

HAMPTON UNIVERSITY HOSTS DR. SIDNEY ALTMAN

Hampton University's *All-Campus Honors Fall Event* is an annual event hosted by the Honors College. This year, the Honors College was happy to join efforts with the Department of Chemistry to present the distinguished molecular biologist and 1989 Nobel Prize recipient, Dr. Sidney Altman, who is recognized for his discovery of Ribonuclease and the catalytic properties of Ribonucleic Acid (RNA).

A very humble Dr. Altman began taking his audience on a journey through time, beginning over four billion years ago. Dr. Altman discussed the formation of Earth through a progression leading to a stable hydrosphere. He stated that the physical and chemical properties of the early world were quite unique,



and confidently added that four billion years ago the atmosphere contained almost no oxygen and the ocean was acidic. He proved that science is understood through imagination, posing questions as to how the sky might have looked or what the early climate of Earth might have been, how much oxygen, methane, and CO₂ there was in the atmosphere, what electrical discharge would occur in that climate and time. Dr. Altman shared a bit about pre-biotic chemistry, briefly discussing the pre-RNA world, then progressing into the RNA world, and

arriving at the first DNA, only to double back in time again to explore RNA, which is the study that gained him notoriety for his research in molecular biology.



Dr. Altman (center) stands with the sophomore physics class of Hampton University
Photo courtesy of AIP

In 1989, in an effort to describe the evolution of life by focusing on the discovery of Ribonuclease and the catalytic properties of Ribonucleic acid (RNA), his research earned him the Nobel Prize in Chemistry. Dr. Altman theorized that prehistoric RNA was the catalyst of life through RNA-processing nucleases. Nucleases are enzymes capable of cutting the phosphodiester bonds between nucleotide subunits. In RNA, Ribonuclease (RNase) is a form of nuclease that catalyzes the degradation of RNA into smaller components. RNase is commonly seen when dealing with the maturation of RNA molecules. RNase P is a form of RNase that cuts RNA and is extremely unique compared to the other RNases because it is a ribozyme. A ribozyme is a ribonucleic acid that acts as a catalyst in the exact same way a protein based enzyme would act. The main function of RNase P is to cut off any extra sequences of RNA on a

tRNA molecule. In bacteria, like *E. coli* for instance, RNase P has two components. There is an RNA chain, known as M1 RNA, and a polypeptide chain, which is also protein, known as C5 protein. *In vivo* it is necessary for both of these components of the ribozyme to function properly. However, *in vitro* M1 RNA can act alone as a catalyst.¹ It is this catalytic property which Dr. Altman believes allows us to have life today.

As he continued in his presentation, Dr. Altman spoke in depth on the components of RNA: phosphate, ribofuranose, adenine, guanine, cytosine, and uracil, demonstrating the passion with which he has worked since he was a young boy growing up in Canada.

One sophomore physics major, Guy Jackson, was very inspired by Dr. Altman's life. He shared his enthusiasm with this statement:

As I listened to Dr. Sidney Altman, I was very astonished as to how much he knew about messenger RNA. He was very inspiring – not because of the awards that he received, or the amount of time and patience that he put in conducting experiments, but because of how well-rounded he is as a scientist. He inspired me to become a well-rounded scientist myself. Some scientists don't seem to remember that even though each living organism has its own DNA and exists as a complete individual, in reality everything is connected. For example, Dr. Altman didn't just talk about RNA, he expounded on how RNA could have possibly come about. Science is not just studying one field or another, but rather studying how everything in the world is connected; and in order to understand one simple part of anything in this life, we have to understand how it all combines.

This annual event also recognized student nominees from departments campus-wide, who have demonstrated that they, too, possess the potential to one day become Nobel Laureates.

From the Department of Physics, Mr. Thoth Gunter, was recognized as *Worthy of Nobel Nomination*. Thoth is a sophomore earning a 3.9 GPA, having research experience in nuclear physics at Jefferson Lab in Newport News, VA and at the Massachusetts Institute of Technology,

as well as heartily engaging in SPS outreach activities. Just as Dr. Altman was an honor to have as a guest presenter at Hampton University, so is Thoth an honor to have as a student.

Dr. Sidney Altman is a captivating researcher who is passionate about his work. He is well deserving of his esteemed title of Nobel Laureate.

A report of the Hampton University Chapter of The Society of Physics Students



Potential Physics Nobel Laureate Thoth Gunter (left) is recognized

Photo courtesy of AIP

ⁱ “Ribonuclease” <http://en.wikipedia.org/wiki/Ribonuclease>