



Undergraduate Research Symposium May 17, 2019 Mary Gates Hall

Online Proceedings

POSTER SESSION 1

Balcony, Easel 121

11:00 AM to 1:00 PM

Bovine Leukemia Virus in Unpasteurized Cattle Milk

Daphnee Patrom, Senior, Biology, East Central Coll

McNair Scholar

Mentor: Alisha Howard, Department of Biology, East Central University

ovine Leukemia Virus (BLV) is a disease that affects US beef herds and large-scale dairy herds. A recent study found correlations to the presence of BLV particles and human breast cancers. Although no actual retroviral insertion (zoonosis) was found in tissue samples, this raises concerns about BLV consumption in from infected dairy samples. To investigate this phenomenon, the prevalence of BLV from raw dairy milk samples will be analyzed. Western blotting will be used to look for the major reactionary viral glycoproteins, gp51 and gp24. Controls were designed for blotting to subclone the coding region of gp51 or gp24 into bacterial expression vectors from a plasmid containing the entire bovine viral genome. Subcloning and quality assays were confirmed first by restriction digestions, PCR then also will be sent for sequencing. The expressed glycoproteins along with infected cell culture samples will then be used in blotting procedures as positive controls while analyzing raw milk samples collected from farms.

POSTER SESSION 1

Balcony, Easel 122

11:00 AM to 1:00 PM

Identifying Species Divergence in the Endemic *Caecidotea* Cave Populations

Justin Harris, Senior, Molecular Biology, East Central Coll

McNair Scholar

Mentor: Alisha Howard, Department of Biology, East Central University

Mentor: Kevin Blackwood, Earth Science, East Central University

The Arbuckle karst system consists of caves, microfractures, and hydrogeologic barriers. Isopods in the genus *Caecidotea* inhabit the pools of water within the groundwater system.

Young *Caecidoteas* travel through microfractures, and small populations move from one cave system to the next. Over the time these fractures close, causing the populations of *Caecidotea* to be isolated and potentially drift genetically. The sampled distinct populations have become morphologically distinct, but it is yet to be determined if they also have become genetically distinct species. Genetic classification may also provide a more timely identification of fracture closing. DNA Barcoding using the Cytochrome Oxidase subunit 1 (COX1) gene will provide the percent of divergence in the samples obtained from different populations/locations; however, the chitin-heavy exoskeleton of isopoda could make it difficult to have DNA extractions that are “clean” (without protein) and decent yield. An extraction method was used proteinaseK (protK) and high salt to release the DNA followed by ethanol precipitation to concentrate the extract. For DNA Barcoding, the COX1 gene sequences need a PCR protocol with the robust primers is crucial. We plan to explore various primer sets for the optimal amplification.

SESSION 1P

MCNAIR SESSION - BIOLOGICAL MANIPULATIONS TO DEVELOP MEDICAL AND ENVIRONMENTAL INTERVENTIONS

Session Moderator: Barbara Juarez, Pharmacology

MGH 295

12:30 PM to 2:15 PM

* Note: Titles in order of presentation.

Viral Promoter Magnetic Pulldowns To Investigate HTLV Viral-Host Interaction

Robert Millhollon, Senior, Biology, East Central Coll

McNair Scholar

Mentor: Alisha Howard, Department of Biology, East Central University

Human T-Cell Leukemia Virus type 1 (HTLV-I), a retrovirus that currently 10 to 20 million people are infected with, has been shown to be associated with the Adult T-cell Leukemia (ATLL) and HTLV-associated myelopathy-tropical spastic paraparesis (HAM/TSP). 1 After an extended period of time, 3-5% of those infected with HTLV-1 will develop ATLL or

HAM/TSP. The viral Tax protein is thought to have involvement in the development of these diseases. The Tax protein inhibits telomerase and topoisomerase-I which in turn inhibits the process of DNA repair. Tax prevents apoptosis and does not allow cells to enter the G0 phase of mitosis. The oncogenic properties of Tax are correlated to the interaction of Tax with host cellular proteins which are strongly influenced by the large amount of Tax protein made from the integrated provirus. We are using viral promoter magnetic pull-downs to investigate HTLV viral-host interactions involving minimal -306bp viral promoter containing vCRE enhancer sites and Tax-recruited host proteins. Experiments have used electrophoresis to determine whether or not the magnetic beads bind the promoter DNA. Absolute quantitation is necessary for consistency and reproducibility in analysis of proteins suspected of recruitment to the promoter.