Name:_____KEY_____ Dr. Reichler's Bio 325 TTh 7:30-9pm Fall 2007 Quiz 10/04

1) What about human DNA indicates the importance of regulating gene expression?
That about the same amount of DNA that codes for amino acids etc codes for regulatory regions.

2) What is a basic difference in regulation of gene expression between prokaryotic and eukaryotic cells?
In prokaryotes most of gene expression regulation takes place at the level of transcription, in eukaryotes in can occur at any of the steps between DNA and the protein. Also, prokaryotic genes are 'on' and can be repressed while eukaryotic genes are 'off' and need to be activated.

3) After a wound, what might be a change in gene expression that takes place over hours or days? (We did not directly discuss this in class)
There are several potential answers. Something having to do an immune response that takes several hours or days to be activated.

4) What is similar to a bacterial operon in eukaryotic cells?
rRNA.

5) If there were low glucose and low lactose, would the lac operon be transcribed?
No, without lactose the repressor binds to the *lac* promoter blocking transcription.

6) What would be the effect on a eukaryotic cell that lacked the enzymes for histone acetylation?
Gene expression would be reduced. Histone acetylation is needed to unpackage genes so that transcription factors etc can have access.

7) What would the sequence of a single strand of DNA that could potentially form four-stranded DNA?
Some four repeats of G's interspersed with a few non-G nucleotides.

8) What about the distribution of putative DNA quadruplex sequences indicates that they have a specific function in cells?
There are not randomly distributed in the genome. There are more common in telomeres and promoters.

9) How would understanding DNA quadruplexes help treat cancer?
Because of their involvement in telomeres, which need to be elongated for a cancer cell to keep dividing, and their presence in the promoters of oncogenes.

10) You are interested to see if two genes, pizzagood and tacosgood, are transcribed in response to the same stimuli. What information in DNA might help you determine this?
Look in the promoters and see if there are similar sequences that would bind to transcription factors thereby activating transcription.

11) Regarding question #10, in relation to the location of the gene, where would you expect to find this information?
Within a few thousand nucleotides of the transcription start site, or further away as enhancers.

12) We looked at data showing conservation and differences in alternative splicing. Give an example of each situation.
Alternative splicing is conserved in mice of different genetic backgrounds. It is different in male and female fruit flies and in different tissues, heart and kidney, of mice.

13) How can the data about conservation of alternative splicing isoforms in different individuals be useful in diagnosing disease?
Since there seems to be such similiarity in splicing for some genes in different individuals, abnormalities in splicing may indicate a disease state.