

## Life Origin on Earth, Current Insights

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### Abstract

An enigmatic question of life origination on Earth is an open topic over long history globally. In this article, we discuss a great number of physics, chemical, biological and ecological factors that can explain the stability, competition and evolutionary of early earth environments.

**Keywords:** Human evolution; life-origin; RNA-world; systems biology; genetic information system; environmental ecology

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### Backgrounds

The enigmatic question of life origin on Earth is an open question for scientists of biomedical and other areas [1]. It has been greatly changed after Crick and Ogel setting foots on the question of life-origin on Earth by molecular-based hypothesis [2-5]. A great part of new hypothesis is still derived from modern physical, chemical, biological and ecological empirical knowledge and guesswork [2-13]. Apart from derivative arguments from Darwin's theory (gradual evolution), some molecular biology hypotheses have been more convincing since Crick and Ogel—including the evolutionary step of genetic duplication from prebiotic broths [4-5, 8], volcanic eruption from deep sea [6-7], extraterritorial living-form landing [9-10], cooperative biological origin hypothesis [11-12], motility of different biomolecules [13] and so on. In order to serve wider-ranges of interested people, a short insight is given.

### Driving Forces from Physical, Chemical, Biological and Ecological Factors

Physical, chemical, biological and ecological factor can all possibly change the course of life origin (Table 1 & 2) [13-14]. The more we study them, the more we can get the advancing understanding events several billion years ago. However, it is less important comparing with correct model selections for life-origin.

### Future Direction

A lot of creative ideas and experimental work can be debated and carried out globally. Multi-factorial modality and mechanism will greatly impact in upcoming life origin study-including growing mathematics, physics, chemistry modality [15-17]. It is not a question of biologists alone. It is a work of all people and may reach unexpected outcomes in the near future.

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Categories	Types of forces	Utility
Molecular	Molecular diversity	Supportive
	Molecular mutation	Evolution necessity
	Mutual co-existence	System stables
Temporary	Regulatory network	Process continuation
	Molecular dynamics	Variable mechanisms
	Mutual competition	Resource requirement
	Ecologic requirement	Energy saving
Spatial	Internal interactions	System & spatial conflict
	Time & climate change	System perfection
	Outside participation	External factors

**Table 1:** Evolutionary force of prebiotic progression for life-origin on Earth.

Physical Factors	Chemical or Biological Factors
Temperature	Inorganic material
PH values	Small molecular organic compounds
Humidity	Large molecular organic compounds
Space restrain and compartment	Biological molecules
Chaotic	Enzyme-like substances
Concentration	Single-cell or multi-cellular organisms
Density (space levels)	Nucleotide
Velocity (chaotic flow or speed)	Balance between synthesis and degradations
Geometric	Balance between life-origin & life-demise
Climate fluctuations	Ecological stability
Dynamics/balance	Eco-complexity

**Table 2:** Ecological study of early environments for life-origin.

## Conclusion

Life origin on earth is unknown to us. Certainly, besides biologists, scientists in other areas can also take part this research and finally offer their contributions.

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