

## Genomic Analysis of the Appalachian Brook Crayfish, *Cambarus bartonii*

Program of Study: Gene expression

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Category: Experimental (basic)

Crayfish are a keystone species in aquatic ecosystems. An analysis of gene expression in crayfish could provide insight to support conservation biology. The Appalachian brook crayfish, *Cambarus bartonii* is a species that is indigenous to Virginia. However, there has been very little work on analyzing the gene expression in crayfish. For example, gene expression in *Cambarus tenebrous* has been used to support the biological connections that are in between both surface and subsurface freshwater ecosystems for analyzing the 16S mitochondrial gene, which may have an impact on the two different habitat types.<sup>(1)</sup> This study seeks to analyze the genome of *C. bartonii* with tissue samples from the hepatopancreas. The hepatopancreas controls the metabolism and immune system of the crayfish. The expression or under-expression of genes from the hepatopancreas<sup>(2)</sup> may provide a basis to compare *C. bartonii* populations from distinct stream environments. *C. bartonii* were hand captured locally from Opossum Creek and a tributary of Ivy Creek for use in this study. The RNA protocol used for this experiment is the illuminaTruSeq, which takes the cDNA derived from the RNA sampled from the hepatopancreas and produces a sequence library for further analysis of gene expression.

Christian Worldview Statement:

God has made life complex. This can be seen when looking at the superficial level however, when one takes a closer look God is still showing off his handy work! God has made it so that all of our DNA is in ALL of our cells the only difference between the cells that make up my heart and the ones that make my liver is that different genes are expressed! With this view that God is the creator it makes me appreciate Him more because, he did not stop adding detail to His creation even if the detail would seem to be not needed such as adding color to organs. This study also allows me to see the fingerprints of God when I look at his creation!

This research is important to the culture at large because it will show that we are connected to where we live. This could also give us an insight to why certain traits are seen only in specific locations.

Works cited:

1) J. E. B. J. B. Finlay, and K. A. Crandall, Surface to subsurface freshwater connections: phylogeographic and habitat analyses of *Cambarus tenebrosus*, a facultative cave-dwelling crayfish. *Animal Conservation* **9**, 375-387 (2006); published online Epub November 2006

2) H. Shen, Y. Hu, Y. Ma, X. Zhou, Z. Xu, Y. Shui, C. Li, P. Xu, X. Sun, In-depth transcriptome analysis of the red swamp crayfish *Procambarus clarkii*. *PloS one* **9**, e110548 (2014)10.1371/journal.pone.0110548)