

Immortal genes, viruses and the ever-evolving new normal

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COMMENT



Back in 1976, biologist Richard Dawkins wrote a book on evolution called *The Selfish Gene*, which popularised a gene-centred view of evolution, an alternative to Charles Darwin's hereditary view, where advantageous character traits of each species are passed down via reproduction variations.

Gene-centred evolutionary theory was originally outlined in 1907 by the philosopher Henri Bergson. In *Creative Evolution*, he wrote: "Life is like a current passing from germ to germ through the medium of a developed organism. It is as if the organism itself were only an excrescence, a bud caused to sprout by the former endeavouring to continue itself in a new germ."

I had to look up some of the language he used here: Bergson's 'germ' is not a microbial pathogen, he uses the word in the germination sense, where germ cells trigger the development of new life forms (organisms) or parts thereof. Perhaps today he may have used the word gene instead? Excrescence is another strong and emotive word: 'a distinct outgrowth on a human or animal body or on a plant, especially one that is the result of a disease or abnormality'. A reference to evolution being driven by the abnormal?

A highly respected philosopher, Bergson was describing all humans, animals and plants as multi-generational life support systems for the genes they carry – and the biological purpose of all living things is to promote the development and survival of these genes.

Genes, which each carry pieces of information about the physical traits and make up of an individual, are found in the chromosomes at the nucleus of every type of cell – and both chromosomes and genes are made of the individual organism's unique DNA.

According to Dawkins, the genes referred to in the selfish gene model are "not just one single physical bit of DNA [but] all the replicas of a particular bit of DNA distributed throughout the world."

My simplistic understanding of the gene-centred view of evolution is that the mechanism involves competing genes, which seek to promote their own propagation in generation after generation of the life forms in which they survive. So the human race, along with the animal and plant kingdoms, are merely gene hosts, with all of our survival instincts and actions, both conscious and unconscious, being geared towards the long term survival of the strongest genes.

Genes too, though, evolve, via gene mutations or genetic recombination. Variations alter gene activity or protein function and introduce different traits in the

individual host organism. If that trait is advantageous and helps the individual survive and reproduce, the genetic variation is more likely to be passed to the next generation and, over long periods of time, the population of the host organism may even evolve into a completely new species – with stronger genes that are more suited to their survival in new host populations living in radically different environments. The genes are not being 'selfish' in this, they are merely striving to be 'immortal', which Dawkins suggests is a word that better suits his book's core message.

Pathogens that cause diseases, such as bacteria, viruses and other microorganisms, are part and parcel of this gene-centred evolution. When a new virus such as COVID-19 penetrates a cell in the human body, it 'messages' the cell's DNA/RNA to generate replicas. The cell itself is damaged in the process and usually dies, while the new copies of the virus are released and proceed to infect other similar cells.

But the immune response mechanism kicks in as soon as a problem has been detected, developing new ways to protect its cells, and these successful changes accumulate over time to better protect the genes from future attack.

In a November 2016 paper entitled 'Our complicated relationship with viruses' by geneticists Cedric Feschotte, Edward Chuong and Nels Elde from the University of Utah, the authors reported that nearly 10% of the human genome is made up of pieces of virus DNA, which are mostly not harmful and in some cases, beneficial. Benefits range from improving immune response against future diseases to evolutionary nutritional benefits, such as the ability to digest starch.

Stowaway sequences of viral genes, called endogenous retroviruses (ERVs), Feschotte hypothesised: "Were likely to be primary players in regulating immune activity because viruses themselves evolved to hijack the machinery to control immune cells."

While we all feel like we are living in unprecedented times and fear the world will never be the same again, virus infections such as SARS-COV-2 are not unprecedented. They have always been an intrinsic part of life and evolution, continuously thrusting new normals upon us.

In terms of our human response to this pandemic, let's seek out and embrace those elements of the change imposed upon us that might improve our future value and quality of life.

Let's steer the latest new normal towards a better one for everyone. □

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