

Scientists confirm that parts of earliest genetic material may have come from the stars

June 13 2008



Scientists have confirmed for the first time that an important component of early genetic material which has been found in meteorite fragments is extraterrestrial in origin, in a paper published on 15 June 2008.

The finding suggests that parts of the raw materials to make the first molecules of DNA and RNA may have come from the stars.

The scientists, from Europe and the USA, say that their research, published in the journal *Earth and Planetary Science Letters*, provides evidence that life's raw materials came from sources beyond the Earth.

The materials they have found include the molecules uracil and xanthine, which are precursors to the molecules that make up DNA and RNA, and are known as nucleobases.

The team discovered the molecules in rock fragments of the Murchison meteorite, which crashed in Australia in 1969.

They tested the meteorite material to determine whether the molecules came from the solar system or were a result of contamination when the meteorite landed on Earth.

The analysis shows that the nucleobases contain a heavy form of carbon which could only have been formed in space. Materials formed on Earth consist of a lighter variety of carbon.

Lead author Dr Zita Martins, of the Department of Earth Science and Engineering at Imperial College London, says that the research may provide another piece of evidence explaining the evolution of early life. She says:

"We believe early life may have adopted nucleobases from meteoritic fragments for use in genetic coding which enabled them to pass on their successful features to subsequent generations."

Between 3.8 to 4.5 billion years ago large numbers of rocks similar to the Murchison meteorite rained down on Earth at the time when primitive life was forming. The heavy bombardment would have dropped large amounts of meteorite material to the surface on planets like Earth and Mars.

Co-author Professor Mark Sephton, also of Imperial's Department of Earth Science and Engineering, believes this research is an important step in understanding how early life might have evolved. He added:

"Because meteorites represent left over materials from the formation of the solar system, the key components for life -- including nucleobases -- could be widespread in the cosmos. As more and more of life's raw materials are discovered in objects from space, the possibility of life springing forth wherever the right chemistry is present becomes more likely."

Paper: "Extraterrestrial nucleobases in the Murchison meteorite", *Earth and Planetary Science Letters*, Sunday 15 June 2008 (Print publication) A full copy of the research can be downloaded at:
[dx.doi.org/10.1016/j.epsl.2008.03.026](https://doi.org/10.1016/j.epsl.2008.03.026)

Source: Imperial College London

Citation: Scientists confirm that parts of earliest genetic material may have come from the stars (2008, June 13) retrieved 24 April 2024 from <https://phys.org/news/2008-06-scientists-earliest-genetic-material-stars.html>

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