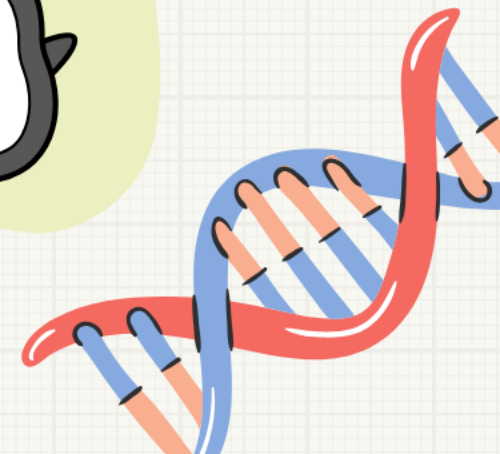
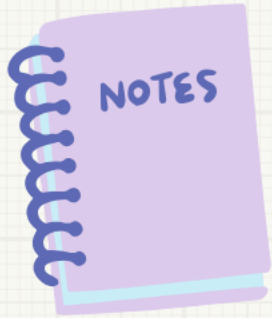
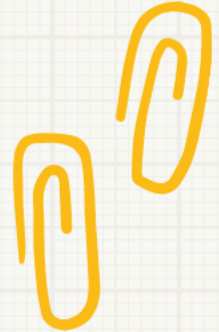


AP Bio

FRQ Fridays

2019 #7
Gene Expression



A researcher is studying patterns of gene expression in mice. The researcher collected samples from six different tissues in a healthy mouse and measured the amount of mRNA from six genes. The data are shown in Figure 1.

