Discovery July 2008

Misty Bailey

Editor

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Recent Publications . . .


Lee SH, Cekanova M, Baek SJ. Multiple mechanisms are involved in 6-gingerol-induced cell cycle arrest and apoptosis in human colorectal cancer cells. Mol Carcinog. 2008;47:197-208.


On June 27, HS Adair gave seven presentations ranging from equine metabolic diseases and asthma to rehabilitation and hyperbaric oxygen therapy at the Alabama Veterinary Medical Association Annual Convention in Sandestin, FL.

FM Andrews gave an oral presentation on "The evaluation of the wireless capsule (SmartPill) for measuring gastric emptying and GI transit in normal dogs" at the American College of Veterinary Internists (ACVIM) forum in June in San Antonio, TX. R DeNovo, R Reese, S Elliott, T Moyers, C Buchanan, and FM Andrews presented "Evaluation of dimethyl sulfoxide effects on intestinal transit in mice suffering IL-23 responses."

Buchanan, SB Elliott, ARAM Jassim, CM McGowan, and AM Saxton. Also at that symposium, LL Abbott presented "Role of sodium-potassium ATPase and sodium-hydrogen exchanger mRNAs in equine gastric ulcer syndrome" (co-authors AL LeBlanc, JF Echandi, MS Dhar, and FM Andrews), and presented "Evaluation of dimethyl sulfoxide effects on intestinal transit in mice suffering IL-23 responses."

Three posters were presented at that symposium, as well – Andrews – "Effects of intravenously administered omeprazole on gastric juice pH and gastric ulcer scores in adult horses" (co-authors N Frank, CF Sommardahl, BR Buchanan, and FM Andrews). Elliott - "Use of a wireless capsule, SmartPill, to measure gastrointestinal pH, pressure, and transit time in a horse" (co-authors R Reese, R DeNovo, S Elliott, and FM Andrews). Elliott – "The effects of Senna extract in the treatment and prevention of gastric ulcers" (co-authors FM Andrews, SB Elliott, AM Saxton, and RB McMullin).
A new software called Rigour is being used by some journals to determine acceptable manipulation limits for images submitted with manuscripts. The service was discussed recently by a panel at the Council of Science Editors meeting in Vancouver. Dana Compton, production manager for The Proceedings of the National Academy of Sciences (PNAS), explained that Rigour is being used to scan all incoming images at PNAS. If the software flags an image as potentially manipulated, the service delivers an analysis to the journal, where trained employees decide whether the manipulation is acceptable.

Compton stressed that most image manipulation is done honestly by scientists who want to improve the quality of the image, such as adjusting contrast to better show bands. Most adjustments like these are acceptable. However, adjusting the contrast too much can create what’s known as “absorption” artifacts, which is usually unacceptable because it hides parts of the image that may be important to its interpretation.

In the case of image manipulation and the difficulty of detecting it without software help are shown in Fig. 1. The software works on color and mono images, and eliminates color changes and image distortions. It also picks up manipulation from Photoshop (used in Fig. 1B), which has tools that leave behind “fingerprints.” The software does have limits: it cannot detect plagiarized figures, mirrored images, or cropped images. If images are found to have unacceptable manipulation, a representative from PNAS contacts the author to resolve the matter. The journal may also provide manipulation information to the agency funding the research.

To avoid being flagged, Chris Everett, art director at Caltech, which developed the Rigour software, suggests documenting the types of files saved when adjusting an image. He recommends recording the software used and saving intermediate versions. However, he warns that re-saving JPG files multiple times can cause false flagging of images because of the amount of compression resulting each time the JPG is saved. Martin also recommends providing image manipulation information in the legend of the paper.


**Fig. 1. Image manipulation.** In IC, the circles show where parts of the image have been altered. The lower bands are contrast-adjusted to show that they have been added onto another image. Without adjusting the contrast, the image looks legitimate (1B).

J Bernard presented the poster “Detection of Helicobacter pylori infection in cheetahs (Acinonyx jubatus) using real-time polymerase chain reaction assay and serology” at the Morris Animal Foundation annual meeting in San Diego, California. The author, who also presented a talk at the American Animal Medical Association meeting in Copenhagen, Denmark, in June, explained that the research team performed real-time PCR on gastric biopsies from 20 cheetahs from four different zoos in the United States. They found that the infection was present in about 40% of the animals.

