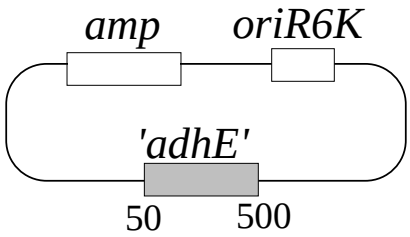
**Note: the following question is Q1 on Exam 3 from 1997**

**(the answer is posted under "old exams")**

The *adhE* gene is about 2000 bp. Nancy Maulen cloned a fragment corresponding to nucleotide 50 to 500 of the *S. typhimurium adhE* gene into the *pir*-dependent plasmid pGP704. [pGP704 has no homology with the *S. typhimurium* chromosome.]




- Why is this plasmid *pir*-dependent?
- What would happen if this plasmid was transformed into a *S. typhimurium adhE*$^+$ *pir*$^+$ strain with selection for Amp$^R$?
- What is the predicted phenotype of the transformants described in part b above? Why?
- What would happen if this plasmid was transformed into a *S. typhimurium adhE*$^+$ *pir*$^-$ strain with selection for Amp$^R$?
- What would the phenotype of the transformants described in part d above? Draw a diagram to explain your answer.