BC 378 **Problem Set #4**

The famously eccentric biologist Pool Greenwater has dedicated his life to the study of gene expression in mammalian cells, using mice as a convenient model system. In his favorite mouse strain, sqk49, Pool has found that the growth factor GRW causes proliferation of liver cells. Pool has recently developed some mutant versions of his mice with the following genetic changes:
sqk49-ΔIRP mice have a mutation in the gene encoding the iron response protein that completely blocks transcription of the *IRP* gene.
sqk49-FΔIRE mice have a deletion in the gene encoding ferritin that removes the IRE from the ferritin mRNA sequence.
sqk49-GRWΔAT mice have a deletion that removes a ATTTAATTTAATTTAATTTAATTTA sequence from near the 3' end of the *GRW* gene.

1. What effects (if any) would you expect the mutation in the **sqk49-ΔIRP** mice to have on the production of ferritin protein? Explain your answer, being as specific as possible.

2. What effects (if any) would you expect the mutation in the **FΔIRE** mice to have on the production of ferritin protein? Explain your answer, being as specific as possible.

3. Pool has noticed that he has trouble keeping his **sqk49-GRWΔAT** mice, as most of them die from liver cancer. Can you provide him a logical explanation for this observation? Please be as specific as possible.