The Big Bang, the Milky Way, and the Cradle of Life

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The theory that Life—or at least some of its components—might have been originated before the formation of our Solar System is not new. There are indications that archaic forms of life could have evolved inside the heart of asteroids and comets rather than on the surface of the primordial Earth (Hoover 2011). Data are still controversial and further evidence is of course needed, but the alien life hypothesis is certainly worth exploring. This finds confirmation in recent laboratory findings, which suggest that a wide range of nucleobases may have been present in meteorites (Callahan et al. 2011).

Rhawn Joseph and Chandra Wickramasinghe's article, however, leads us to an original and innovative suggestion. Not only the Earth should no longer be considered the cradle of Life, but our Solar System too should not be regarded as the place where the ingredients of Life were synthesized for the first time. In fact, if the Authors were correct in dating the appearance of the first gene nearly after the Big Bang, then primitive organic structures capable of self-replicating would have been existing very long before our Sun began to burn. Still, if the Sun and the Planet Earth have to be regarded as unexceptional rather than special places, what region of the Universe could now aspire to be the cradle of Life? Probably the very special place should be the Milky Way. According to the dating technique based on the accumulation of Beryllium, our Galaxy is supposed to be born approximately 200 million years after the Big Bang (Pasquini et al. 2004). It seems, therefore, that the Milky Way could have been one of the first galaxies to populate the Universe.

The exact process of galaxy formation is not clear as yet but, if the supporters of the extra-terrestrial abiogenesis theory are correct, then the development and the growth of the Milky Way had to play an important role in the origin of Life. Unfortunately this point is not adeguately stressed by Joseph and Wickramasinghe, who seem to suggest that the Big Bang itself could have provided the essential elements for Life. In fact it was at least after the death of the first generation of stars that carbon and the other elements necessary for Life could be synthesized. Accordingly, the appearance of DNA and RNA could have happened with all probability inside our Galaxy hundred million years after the end of the Big Bang. In fact, all elements heavier than lithium are synthesized in stars and WMAP (*Wilkinson Microwave Anisotropy Probe*) data reveal that the first stars in the Universe arose about 400 million years after the Big Bang (WMAP Science Team 2011). Indeed the Big Bang settled the future environmental conditions for Life to emerge, however it did not produce any organic element. Hence the

question is whether or not the turbulent protogalaxy that was to become the Milky Way could have been a suitable place for the synthesis and the survival of primordial genes.

It is not known how long molecular components of DNA and RNA structures can last in the cosmic space, given that the harsh radiations coming from stars and explosions constantly expose genes to danger. However, the probability of finding out in the distant space conditions that favored processes of self-replications and evolution of genes through billions of years must not be high. These questions are still open, and only further investigations will be able to shed light on these crucial issues. In a sense, therefore, the linear consistency of the stastistical analysis given by Joseph and Wickramasinghe is at the same time the strength and the weekness of their article. If future discoveries do not show that primitive forms of life are able to survive and evolve out in the cosmos, we will have to admit that the rate of gene formation and replication is not constant through time and therefore their statistical analysis fails to provide a reliable trend of the mechanisms which led to Life as we know it. On the contrary, if new proof does definitely confirm the presence of traces of genetic material in the very ancient past of the Universe, we will be able to accept that the cradle of Life was in a spectacular and wondrous galaxy, our Milky Way.

References

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