K Tobias presented “Methicillin resistant Staphylococcal infections and “Pseudomonas aeruginosa isolated from dogs in the United States.” In the same conference in June, K Tobias presented “Methicillin resistant Staphylococcal infections and “Pseudomonas aeruginosa isolated from dogs in the United States.”


**Fig. 1B.** Original image. **Fig. 1C.** Manipulated image exposed by contrast.

**Fig. 1A.** Original image. **Fig. 1B.** Manipulated image.


**Table 1.** UCTVM Investigators Earn $1,413,350 for Sponsored Projects Since March

<table>
<thead>
<tr>
<th>Title</th>
<th>Agency</th>
<th>Start date</th>
<th>Type</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPAR-gamma ligands in colorectal cancer</td>
<td>SJ Baek</td>
<td>NH</td>
<td>6/108</td>
<td>919,929</td>
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<td>Gene alteration by NSAIDs</td>
<td>SJ Baek</td>
<td>American Cancer Society</td>
<td>7/108</td>
<td>180,000</td>
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<td>Coronaviruses RNA replication</td>
<td>DA Brian</td>
<td>NIH</td>
<td>6/108</td>
<td>355,750</td>
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<tr>
<td>Characterization of P-type ATPase, an integral membrane protein</td>
<td>MS Dhar</td>
<td>ARC Core Health Faculty</td>
<td>1/107</td>
<td>12,960</td>
</tr>
<tr>
<td>Immune response to viral intereukin 10 in gamma haemolyticus-infected black rhinoceros</td>
<td>SA Kania</td>
<td>Montana Animal Foundation</td>
<td>6/108</td>
<td>4,000</td>
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<tr>
<td>Bisulphism assay for DNA and RNA quantification</td>
<td>CA Kanch</td>
<td>NSF</td>
<td>1/108</td>
<td>25,344</td>
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<tr>
<td>Development of clinically useful methods of body composition assessment to enhance weight loss</td>
<td>CA Kanch</td>
<td>NIH</td>
<td>2/108</td>
<td>134,114</td>
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<tr>
<td>The impact of visual cues associated with feed bowl and scoop size on food portions offered to dogs by their owners</td>
<td>AL Lusby</td>
<td>NCSU</td>
<td>1/108</td>
<td>5,741</td>
</tr>
<tr>
<td>Dept of Homeland Security MOT 332: Agriculture and food vulnerability assessment training course</td>
<td>BR Thompson</td>
<td>South Central PA Task Force</td>
<td>2/108</td>
<td>25,223</td>
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<tr>
<td>MOT 332: Agriculture and food vulnerability assessment training course</td>
<td>BR Thompson</td>
<td>Regents of New Mexico State University</td>
<td>2/108</td>
<td>25,224</td>
</tr>
<tr>
<td>The role of the new zeta cleavage in ABeta formation</td>
<td>X Xu</td>
<td>NIH</td>
<td>6/108</td>
<td>291,305</td>
</tr>
</tbody>
</table>

Sura Earns National Recognition Research Recognition

Year's Phi Zeta Research Award for Most Outstanding Manuscript in the Clinical Sciences category belongs to Small Animal Clinical Sciences assistant professor Dr. Patri
cura Sura. The national award is given annually to one clinical and one basic science manuscripts selected based on study originality, scientific significance, and quality, as well as clarity of writing and illustrations. Sura's award-winning paper is titled "Two scintigraphic methods for detection of portal-systolic processes in dogs." 


**S** **T** **P** **W** **A** **F**
From Discovery to Revenue

Did you know that the discoveries you make at the University of Tennessee have the potential to turn into revenue for your department, the College of Veterinary Medicine, and you, personally?

With the help of the University of Tennessee Research Foundation (UTRF), UT researchers can protect their intellectual property, which can then be licensed to companies for the development of new or improved products and services for the marketplace. Once licensed, the licensing terms frequently result in additional funds to departments, colleges, and individuals who were the originators of the new discoveries. But did you know that these relationships often result in additional research funding for the inventor’s lab?

Here are just a few recent examples:

- Drs. Neal Schrick and Lannett Edwards have attracted the interest of a private investment group to develop and commercialize their ongoing work in the area of embryo development and survival. The licenses to the intellectual property and related research agreement have generated nearly $3 million in research funding and license revenue over the past 3 years.

- A research group that includes Dr. Shige Eda and Cathy Scott has developed a new detection assay for Johne’s disease, a devastating bacterial infection in cattle and other ruminant animals. Through a research and option agreement with the potential licensee, the investigators have been working to develop a commercial version of the test, and the relationship may result in an ongoing research and development arrangement.

