SCIENCE & TECHNOLOGY

Immortality is mathematically impossible, new research finds

A mathematical equation has proven that controlling one of the two major changes in a cell—decay or cancerous growth—enhances the other, causing inevitable death

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By Akshit Sangomla
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Human beings seem to be obsessed with the idea of immortality, and their long-standing fixation with it has been a part of cultural narratives—showing up in the ancient epic Mahabharata, the hit fantasy series Harry Potter and The Man from Earth, among many others. Our species' desire to be immortal has led scientists and companies to research longevity and hoodwinking death.

A study published in the journal *Proceedings of the National Academy of Sciences* has stated, through a mathematical equation, that it is impossible to stop ageing in multicellular organisms, which include humans, bringing the immortality debate to a possible end.

According to the study, titled *Intercellular Competition and Inevitability of Multicellular Aging*, the human body goes through two major changes at the cellular level as it ages: first, the function of cells shuts down, making them sluggish and second, cells become increasingly cancerous with age. The researchers from the University Of Arizona, who conducted the study, found that controlling any one of these processes will enhance the other. This means that a human being has to either die of cancerous growth in her body or the failing of cells, which will lead to the eventual dysfunction of organs.

In a report on Phys.org, Paul Nelson, who is the lead author of the study says, 'As you age, most of your cells are ratcheting down and losing function, and they stop growing, as well."

"But some of your cells are growing like crazy. What we show is that this forms a double bind - a catch-22. If you get rid of those poorly functioning, sluggish cells, then that allows cancer cells to proliferate, and if you get rid of, or slow down, those cancer cells, then that allows sluggish cells to accumulate. So you're stuck between allowing these sluggish cells to accumulate and allowing cancer cells to proliferate, and if you do one you can't do the other. You can't do them both at the same time,' he adds.

The argument for immortality

Scientists have wondered why nature has not selected any life form to be immortal, if it was a possibility. There are examples of long-living trees like the bristle cone pine, which grows in the arid parts of the US and can live for 5000 years, and the round worm C elegans which can go into a coma for four months and come back to life. But no living being lives forever.

Scientists have investigated this possible oversight of natural selection, studying why nature or evolution has not done away with the process of aging altogether. The current research on the topic is based on the hypothesis that science can trump aging, at least in theory. The practical way out, the scientists say, is by making cells healthier and then pushing natural selection to choose between healthy cells over non-functioning cells.

A detailed coverage by Down to Earth explored the approaches towards making cells healthy with the help of insulin signaling genes, sirtuins—a protein that may prolong life and rapamycin—a compound that has been known to extend lifespan in mice and yeast. Some other strands of research have aspired to identify the rare genes or regions of genomes within cells, which comprise the entire sequence of genes in an organism, that have allowed some humans to live longer lives and use them to find the ultimate key to human immortality. Though many of these have yielded positive results on other animals, there is no conclusive evidence for a solution to human ageing.

There are also many ongoing efforts by companies and research groups to know more about human health and death. Verily – Google's life sciences subsidiary is trying to understand human health in a broad way through its project Baseline. The Resilience project of the Icahn School of Medicine is working to understand the hidden factors that keep people away from disease.

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Carbon market mechanism is turning into a big negotiation thorn

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By Jayanta Basu
Last Updated: Friday 06 December 2019

CoP 25 opening ceremony. Photo: UNFCCC

The ghost of pre-2020 carbon market mechanism has started to haunt the Madrid negotiations over the new climate market mechanism proposed for the post-2020 Paris regime. The negotiations for the new carbon market regime, which falls under Article 6 of the Paris agreement, will take centre stage along with the other outstanding issue of "Loss and Damage" before the agreement gets rolling on ground.

According to sources, some developing countries, in private discussions, have already raised the demand that the Kyoto Protocol phase II should be pushed back for couple of years to ensure that the developed countries complete their commitments under the protocol. Developing countries are pointing out that the Doha Amendment to the Kyoto Protocol, which officialises the second commitment period from 2015 to 2020, is yet to be ratified by requisite number of developed countries and hence did not get started on ground, though its scheduled closure has almost reached.

While developed countries are mostly pushing for a new market-based carbon cut mechanism post-2020, developing countries, led by India, want the developed world to first fulfill their emission reduction commitments made under the Kyoto Protocol before finalising a new market mechanism. India, supported by like-minded developing countries, and Brazil are also demanding that certified emission reductions or CERs, a typed of carbon credits issued under the Kyoto protocol, should either be valid under the Paris regime or the developing countries should be compensated for discontinuing them.

India still has 750 million CERs, which could not be sold, as per a senior Indian delegation member. "It is not only the issue of money but also of trust and credibility of the UN process as the certificates were generated under UNFCCC programme and Kyoto protocol mandate. How can we now conveniently forget CERs built under pre-2020 regime and embrace post-2020 Paris agreement's similar market-based approach. Who will guarantee that the same thing will not repeat post-2020?" asks the delegate. Sources say that developing countries might demand an extension of the Kyoto Protocol, if untraded CERs do not bear fruit.

Under the clean development mechanism (CDM) of the Kyoto protocol, developed countries could buy CERs from developing countries to meet their emissions commitments. Initially, the market had shot up when developed countries were willing to pay US$20 for 1 tonne of carbon. The market subsequently crashed when the developed countries chose to ignore their commitments under Kyoto phase II and stopped trading in CERs, which fell to less than a dollar for 1 tonne carbon.

The impact was felt by several Indian companies, including the public sector, which invested on emission cuts to earn CER certificates. India and China hold the maximum untraded CERs but other developing countries also have substantial amounts of CERs. The total global untraded CER number stands around 4 billion.

"They (old CERs) are mostly junk. There should not be any carry over as they will lead to double accounting. We should make a fresh start under the Paris agreement," says Sam Van den plas, policy director, Carbon Market Watch. Others disagree. "India has valid logic but both sides should weigh the options on table and reach to a solution," says Sanjay Vasisht of Climate Action Network South Asia (CANSA). He points out that till now there has been hardly any forward movement in Article 6 negotiation apart from a new text that came out on Wednesday. "The number of pages was reduced, so are the brackets (which mean no agreement). The text has become sharper but all contentious issues are still there," says Vashist. The unresolved issues around CERs, apart from the carry forward controversy, include double accounting of such emissions as they were created before 2020, consideration of human rights safeguard in the process, market versus non-market mechanism promoted by Bolivia and Venezuela and silently supported by China, as well as the possible limits of trading under the new carbon market set up.

A fresh negotiation text is set to come out before the political leaders as they start negotiations next week.

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