

Illinois Alumni News

Published by the University of Illinois

Volume 44, Number 7

November 1965

Spiegelman Team Accomplishes 'Dream Experiment' in Biology

Under the date of Thursday, Sept. 30, the University Calendar listed various doctorate examinations, seminars, colloquia and other events, including a microbiology lecture by Prof. Sol Spiegelman.

At 4 p.m. in 228 Natural History Building, the notice read, the professor would speak on "The Synthesis of a Self-Propagating Infectious Nucleic Acid."

Well ahead of 4 o'clock, students and faculty members were converging on the lecture hall. When the hour arrived, the crowd, made up largely, it seemed, of undergraduates, filled all the 356 seats, clogged the aisles and still was funneling into the doors, so that Prof. Spiegelman could hardly make his way into the room.

Thus it was the campus greeted the first public platform appearance of the University of Illinois microbiologist following announcement the day before that he and co-workers had accomplished a "dream experiment," the synthesis of a self-duplicating entity in a test tube.

Wide publicity given the announcement was responsible for the crowding of the lecture room; there were even headlines talking about "life created in a test tube," which Prof. Spiegelman disavowed.

A Nod to Dr. Haruna

The team had produced synthetic material in which virus ribonucleic acid (RNA) can reproduce itself indefinitely, but it had not started from scratch. It had succeeded in starting within a test tube a process that previously had been possible only inside a cell, thus opening new opportunities for biological research.

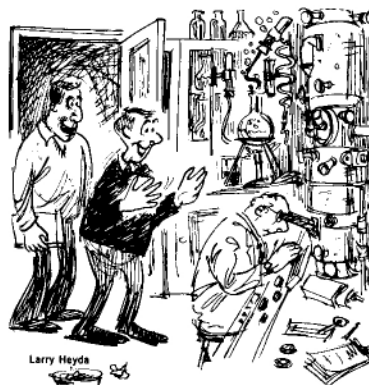
Prof. Spiegelman began his lecture with a salute to the members of his research team, especially Ichiro Haruna, "whose patience, courage and skill made these experiments possible." (Not everyone, he said, can indulge himself in the pleasure of doing his own laboratory work.)

Then, with one interruption by campus police who, amid catcalls and hissing, insisted on clearing the aisles as a safety measure, the University scientist proceeded with a lucid explanation of his labora-



Dr. Sol Spiegelman

The Plea Was Premature



"Say, Dr. Spiegelman, can you make us a couple redheads?"

—Cartoon by Larry Heyda '66 in SDX's annual Homecoming paper, Illini Tumor

tor's most recent accomplishment.

Initial announcement of the research advance came in a report by Dr. Spiegelman in the September issue of the Proceedings of the National Academy of Sciences, and he gave a further report at the academy meeting in Seattle Oct. 13.

The announcement was that he and his co-workers had synthesized a self-propagating, infectious ribonucleic acid.

Ribonucleic acid, commonly referred to as RNA, is the material of which the genes or reproducing molecules of certain viruses are

composed. Starting with a copy of a viral RNA, new RNA is synthesized which can in turn direct formation of genes and reproduce indefinitely.

"For the first time, a system has been made available which permits the unambiguous analysis of the molecular basis underlying the replication of a self-propagating nucleic acid," the investigator said.

The work was carried on in the Department of Microbiology of the School of Life Sciences, a unit of the College of Liberal Arts and Sciences. Grants from the U.S. Public Health Service, the National Cancer Institute, and the National Science Foundation supported the research.

Three postdoctoral and one doctoral student were coauthors of the report.

Dr. Haruna, on leave from the Institute for Virus Research of Kyoto University, Japan, has been working with Dr. Spiegelman on the project for three years.

Others on Team Named

With him during the past year were Prof. George S. Beaudreau, who has returned to the department of agricultural chemistry at Oregon State University; Ian B. Holland, on leave from the department of genetics of the University of Leicester, England; and Donald R. Mills of Bloomington, Ind., doctoral student at Illinois.

Dr. Spiegelman explained in the article how he mixed precise quantities of a pure enzyme, four triphosphates, and RNA virus genes, terminated the reaction with an ice bath, and then filtered and washed the precipitate seven times.

A few of the RNA molecules which grew in the first test tube were transferred to a second, from there a few to another, and so on for 15 test tubes. Dilution of the original material in the 15th was such that less than one molecule of the original was present.

A standard test showed that this last tube, and the others, contained viral RNA molecules which had reproduced in the synthetic mixture.

The virus Dr. Spiegelman used reproduces through an RNA
(Continued on Page 13)

Spiegelman . . .

(Continued from Page 1)

molecule. For other forms of life, and some viruses, reproduction involves both RNA and a similar substance termed DNA—deoxyribonucleic acid. The scientist predicts that methods soon will be developed which will apply to the DNA viruses also.

The University of Illinois man has been a leader in the exciting scientific field of genetics research, where he was one of the first to discover and demonstrate the role of ribonucleic acid (RNA) as the messenger for genetic information. His more recent discoveries were in keys to the genetic messages carried by RNA.

A professor of microbiology here since 1949, he has been a member of the University's Center for Advanced Study since 1964.

Dr. Spiegelman, who was born in New York City in 1914, studied at the College of the City of New York, Columbia University, and Washington University in St. Louis, where he was a member of the faculty.

He was honored last May by election to the National Academy of Sciences, received the Pasteur Award of the Illinois Society for Microbiology in 1963, was Jesup Lecturer at Columbia University in 1963, and this year delivered the Ciba Lecture at Rutgers University.