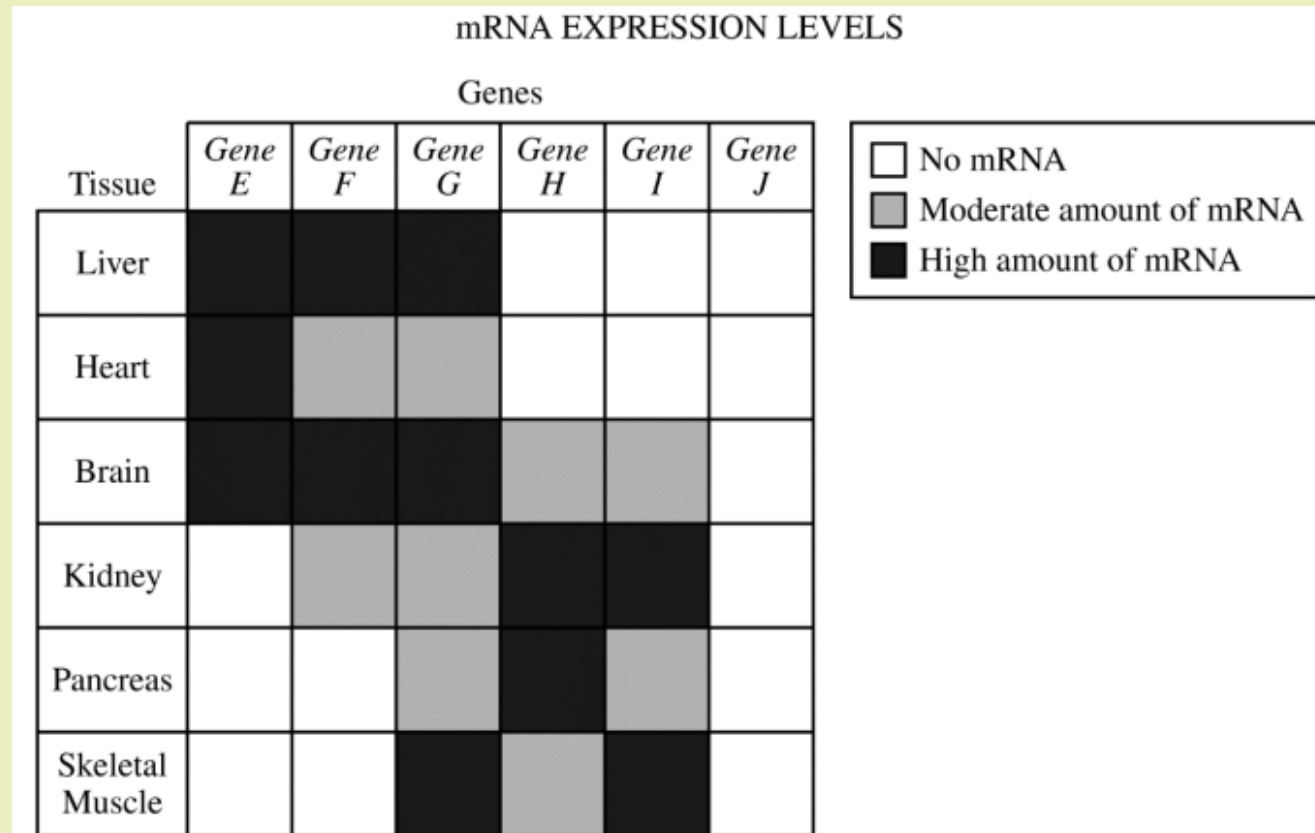


Figure 1. mRNA expression levels of six genes



FRQ Friday #16

2019 #7

(a) Based on the data provided, **identify** the gene that is most likely to encode a protein that is an essential component of glycolysis. **Provide reasoning** to support your identification.

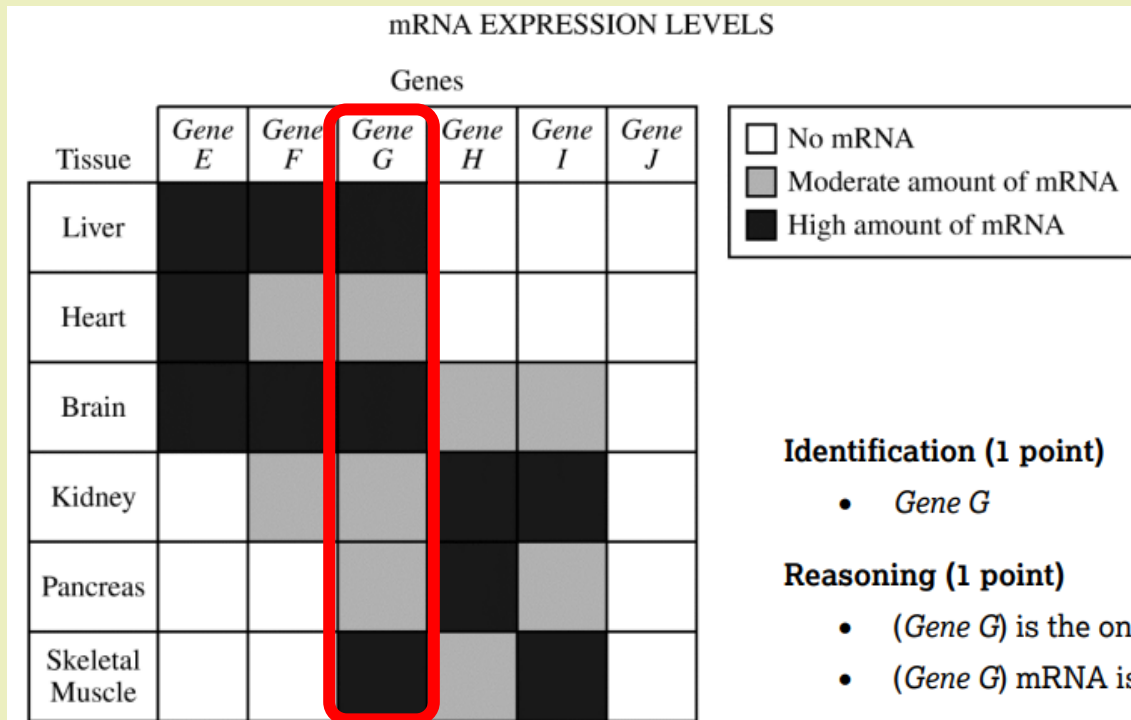


Figure 1. mRNA expression levels of six genes

Identification (1 point)

- *Gene G*

Reasoning (1 point)

- (*Gene G*) is the only gene expressed in all (six) tissues, AND glycolysis occurs in all (six) tissues.
- (*Gene G*) mRNA is the only mRNA present in all (six) tissues, AND glycolysis occurs in all (six) tissues.



FRQ Friday #16

2019 #7

(a) Based on the data provided, **identify** the gene that is most likely to encode a protein that is an essential component of glycolysis. **Provide reasoning** to support your identification.

