Ayeras, Ara; Trevino, Jeanette; Dao, My; Gifford, Armel; Dacak, Vincent; Nguyen, Nam; Avila, John Jr., ISOLATION OF BHLHB4 HOMOLOG FROM DANIO RERIO BY POLYMERASE CHAIN REACTION, Dr. Debra Bramblett, Biology

The bhlhb4 gene codes for a basic helix-loop-helix transcriptional factor known to be involved in vertebrate retinal development (Bramblett, 2004). Our objective is to isolate and clone the bhlhb4 gene from danio rerio (zebrafish) tissue. To isolate the bhlhb4 gene, a polymerase chain reaction (PCR) was performed, amplifying a sub-fragment of the bhlhb4 coding region. Zebrafish genomic DNA was used as the template for the PCR reaction. The zebrafish bhlhb4 nucleotide sequence was acquired from the Ensemble database, utilizing the ensemble accession number presented in the paper by Adolf et al. The zebrafish sequence is believed to correspond to the homolog of the mouse bhlhb4 gene based on a pairwise sequence alignment of the translated amino acid sequences using the ClustalW alogorithm. Synthetic oligonucleotide primers used in the PCR reaction were designed based on the ZF-Bhlhb4 sequence derived in silico. The resultant PCR fragments of the bhlhb4 gene will subsequently be inserted into DNA plasmid vectors and replicated by using competent E. coli bacterial cells. The success of this experiment will be based on the sequence of the recombinant sub-clone. Thus, the subclones will be sent off site for DNA sequencing. If the sequence is correct, the sub-clone will be utilized in an additional experiment, where it will be used in the preparation of RNA probes for in situ hybridization, a labeling technique that locates the expression of specific genes in vivo. This will be performed on zebrafish embryos at several developmental stages that we have harvested in the UST Biology laboratories.

Brownell, Colleen; Kinsella, Devin; Nguyen, Kathy; Wells, Annie, ASSESSING THE PSYCHOMETRIC PROPERTIES OF JOB SATISFACTION, Dr. Ly Phan, Psychology

In this report, the researchers examine the psychometric properties of two scales measuring job satisfaction and job stress. The Abridged Job Descriptive Index (Russell, Spitzmuller, Lin, Stanton, Smith, & Ironson, 2004) measures the extent to which the employee is content with the following dimensions of their job: work on present job, present pay, opportunities for promotion and relationship with their supervisor. Job stress is measured using the Stress in General Scale (Ironson, Smith, Brannick, Gibson, & Paul, 1989). This scale measures the employees' perceived tension toward their workplace. For this study, we will survey 960 full-time employees from businesses in the Greater Houston Metropolitan area including both male/females, ranging in ages from 18 to over 60 years of age. Preliminary reliability analyses of the job satisfaction index, job stress and job in general showed a Cronbach's Alpha of 841, .825 and .849 respectively. Additionally, an overall reliability analysis that included the above three indices resulted in a Cronbach's Alpha of .823. Within the job satisfaction index, there are four subscales; each of these was tested for reliability as well. The individual subscales are as follows: work on present job, present pay, opportunities for promotion and supervision, scoring Cronbach's Alpha of .676, .788, .845 and .745 respectively. Suggestions for future research will be discussed.

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Dominguez, Anabelle, REFUGEE RESETTLEMENT: THE MYSTERY OF THE HOLY FAMILY, Sr. Paula Jean Miller, Catholic Studies

Refugees Resettlement: the Mystery of the Holy Family: This presentation explores the plight of refugee families and the barriers they face to life with dignity. The refugee family can be linked to the rich Christian tradition of the Holy Family of Nazareth, who experienced the plight of the refugee. Another source of spiritual hope for these families is their mission to be an Icon of the Triune God, an image of love and community within diverse and difficult circumstances. This presentation integrates one student's educational concentrations in Catholic Studies and Theology with internship experience at Catholic Charities of Galveston-Houston in Refugee Resettlement.

Dyer, Tiffany, THE SACRAMENTAL NATURE OF MUSIC, Sr. Paula Jean Miller, Catholic Studies

Throughout history, music has had moral and communal value to those who studied it and those who listened to it. Today, however, music is often considered an expensive hobby or something that merely "sounds nice." Since World War II, music therapists have used music to connect with nonverbal or limitedverbal patients. Why does music have such a great effect on us? This paper will attempt to discover an answer to this question as well as its implications in music education.

