

UNIVERSITY OF CALIFORNIA

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BERKELEY 4, CALIFORNIA

October 7, 1955

Professor Joshua Lederberg  
University of Wisconsin  
Department of Genetics  
Madison 6, Wisconsin

Dear Dr. Lederberg:

Thank you very much for your interesting letter of September 26th.

Replica plating is a technique with which I was unfamiliar until, in a conversation held after my letter to you was mailed, Ed Adelberg suggested it as a good way of doing the sort of experiment that I had in mind. It is certainly an elegant method!

I very much appreciate your invitation to spend a month at Madison and believe that it might be arranged--but not until sometime in the latter half of the calendar year 1956. Unfortunately I must at the present time support myself almost entirely through the clinical practice of medicine; one of my grants pays me indirectly for one day a week, but the rest of the time I spend in the lab is on my own. I have used up all my leave and then some for the calendar year July, 1955, through June, 1956. But I can no doubt arrange to be away a month of the following calendar year; and I should like very much indeed to get some experience with the methodology of bacterial genetics.

In the meantime I will investigate the possibility of doing here the  $LAC^- + V_1^S$  experiment that you suggest. Quite possibly Ed Adelberg would be interested in collaborating on it. I am pretty busy and may not find it practical to divert the time involved, but I will write you again when I have worked on the matter a bit.

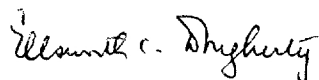
I agree that the question of the relative primitiveness of intra- vs. intercellular sexuality will not be answered by the discovery of the former in "vegetatively" reproducing bacteria. Actually I am interested in such phenomena more from the standpoint of a further understanding of bacterial nuclear behavior as such. The fragmentability of the genetic systems of those relatively few bacteria that have been studied and the displaceability of genetic material, presumably in "chromosomes", by (?) subchromosomal blocks of one or more genetic determinants (as with transforming principles and virally transduced material and as in the "coitus interruptus" phenomenon of Elie Wollman and his collaborator) mystify and intrigue me. Are there genetic messengers that communicate in an analogous way between nuclear bodies within the cell. And are their "crossing over" processes between these messengers and the homologous parts of the bacterial chromosomes such as occur between different related phages infecting a single cell? Are the virulent phages merely such messengers escaped from the more typical controls of the cell? And are they thus gene products having arisen originally in evolution as part of a "sexual" mechanism, but having developed a

October 7, 1955

certain degree of autonomous phylogeny? I dare say these questions are as tantalizing to you as to me, and quite probably you have more evolved ideas about them than I.

I shall have to give the terminology "parasexual" vs. "sexual" some thought. Actually I do not use the former term in my review on the origin of sexuality, but consider all phenomena in both categories as part of the broad spectrum of "sexuality". (Incidentally, I think that "parasexuality" in fungi is probably a secondarily derived mechanism in evolution, but I'm not sure. At the moment I'm toying with the idea of exploring the minute flagellates for comparable mechanisms. Chromulina pusilla, a marine chrysoomonad, is a wee critter of 1.5-2 $\mu$  in diameter, which grows to populations of  $1 \times 10^8$  in liquid media. So far, however, it has not been reared axenically (i.e., by itself) and has refused to colonize on agar surfaces).

Very sincerely yours,



Ellsworth C. Dougherty

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