E-2001

Resistance of Serratia marcescens. MARY ELIZABETH CROWTHER KENT . Birmingham, AL 35215. Email: hehague89@aol.com

Over the previous years, bacteria have become resistant to antibacterial agents and antibiotics used in cleaners to destroy them. Diseases, bacteria, and biofilms have shown to become resistant to these agents, because of genetic changes known as exogenous resistance. However, other forms of resistance occur, such as acquired resistance. Acquired resistance is when a strain develops resistance after contact with an antibiotic. This can occur when a cleaner is used incorrectly or too frequently. Inherent resistance is when the bacteria naturally has its own defense against a certain strain of antibiotic. Acquired resistance is the type of resistance that will be tested for in this experiment. Many examples of resistant bacteria exist today—such as how penicillin has little or no effect on infections today. Serratia marcescens is a prominent bacteria that is very common, and easy to obtain for testing. Most forms of bacteria form their own antibiotic, due to time restrictions, experiments cannot be conducted to test the bacteria for resistance. The bacteria is used to test the effects of Lysol on the growth of resistant bacteria. It is known that specific herbs, such as turmeric and garlic are just as effective as commercial antibiotics. Serratia marcescens would most likely build up resistance to the highest molar solution first, due to time restrictions. The roots allowed to be used against itself for this experiment. Therefore, a common bathroom cleaner, Lysol, will be used. This experiment differed from Serratia marcescens would build up resistance to Lysol if treated with it randomly. There were two solutions made with water: 1M and 3M. From research, it was hypothesized that Serratia marcescens would show that garlic and turmeric were both effective in preventing bacterial growth will cease. The E. coli k12 is exposed to the natural extracts of Turmeric and Garlic and then the E-2002

The Effects of Road De-icer (MgCl2) on Plant Germination. CAREN COLINS 1 , Jay Ingram 1 , and David Minnhead 1 . North Garland High School, Garland, TX 75044, and Texas Scottish Rite Hospital. Email: cmicklin6@ yahoo.com

Road de-icers are put on roads throughout the winter season in order to prevent ice-related automobile accidents. However, after the ice has melted, the water evaporates under the heat of the sun and the chemicals of the road deicers are left on the road. These chemical residues are eventually washed off into the ditches, and then into the nearby bodies of water. Radish seeds were germinated in varying concentrations of a popular road de-icer, MgCl2, to test the effects of road salts on plant life. Radish seeds were germinated in 1.5% agar plants with MgCl2 solutions from 1–10% in 1% increments. After 5 days of growth, roots were measured, and roots were dissected. The zone of elongation was removed and fixated using standard plant tissue protocols. Radish seeds that were germinated in the control solution had the second longest average root length. Between the 1% and the 4% deicer solutions, the average length of the radish seed root was dramatically shorter than that of the control. This could be caused by the Chloride ions in the MgCl2, stunting the growth of the seed. The seeds germinated in the 5% deicer solution had the longest average root length. The average length of the radish seeds decreased again, after 5%, which was probably due to a hyper-osmotic environment. The structure of the root also changed as the percentage of the deicer increased. The control radish seed magnified at 400 times magnification has square, normally constructed cells. The 5% radish seed magnified at 400 times magnification has damaged cells that are damaged. The amount of road deicer present increases, the structure of the root cell of the radish seed changes. The MgCl2 appears to have a positive affect on the seeds because the length is increased, yet the cells are damaged. The radish seeds benefited from the Magnesium in the deicer, but overall, the deicer solutions contained too many Chloride ions, and basically dehydrated the cells of the seeds.
E-2004
Microbiology Evaluation of Toothbrushes. V. H. FERNANDES and D. L. César. Fundação Educacional Montes Claros, Departamento de Química, Montes Claros, MG, BRAZIL. Email: fernandesv@hotmail.com

The toothbrushes, used for thousand of people in the whole world, are generally kept in the bathroom—humid and dark place with little ventilation—that is propitious for the growth of fungi and bacteria. The bad hygiene of the places where the toothbrushes are kept, associated to the lack of personal hygiene, compromises the buccal health of the toothbrush users. The present paper has as its main objective to verify the presence of microorganisms in the dental brushes by means of a qualitative microbiological analysis. Its secondary objective is to quantitatively analyze the dental brushes with a more significant sampling rate, providing us statistics data to alert the population on the importance of the personal hygiene, emphasizing the existing relation between microorganisms detected in the toothbrushes and the possible illnesses they can cause. Studies made by the authors of this project with the plastic boxes that come with some toothbrushes, had shown that these boxes work as incubators for the development of microorganisms such as: Streptococcus, Staphylococcus, lactobacillus and Candida albicans. As they are in the gram rods morphology—positive isolated and gram short chain clusters of cocci—positive and negative. Some species of these microorganisms are highly pathogenic, being able to cause Pharyngitis, laryngitis, dental decay (very common illnesses of high level of relapse) desmineralization of teeth, serious gingivitis, bad Candidiasis and others. Based on these studies, we propose the development of a sterilizing container to store the toothbrushes in use, substituting the traditional plastic boxes.