Gibbs, Ashley, BEZIER CURVES IN APPLICATION, Dr. Richard Myer, Mathematics

The mathematical problem of interpolation is concerned with finding a curve that best fits or represents a given set of discrete data points. The algebraic representations of these curves are not unique but certain representations can be more convenient for a given situation. One particular representation is a parametric curve in Bezier form.Bezier Curves see frequent use in computer-aided design, fonts, and in computer animation. In this project we plan to explore the mathematics involved in Bezier Curves and how they are used in our daily lives.

Kutach, Jeanette GUARDING OUR FUTURE: SUICIDE PREVENTION IN AMERICAN HIGH SCHOOLS, Dr. Terry Brandt, Education

Adolescent suicide is more common than most people think. Having to grow up in a world of instant rewards and consequences, more and more teenagers view suicide as a fast solution to the stress of life. Adolescent suicide has risen at an alarming rate since the 1980's. Yet with this depressing fact comes hope. Schools can be used as a source of suicide prevention; and some schools have already begun to use prevention programs in their system. Schools as a source of prevention and intervention is a logical idea as students spend seven to eight hours a day for one hundred and eighty days out of the year within the school system. With this in mind, this project will look at the problem of youth suicide, the role schools can play in intervening and preventing adolescent suicide, and different suicide prevention programs that have been proposed or are already being implemented in schools.

Le, Thuy; Montes, Miguel; Fuson, Kerry; Sutton, R. Bryan, PURIFICATION AND CHARACTERIZATION OF SYNAPTOTAGMIN C2A AND C2B DOMAINS IN DROSOPHILA MELANOGASTER, Dr. Terry Hall, Honors

Commonly found on the membrane of synaptic vesicles, synaptotagmins are proteins that bind phospholipids and are involved in Ca2+-dependent exocytosis and Ca2+-independent endocytosis in neurons. Synaptotagmins are characterized by a transmembrane domain joined to two homologous C2 domains by a linker. The properties and structure of synaptotagmin hint at a regulatory function in the synaptic vesicle pathway and therefore synaptic transmission. Consisting of eight strands of \(\mathbb{B} \)-pleated sheets, the C2 domains of synaptotagmin act as a sensor for Ca2+ ions. By interacting with the SNARE (soluble N-ethylmaleimide-sensitive factor attachment protein receptor, SNAP receptor) complex, synaptotagmin C2 domains regulate the fusion of vesicles with membranes and therefore regulate the exocytosis of neurotransmitters. As such, defining the structure of C2 domains will prove to be a valuable resource for functional studies. This project is aimed at the extraction and purification of synaptotagmin for the purpose of crystallization. Once crystals have been

realized, diffraction patterns obtained through x-ray crystallography can be used to deduce a structural model of the C2A and C2B domains of *Drosophila melanogaster*. Cloning and expression of *Drosophila* synaptotagmin have been achieved. Purification, using the techniques of affinity chromatography, ion exchange chromatography and gel filtration, was performed. Further characterization of the protein, using SDS-PAGE gel electrophoresis, mass spectroscopy, circular dichroism, primary structural comparisons, secondary structural prediction and homology modeling, was also conducted. Preliminary crystal screens are expected to yield quality crystals for further analysis.

LeCompte, Amanda, JAPHET CREEK: A WATER QUALITY ANALYSIS, Dr. Maury Harris, Environmental Studies

Trash, polluted runoff, and dumping of industrial/construction wastes is taking its toll on Japhet Creek, located on the east side of Houston (Fifth Ward). The area is a mixture of light commercial and industrial facilities, interspersed with neighborhoods. Japhet Creek is exposed at the surface between Clinton Drive and the Buffalo Bayou. The stormshed for Japhet Creek extends northwards to Interstate 59 and the railyards and drains a varied ground surface into the creek.:: The purpose of this study is to determine the water quality, and if any of the trash and refuse dumped into the creek is having an effect on the water quality in the section between Clinton Drive and the Bayou. Samples were collected at seven localities along the creek and analyzed for a variety of chemical components, such as phosphates, nitrates, dissolved/suspended solids (turbidity and conductivity), and dissolved oxygen. It is hoped that the results of this study will allow the local area community to turn Japhet Creek into a green corridor, or finger to the Bayou for the enjoyment of the entire community.