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APT. 393, ALEXANDER HAMILTON BLDG.
DRUMMERS LANE, WAYNE, PA. 19087

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Dr. Joshua Lederberg,
Stanford University School of Medicine,
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Dear Joshua,

After our first work on "transmissible toxigenicity" we made other experiments which, as I recall, were mainly attempts to transmit toxigenicity to other species of bacteria. These led to nothing and we turned our attention to other, unrelated, studies.

In 1929 I left Johns Hopkins to join the Rockefeller Foundation group in studies of yellow fever. So far as I know, no one followed up our streptococcus work, at least to the extent of publishing pro or con. But my interest in the literature at that time had turned exclusively to yellow fever so that papers on scarlet fever or streptococci would have escaped my attention.

I infer from your letter that you might be interested in any missed leads or "postponed opportunities" and, at the risk of wasting your time I cite one from our yellow fever studies. Among the mosquitoes that harbor yellow fever virus for relatively long periods but, so far as is known, never transmit by their bite, is Mansonia titillans.

The late Dr. Nelson Davis, then Director of the yellow fever laboratory in Bahia, Brasil, marveled over this. I suggested that perhaps the saliva of the insect was virucidally acidic. Davis, who was very expert at dissecting out mosquito salivary glands, and I, spent a Sunday in the laboratory, he taking out dozens of salivary glands from M. titillans and I immediately macerating them in distilled water in La Motte "little cups", testing the pH with dyes like brom-cresol purple. The glands appeared quite acid. I believe yellow fever virus and other Group B Arboviruses have since been shown to be acid-labile. We had no better means of determining pH in those days in Bahia and no opportunity to conduct further tests, including controls on Aedes aegypti. We felt that our data were entirely/limited and preliminary to justify any conclusions. Perhaps similar physiological peculiarities could account for other entomological specificities in arthropod transmission of other pathogens.

With all good wishes and, as the Brasileiros say,

Saudações collegiaes,



Martin Frobisher