

Did the first cells evolve in soda lakes?

March 20 2024



Last Chance Lake in British Columbia, Canada is a modern analog for soda lakes that may have supported the emergence of cells on the early Earth. Credit: Zachary R. Cohen

Soda lakes, which are dominated by dissolved sodium and carbonate species, could have provided the right conditions for the first cells, according to a [new study](#) published in *PNAS Nexus*.

Early cells may have been composed of RNA inside [lipid membranes](#). But RNA function requires divalent cations such as Mg^{2+} , which disrupt primitive membranes made of fatty acids. The question arises whether the relatively low concentrations of Mg^{2+} found in soda lakes may have allowed both RNA and membranes to function together.

To explore this possibility, Zachary Cohen and colleagues collected water from Last Chance Lake and Goodenough Lake in Canada after seasonal evaporation. These soda lakes each contained ~ 1 M Na^+ and ~ 1 mM Mg^{2+} at pH 10. The authors found that spontaneous extension of short RNA primers occurred in [lake water](#) at a rate comparable to the rates in standard laboratory conditions.

The authors added [fatty acids](#), which could have been available on the early Earth, to the lake water to see if the molecules would assemble into membranes. The membranes formed in dilute water that simulates a rainfall event, and the membranes persisted even when surrounded by concentrated lake water from the dry season.

According to the authors, soda lakes on the early Earth could have supported key features of protocell development, with RNA copying and ribozyme activity taking place in the dry season and vesicle formation occurring during the wet season.

More information: Zachary R Cohen et al, Natural soda lakes provide compatible conditions for RNA and membrane function that could have enabled the origin of life, *PNAS Nexus* (2024). [DOI:](#)

[10.1093/pnasnexus/pgae084](https://phys.org/news/2024-03-cells-evolve-soda-lakes.html)

Provided by PNAS Nexus

Citation: Did the first cells evolve in soda lakes? (2024, March 20) retrieved 27 April 2024 from <https://phys.org/news/2024-03-cells-evolve-soda-lakes.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.