



Comet contains glycine, key part of recipe for life

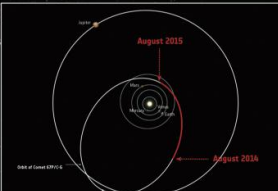
May 27 2016

→ ROSETTA'S COMET CONTAINS INGREDIENTS FOR LIFE 



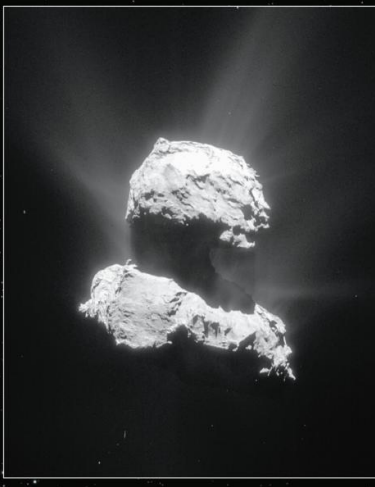
Rosina-DFMS

The measurements were made with the Rosetta Orbiter Spectrometer for Ion and Neutral Analysis Double-Focusing Mass Spectrometer (ROSINA-DFMS).

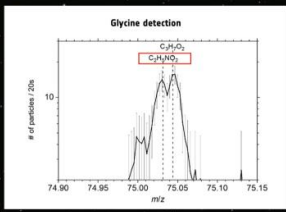


August 2015
August 2014

The data were collected between August 2014 and August 2015.



The measurements were made when Rosetta was between 10 and 200 km from the comet.



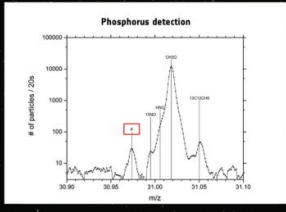
Glycine detection

$C_2H_5NO_2$
 $C_2H_3NO_2$

of particles / 20%

m/z

Spectrum indicating glycine [$C_2H_5NO_2$] detection on 9 July 2015. The simple amino acid glycine is a biologically important organic compound commonly found in proteins.



Phosphorus detection

of particles / 20%

m/z

Spectrum indicating phosphorus (P) detection, along with other gases, on 26 October 2014. Phosphorus is a key element in all living organisms. It is found in DNA, RNA and in cell membranes, and it is used in transporting chemical energy within cells for metabolism.

www.esa.int European Space Agency

ROSINA detected ($C_2H_5NO_2$, up) as well as Phosphorus (P, below) in the coma of the comet. Credit: © ESA

An important amino acid called glycine has been detected in a comet for the first time, supporting the theory that these cosmic bodies delivered the ingredients for life on Earth, researchers said Friday.

Glycine, an organic compound contained in proteins, was found in the cloud around Comet 67P/Churyumov-Gerasimenko by the European Space Agency's probe, Rosetta, said the study in the journal *Science Advances*.

The discovery was made using an instrument on the probe, called the Rosetta Orbiter Spectrometer for Ion and Neutral Analysis (ROSINA) mass spectrometer.

"This is the first unambiguous detection of [glycine](#) in the thin atmosphere of a comet," said lead author Kathrin Altwegg, principal investigator of the ROSINA instrument at the Center of Space and Habitability of the University of Bern.

In addition to the simple [amino acid glycine](#), the instrument also found phosphorus. The two are key components of DNA and cell membranes.

Glycine has been detected in the clouds around comets before, but in previous cases scientists could not rule out the possibility of Earthly contamination.

This time, however, they could, because the mass spectrometer directly detected the glycine, and there was no need for a chemical sample preparation that could have introduced contamination.

"The multitude of organic molecules already identified by ROSINA, now joined by the exciting confirmation of fundamental ingredients like glycine and phosphorus, confirms our idea that comets have the potential to deliver key molecules for prebiotic chemistry," said Matt Taylor, Rosetta project scientist of the European Space Agency ESA.

"Demonstrating that comets are reservoirs of primitive material in the Solar System, and vessels that could have transported these vital

ingredients to Earth, is one of the key goals of the Rosetta mission, and we are delighted with this result."

Scientists have long debated the question of whether comets and asteroids brought the components of life to Earth by smashing into oceans on our planet.

More than one hundred molecules have been detected on comets and in their dust and gas clouds, including many amino acids.

Previous data from Rosetta has shown that water on Comet 67P/C-G is significantly different from water on Earth, suggesting that comets did not play as big a role in delivering water as once thought.

However, the latest finding shows "they certainly had the potential to deliver life's ingredients," said a statement by the University of Bern.

More information: K. Altwegg et al. Prebiotic chemicals—amino acid and phosphorus—in the coma of comet 67P/Churyumov-Gerasimenko, *Science Advances* (2016). DOI: 10.1126/sciadv.1600285 , advances.sciencemag.org/content/2/5/e1600285

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