Protein discovered inside a meteorite

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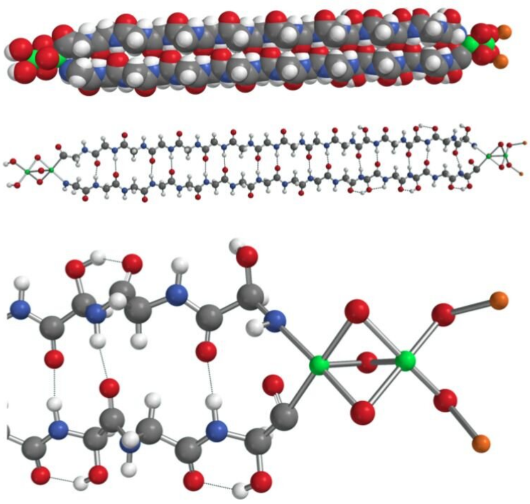

Model of the 2320 hemolithin molecule after MMFF energy minimization. Top: in space-filling mode; Center: ball and stick; Bottom: enlarged view of iron, oxygen and lithium termination. White = H; orange = Li; grey = C; blue = N; red = O and green = Fe. Hydrogen bonds are shown by dotted lines. Credit: arXiv:2002.11688 [astro-ph.EP]

A team of researchers from Plex Corporation, Bruker Scientific LLC and Harvard University has found evidence of a protein inside of a meteorite. They have written a paper describing their findings and have uploaded it to the arXiv preprint server.

In prior research, scientists have found organic materials, sugars and some other molecules considered to be precursors to amino acids in both meteorites and comets—and fully formed amino acids have been found in comets and meteorites, as well. But until now, no proteins had been found inside of an extraterrestrial object. In this new effort, the researchers have discovered a protein called hemolithin inside of a meteorite that was found in Algeria back in 1990.

The hemolithin protein found by the researchers was a small one, and was made up mostly of glycine, and amino acids. It also had oxygen, lithium and iron atoms at its ends—an arrangement never seen before. The team's paper has not yet been peer reviewed, but once the findings are confirmed, their discovery will add another piece to the puzzle that surrounds the development of life on Earth. Proteins are considered to be essential building blocks for the development of living things, and finding one on a meteorite bolsters theories that suggest either life, or something very close to it, came to Earth from elsewhere in space.

Proteins are considered by chemists to be quite complex, which means a lot of things would have to happen by chance for protein formation. For hemolithin to have formed naturally in the configuration found would require glycine to form first, perhaps on the surface of grains of space dust. After that, heat by way of molecular clouds might have induced units of glycine to begin linking into polymer chains, which at some point, could evolve into fully formed proteins. The researchers note that the atom groupings on the tips of the protein form an iron oxide that has been seen in prior research to absorb photons—a means of splitting water into oxygen and hydrogen, thereby producing an energy source that would also be necessary for the development of life.

More information: Hemolithin: a Meteoritic Protein containing Iron and Lithium, arXiv:2002.11688 [astro-ph.EP] arxiv.org/abs/2002.11688