OPENING REMARKS TO THE TRANSLATION SECTION

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Looking over the lecture program of this session shows two things. Many of the problems of in vitro protein synthesis have been addressed but in not one of these cases has tumor virus RNA been used. This fact reveals that although there is a general awarness of the significance of in vitro protein synthesis for studying gene expression of tumor viruses, the experimental approach to this field is still being sought.

Tumor viruses do not stop the protein synthesis of the infected cell. Thus, there are only two ways to study their genetic information and its expression. First, one can look at the effects of using a conditionally lethal (temperature sensitive) mutant of the virus. Second, one can attempt to find proteins encoded for on the virion RNA by in vitro translation.

The first question is, can the virion RNA act as a messenger or does a messenger RNA, complementary to the nucleotide sequence of the virion RNA, have to be synthesized in the cell. We have been able to show (1) that at least some of the structural proteins of AMV are encoded on the virion RNA. Similar results for various other tumor viruses have been reported (2, 3). On the grounds of theoretical considerations (1) the conclusion seems justified that in tumor viruses the whole genetic information is present in the form of messenger RNA.

Surprisingly, the cited results have been found in a heterologous system, namely in cell-free extracts of E. coli. To date it has not been possible to develope a well functioning in vitro system out of the actual host cells of the tumor viruses. It is conceivable that in the heterologous system it will become possible to answer the next important question: are there encoded on the RNA non-structural proteins which are perhaps involved in the transformational process? Or in other words, does the synthesis of virus-specific proteins lead to the expression of the so-called oncogenes?

A further set of questions which need to be mentioned in closing can only be answered in a homologous but not a heterologous system. It would be important to know if special (perhaps specifically inhibitable) initiation or elongation factors are involved in the translation of viral RNA, or if specific tRNA species are required, etc.

Some of the following contributions, although not concerned with tumor viruses, show how such studies can, in priciple, be performed. Others show how an in vitro system can be made using material isolated from various sources and what it is able to do. If, through these contributions and their discussion, we can come only a step closer toward creating a homologous system, then we can be quite satisfied.

Literature:

1 Siegert, W., Konings, R. N. H., Bauer, H. and Hofschneider, P. H., Proc. Nat. Acad. Sci. U.S. *69*: 881 (1972).
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