Life's Building Blocks Are Common In Space

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A team of NASA exobiology researchers revealed today organic chemicals that play a crucial role in the chemistry of life are common in space.

"Our work shows a class of compounds that is critical to biochemistry is prevalent throughout the universe," said Douglas Hudgins, an astronomer at NASA's Ames Research Center, Moffett Field, Calif. He is principal author of a study detailing the team's findings that appears in the Oct. 10 issue of the *Astrophysical Journal*.

Image: NASA Spitzer Space Telescope image of the spiral galaxy M81,

located some 12 million light years from Earth. The infrared radiation emitted by polycyclic nitrogen-containing aromatic hydrocarbon (PANH) molecules is shown in red. This emission is excited by star (and planet) formation along the edges of the spiral arms.

"NASA's Spitzer Space Telescope has shown complex organic molecules called polycyclic aromatic hydrocarbons (PAHs) are found in every nook and cranny of our galaxy. While this is important to astronomers, it has been of little interest to astrobiologists, scientists who search for life beyond Earth. Normal PAHs aren't really important to biology," Hudgins said. "However, our work shows the lion's share of the PAHs in space also carry nitrogen in their structures. That changes everything."

"Much of the chemistry of life, including DNA, requires organic molecules that contain nitrogen," said team member Louis Allamandola, an astrochemist at Ames. "Chlorophyll, the substance that enables photosynthesis in plants, is a good example of this class of compounds, called polycyclic aromatic nitrogen heterocycles, or PANHs. Ironically, PANHs are formed in abundance around dying stars. So even in death, the seeds of life are sewn," Allamandola said.

The NASA team studied the infrared "fingerprint" of PANHs in laboratory experiments and with computer simulations to learn more about infrared radiation that astronomers have detected coming from space. They used data from the European Space Agency's Infrared Space Observatory satellite.

Source: NASA