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Gerontology

Introduction:

In the field of gerontology, there is no other issue which is as contentious as the question of how long humans can live. One school maintains that human life can be extended for any number of years. While the opposing school says that there is for sure an age limit beyond which human life cannot be extended.

Body:

Aging is labeled as the accumulation of diverse harmful changes occurring in cells and tissues with advancement of age that are responsible for the increased risk of disease and death. (Harman 2003). Opposed to humans, most animals living in natural environs don't age much due to various factors like disease, predation, drought or starvation. (Holliday 2006). In fact, it can be said that aging is a unique human phenomenon. (Hayflick 2000b).

Advances in the fields of biomedicine and hygiene have enabled us to know more about the aging process. The increase in life expectancy in the recent years can be seen in the boost, in the number of the old in developed

countries.

We need to distinguish the terms, life expectancy and life span, clearly. Life expectancy is the number of years a human can expect to live on average. The maximum upper limit that a human can aspire to live is life span. Life span for humans has remained more or less unchanged over the past 100,000 years and it remains at roughly around 125 years. But life expectancy has increased tremendously over the past few decades thanks to advances in medicine and improvements in lifestyle.

One scientist who has become famous for expounding that science can reverse the aging process is gerontologist Aubrey de Gray. He is one among the leading lights that belong to the school that argues that extension of human life is child's play for Science. To understand his arguments in a nutshell, one has to pay attention to the comparison he makes. He says the human body is just like a serviceable car. If one does the tune-ups or service that is necessary at the right times it will go on ticking for a much longer time like many classic cars. He even goes on to argue that human life can be extended for up to a 1000 years and surprisingly he is not the laughing stock of the scientific world. In fact, in 2005, a scientific publication of repute offered a hefty cash prize of \$20,000 to anyone who can disprove him. Many came forward readily to disprove him, but none was able to do so.

Many gerontological researchers like Peter Martin of the Iowa State University lists down six behavioral factors that could lead to better longevity among humans (Martin 2012). First of these is the environmental support that is required and by this he means social supports like family, community and also the required economic support needed to sustain one well to stages

of very late life. Next is the factor of individual characteristics like gender, ethnicity and personality. Gender wise, women are more likely to live longer than men. Ethnic wise, African Americans have a lower life expectancy than whites. Another factor that comes into play is the behavioral skills. These include good cognitive functioning, active lifestyle and good coping up with daily activities. Good health behaviors and nutrition like what we tend to eat and how we keep ourselves fit are another important component to longevity. Staying healthy is another vital component and it boils down to each one of us to do so with some of it being biological. Good mental health is another vital component and optimistic people are more likely to increase their life span.

There is an equally strong and vociferous group within the scientific community who argue otherwise. They maintain that human life has a definite upper limit beyond which it cannot be extended. The reasons are not too far-fetched. All living organisms have cells of two types, non-reproductive and reproductive. The non-reproductive variety is those that are in the skin, eyes, muscles, heart, bones and many more. The sperm and eggs are the reproductive cells. All organisms, humans, included, face constant challenges to survive. Harmful viruses and bacteria, radiation and chemicals, are perpetually attacking and bombarding our body cells. During any day, thousands of our body cells have to undergo repair due to this wear and tear. The genetic material or DNA also gets damaged from such threats and ultimately undergo mutation or change. The body eventually gets these cells replaced by continual translation and copying of the genetic information embedded in the DNA. Human life and life of all other living organisms

depend on this process. This vital process requires tremendous energy, but we have only a limited supply of it to split between maintaining and repairing healthy cells and reproduction. Through the evolutionary course, all living organisms including humans now direct most of this energy supply that is limited for maintaining reproductive cells.

Aging primarily occurs as our body has to deal with the trade-off between staying in good repair and reproducing. With its limited energy supply the body cannot have both in equal measure. This is the basis for an important theory of aging called "The Disposable Soma Theory." This theory was formulated by a Newcastle University professor of medicine namely Thomas Kirkwood in 1977. This theory maintains that the limited energy supplies our body has; is allocated most to protection and production of sperms and eggs that are the reproductive cells. Only the left-over portion goes into repairing non-reproductive cells like bones, eyes, skin and muscles. This results in the cells accumulating damage with the passage of time leading to diseased organs. Eventually, organs don't function as expected leading to death. Severely damaged cells or those which cannot divide anymore commit suicide ultimately.

There is another interesting statistic that points out that there might be a definite upper limit to human life. Today in the developing countries, in excess of 80% of the population survives into their 70's. 150 years ago, this was only 20%. Even in the midst of such drastic improvements in longevity, only a single person has lived beyond 120 years, the reason why many experts believe in a strict limit on human longevity.

Gerontologist Leonard Hayflick belongs to the school that thinks humans are

destined for a stipulated expiry date. He proved that skin cells of humans grown in laboratory conditions have a tendency to divide around fifty times before they lose their ability to divide. This phenomenon of any cell multiplying only a limited number of times is known as the Hayflick limit. Hayflick and other researchers have documented this limit in various life forms. This limit is tell-tale evidence as to why humans cannot live just beyond 120 years, which is the maximum extent to which humans have been found to live.

Conclusion:

The scientific community is clearly divided into two halves on the question of how extendable human life is. One half firmly believes in the wonders of science being able to extend it to even a thousand years. While the other half stipulates there is a strict upper limit beyond which it is impossible for human life to exist. In my viewpoint, both sides present compelling reasons in their favor and has done studies to back them up.

Physiological and biological processes like that happening with cells indicate a definite expiry for the human body. It is hard to imagine toying around with this natural process. But the opposing school is also coming up with their own reasons on how human longevity can be improved. A pointer in case is the increased life span of those in developed countries. Studies have also proved that increased brain activity or cognitive faculties tend to elongate human lives. Some statistics also point out to the higher number of centenarians and supercentenarians (those above age 110) living now.

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