

PURDUE UNIVERSITY

BIOPHYSICAL LABORATORY

LAFAYETTE, INDIANA

Dec 1, 1955

Dear Joshua,

You probably have gone through the calculation we talked about by now, but anyway - 1. grow cells at level of 100 microcuries/microgram P 2. Coli contains about 10^{-9} micrograms DNA-P 3. therefore incorporate 10^{-7} microcuries/cell, or $4 \cdot 10^{-5}$ dis/sec/cell, and presumably transfer from Hfr to F around $5 \cdot 10^{-4}$ dis/sec/cell. This level is too low to count by geiger tube technique because of background which is difficult to reduce below 10 counts/min. Special techniques can go to still lower backgrounds but not to the level this experiment demands. The beauty of emulsions is that only "stars" are counted, i.e. multiple tracks originating from a single point (the cell), and these are readily distinguished from background. The level of activity in this experiment is well within the emulsion range.

Your proposed experiment interests me for two reasons. First, it may provide a test of the Levinthal et al model for crossing over. If crossing over does not require the incorporation of the parental chromosome then the Hfr DNA may be lost in those ~~cells~~ ^{clones} which form recombinants. Of course a negative result (retention of DNA) would not mean anything since the DNA may hang around as nonfunctional material or be broken down and efficiently reutilized. Second, it may tell something about the kind of material being transferred. If only nuclear DNA is transferred then stars should still form even if the F cells are disrupted before plating on the emulsion. Small molecular components (and RNA especially if RNAase is added) should not register. You probably have other reasons for thinking about this experiment.

In your diploids carrying Lp^r and Lp^s (which are immune to virulent lamda) do the infected cells still continue to segregate sensitives after infection? I would guess not. Also Benzer would like to find out if such diploids can grow his $T4r_{II}$. Would you be willing to test it if he sent the strain? The experiment is quite simple.

I will be off to CSH in a week to finish things with Dave. I hope we will be in a position to send you a complete story before long.

Please give my regards to Esther.

best wishes,

Alan