- Professors from the College of Engineering have developed a stretchable fabric that prevents diaper leakage. The technology was licensed by Tredegar Film Products and has been used in over 20 billion diapers worldwide. This project has resulted in licensing revenue as well as additional research funding for the inventors.

To learn more about how to protect your intellectual property and generate new funding, contact Stacey Patterson at UTRF: sspatter@utk.edu; 974-0140. You can also visit the Web site at http://utrf.tennessee.edu.

Thompson Part of Steering Committee for Animal Health Emergencies

Dr. Sharon Thompson is part of a committee to provide initial feedback and support for developing an animal health emergencies draft framework that will be presented to a homeland security technical working group later this year.

The Federal Emergency Management Agency oversees the project, which is focused on defining preparedness and revising the “Target Capabilities List,” a publication that describes the capabilities needed to achieve emergency preparedness at local through national levels.

NIH Delays Transition from PureEdge to Adobe in Electronic Submissions

The National Institutes of Health (NIH) have pushed back their time line for transition from PureEdge Viewer to Adobe forms in electronic submissions.

Originally, NIH planned to complete that transition by the end of June, but now the transition is not expected to be completed until December, with the exception of some career development awards, service awards, and training grants, which will make the transition later in 2009.

Funding Deadlines Drawing Near

<table>
<thead>
<tr>
<th>Deadline</th>
<th>Sponsor</th>
<th>Program</th>
<th>$ Amount</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug. 15</td>
<td>Damon Runyon Cancer Research Foundation</td>
<td>Fellowship awards</td>
<td>140,000-174,000</td>
<td><a href="http://www.drcrf.org">www.drcrf.org</a></td>
</tr>
<tr>
<td>Sept. 1</td>
<td>American College of Veterinary Ophthalmologists Foundation</td>
<td>Residents</td>
<td>5,000</td>
<td><a href="http://www.visionforanimals.org">www.visionforanimals.org</a></td>
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<tr>
<td>Sept. 5</td>
<td>American Lung Association</td>
<td>Independent investigators; career investigators; training; fellowships; Alliance program</td>
<td>40,000; 60,000; 21,000-32,500; up to 100,000</td>
<td><a href="http://www.lungusa.org">www.lungusa.org</a></td>
</tr>
<tr>
<td>Sept. 14</td>
<td>L’Oreal</td>
<td>Women in Science program--fellowships</td>
<td>Not specified</td>
<td><a href="http://www.loreal.com">www.loreal.com</a></td>
</tr>
<tr>
<td>Sept 15</td>
<td>American College of Veterinary Internal Medicine Foundation</td>
<td>Clinical investigation to improve the diagnosis, treatment, &amp; prevention of disease in animals (residents; neurology; oncology; urgent study; renal failure or cardiomyopathy</td>
<td>12,500; 15,000; 50,000; 20,000; 100,000</td>
<td><a href="http://www.akcchf.org">www.akcchf.org</a></td>
</tr>
</tbody>
</table>

EndNote Download Available FREE Thanks to UT License

EndNote Desktop is now a free download to all UT students and staff through the UT Libraries and the Office of Information Technology. Previously, the program had to be either purchased individually for about $250 or used (with limitations) via the Web.

For writers who frequently use the same references, EndNote saves an enormous amount of time that would be spent on organizing and formatting those references.

To download EndNote Desktop, enter your UT NetID and password at https://web.dii.utk.edu/softwaredistribution/.

Research at the University of Tennessee (2008) 3.2
The research concept behind Dr. Nalin Sirivardhana and Dr. Hwa-Chain Robert Wang’s pre-cancer prevention manuscript was featured on the cover of Molecular Carcinogenesis in May.

The article outlines a line of research within the Anticancer Molecular Oncology Laboratory at UTCVM: a cellular model in which human breast epithelial cells are exposed to carcinogens and green tea catechins (GTC) to show the ability of green tea to prevent cancer.

Transformation of breast epithelial cells from non-cancerous to pre-cancerous to cancerous occurs over a number of years and results from multiple environmental factors that affect multiple cellular processes. For these reasons, this type of cancer is difficult to emulate in the laboratory and thus difficult to study. However, Wang’s research team uses human breast epithelial cells exposed to picomolar concentrations of B[a]P, a cancer-causing substance found in tobacco, the environment, and certain dietary chemicals. Using picomolar concentrations more accurately mimics the long-term, gradual exposure to small amounts of carcinogens people experience every day.

