



Photograph by Fernando Rincón

# On the origin of life

An incomplete scientific story

Monograph coordinated by Juli Peretó and Antonio Lazcano

«**T**he question of the origin of life is one of the fundamental problems of science.» Few would disagree with this statement by the Russian biochemist Alexander I. Oparin, pioneer in the scientific study of the transition from inanimate matter to the primitive forms of life. The naturalist and evolutionary approach to the problem of the origin of life on Earth enabled the experimental study, but it is amazingly complex, so it is impossible to tackle the issue from a single scientific discipline. Therefore, what we see is the paradigm of multidisciplinary studies, one that interests astronomers, geologists, chemists, physicists or biologists and can require observation and experimentation, as well as computational simulation and theoretical speculation. That is why, even if we do not create a comprehensive list, we should add mathematicians, computer scientists and philosophers to the army of scholars interested on the emergence of the earliest forms of life.

In this MÈTODE monograph we try to collect different scientific and philosophical approaches, as is common in the main international meetings on the origin of life or in the academic journals that yield the most important innovations in the field. Beyond specific details about the problem, the overall picture shows a very dynamic landscape where the frontiers of our ignorance move very quickly. The final goal is not to know exactly how life originated – an irreproducible historic event – but to outline a coherent narrative taking into account all the available information and data, verified experimentally, and explain how the transition from geochemistry to biochemistry came to occur more than 3,500 million years ago; an intellectual task that will never end.

**Juli Peretó.** Tenured Professor of Biochemistry and Molecular Biology and researcher at the Cavanilles Institute of Biodiversity and Evolutionary Biology of the University of Valencia (Spain). He has published several works on metabolic evolution, symbiosis, the problem of defining life or the history of ideas on the natural origin and the artificial synthesis of life. From 2014, he is a Fellow of the ISSOL (International Society for the Study of the Origin of Life).

**Antonio Lazcano.** Full Professor of the origin of life at the National Autonomous University of Mexico. He is the author of scientific papers and books on the early stages of the evolution of life and has a long career in science communication in written media, radio, and television. He is the director of the Lynn Margulis Galapagos Centre. He was the President of the ISSOL twice and was made an Honorary Doctor by the universities of Milan, Valencia, and Michoacán. Since 2014, he has been a member of El Colegio Nacional, the highest cultural and scientific distinction in Mexico. His current research interests include the chemistry of the origin of life and the use of phylogenomic databases to reconstruct the early stages of cell evolution.

The artist that illustrates this monograph is Rebeca Plana (Albalat de la Ribera, Spain, 1976). In the series «The origin of life», tensions overflow through intense stains, saturated colours and interference between pictorial planes. Her pictures hit our senses, as the rest of her paintings, and present a confessional character that conveys her experiences.

Rebeca Plana. *Untitled*, 2015. Mixed technique on linen, 160×190 cm.