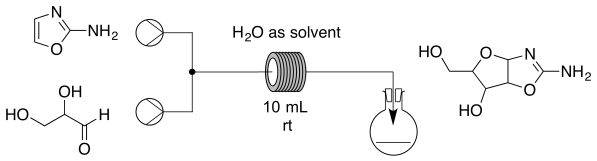
PREBIOTIC FLOW SYNTHESES OF CHIRAL NUCLEOSIDE PRECURSORS. A. C. Evans[1] and J. S. Kading[1], [1]Dept. of Chemistry and Biochemistry, California State University Fullerton, 800 N. State College Blvd., Fullerton, CA, 92832; amevans@fullerton.edu

Introduction: Under mild prebiotic batch conditions, glycolaldehyde dimer and cyanamide have been shown to react to form 2-amino-oxazole.[1] In the presence of racemic glyceraldehyde, this molecule can cyclize to form a precursor to (DL)-ribose/deoxyribose, the backbone of DNA and RNA.[1],[2] However, batch/flask conditions do not afford optimized continuous production of 2-amino-oxazole and its derivatives – and are not necessarily mimetic of the conditions that would have existed on prebiotic Earth. We here report a continuous processing (CP) approach towards the production of 2-amino-oxazole under ambient temperatures and pressures using water as solvent. Higher temperatures and pressures do not appear to impact yields; however, the presence of a base such as NaOH or KH_2PO_4 can have significant effect. Subsequent reaction of 2-amino-oxazole with (DL)-glyceraldehyde in water under CP conditions provides the ribo/arabino furanosyl amino-oxazolines in yields ranging from 29-68 %.



Scheme 1 - CP approach for nucleoside precursor generation.

It should be noted that the above reaction is depicted as an achiral process – the chiral batch optimization of this reaction has also been reported.[3] However, given the effects that supramolecular environments can have on chirality and the essentially chiral nature of life, we are interested in how CP approaches can be combined with supramolecular chiral influences to generate prebiotic asymmetry.

References:

[1] Powner, M. W.; Gerland, B.; and Sutherland, J. D. (2009) *Nature 459,* 239–242.

[2] Patel, B. H.; Percivalle, C.; Ritson, D.J.; Duffy, C.D.; and Sutherland, J.D. (2015), *Nature Chem., 7(4),* 301-307.

[3] Hein, J.E.; Tse, E.; & Blackmond, D.G. (2011), *Nature Chem., 3(9),* 704-706.