Identification (1 point)

- Gene G

Reasoning (1 point)

- (Gene G) is the only gene expressed in all (six) tissues, AND glycolysis occurs in all (six) tissues.
- (Gene G) mRNA is the only mRNA present in all (six) tissues, AND glycolysis occurs in all (six) tissues.

2) ~~Gene G~~ Gene G is most likely to encode a protein that is ^{an} essential component of glycolysis because ~~it~~ ^{the mRNA} is at least moderately present in all types of tissues. All tissues undergo glycolysis to get a small amount of ATP to function. ~~Gene G~~ Gene G is the only gene that has mRNA present in all tissues so all of these tissues are able to code for the specific protein.



(b) The researcher observed that tissues with a high level of *gene H* mRNA did not always have gene H protein. **Provide reasoning** to explain how tissues with high *gene H* mRNA levels can have no gene H protein.

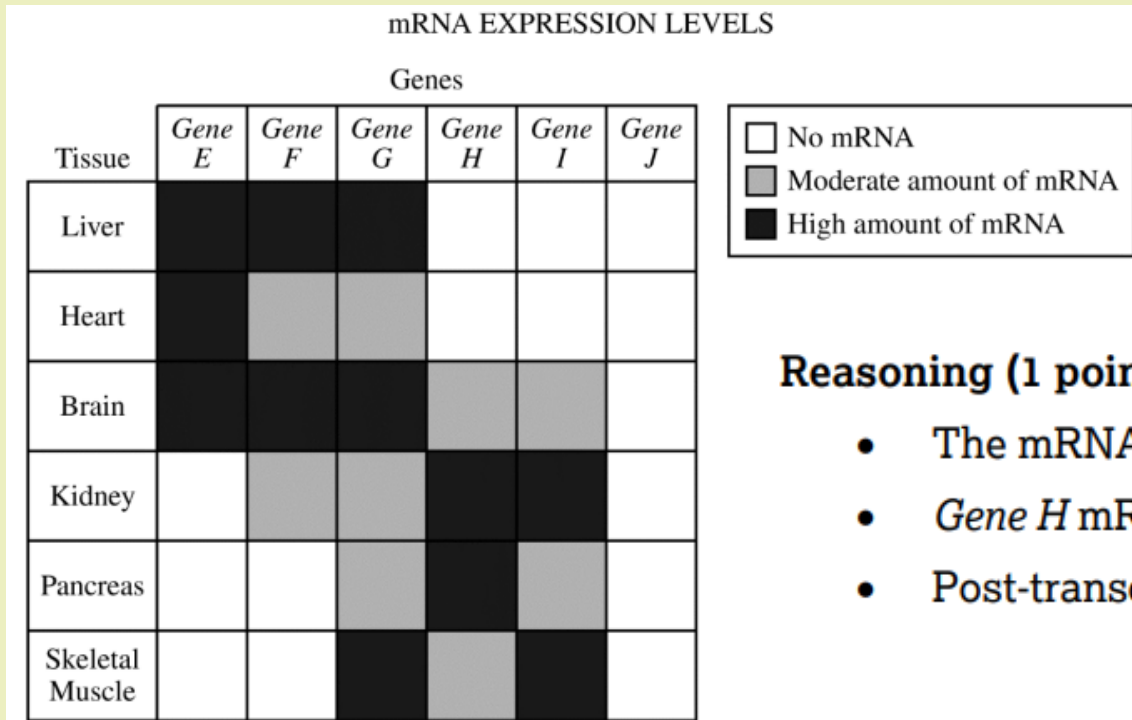


Figure 1. mRNA expression levels of six genes

Reasoning (1 point)

- The mRNA is not exported from the nucleus.
- *Gene H* mRNA is not translated/RNA interference prevent(s) translation.
- Post-transcriptional modifications.



(b) The researcher observed that tissues with a high level of *gene H* mRNA did not always have gene H protein. **Provide reasoning** to explain how tissues with high *gene H* mRNA levels can have no gene H protein.

Reasoning (1 point)

- The mRNA is not exported from the nucleus.
- *Gene H* mRNA is not translated/RNA interference prevent(s) translation.
- Post-transcriptional modifications.

are able to code for the specific protein.
b.) tissues could have a high level of gene H mRNA, but not have a gene H protein because the mRNA was never translated. The gene H ~~may~~ may have been transcribed from DNA to mRNA, but if the rRNA and tRNA do not translate this particular strand it will not ~~be~~ code for the amino acids and therefore not become a functional protein.

