

C00-1633-27

STRUCTURE AND SYNTHESIS OF SMALL VIRUSES
AND THEIR COMPONENT PARTS

Progress Report

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Progress Report Abstract

During the period February 16, 1973 to February 15, 1974 studies involving the structure and mechanism of action of small RNA viruses were continued.

The in vitro synthesis of Q β coat protein provided a very useful system towards clarifying the mechanisms involved in the post-translational cleavage of fMet residues normally associated with protein synthesis in E. coli. Expanded studies are now underway involving the replicase of Q β as a result of our isolation of an amber mutant which is capable of causing the overproduction of this enzyme.

Extracts from wheat embryo have been shown to be very useful to study the translation of the RNA components of brome mosaic virus. The wheat system has now been extended to study heterologous messengers, such as Q β RNA. In the case of Q β RNA, fidelity of translation was observed although the efficiency of translation was much lower than when the monocistronic BMV coat protein message was used.

An evaluation of evolutionary pressures with respect to the extensive secondary structure in mRNAs was also summarized.

This report describes work done for the Atomic Energy Commission under Contract # AT(11-1)-1633, in the laboratory of the principal investigator Professor Paul Kaesberg. During the period covered by this report the principal investigator devoted approximately 25% of his time to this project. He is expected to continue at this rate.

Most of the work done on this project during this period has resulted in publications and, in accord with A.E.C. instructions, the information contained therein is not repeated here; instead, copies of these publications are enclosed:

C00-1633-28 Implications of Secondary Structure in Messenger RNA. Ball, L. A. J. Theor. Biol. 36, 313 (1972).

C00-1633-29 Translation of Brome Mosaic Viral RNA in a Cell-Free System Derived from Wheat Embryo. Shih, D. S. and Kaesberg, P. Proc. Nat. Acad. Sci. 70, 1799 (1973).

C00-1633-30 Amber Mutant of Bacteriophage Q β Capable of Causing Overproduction of Q β Replicase. Palmenberg, A. and Kaesberg, P. J. Virol. 11, 603 (1973).

C00-1633-31 Translation of Virus Messenger RNA: Synthesis of Bacteriophage Q β Proteins in a Cell-Free Extract from Wheat Embryo. Davies, J. and Kaesberg, P. J. Virol. 12, 1434 (1973).

C00-1633-32 Cleavage of the N-Terminal Formylmethionine Residue from a Bacteriophage Coat Protein *In Vitro*. Ball, L. A. and Kaesberg, P. J. Mol. Biol. 79, 531 (1973).