E-2005
Proteomics Analysis of Osteosarcoma Cells. M. M. POLMEAR and L. K. Polepeddi. Cell and Structural Biology, University of Colorado at Denver and Health Sciences Center, Denver, CO 80111. Email: Palmers84@aol.com

Osteosarcoma is the most prevalent tumor in dogs and a devastating human cancer, but its pathogenesis is unknown. The objective of this project is to explore the role of a known tumor suppressor, beta-catenin, in tumorigenesis and progression. It was hypothesized that beta-catenin function may be compromised in osteosarcoma cells and that this may be reflected in a decrease in beta-catenin level in these cells. To test the hypothesis, cell homogenates from canine osteosarcoma and stroma tissue samples were prepared and subfractionated into a cytosolic division and a phospholipid-enriched pellet. The proteins in both fractions, from the tumor cells and the control cells, were resolved by SDS-polyacrylamide gel electrophoresis, blotted onto membranes, and probed with a beta-catenin antibody. Quantitative multi-modal analysis with revealed that beta-catenin was reduced by about 1.54 times in the supernatant of cancer cells compared to the supernatant of control cells. Beta-catenin immunoprecipitation revealed discrepancies in binding complexes to this beta-catenin in osteosarcoma versus normal cells. Immunofluorescence localization of beta-catenin revealed a nuclear and membrane accumulation opposed to a more uniform distribution in fibroblast cells. Additional experiments will assess methods for treating cancer by using polymeric encapsulation and viral therapy. The obtained results are consistent with the hypothesis that changes in beta-catenin level/function are involved in osteosarcoma pathogenesis.

E-2006
Determining the Effects of Vitamin A on Short-term Memory Ability. AMANDA M. THOMAS. School of the Osage, Lake Ozark, MO 65049. Email: CgirlL13@excite.com

Recent studies have determined that vitamin A can have an impact on memory capacity (Etchamendy, et al, 2001). It has also been determined that vitamin A supplementations can add to memory ability as well as overall health. This is especially true for adults over the age of thirty with problems relating to dementia. The purpose of this experiment is to determine whether or not there is an actual correlation between vitamin A and short-term memory ability. It is hypothesized that the vitamin A supplementation will help the subjects overall memory capacity as measured by a memory test administered by the researcher. A group of sixty subjects were randomly selected from the School of the Osage faculty and staff to participate in both the control (thirty subjects) and experimental (thirty subjects) groups. The control group underwent memory tests both before and after the three week supplementation period; however, they did not undergo supplementation. The experimental group was subjected to the memory test both before and after the three week supplementation period, and underwent vitamin A supplementation. All participants took, under the supervision of a medical doctor, a 10,000 IU softgel capsule each day for a period of twenty-one days. The test results determined that there is a significant change between the memory test scores of the experimental group (P=0.023), but there was not a significant change in the test scores of the subjects in the control group (P=0.263). The results of this study provide data that vitamin A improves short-term memory ability.

E-2007
The Development of a Novel Gene Knockout Technique Utilizing RNA-interference. JASON C. ZHANG. Yorktown High School, Yorktown Heights, New York 10598. Email: jason.c.zhang@gmail.com

Gene knockout has become vital in the development of drug related pharmaceuticals, with many institutions focused solely on the application of related methodologies. However, current gene knockout technology is limited and consists of crude deletion techniques and nonspecific pathways. RNA interference, with high specificity and variability, offers an alternative for gene manipulation. Integration of miRNA and siRNA interference pathways allows for optimized processing and knockout. In this investigation, mutant siRNA-coding let 7a-3 miRNA constructs and Firefly-Luciferase-mRNA coding target were transfected into P19 cell cultures. Transfected cells were analyzed with two luminescent makers: Renilla-Luciferase (targeted gene expression) and Firefly-Luciferase (transfection efficiency control). Levels of gene expression were variable but consistent, the highest being 40%. Following system affirmation, optimization of construct design is required to produce the traditional 90–98% gene knockout. Future introduction of recombinase sites or effector switches will allow for conditional knockout. Using the data derived from the present work, RNAi can be utilized to provide a new degree of gene regulation, controlling gene expression levels at will. Further optimization of this system is essential.

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