

Errata Sheet

Additional Exhibitor

Diamond Booth

9. Alcorn State University Graduate Studies



THURSDAY

Agriculture and Plant Science

Poster Addition

P1.12

3-D OBJECT DISPLAY AND USED IN FRUIT BRUISE DETECTION SIMULATION

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The price of the fruits depends on the quality of the fruit. A fruit which has bruises will be sold in a lower price compared to a fruit with no bruises. In the fruit packing industry, traditionally, the sorting of the fruits is normally done manually for quality control before shipping to consumer. The use of human resource for sorting of fruits has various disadvantages. Thus the mechanized grading of horticultural products is essential for lowering sale pricing, and handling storage.

In this paper we propose an efficient method for displaying bruised fruits with three dimensional viewing. The images of the fruits are captured by a 3-D camera. The features are then extracted by taking the RGB values. Simulation experiments are conducted on apples and tomatoes and 3-D fruits images will be displayed on a computer monitor.

The proposed algorithm is implemented using Matlab software. With the use of functions available in the module it is possible to rotate, pan and zoom in/out of 3D model. The bruised areas of the testing fruits are extracted and feature extraction is made in the proposed fruit bruise detection system.

Keywords: Three Dimensional Imaging Processing, Fruit Bruise Detection, Simulation, Matlab

Poster Addition

P1.13

INVESTIGATION OF DROUGHT RESISTANCE IN BLUEBERRY GENOTYPES

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William Carey University, Hattiesburg, MS USA¹ and USDA-ARS, MS USA²

Agricultural development for specific flora has boomed since advancement in genetic decoding, engineering of PCR, traditional genetics, etc. in the last 25 years; however, resources must be concentrated on researching of consumer goods and meat products. This paper focused on studying several varieties of both Highbush and Rabbitsey blueberry varieties to obtain quantitative data on their resistance to drought conditions to further the former's progression. Rapid dehydration leaf assay and stomatal count of samples revealed the response time to the stressor. The lower epidermis of each sample varied even within the same genotype. Thus, a statistical average was used to determine the density of the stomates within the species. The expected correlation of higher stomatal density increasing the likelihood of water loss was not met as several genotypes with lower stomates in an area. Qualitatively, the reasoning for this conclusion is the variety of plants production of abscisic acid (ABA), the guard cell's hormone responsible to signaling the stomates to close, is the largest contributor for the plants adaption to drought. There remains a need for more investigation of the genetic link between ABA production and sensitivity so desirable breeds can be selected to create a hardier plant. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

Cellular, Molecular and Developmental Biology

Poster Addition

P2.40

ELUCIDATING THE FUNCTIONAL ROLE OF EPITHELIAL DUAL OXIDASE (DUOX) IN THE GULF COAST TICK, *Amblyomma maculatum*

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Dual oxidase (Duox) was the last of the six NADPH oxidases (Nox) to be discovered, but is thought to have been the original Nox protein due to functional conservation from arthropods to humans. Duox is Ca^{2+} -dependent transmembrane protein present in apical surface of epithelial tissues with known roles of generating the ROS species, H_2O_2 , implicated in the formation of extracellular tyrosine cross-linkage. In *Caenorhabditis elegans* it is involved in cuticular structure while in *Anopheles gambiae* and *Ixodes scapularis* with the formation of an acellular gut barrier referred to as a dityrosine network (DTN) where it was shown to influence the survival of pathogens by preventing their initiation of a local inflammatory response as assessed by dsDuox knockdown. Using this concept, RNAi using Duox dsRNA targeting the FAD⁺-cofactor binding domain was used to determine the functional role of Duox in *Amblyomma maculatum*. Duox dsRNA and dsLacZ control were injected in adult female *A. maculatum* and blood fed on a sheep with ticks pulled for qRT-PCR analysis at 5-days post-infestation and when replete at 12-days for ovipositioning. Three trials produced similar results regarding tissue-specific Duox knockdown and compared using a gene study; it was observed that midgut tissues were most knockdown-resistant (65%) when compared to the salivary glands (94%) and ovary (85%). The qRT-PCR analysis was used to determine antioxidant compensatory mechanisms and bacterial burden. Confocal imaging targeting dityrosine was performed to demonstrate Duox role in forming the DTN in *A. maculatum*. Most interestingly, the presence of a DTN was discovered lining the central ducts of the salivary glands, which in *I. scapularis* was previously used as a control as it had no indication of the presence of a DTN. This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

History and Philosophy of Science

Oral Presentation Withdrawn

O7.04

11:15 DO ENVIRONMENTAL SCIENCE ADVISERS REPRESENT THE THREAT OF A TECHNOCRACY?

Sara Kolmes

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In many arenas, our modern lives are mediated by science and technology. This has immense benefits, but the technological and scientific realities of our world shape the ways we interact with the world and the possibilities open to us. Technological “Lock-In” in which infrastructure is shaped by aspects of a technology not inherent to its purpose, often directs what further development is possible. For example, Robert Moses’ overpasses on the way to Jones beach were built shorter than buses or trains. Only cars could pass, so only those rich enough to own cars in the 1930s could visit. The area developed as a haven for the rich where the poor were not welcome even as cars became common, as only expensive attractions were built there. The concern that technical experts make normative decisions without realizing it is an old one. The status of technical decisions as unquestionable by a layperson and the possibility for this to lead to de-facto rule by experts inspired concerns about a technocracy. Recently, worries that government science advisers pose this risk have resurfaced surrounding environmental scientists. I argue that science advisers do not represent this threat, because scientific results are reported as probabilities rather than binary responses or specific advice. Scientists will report results within statistical standards for the profession (such as 0.05 probability for confidence), and then conscious interpretation of this result into practical advice will occur. Because of the way in which scientific knowledge is expressed, science advisers do not pose a technocratic threat.

