Energy Microbes As Monocellular Biorefineries

Biofuels Digest [1] — In California, a report on Craig Venter in Discover focuses on the Syntehtic Genomics founder's ambitions to develop synthetic life forms [2]. Researchers have succeeded in "stitching together pieces of synthesized DNA" and transplanting that to a host bacterium, but the bacterium has been rejecting the genome as an invader, until recent efforts to add methyl tags to M. mycoides allowed the genome to go unnoticed by the bacterial defense system.

The prize? Energy microbes that become monocellular biorefineries, consuming waste energy and converting it to biofuels. It is unclear whether the Synthetic Genomics research effort with ExxonMobil in algae will directly benefit from the R&D effort, as algae is a much more highly complex organism than bacteria. But Venter told the Times, "Assuming we don't make any errors, I think it should work and we should have the first synthetic species by the end of the year."

Last March, the co-founder of advanced biofuels producer LS9, Professor George Church of Harvard Medical School, said that his two-man research team at Harvard had synthesized an artificial ribosome, a "biological machine" or "cell engine" that is found in every living organism and is the biological manufacturer of proteins.

The Church breakthrough made possible the development of new, artificial "designer" enzymes for cellulosic breakdown, as well the as the possibility of artificial life itself. Church downplayed the "artificial life" angle himself in comments with reporters, saying only that it was only an important step in that direction, that a ribosome was an essential component in a synthetic life form.

However, the researchers have developed a means of synthetically replicating proteins in lab dishes, and successfully synthesized luciferase, the protein that causes fireflies to glow, in a test. A potential benefit of such study is the development of cellular life that contains higher lipid or starch content for biofuel production, or converts a higher range of light wavelengths to plant energy and competes with solar thin-film photovoltaic cells in solar efficiency.

The breakthrough has not yet been reported in peer-reviewed academic journals, and is part of Church's Harvard research, not IP owned by LS9.

Links:
[1] http://biofuelsdigest.com
[2] http://blogs.discovermagazine.com/80beats/2009/08/24/synthetic-life-by-the-years-end-yes-proclaims-craig-venter/