Complete Set of Nucleobases used in Life found in Meteorites

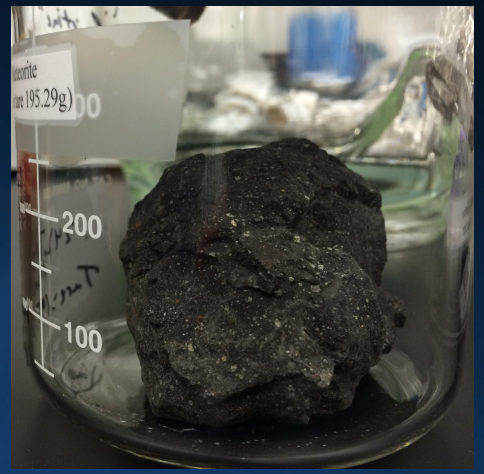
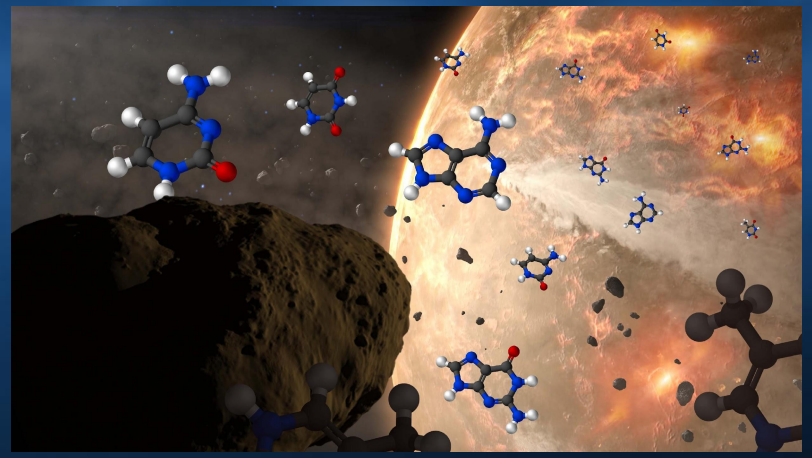


Photo of the Murchison meteorite used in this study. Credits: NASA



Asteroid delivery of nucleobases to the early Earth. Credits: NASA Goddard/CI Lab/Dan Gallagher

An international team of scientists searched for and found a wide diversity of purines and pyrimidines in three carbon-rich meteorites, including the entire set of nucleobases found in DNA and RNA used in life.

- Prior to this study, only three of the five nucleobases (adenine, guanine, and uracil) found in life had been identified in meteorites and it was a mystery why the other two (cytosine and thymine) had not been found.
- Using a new cool-water meteorite extraction technique, the pyrimidines cytosine and thymine were identified. These molecules are fragile and may have been destroyed in previous experiments that used hot acid to extract the meteorites.
- These results indicate that asteroids could have seeded the primordial Earth and other bodies in the solar system with all of the informational components of nucleic acids prior to the emergence of life.
- The study also provides a proof of concept for a more effective technique to extract information from asteroids in the future, especially from the samples of Bennu that will be returned to Earth next year by NASA's OSIRIS-REx mission.

Oba et al. (2022) *Nature Communications*