

*Posters will be on Display for the Entire Week.
Presenters are Requested to be Present at Their Poster the Last Half-Hour Break of the Evening.*

**POSTER SESSION: SPECIAL SESSION IN HONOR OF JIM FERRIS:
FROM THE PREBIOTIC SYNTHESIS OF BASES AND POLYMERIZATION
TO RNA WORLD RESEARCH/CONCEPTS
Price Center Ballroom East**

Sawant A. A. Rajamani S.

[*Synthesis and Characterization of a Putative Pre-RNA World Ribonucleoside Precursor*](#) [#4221]

We describe chemical synthesis and characterization of a putative pre-RNA world ribonucleoside precursor and Oligomers of these ribonucleoside precursor are expected to preserve information transfer capability of RNA.

Bahn P. R.

[*Tetrahedral Chart of the 4 Commonly Occurring RNA Bases*](#) [#4019]

A useful heuristic device for learning the names, chemical structures, and 1-letter symbols of the four commonly occurring RNA bases was made by putting such information on the four faces of a tetrahedron, which can be used generate random RNA sequences.

Rodriguez L. E. House C. H. Callahan M. P.

[*Nitrogen Heterocycles in Miller-Urey Spark-Discharge Mixtures: Using Chemical Trends to Elucidate Plausible Pre-RNAs on the Early Earth*](#) [#4144]

We incubated 53 nitrogen heterocycles with spark-discharge mixtures and found that they react with only a handful of nitriles to yield adducts that may polymerize. Whether these adducts can form a monomer of Peptide Nucleic Acid was investigated.

Pérez-Villa A. Georgelin T. Lambert J-F. Guyot F. Maurel M.-C. Saitta A. M. Pietrucci F.

[*Molecular Modeling of RNA Nucleotides Under Hydrothermal Prebiotic Conditions*](#) [#4157]

We study ribonucleotides synthesis by ab initio molecular dynamics in combination with free-energy methods under hydrothermal prebiotic conditions. In addition, we performed NMR and MS experiments to complement the results from the in silico modeling.

Wang H. Y. Han D. X. Zhao Y. F.

[*Based on the Hydrothermal Sediment Samples in the Extreme Environment to Study the Origin of Life*](#) [#4010]

We demonstrate that amino-acid homochirality, as a unique feature of life, might have originated synchronously with the Genetic Code.

Kawamura K. Konagaya N. Maruoka Y.

[*Mineral-Mediated Chemical Evolution of RNA and Related Molecules Compatible with the Hadean Environments*](#) [#4048]

We show a possible RNA world scenario compatible with the Hadean environments on the basis of hydrothermal micro-flow reactor experiments associated with catalytic roles of minerals for the formation of RNA even under hydrothermal conditions.

Ertem G.

[*Role of Minerals in the Formation and Preservation of RNA Oligomers in the Events Leading to the Origin of Life*](#) [#4100]

Montmorillonite catalyses formation of RNA oligomers which serve as template for formation of complementary RNA oligomers. Minerals protect RNA and protein monomers from UV and gamma radiation demonstrating minerals' role in events leading to origin of life.

Rogers K. L. Burcar B. Ackerson M. Riggi V. Watson E. B. McGown L. B.

[*Early Earth Environments for an Emerging RNA World — More Widespread than Previously Thought?*](#) [#4206]

Expanding the potential for an RNA World, we show that several mineral catalysts, beyond montmorillonite, can catalyze the polymerization of activated 5'-adenosine monophosphate under high pressure conditions.

Tupper A. S. Shi K. Higgs P. G.

[*The Role of Templating in the Emergence of RNA from the Prebiotic Chemical Mixture*](#) [#4166]

If template-directed synthesis operates in the prebiotic mixture, strands with uniform chirality, monomer alphabet, and bond type will emerge. This leads to selection of uniform RNA at the level of oligomers before the origin of ribozymes.

Smith G. P. Fraccia T. P. Todisco M. Zanchetta G. Zhu C. Bellini T. Clark N. A.

[*Liquid Crystal Formation by Base-Pairing and Duplex Stacking of Mononucleoside Triphosphates in Aqueous Solution*](#) [#4185]

We observe for the first time duplex columnar liquid crystal order in aqueous solution of dATP/dTTP and dGTP/dCTP at high concentrations (~700 mg/mL) and low temperature (5°C). This sets up experimentation on natural self-ligating liquid crystals.

Smith G. P. Fraccia T. P. Todisco M. Zhu C. Bellini T. Walba D. M. Clark N. A.

[*Intricate Behavior of 4-Base NanoDNA Sequences: An Intersection Between Condensed Matter and RNA World*](#) [#4197]

As a bridge between ligation mediated by intermediate length nanoDNA oligomers and liquid crystals formed from single-base monomers, we pursue a general characterization of the self-assembly and phase behavior of particularly short 4-base DNA.

Hayden E. E. Smith G. P. Fraccia T. P. Todisco M. Bellini T. Clark N. A.

[*Liquid Crystal Phases of RNA Mononucleoside Triphosphates in Aqueous Solution*](#) [#4199]

Recently it has been shown that Deoxynucleoside Triphosphates (dNTPs) in aqueous solution form duplex base pair stacks that form columnar liquid crystal phases; here we investigate the self-assembly behavior of Ribonucleosidal Triphosphates (rNTPs).

Theis J. G. Smith G. P. Yi Y. Clark N. A.

[*Liquid Crystal Phase Behavior of Aqueous Mixtures of Sunset Yellow and a DNA Dodecamer*](#) [#4202]

We explore the molecular separation and partitioning of Sunset Yellow dye and self-complementary Dodecamer DNA molecules in stacked aggregates to exemplify a condensed matter route to chemical selection.

Lanier K. A. Kovacs N. A. Petrov A. S. Williams L. D.

[*The Ribosome: A Window in Time*](#) [#4189]

Our results support a model in which protein folding was an emergent phenomenon of interactions with RNA, and that the evolution of the ribosome was the maturation of the symbiotic relationship between RNA and protein.