

December 8, 1952

Doctor J. Crézé  
Professor of Bacteriology  
School of Medicine  
Angers, Maine et Loire,  
France:

Dear Professor Crézé:

Your letter of November 27 has just been received, and I have read it with great interest.

I am not sure that I have thoroughly understood your experiment. May I ask the following details?

1. I understood that *S. typhi* H-901 completely lacked a Vi antigen, and therefore could not be given a phage type. According to my associate, Dr. Spicer, who has worked in Dr. Felix' laboratory at Colindale, London, the H-901 is used as the type for non-Vi preparations! Similarly, Booy & Wolff (see below) rely on this in their study.

2. Exactly what temperature and time of treatment was used to kill the *S. paratyphi* B (Ranson).

3. How was T M isolated from the treated culture of T R? Is it that the latter is so rough that it agglutinates, while the T M grows in the supernate?

I ask these questions to determine whether your findings can be correlated with our own studies on so-called "transduction" in *Salmonella*. We have found that various traits can be transmitted from one culture to another by means of certain phages. As shown in the enclosures, these traits include not only various physiological characteristics, but also the H antigens. Dr. Spicer is now working on the transduction of O antigens. We have not yet considered the Vi antigen, but Booy and Wolff (*Antonie v. Leeuwenhoek*, 1952, 18:183-189) have reported the partial transmission of Vi antigen from *S. ballerup* to *S. typhi* H-901. I do not know how their phenomenon correlates with ours either. Our phages withstand one hour at 58° C., but are quickly destroyed at temperatures over 70°.

Our first studies have been published in the November, 1952, issue of the *Journal of Bacteriology*. As soon as possible, I will send you a reprint. Meanwhile, the enclosures may be of interest to you.

Yours sincerely,

Joshua Lederberg  
Associate Professor of Genetics

P.S. Have you seen also Anderson's paper, The significance of Vi-phage types F1 and F2 of *S. typhi*. *Jour. Hygiene* 49:458-470, 1951? He finds that the phage types can be modified  
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