bernard Williams suggests, is that she has been '42 years old for 300 years' which is enough time to get so bored as to prefer being dead. Although, he believes, if one had to spend eternity at any age, 42 seems an admirable age to spend it at. EM's problem lies in having been at it for too long. As Williams puts it: "Her trouble was, it seems, boredom: boredom connected with the fact that everything that could happen and make sense to one particular human being of 42 had already happened to her".

It is certain that EM had enough time in 300 years to do whatever a 42-year-old person usually does at 42; but a person that lives 342 years does not *necessarily* remain 42 years old for 300 years. She might *look* 42, and her mental capabilities may remain the same but *looking* like somebody that is 42 does not oblige her to *behave* like 42 years old forever, whatever this behavior might signify. A person may *evolve* through her life as she wishes. Jonathan Glover, discussing the EM case, suggests that boredom depend on one's character; he, with the right company would be quite happy to have the chance to sample a few million years "and see how it went".¹³ Tom Kirkwood also envisages for IPLs the attractive prospect of never-ending personal *development*.⁸

There may be several choices at 42, but since now each person must choose – mostly - one, and since now we never remain *physiologically* at this age - our bodies and minds irremediably decay - we cannot actually do alternative things. However, provided that brain cells continue function *fully*, well-trained minds may continue working when and if doing new things. IPL may well combine the initial investment of education, with life experience for further personal development. A person living in IPL might decide for example, that since she has been a physician for the past 50 years, she may now start a new career, studying Law. Current prolonged longevity as limited as it is now, is already influencing people in the direction of development of further skills. These cases, although not yet widespread, are nevertheless becoming less uncommon.

From the present perspective on longevity, it seems difficult to develop a clear-cut notion; mainly perhaps, because we cannot avoid seeing old age as it is now, the stage in life accompanied with body and mind decay, which finally ends up in frailty, tiredness *and* boredom. But it also seems that liking or detesting the idea of finally achieving IPL might be a question of personal inclination. Besides, and most importantly, a bored person could always opt out, as EM finally did.

Justice

Elementary justice demands the same health care be delivered to all people. IPLs would, most probably, occur first in developed countries, which would increase the gap between rich and poor countries and the already acute problem of global justice. While, in Sierra Leone (but not only) the average life expectancy is only 27 years, in developed countries, average life expectancy has gone up well beyond the seventh decade. We should then ask whether we should avoid saving the life of a man aged 60 in Japan in order to prevent a man who is 27 from dying in Sierra Leone. Intuitively, we may answer that it will be unjust to save the 60 year old man. But then, in the name of global justice we should ask the same question regarding people in Japan who need life saving therapies in their fifties, or even in their forties. In fact by this line of reasoning we should be prevented from giving any form of therapy in the developed world after the age of 27.

Let us now suppose the man in Japan is 30 years old. Not preventing this person from dying, if this could be prevented, means letting him die. If the same man chooses not to undertake a life saving therapy, he would be committing suicide. Obviously, people do not volunteer to give up their life, at any age, in order to save people in Sierra Leone, nor it seems to be justified by any reasonable concept of justice for them to do this. Besides, and perhaps most unfortunately, preventing people in Japan (or elsewhere) from having life saving therapies at the age of 60 will not prevent people in Sierra Leone from dying at the age of 27; as it didn't when people in the developed world had an average life expectancy of 42. Giving up one's own life will not help the people in Sierra Leone, for global justice is a matter of global policy which should be aiming to improve health care everywhere, for everybody, by current means.

Local Justice

How could 'normal' people live alongside IPLs people? Average life expectancy is one number; however, we may still have different individual life spans. Some people may die young because we cannot cure them. However, we do not avoid curing somebody in her forties because her brother died from cancer when he was only 22 years old. IPLs, therefore, may not be considered differently when and if we get results from life saving procedures. We might have to accept the fact that some people will get IPLs therapy whilst others may have to wait. A just policy, however, needs to be worked out.

For how long people would continue having this therapy could be decided by a new scheme for society. Tom Kirkwood pictures a world, where individuals may have two children each. Deciding to complete one's reproduc-

tion quota signifies one's 'self-imposed' death sentence. Such a world has reached the kind of 'generational cleansing' by voluntary euthanasia that Harris refers to as a possibility in the future. This sounds better than a collective decision of what a fair innings of a 'full life-span' should be, because, at least, the decision is autonomous and the choice is made individually, albeit connected with some societal restriction. However it remains unclear which scheme of *current* morality would be behind this system. This calls for further discussion well ahead of the time when IPLs become a reality.

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