

Tuesday, April 25, 2017

ORIGIN AND EVOLUTION OF LIFE: PREBIOTIC CHEMISTRY:

FUNCTIONAL BIOPOLYMERS II

1:30 p.m. Arizona Ballroom A-C

- 1:30 p.m. Francis B. R. * Watkins K. Kubelka J.
[Double Hydrogen Bonding between Side Chain Carboxyl Groups in Aqueous Solutions of Poly\(\$\beta\$ -L-malic acid\): Implication for the Evolutionary Origin of Nucleic Acids.](#) [#3005]
Experimental support is provided for the hypothesis that poly(β -D-malic acid) was the earliest evolutionary predecessor of the nucleic acids.
- 1:45 p.m. Switzer C. * Kim E.-K. Heuberger B. Shin D. Rico N. Vaidya S.
[Primitive Metallo Nucleic Acids](#) [#3688]
The presentation will explore the prebiotic and early biotic functional fitness of astrophysically plausible nucleobases capable of metal-ion-mediated base pair formation.
- 2:00 p.m. Biondi E. * Yang Z. Zhang L. Dasgupta S. Piccirilli J. A. Leal N. Benner S. A.
[Alternative Biopolymers in Early Evolution](#) [#3176]
We present the development of structural and molecular biology for an artificially expanded genetic system (AEGIS), and their application to in-vitro evolution.
- 2:15 p.m. Efthymiou T. * Gavette J. Stoop M. Krishnamurthy R.
[The Potential Emergence of "Homogeneous" RNA from "Heterogeneous-Backbone" Pre-RNA Scaffolds](#) [#3177]
Heterogeneous-backbone oligonucleotides may have served as pre-RNA constructs, pointing towards RNA and its homo-ribose sugar backbone as an emergent entity.
- 2:30 p.m. Wei C. * Pohorille A.
[Fast Vesicle Fusion Mediated by Hydrophobic Dipeptides](#) [#3231]
Extensive molecular dynamics simulations elucidate the kinetics and mechanism of fast fusion of fatty acid vesicle mediated by hydrophobic dipeptides.
- 2:45 p.m. Keating C. D. *
[Microcompartmentalization by Aqueous Phase Separation as a Step Towards Protocells](#) [#3218]
This presentation considers organic-rich droplets formed by aqueous phase separation as a path to "cytoplasm first" protocells.
- 3:00 p.m. Engelhart A. E. * Adamala K. P. Szostak J. W.
[Novel Properties Arising from Interactions Between Lipid Compartments and Biopolymers](#) [#3619]
Biopolymer catalysts exhibit novel behaviors when compartmentalized. We present demonstrations of such behaviors, which were of potential utility in early life.
- 3:15 p.m. Poudyal R. R. * Keating C. D. Bevilacqua P. C.
[Non-Enzymatic Polymerization of RNA Inside Complex Coacervates](#) [#3165]
We have explored complex coacervates as a model for membraneless protocells to facilitate prebiotically-relevant reactions such as non-enzymatic polymerization of RNA.
- 3:30 p.m. Tkachenko A. V. * Maslov S.
[Spontaneous Reduction in Information Entropy in Self-Catalyzing Heteropolymers](#) [#3550]
Within a simple theoretical model of autocatalytic heteropolymers driven by cyclic changes in the environment, we find an onset of Darwinian-like behavior.
- 3:45 p.m. *Coffee Break*