

June 16, 1952

REPORT ON RESEARCH PROJECTS
for the
FISCAL YEAR 1951-52

I. Name LEDERBERG J. Dept. GENETICS Proj. No. 51:308

Title Bacterial Genetics

II. Personnel: **Elise Cahn** (now transferred to another dept.)
Ethelyn Lively (part)
Phyllis Fried (graduated, M.A. 1952)
Norton Zinder (part) (graduated, M.B.A. 1952)

III. Statement of other financial support, if any:
Atomic Energy Commission \$ 1500
National Institutes of Health \$ 4320
Army Chemical Corps ca \$ 5000 (prorated for '51-52)

IV. Brief statement of specific progress made during the year:

Genetic recombination in Salmonella has been found to take place by a new mechanism. Virus particles grown on one strain may transfer genetic material (chromosomal fragments) to another. New types of Salmonella have been synthesized by hybridizing S. typhi X A. typhimurium.

In Escherichia coli, genetic factors which control sexual compatibility have been discovered, making it possible to control crosses, and to achieve much higher frequencies of sexual mating. So far, no cytological correlate of mating has been found, suggesting that this is a simple process uncomplicated by any special fruiting structures as claimed by other workers. The chromosomal mechanism has been further clarified, but is still quite complex. However, there are probably two, rather than just one chromosome.

Lysogenicity (latent virus growth) has been studied by crossing methods. A single chromosomal gene controls the growth of the virus. It is reasonably probable that the virus is actually fixed on the chromosome while it is latent. This is further evidence for an especially close relationship between virus growth and nuclear function.

A new method (replica plating) has been developed for handling large numbers of bacterial clones, and has been applied to a rigorous proof that adaptive mutations of bacteria are spontaneous, and selected by the environment.

V. Publications that have appeared in print during the present fiscal year:

Lederberg, J., Prevalence of Escherichia coli strains exhibiting genetic recombination. Science 114: 68, 1951 (July)
Lederberg, J., and Lederberg, E.M., Replica plating and indirect selection of bacterial mutants. J. Bact. 63:399, 1952 (March)
Lederberg, J., Lederberg, E.M., Zinder, N.D. and Lively, E.R., Recombination analysis of bacterial heredity. Cold Spring Harbor Symposia Quant. Biol. 16: 413, 1951

VI. Manuscripts accepted for publication but not yet printed:

Lederberg, J., Cavalli, L.L., and Lederberg, E.M., Sex compatibility in Escherichia coli. Genetics, In Press.

Zinder, N.D., and Lederberg, J., Genetic exchange in Salmonella. J. Bact., In Press

Lederberg, J., Some biological aspects of bacterial genetics. Proc. 2d Natl. Cancer Cong. In Press

Lederberg, E.M., and Lederberg, J., Genetic studies of lysogenicity in Escherichia coli. Genetics, In Press

The pink copy should be returned to the Graduate School Office on or before August 1, 1952. The blue copy is for your file.

Lederberg, J., Cell genetics and hereditary symbiosis. Physiol. Rev., In Press