

2016 Research Week Proposal

Title – A Reexamination of the 1953 Urey-Miller Experiment

Program of Study – Biomedical Sciences

Presentation Type – Print Poster

Mentor and Mentor's Email – Dr. Michael Korn (mrkorn@liberty.edu)

Students and Emails – Matthew Anderson (manderson207@liberty.edu); Samuel Lakey (sclakey@liberty.edu)

Category – Experimental (Basic)

Abstract: This research project examines the evidence and procedures of the famous 1953 Urey-Miller experiment. The Urey-Miller experiment was based on what evolutionary scientists believed was the formation of amino acids, which began the evolutionary process from which modern life came into being. The original experiment used methane and ammonia as the reagents in the reaction in the presence of an electric discharge, since this was believed to have comprised what a prebiotic atmosphere on earth would have been, with occasional lightning storms. Since then, other researchers have used different combinations of gases in a similar experimental procedure, as the proposed models of the atmosphere on earth has changed multiple times. The research conducted at Liberty University builds upon the basis of one of these follow-up studies, the Cleaves model, which details the synthesis of amino acids uses an atmosphere of nitrogen and carbon dioxide gas. In this study, a large 3L flask with electrodes was evacuated and about 100 torr of both CO₂ and N₂ gases were placed inside with 100mL of water. An electric discharge was generated in the flask by using electrodes, which reacted the gases for 48 hours. The products from the reaction were then analyzed using various techniques including two-

dimensional thin-layer chromatography (2D-TLC), high-performance liquid chromatography (HPLC), and a polarimeter to determine optical rotation of any amino acids produced. In addition to these tests for amino acids, we purpose to use additional tests to determine the presence of any sugars, like ribose that would be needed for the development of nucleic acid, the genetic material in living organisms. Future goals for this research would be to establish a simple laboratory procedure that could be replicated in an undergraduate organic chemistry lab for use at Liberty University and other schools interested in this area of research.

Christian Worldview Integration: From a Christian perspective, the debate over the origin of life is essential to our faith. Christian scientists believe that scientific evidence points to an all-powerful, holy Creator from whom life began. Integrating a biblical worldview into this research has provided the distinct opportunity to follow up on previous research completed from an evolutionary perspective with unique research from a Creationist perspective. Most research completed in this area of “prebiotic” chemistry is conducted with an evolutionary standpoint, so by promoting research in this field, Liberty University has set itself apart as a research institution that is open to exploring a wide variety of sciences, while maintaining the worldview that is essential in the Christian faith. While the goal of this project was not to prove that our world was created by a supernatural being, it does give us as Christians the ability to see some of the flaws in the conclusions of the original Urey-Miller experiment. Christian scientists can examine the same results for any type of study, but come to a very different conclusion than what their evolutionary counterparts would. This is founded in the basis that evolutionists and Creationists have different assumptions on the world and some of the laws that govern it. A Christian worldview also affects how scientists present this research. The goal of this research is to

examine both the strengths and flaws of the Urey-Miller experiment. By looking at the evidence presented through this experiment critically, a Christian should be able to directly apply this research into forming and strengthening his or her worldview.