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11:00 a.m. – 12:00 p.m.
Houston Science Center (HSC), 102

An Autocatalytic Reaction Network that Produces Nucleotide Precursors



ABSTRACT: The formose reaction¹ is frequently cited as a prebiotic source of sugars and is considered among the most plausible forms of autocatalysis on early Earth. In this talk, our progress towards coopting formose autocatalysis towards the production of nucleotide precursors will be presented. Using HPLC, LC-MS, ¹H NMR spectroscopy and isotopic labelling experiments, we investigated how cyanamide, a simple C1 compound thought to be present on early Earth, affects formose reaction kinetics and product

distributions. Cyanamide was observed to extend the lag phase of the formose reaction by reacting with formose-derived sugars to form a variety of products, including 2-aminooxazole and 2-aminooxazolines, compounds of which are intermediates in proposed prebiotic nucleotide syntheses². In effect, cyanamide “peels off” sugars from the autocatalytic cycle, which nonetheless remains intact. The results of this work in the context of the chemoton model will also be discussed.

1. I. V. Delidovich, A. N. Simonov, O. P. Taran, V. N. Parmon, *ChemSusChem*, **2014**, 7, 1833.
2. M. W. Powner, B. Gerland and J. D. Sutherland, *Nature*, **2009**, 459, 239.

BIO: Albert received his PhD from Northwestern University in Organic Chemistry in 2013 under the mentorship of [Professor Sir Fraser Stoddart](#) investigating the molecular self-assembly and template-directed syntheses of artificial molecular switches and machines. Albert then moved to Boston to carry out research in origins-of-life chemistry as a postdoctoral researcher with [Professor Jack Szostak](#) at Harvard University and Massachusetts General Hospital. Thereafter, Albert spent about one and a half years at the Tokyo Institute of Technology with the Earth-Life Science Institute (ELSI) as an associate principal investigator before moving to UNSW where he is currently a senior lecturer at the School of Chemistry, director of the Australian Centre for Astrobiology and a member of the UNSW RNA Institute.

Host: Ognjen Miljanic, Chemistry

Persons who require special accommodations to attend this lecture should call 713-498-9703 as soon as possible.