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ASTRONOMY BEAT

THE MILKY WAY'S SWEET SPOT

The inventory of ingredients for life that have been observed in space is large and growing. Last November an international team of astronomers made perhaps the most significant such discovery to date: They found glycolaldehyde, a type of sugar, in a Milky Way stellar nursery 26,000 light-years away.

Glycolaldehyde is a key component in RNA, which may have driven the development of the first living cells on Earth. According to study author Serena Viti, an astrochemist at University College London, this is the first time that the molecule has been identified in a region of the galaxy that could be hospitable to life.

By looking for unique chemical signatures in light and radio signals gathered by telescopes, researchers have observed more than 140 molecules—including increasingly complex organic ones—surrounding stars or in interstellar space. Another RNA ingredient, propenal, was found in the Milky Way in 2004. Some astronomers have even reported spotting amino acids, the building blocks of proteins, although these finds remain unconfirmed. And last April, a German team identified a molecule closely related to amino acids in a gas cloud in the constellation Sagittarius.

Some researchers have speculated that organic space molecules could help seed life on other worlds. But Alycia Weinberger of the Carnegie Institution of Washington takes a more cautious view, noting that the chemicals might not survive the violent processes of star and planet formation. Still, Weinberger says, the recent discoveries are very encouraging in the search for life in the cosmos, especially if astronomers find that complex organic substances are widespread throughout the universe.

New technology may speed the search. In 2010 a sensitive radio telescope array in Chile, called ALMA, will begin operation, giving researchers an unprecedented ability to locate substances that suggest we are not alone.

Andrew Grant

CHEMISTRY BEAT

MICROTECH GETS A GRIP

Researchers have come up with many clever concepts for microdevices that could perform fine surgery or assemble tiny electronics. The hardest part is finding a way to power these minimachines. In December Johns Hopkins University chemical engineer David Gracias and colleagues announced a small breakthrough: They had developed a set of microgrippers that open and close in reaction to simple chemical changes. The minute machines are able to pick up and put down objects less than 1/500th of an inch across.

These star-shaped grippers, made of gold-coated nickel and no bigger than specks of dust, start out in water in the open position. When acetic acid—the substance that makes vinegar taste sour—is poured into the water, the grippers close to grasp a minuscule object. A magnet is used to move the grippers; then the addition of another chemical, hydrogen peroxide, prompts them to release their cargo. The researchers were able to use the grippers to grab and deliver glass beads, tiny wires, and tubes.

"We can pick up objects and place them down," Gracias says, "so we've achieved the most basic function of engineering, and we've done so without batteries or electricity." To eliminate the need for a human operator to move the magnet, the grippers could travel instead with the flow of a liquid. Gracias's team is now testing human-safe chemicals that would trigger the grippers during biopsies.

Boonsri Dickinson

SHIMIZU

FROM TOP: ESO; J. KANOHAWA (GRACIAS LABORATORY, JHU)