

Does evolution put us in our place?

Does evolution by natural selection have any relevance to some of the big questions that humans ask: "Where do we come from?" "What drives us as individuals and societies?" "Are we alone in the universe?"

Evolving out of Africa

Human origins have been much debated. Some studies on variation in skull measurements have suggested that humans evolved independently in different locations around the world. Recent research has looked again at the diversity in people around the world, comparing genetic diversity and variation in skull measurements. This study showed that the further population groups are from sub-Saharan Africa, the less the genetic diversity and variation in skull measurements within the groups. Genetic diversity and variation in physical characteristics are highest in populations closest to where a new species originated, so this demonstrates that humans evolved once from an ancestor in Africa and not in different locations around the world.



Subsaharan Africa
(Nigeria)

Subsaharan Africa
(South Africa)



Australia
(South Australia)

Australia
(New South Wales)

Our diseases may reveal much about our origins. The bacterium (*Helicobacter pylori*) that causes stomach ulcers seems to have been travelling with us since we left Africa 60,000 years ago. A comparison of the genetic diversity among many different strains of *Helicobacter pylori*, from around the world, shows that it emerged from Africa at the same time as the first humans. Also, the genetic differences between bacterial populations mirror the differences that arose in human populations as we dispersed from Africa.

Is there life on other planets and what might it look like?

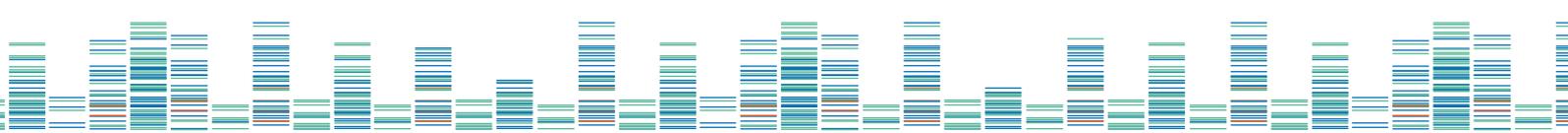
Earth is the one place in the universe that we know harbours life, but most scientists agree that Earth is unlikely to be unique among the planets that orbit the billions of stars in our universe.

The discovery of frozen water on the surface of Mars, and evidence that suggests there may be reservoirs of water below the surface, has raised hopes that simple organisms may live, or have lived, there. Jupiter's moon Europa has a thick covering of ice that may hide a liquid ocean beneath, and Titan, Saturn's moon, has a methane rich atmosphere; both are environments that might support life. But what might this life be like?

Aliens might be simple microbes or complex creatures like us. Must life-forms be carbon and DNA-based? And what might natural selection, working on different building blocks and in extreme planetary environments, have produced on other worlds?



Mars



Our search for extraterrestrial life is based on our experience of 'life' on Earth where life thrives even in the most extreme conditions. The existence of 'extremophiles' - microbes adapted to conditions that would be fatal to most other life - demonstrates the tenacity of life in the harshest of environments.

Space missions over the next few years may reveal whether there is life elsewhere in our solar system. Meanwhile, astronomers are searching for planets outside our solar system ('extra-solar' or 'exo' planets). This is a difficult task because these planets are very distant and they are dwarfed in size and brightness by their parent stars. However, over 300 exoplanets have been discovered. Most are huge, gas planets like Jupiter, but a few are rocky planets like Earth. Astronomers have studied the light reflected from these planets and found some signs of the chemicals we associate with life, such as water and organic molecules.



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Summit view of one of the twin Keck telescopes, located at 13,600 atop a dormant volcano in Hawaii. These are used by NASA to seek planets and ultimately life beyond our solar system.

Evolving society

Business practices allow information to be stored and passed on, just like genes, while innovations in practice or technology act like mutations, altering the behaviour of existing systems. Major innovations can create new 'species' of financial activity or institution. Competition between institutions for the markets' resources allows 'natural selection' to eliminate the least competitive practices (genes), while the selection process is driven by constantly changing markets and innovations by competitors.



Leader-follower relationships almost always emerge when groups of people interact because these relationships help groups to function effectively. A leader is someone who chooses to choose first, while a follower is someone who chooses to wait and see. Leading is a risky strategy because a leader is only successful if they attract followers. The decision to lead is based on the benefits of leading and a judgement of likely success/failure. By studying how leadership/followership works, from a Darwinian point of view, we may better understand why it matters and how it comes about. Studies of leadership may explain the success and failure of business leaders, fashion and consumer trends, financial trading strategies and pricing in competitive markets.

Read more at <http://www.darwin.rcuk.ac.uk>

Darwin Today is raising awareness of the importance of Darwin's theory of evolution by natural selection, in current research and innovation across many disciplines. **Darwin Today** is targeting general audiences around the UK. It is led by the Biotechnology and Biological Sciences Research Council on behalf of the UK Research Councils.

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