Life as we know it

Do we know what we are looking for?

The more we explore life on Earth, the more we realise just how widespread and adaptable it is. Microorganisms called obligate anaerobes live in environments where there is no oxygen, such as deep-sea hydrothermal vents and the human gut. Exposure to small amounts of oxygen would actually kill them – they are 'obligated' to avoid oxygen.

One thing that all Earth's life has in common, however, is water. Carbon is another – about 18 per cent of the mass of a human body is made of it. In plants it can reach 50 per cent. Carbon is extremely abundant in living matter and is chemically versatile. It bonds easily with other elements to build the complex molecules found inside living things. (For more on carbon, see our in-depth article on the sixth element.)

Yet some astrobiologists speculate that alien life need not be carbon-based, suggesting that silicon, which has some similar chemical properties, might be used in biochemical systems. So we need to be careful when searching for extraterrestrial life that we don't ignore other possibilities.

One of the first scientists to think about searching for alien life was radio astronomer Frank Drake. In 1961, he devised a way to estimate the number of intelligent civilisations that might exist in our Milky Way galaxy.

The 'Drake equation' acts as a giant sieve. First, take all the stars in the galaxy. Then, sieve out the ones that don't have any planets. Next, remove the ones without Earth-like planets, followed by ones that have Earth-like planets but the wrong conditions for life. Go on sieving a few more times until you end up with what's left.

Drake originally came up with answer of over 10,000 intelligent civilisations in our galaxy alone. Modern, sceptical versions of the equation put that number down into single digits.

The formula for the Drake equation

N: Number of communicative civilisations
R: Rate of star formation
fp: Fraction of stars with planetary systems
ne: Number of planets around stars with an ecoshell
fl: Fraction of planets where life develops
fi: Fraction of living species that develop intelligence
fc: Fraction of intelligent species with ability to communicate

ABOUT THIS RESOURCE

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