Physics and Engineering

Poster Addition

P10.07

IDENTIFYING ALTERNATE TARGETS FOR PROSTATE CANCER DRUG DESIGNING

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Background & Significance: Prostate cancer affected 2,975,970 (43%) men in the United States this year, and killed 29,480. Nuclear hormone receptor, Androgen Receptor (AR) is the main protein responsible for prostate cancer progressions and thus the main targets for hormonal therapies. However, hormonal therapy is found to acquire resistances and prostate cancer is found to

progress in androgen-independent manner. Our objective is to study protein-protein and protein-DNA interfaces of AR and identify and validate alternate targets for hormone-independent drug designing.

Methodology: Using crystal structures of AR and AR-DNA interfaces, molecular modeling, molecular dynamics simulations, and bioinformatics we have explored unique sequence motifs for dimerization and DNA recognition that could act as a suitable template for ligand-independent drug designing.

Results: Using AR ligand binding domain (LBD) crystal structure 1T5Z.pdb, we have modeled and validated a dimer structure and explored essential hydrogen-bonding contacts for dimerization. The LBD dimerization contacts are found to be inadequate for alternate drug designing target. We then explored the dimerization contacts of AR DNA binding domain (1R4I.pdb) and found essential contacts that could be used as alternate targets to design inhibitors. Currently, we are grafting the essential contact residues of AR-DBD in Alanine and Glutamine based helices and elucidating their binding affinities with AR in order to develop ligand-independent peptide inhibitors.

Conclusion: The discovery of novel protein targets from protein-protein and protein-DNA interfaces would open avenues for the development of a new generation of small molecule therapeutics for hormone-independent progression of prostate cancers.

This work was supported by the Mississippi INBRE, funded by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103476.

Zoology and Entomology

Oral Presentation Withdrawn

O13.05

10:00 ECOLOGICAL SERVICE OF CAVITY DWELLING BIRDS

Charles C. Barnes, Darrell D. Barnes, Mark L. Montgomery, Maithri Adris, James Sylvester, Brent Lavers, Paul Grisham, Piyatilake Adris, Ray Cox, Sarah Mattox, K.N.Thimmaiah, Padma Thimmaiah, Kyle Ellis, and Jeremy Isome

Northwest Mississippi Community College-DeSoto Center, MS USA

The 2014 project, which extended from April-June, included a survey of insect and prey populations using pit fall traps near existing man-made cavities for bluebirds on the Northwest MS Community College-DeSoto Campus in Southaven, MS. The hypothesis was that there would be more insect/prey biodiversity (utilizing Simpson's index of biodiversity) near the bird-occupied cavities (sites 1, 2, 3 and 7) than at the control sites (sites 4, 5 and 6). All sites were located on the Northwest MS Community College-DeSoto Campus. It was determined in this brief experiment that the insect/prey biodiversity was slightly less (2.373) when all of the experimental bird-occupied cavity sites (House Sparrow, *Passer domesticus* and Eastern Bluebird, *Sialia sialis*) were compared to the control sites (2.395). The biodiversity was markedly less at the single site 1 (2.010, occupied by House Sparrow, *Passer domesticus*) when compared against all of the controls (2.395). The presence of bird lice/mites heavily contributed to the diminished biodiversity around the control sites.

FRIDAY

Health Sciences

Correction of abstract P6.76

P6.76

EXPOSURE TO SEROTONIN ADVERSELY AFFECTS OLIGODENDROCYTE DEVELOPMENT AND MYELINATION IN VITRO

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As serotonin (5-hydroxytryptamin, 5-HT) has been implicated to play critical roles in early neural development, the perinatal exposure to selective serotonin reuptake inhibitors (SSRIs) results in cortical network miswiring, abnormal social behavior, callosal myelin malformation, as well as oligodendrocytes (OL) pathology in rats. To gain further insight into the cellular and molecular mechanisms underlying SSRIs-induced OL and myelin abnormalities, we investigated the effect of 5-HT exposure on OL development, cell death, and myelination in cell culture models. First, we showed that 5-HT receptor 1A and 2A subtypes were expressed in OL lineages, using immunocytochemistry, Western blot, as well as intracellular Ca²⁺ measurement. We then assessed the effect of serotonin exposure on the lineage development, expression of myelin proteins, cell death, and myelination, in purified OL and neuron-OL myelination cultures. At higher doses, such exposure triggered a development-dependent cell death, as immature OLs exhibited increasing susceptibility to 5-HT treatment compared to OL progenitor cells (OPCs). We showed further that 5-HT-induced immature OL death was mediated at least partially via 5-HT_{2A} receptor, since cell death could be mimicked by 5-HT_{2A} receptor agonist DOI, but attenuated by pre-treatment with 5-HT_{2A} receptor antagonist ritanserin. In contrast to cell injury observed in pure OL cultures, 5-HT exposure did not lead to OL death or reduced OL density in neuron-OL co-cultures. However, abnormal patterns of contactin-associated protein (Caspr) clustering were observed at the sites of Node of Ranvier, suggesting that 5-HT exposure may affect other axon-derived factors for myelination. In summary, this is the first study to demonstrate that manipulation of serotonin levels affects OL development and myelination, which may contribute to altered neural connectivity noted in SSRIs treated animals.