



**Extraterrestrial
Institute**

Conclusions

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Key Takeaways

- The chemicals necessary for Earth's biochemistry have already been discovered in the interstellar medium, planetary atmospheres, as well as on the surfaces of comets, asteroids, meteorites, and interplanetary dust particles. In fact, the building blocks of life are not in short supply.
- Astrobiology can barely be separated from its cultural context, including philosophical, ethical, and theological aspects, because the discovery and continued study of extraterrestrial life will radically challenge our understanding of nature, including ourselves.
- Water is required for life on Earth as a solvent for biological activities. On terrestrial planets with a chemical make-up and temperature range similar to Earth, sufficient amounts of carbon and other elements may enable the creation of living beings.
- According to an analysis of organic chemistry, life, as a chemical system capable of Darwinian evolution, may exist in a variety of situations. These may be low-temperature nonaqueous solvent systems or even supercritical dihydrogen-helium mixtures.
- A key result here is that when one compares the rare-life versus common-life scenarios, the common-life scenario is always at least nine times more likely than the rare one. Kipping's study puts the squelch on the idea that intelligence may emerge in the cosmos at a very rapid rate.
- If humanity did not waste its potential on wars and division of the Earth, but was engaged in the development of technologies, then perhaps research in this field would be much more serious, so we suggest thinking and laying the foundations of the 5th industrial revolution these days in order to push the humanity forward to the unknown worlds.
- Astrobiology is quickly becoming a topic with active scientific and technical research. There has been a lot of interest in the numerous recent space missions to asteroids, comets, and other celestial bodies in search of alien primitive life.

Key Takeaways

- The mixture of gasses in the atmospheres of Earth-sized exoplanets could be seen for the first time by the James Webb Space Telescope, which was launched in 2021.
- A biosignature can serve as proof that there are living things outside of Earth, and it can be directly or indirectly found by looking for their particular waste products.
- Similar to biosignatures, which indicate the presence of life, whether sentient or not, technosignatures also indicate the presence of life. Radio broadcasts are sometimes left out of definitions by authors; however, this limited usage is not common.
- Both ground- and space-based platforms are used to conduct observational astronomy. Astronomers can then make sense of what they are seeing and develop a better understanding of how today's galaxies were created by using computer modelling.
- The most commonly used means of detecting extraterrestrial activity are gravitational waves measuring, spectroscopy, optical methods, planetary conditions modelling, Big Data ML-modelling for ET research, optical waves detection, and artificial life modelling.
- Scientists are now able to detect planets orbiting stars other than the Sun where life may exist, and living generations potentially could see the signatures of extraterrestrial life being detected.
- The search for extraterrestrial intelligence may become a focal point within the technological progress of humanity. Any evidence of carbon-based life form would redefine the scientific and technological approaches to humanity's industrial development. So, in any case, we need to think about it using first principle methods. In turn, the Extraterrestrial Institute set a goal to solve this problem with the help of data science and create a big data analytical system.