OLIGOMERIZATION OF HYDROXYMETHYLPYRIMIDINES IN AQUEOUS SOLUTIONS. K. E. Smith[1], C. H. House[2], J. P. Dworkin[3] and M. P. Callahan[3], [1]NASA Postdoctoral Program Administered by Oak Ridge Associated Universities, Greenbelt, MD 20771, USA, [2]Department of Geosciences and Penn State Astrobiology Research Center, Pennsylvania State University, University Park, PA 16802, USA, [3]Solar System Exploration Division and the Goddard Center for Astrobiology, National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, MD 20771, USA, E-mail: michael.p.callahan@nasa.gov.

Hydroxymethylated pyrimidines may have been abundant on early Earth because these compounds can be readily synthesized from a pyrimidine and formaldehyde under plausibly prebiotic conditions [1]. Previous studies have shown that 5-hydroxymethyluracil is highly reactive with various nucleophiles, resulting in 5-substituted uracils with various functional groups, and is capable of self-oligomerization [1,2].

Here, we investigated the oligomerization of 5-hydroxymethyluracil and 5-hydroxymethylcytosine in aqueous solutions. We characterized oligomers by means of direct infusion high resolution mass spectrometry and liquid chromatography coupled to UV detection and high resolution mass spectrometry. We report that oligomers as large as octamers were detected and some oligomers contained both uracil and cytosine, which might make the storage of sequence information possible (in a manner similar to that of DNA and RNA), and may represent the first steps towards the development of simple informational polymers.

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