THE JOHNS HOPKINS UNIVERSITY
BALTIMORE 18, MARYLAND

McCOLLUM-PRATT INSTITUTE
INVESTIGATION OF
MICRONUTRIENT ELEMENTS

Sept 13

Dear Joshua,

First of all congratulations to the chairmanship at Stanford. With you, Kornberg & Yanofsky it's quite a place! – The meeting in Chicago was a success (although we missed you). There were no 'meatheads' talking for 1 hr about irrelevant things. All the talks were intense & concentrated.

During the transition period here I must get my own work (plus some of Kjosh.'s unpubl. obs.) published. The article will be rather long and in a way dull because it stresses methods. As you already know the results became much clearer after I dumped glucose out of the window (that is an exaggeration because you can't open windows in the clinical center!). The ~~generation~~ lag phase & generation time with glycerol as carbon source is of course much longer and I lost a good deal of my night sleep – but it was worth it. I may have told you that galactose in cons. of 1×10^{-5} mol ~~has~~ has a bacteriostatic effect on the growth of 3096 (transferase-less) which is quite dramatic (this is w. glycerol instead of gluc. as C source). After 14–18 hrs a "recovery" sets in which may be selection of mutants. Yet these suspected mutants are still dual neg. The analysis of this phenomenon is first on the program. Likewise I am curious to know the effect of galactose on 3096 on the burst size if infected with virulent lambda. – Another new observation: 4-epimerase is 10–20 times higher in the presence as in the absence of galactose in 3100, 3096, 3092 ~~[illegible]~~ – again provided glycerol is the C source.

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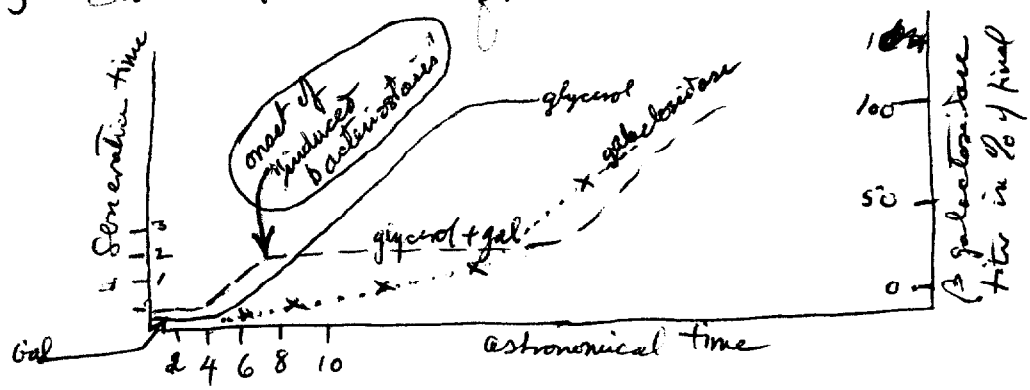
This is of course not surprising at all. In "Gal 3" (3264 & 3265) in the constitutive 4-epim. is about 50% (i.e. app. same order of magnitude) as that found in 3100 & 3096. However, add. of galactose in "Gal 3" does not give 10-15 times increase but only 50-75% of an increase (which may be within the limit of error*). "Gal 9" is of course complete devoid of 4-epimerase, const. as well as induc. The kinetics of galactosidase is also intriguing. In 3096 as follows:

Glycerol: 1%
Gal: 1×10^{-4} mol.



I suspect that in 3096 the gal kin. is almost operating as fast as gal permease & hence the conc. of free gal in the cell very low. Sufficient to induce gal kin. but insuff. to induce galactosidase until the acc. of gal-1-P (which is staggering) begins to inhib. the phosphorylation of gal & hence permit the free gal in the cell to attain higher values. This is born out of the fact that in 3100 & 3092 galactosidase increases (on a cellular basis) rapidly right from the beginning. More detailed & precise information later. — Phenol extraction of complex polysacch. (cell wall, somatic etc) showed no galactose (if any merely traces) which agrees with the fact that 3099 grows happily on glycerol without gal. — I am interested in mapping of 3099 with a Shigella. Perhaps Jacowsky's deletion mutants will also be helpful.

I am tired by now, will finish with lots of greetings to You & Esther.

Your Herman

*) We have found for instance that 4-epimerase conc. is going down to 30-40% in post-log phase as compared with the titer in the middle log phase.