

2019 AP® BIOLOGY FREE-RESPONSE QUESTIONS

7. 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.

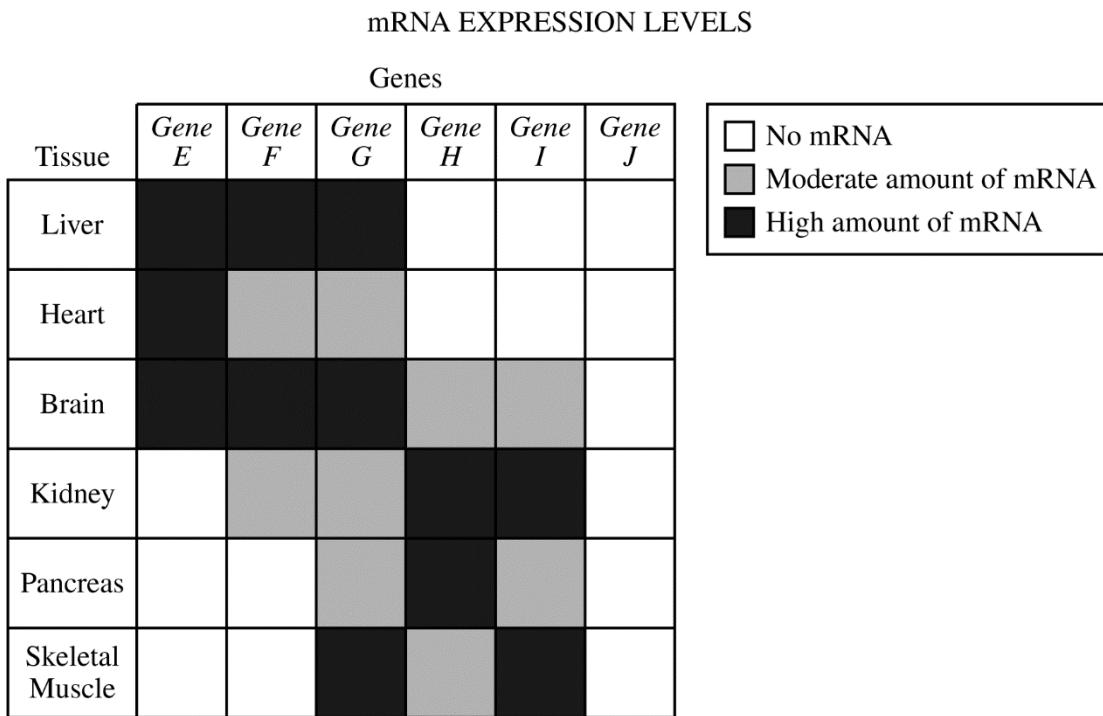


Figure 1. mRNA expression levels of six genes

- 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.
- 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.

**AP® BIOLOGY
2019 SCORING GUIDELINES**

Question 7

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.

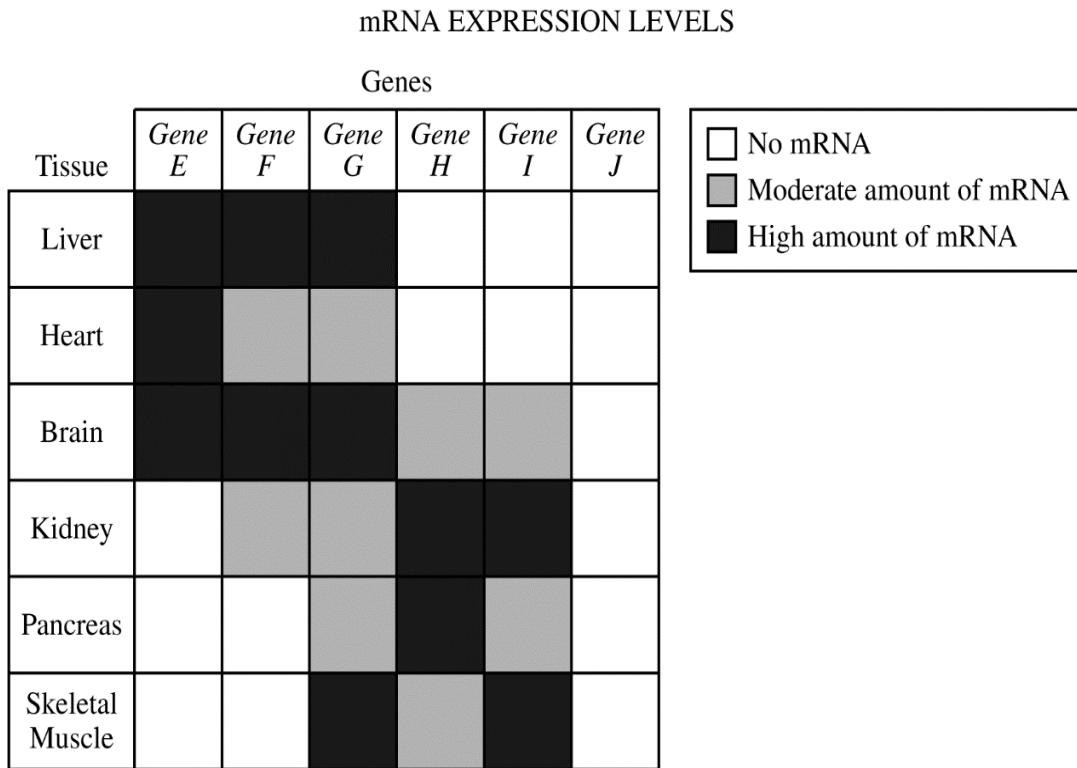


Figure 1. mRNA expression levels of six genes

- (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.

- (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.