The cellular model developed in Wang’s laboratory shows that these cells develop distinct characteristics on the way to becoming cancerous. Furthermore, the model shows that biological amounts of GTC inhibit pre-cancer formation in these cells. Therefore, this model is capable of serving as a way to identify other agents that might prevent cancerous progression of human breast epithelial cells.

Full details of the article are found in “Publications” on p. 5.

Public Health Relevance Project Narrative
A Confusing but Critical Component of the NIH Grant Application

The May 2005 addition of the project narrative to the NIH grant application came with minimal explanation: “Using no more than two or three sentences, describe the relevance of this research to public health.” And do this in plain language, too.

With less guidance comes greater freedom but also the potential for greater confusion. If a grant writer has not read the instructional description for the project narrative, it can turn into a lay abstract with no mention of public health, much less its relevance in that particular project.

Even if one has read the instructions, to satisfy the narrative requirement, it is tempting to write, “This project is relevant to public health in that it will benefit the whole of society.” However, with appropriated space of only “two or three sentences,” it seems wasteful to spend one of those sentences on a circular definition, i.e., the project is relevant to public health because it will benefit [insert definition of public health].

One way to start thinking about how to write an effective project narrative is to consider the audience. The National Institutes of Health use these statements to analyze portfolios, to identify research highlights to Congress, and to make the importance of the research clear to the public.

Therefore, the statement should be accessible to non-scientists, but it should also include precise word choice to avoid becoming an empty statement. For biomedical researchers, stating the long-term goal of the research might be the best solution. A better first sentence, therefore, might be this: “Determining whether epicatechins found in dark chocolate prevent cholesterol from gathering in the arteries could result in dietary recommendations to reduce the risk of blood clots and clogged arteries, which affect about 35% of American adults.”

This sentence uses language accessible to a lay audience, and its relevance to public health is specific and clear.

Welcome to New CEM Students and Congratulations to Recent Graduates

Both Amanda Peretich (MS, mentor Madhu Dhar) and Pranita Sarangi (PhD, Barry Rouse) graduated from the Comparative and Experimental Medicine (CEM) program in the spring. Peretich is now an adjunct chemistry instructor for South College and will be teaching biology and chemistry at Karns High School this fall. Sarangi took a post-doc position at the University of Rochester.

Nine CEM students have joined the program this year. New spring students were Sarah Elliott (MS, mentor Nicholas Frank), Beth Hammer (PhD, Joseph Bartges), Yarong Liu (PhD, Xuemin Xu), and Samar Solyman (PhD, Stephen Kania).

Joining the program in the summer were Sarah Hurst (MS, Dhar) and Sachin Mulik (PhD, Rouse), and working toward PhDs in the fall will be Dan Chen (Xu), Ashley Pedigo (Agricola Odoi), and Elizabeth Tadros (Frank).
Journals Using Software to Detect Image Manipulation Not Visible to Eye

A new software service called Rigour is being used by some journals to determine acceptable manipulation limits for images submitted with manuscripts.

The service was discussed recently by a panel at the Council of Science Editors meeting in Vancouver. Dana Compton, production manager, said for The Proceedings of the National Academy of Sciences (PNAS), explained that Rigour is being used to scan all incoming images at PNAS. If the software flags an image as potentially manipulated, the service will send a notice to the journal, where trained employees decide whether the manipulation is acceptable.

Compton stressed that most image manipulation is done honestly by scientists who want to improve the quality of the image, such as adjusting the contrast to better delineate between different tissues. Most adjustments like these are acceptable. However, adjusting the contrast too much can create what’s called “sloppy shading,” a sort of white, which is usually unacceptable because it hides parts of the image that may be of important interpretation.

In the case of image manipulation and the difficulty of detecting it without software help are shown in Fig. 1. The software works on the basis that if there are any changes, they are most likely artefacts of image manipulation rather than a genuine change in the quality of the image.

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On June 27, HS Adair gave seven presentations ranging from equine metabolic diseases and anaesthesia to rehabilitation and hyperbaric oxygen therapy at the Alabama Veterinary Medical Association Annual Convention in Sandestin, FL. FM Andrews gave an oral presentation on “The evaluation of the wireless capsule (SmartPill) for measuring gastric emptying and GI transit in normal dogs” at the American College of Veterinary Internal Medicine (ACVIM) forum in June in San Antonio, TX. R. DeNovo, R. Reese, S. Elliott, T. Meyers, D. Barthal, M. Lyman, and G. Daniel were also authors.

