SCIENCE NEWS Online
THE WEEKLY NEWSMAGAZINE OF SCIENCE

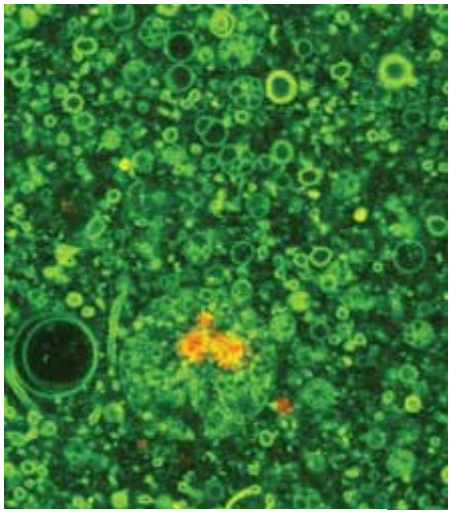
SCIENCE SERVICE

Clays catalyze life?

Alexandra Goho November 1, 2003

Billions of years ago, the very first cells emerged and gave rise to life on Earth. How these ancient cells formed has been a mystery. Now, a team of evolutionary biologists suggests how clay—perhaps near hydrothermal springs on the ocean floor—may have spurred the formation of these early cells.

Previous studies have shown that clays can catalyze the assembly of RNA molecules, the instructions that cells use to make proteins. Perhaps the same might be true for cellular lipid membranes, reasoned Jack Szostak and his colleagues at Massachusetts General Hospital in Boston.



CLAYMATION. In a simulated protocell, lipid vesicles (green) encapsulate RNA (red) bound to clay. Science

To test their theory, the researchers added small particles of montmorillonite—a clay widespread in the environment—to a solution of small lipid spheres called micelles. Almost immediately, the micelles began to assemble into larger, fluid-filled sacs, or vesicles. Because the clay is acidic, says Szostak, it destabilizes the micelles, prompting them to aggregate into the larger vesicles.

To see whether these microscopic sacs would encapsulate RNA in a cell-like fashion, the researchers attached RNA molecules labeled with a fluorescent tag to clay particles and mixed these in a solution of micelles. Vesicles harboring the glowing RNA were clearly visible through a microscope. "The effect was really dramatic," says Szostak, who described his work in the Oct. 24 Science.

****

References:

Hanczyc, M.M., S.M. Fujikawa, and J.W. Szostak. 2003. Experimental models of primitive cellular compartments: Encapsulation, growth, and division. Science 302(Oct. 24):618–622. Abstract available at http://dx.doi.org/10.1126/science.1089904.

Sources:

Jack W. Szostak
Massachusetts General Hospital
32 Fruit Street
Department of Molecular Biology
Boston, MA 02114
From Science News, Volume 164, No. 18, November 1, 2003, p. 285.