THE GRADUATE SCHOOL

UNIVERSITY RESEARCH COMMITTEE

REQUEST FOR RESEARCH SUPPORT FOR THE YEAR 1957-58 MUST BE IN THE GRADUATE SCHOOL OFFICE NOT LATER THAN JANUARY 17, 1957

(Please submit forms in duplicate)

Name Lederberg Joshua Date Jan. 14, 1957
Last First Middle Initial

Department Genetics

Title of project Genetics of Bacteria

---details in annual progress reports---

Results to date: 1. Phase variation in Salmonella depends on the alternation between active and inactive 'states' of a single gene.

2. Genetic factors of the host bacterium are 'transduced' by phage particles grown on it. The phage itself behaves as another such genetic factor.

3. Galactose-fermentation in E. coli follows the same enzymatic pathway as in man. Mutants affecting different enzymes have been found; some are homologous with the hereditary disease in man, 'galactosemia'. As a rule, mutants affecting the same enzyme show a genetic position-effect with one another, in accord with the popular conception of a unitary gene-enzyme relationship; however, some exceptions have been found and should be analysed further.

4. Penicillin inhibits the synthesis of the bacterial cell-wall, resulting in the production of wall-less protoplasts. The protoplasts can be cultivated, if embedded in agar media, to give what had been described as L-colonies.

Procedure - indicate the essential working plans: We plan to continue these studies along the same lines as now in progress. Additional facets are:

1. The attempted use of protoplasts as recipients for free DNA. Since they lack an rigid external barrier, they might be more amenable to the introduction of free chromosome fragments (i.e., DNA-mediated, rather than phage-mediated, transduction).
2. A search for mutants which are blocked in the biosynthesis of specific cell-wall components. One such mutant is already available, having been found casually by B. Davis, and requires diaminopimelic acid. In the absence of this compound, the mutant forms protoplasts. Such mutants would furnish specific bioassays for wall components like diaminopimelic acid.
3. Mr. Richter, who is completing an M.A. thesis on genetic mapping in E. coli, will work on a collaborative project with Prof. C. Heidelberger on 'genetic chemistry'. He will study the genetic effects of the incorporation of bromouracil and other purine-pyrimidine analgues into bacterial DNA.

Budget - (OVER)

Budget -

Staff* **# are incumbents**

Research Assistants (A $1920; Acad Yr $1600)

A	**# Tetsuo Iino**	**1920**
A	**# Alan Rx Richter (WARF fellow)**	**1920**
A	**# Robert E. Wright**	**1920**
A	**——**	**1920**

Other

7680

$

*List names only if it is fairly definite the person will be available; otherwise open positions should be indicated.

Hourly Help **For skilled undergraduate assistants approaching the calibre of graduate research assistants. Other funds are available to cover costs of routine dishwashing.**

$ 600

Supplies and Equipment

$ 720

TOTAL REQUEST

9 000