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SUBJECT OF INVESTIGATION

GENETIC ANALYSIS OF MICROORGANISM BY MIXED INFECTION OF ACTIVE PHAGE PARTICLES AND PHAGE OR BACTERIAL DNA,

RESPONSIBLE INVESTIGATOR

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In the previous experiment, it could be known that S. gallinarum doubly infected with active phage a10s particles and purified DNA extracted from phage a1 could yield a few recombinant type phages between a10s and a1 besides a majority of normal a10s progeny phages.

In this case it must be mentioned that phage a10s is unrelated with a1, the donor phage of DNA sample, so that there are no probability of occurrence of such recombinant type phages from the double infection of a10s and also active a1 phage particles, if any, survived in DNA sample.

On the other hand, among such newly obtained recombinant type phages there some particles endowed with the ability of lysogenic conversion of salmonella O(T) antigen which is one of genetic character of a1, the donor phage of DNA, but not of phage a10s.

My chief research required in this Contract is the genetic and chemical analysis of the genetic factor concerning the lysogenic conversion of salmonella O(T) antigen by mixed infection method of active other phage particles and DNA sample extracted and purified from phage a1.

Before setting forth research on this line, I believe, it will be more fruitful in future experiment to clarify much more genetic markers of a1 phage, the donor of DNA, and a10s phage or more precise relationship between both phages.

On this viewpoint, I have just started my research by the study on the analysis of another genetic character of phage a1; the host controlled variation observed in this phage cultured through one of its sensitive host bacteria.

Here is summarized the results of experiments carried out during the past two months.

1) The phage a1 cultured by Sg, one of strain of Salmonella gallinarum--a1(Sg)--forms plaque on indicator Sg in good efficiency of plating, e.o.p., but can not form plaque in such a good e.o.p. on indicator S4S, one of the delysogenized strain of S. typhimurium S4.

The proportion of plaques on S4S formed by a1(Sg) to those of the same phage on Sg is about 10^-5.555.

2) On the other hand, the phage a1 cultured by S4S-a1(S4S)--can forms plaque on S4S almost in the same good efficiency as well as on Sg.

3) This restricted phage a1(Sg), however, can also adsorb to indicator S4S but in a little lower rate than that to Sg. Its K value, velocity constant of adsorption to indicator S4S and Sg are 4.7 X 10^-10ml/min and 2 X 10^-10ml/min respectively.

4) Whether DNA of a1(Sg) phage is or is not injected into S4S cell will be a future problem. However, it seems to
occur also in this case since at least 5 minutes after adsorption of a₁(S₂g) onto S₄S the superinfection of a₁(S₄S) is mutually excluded.

5) The analyses of the fate of DNA of a₁(S₂g) injected into S₄S will be carried on by several methods.

Of course the mixed infection of S₄S with DNA extracted from a₁(S₂g) and active phage particles of a₁(S₄S) will be attempted.