

Researchers make the case that modern life sprang from early mega-organism

November 28 2011, by Bob Yirka

(PhysOrg.com) -- A lot of work has been done over the years to nail down the origins of life, with much speculation given to whatever first bit of "life" appeared from what was before, nothing but non-living material. Unfortunately, evidence of such life has long vanished leaving researchers to try to piece together what might have happened afterwards by rewinding the genetic tape so to speak.

To that end, Michael Marshall, in a piece in <u>New Scientist</u> has synthesized the current thinking regarding a so-called mega-organism that is thought by many scientists to have existed some 2.9 billion years ago (more than a billion years after <u>life</u> is first thought to have appeared on Earth) and which split into three main parts, each of which led to one of the three main types of life now in existence on the planet.

Marshall spoke with Gustavo Caetano-Anollés of the University of Illinois, one of the leading authorities on the mega-organism known as LUCA, who suggests the multi-celled organism virtually filled the oceans and lived as sort of a single entity where individual cells traded useful traits back and forth rather than competing with one another. At some point, he says, LUCA split into three separate groups of celled organisms: bacteria, archaea and eukaryotes, the last of which is suspected of giving rise to all the plants and animals alive in the world today.

To figure out the composition of LUCA, Caetano-Anollés studied modern proteins - going on the assumption that if one or more could be



found that are common to virtually all forms of modern life, the odds would be good that it existed in LUCA as well, seeing as how research has shown that the basic structures of most proteins change little over time even as their genetic structure does. Caetano-Anollés found that five to eleven percent of those he studied appeared to be universal, which he then theorized meant that they were likely present in LUCA as well.

Then, because the types of proteins that were found to be universal were the kinds that are able to break down and extract energy from nutrients, Caetano-Anollés suggests that LUCA was able to do so as well, which seems only logical as its doubtful the mega-organism would have been able to exist without such a capability.

Marshall then contends that the cells that made up LUCA likely also had cell walls, and backs up his assertion with results found by previous research which has also found that the cells were likely compartmentalized, but lacked DNA; instead noting that it was likely RNA that such cells used to store information that could be passed on to offspring.

What's most notable, however, is the combined work of many researchers that suggests that the <u>cells</u> that made up LUCA shared information rather than competed to thwart one another, in sharp contrast to how so much of the biological world operates today.

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