Also at the ACVIM forum, Andrews presented “livermetacin concentrations in blood and cerebrospinal fluid following intravenous administration to healthy llamas,” which was prepared by S. van Amstel and co-authored by A. Portmann, S. Cox, T. Doherty, and S. Newman. Three posters presented at ACVIM were as follows: “In vitro effects of lactobacilli on bioelectric properties of equine nonendangered mucosa” (B. Buchanan, F. Andrews, S. Elliott, R. Al Jasim, C. McGowan, A. Saxton); “Use of a wireless capsule, SmartPill, to measure gastrointestinal pH, pressure, and transit time in a horse” (S. Elliott, R. Reese, R. Denovo, D. Barthal, M. Lyman, G. Daniel, F. Andrews); “The effects of seabuckthorn extract in the treatment and prevention of gastric ulcers” (R. Reese, F. Andrews, S. Elliott, A. Saxton, R. McBmullen). N. Frank coordinated the Equine Endocrinology Special Interest Group at the ACVIM conference and presented two sessions: “Overview of insulin resistance and equine metabolic syndrome” and “Leptin/melanocortin system as a treatment for insulin resistance.” Frank was a co-author on “Increased adiposity in horses is associated with decreased insulin sensitivity, but unchanged inflammatory cytokine expression in subcutaneous adipose tissue” with R. Carter, J. McCutcheon, T. Burns, J. Belknap, and R. Geor.

In addition, F. Toth presented “Urinary glucose concentrations during intravenous glucose-tolerance tests in horses” (co-authors N. Frank, K. Perdue, R. Geor, S. Elliott, B. Buchanan, C. McGowan, and A. Saxton). Also at that symposium, LL. Abbott presented “Role of sodium-potassium-ATPase and sodium-hydrogen exchanger mRNAs in equine gastric ulcer syndrome” (co-authors AL. Carroll, M. S. Daniel, G. Daniel, and FM Andrews), and presented “Evaluation of dimethyl sulfoxide effects on initial response to endotoxin challenge in the horse” (co-authors G. Kelmer, T. Doherty, S. Elliott, A. Saxton, and MM. Fry). Three posters were presented at that symposium: “Anellins – Effects of intravenously administered oromepazine on gastric juice pH and gastric ulcer scores in adult horses” (co-authors N. Frank, C. Smordanstahl, B. Buchanan, S. Elliott, and Y. Allen); “SmartPill”, “Use of a wireless capsule, SmartPill, to measure gastrointestinal pH, pressure, and transit time in a horse” (co-authors R. Reese, R. Daniel, G. Daniel, B. Buchanan, G. Daniel, and FM Andrews); “The effects of Sea buckthorn extract in the treatment and prevention of gastric ulcers” (co-authors FM Andrews, S. Elliott, A. Saxton, and RB. McMillen).

Second Annual Comparative & Experimental Medicine Research Symposium

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**Abstracts**

**CVM Well Represented in Research Symposium**

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- p4: Wang report, public health relevance statement, NIH boost, Luxsy award, CEM students
- p5: Sara award, grant awards
- p6: Publications & Presentations

**OUTSTANDING PRESENTATION AWARD**

Aarih Sundararajan, Microbiology

**PFI ZETA EXCELLENCE IN CLINICAL VETERINARY RESEARCH AWARD**

Patricia Durant, Small Animal Clinical Sciences

**AWARD OF ACHIEVEMENT**

Research Assistant Professor Category

- Maria Prado, Animal Science

**AWARD OF ACHIEVEMENT**

Research Associate Category

- Elvira Y. Liu, Pathobiology/Microbiology

**AWARDS OF EXCELLENCE**

Research Assistant Professor Category

- Scott LeBlanc, Ophthalmology

**Awards of Excellence**

Graduate Student Category

- Katherine Stenske, Small Animal Clinical Sciences

- Hye Mee Joo, Microbiology

- Ferenc Toth, Large Animal Clinical Sciences

- Mugha Saghal, Pathobiology

- Katherine Stenske, Small Animal Clinical Sciences

- Hye Mee Joo, Microbiology

- Ferenc Toth, Large Animal Clinical Sciences

- Mugha Saghal, Pathobiology

- Katherine Stenske, Small Animal Clinical Sciences