



From
College of Pharmacy Dean
Gary Pollack, Ph.D.

July 2016

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Dear Friends and Colleagues:

As has been reflected in many of my comments in earlier issues of this newsletter, our college has implemented a number of changes in our Doctor of Pharmacy program over the past three years. In the aggregate, we believe that these changes contribute to our students receiving a truly outstanding education that prepares them not only to enter practice upon graduation, but to adapt to and lead change in a rapidly-evolving healthcare environment. Our approach to preparing the next generation of pharmacy practitioners and pharmaceutical scientists is, of course, consistent with Washington State University's goal of providing its students with a "transformative experience". In our case, we aspire to transform not only how students think about the world around them and their place in that world (the traditional definition of a transformative educational experience), but to catalyze their transformation from students to professionals.

In order to more broadly share our vision of the future of academic pharmacy, our college hosted a Transformation and Innovation in Pedagogy Summit at the end of June. Representatives from other pharmacy programs, the American Association of Colleges of Pharmacy, and our own faculty met for two days to discuss why and how we have implemented our broad array of changes in educating our students, and what we perceive the impact has been. Our approach to aligning assessment of student performance with curricular delivery in a competency-based framework, our commitment to re-engaging students to assure that they can demonstrate competency in key areas of science and practice, our embrace of active- and collaborate-learning strategies throughout the professional curriculum, our approach to implementing the extension of our program to Yakima and how that project has affected how we view the educational process were among the topics discussed. I am extremely grateful to Stuart Muller and Linda Garrelts MacLean, who led the development of and hosted the summit. This event is just the latest example of how our program is influencing how others think about pharmacy education, and helps to establish our position as thought leaders in academic pharmacy.

In addition to how we engage our students, our program also has focused significant attention on assuring that we provide students with opportunities to specialize and distinguish themselves. We have developed an honors

program for students interested in research, established concurrent degree options for students interested in pursuing the Ph.D. in Pharmaceutical Sciences or the MBA in addition to the Pharm.D., and have restructured our curriculum to create additional opportunities to pursue elective coursework. This latter development will facilitate our intent to design a series of specialty tracks so that every student entering our program will graduate not only with the Pharm.D. degree, but with an area of concentration that will support the student's individual career aspirations.

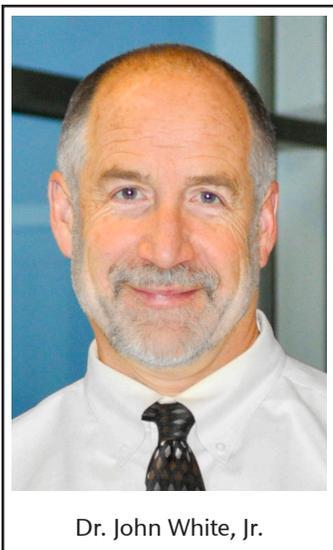
Wishing you all a happy and safe Independence Day,



Gary M. Pollack
Dean
Washington State University College of Pharmacy

Coffee vs. Energy Drinks

WSU clinical trial determines no difference in caffeine absorption

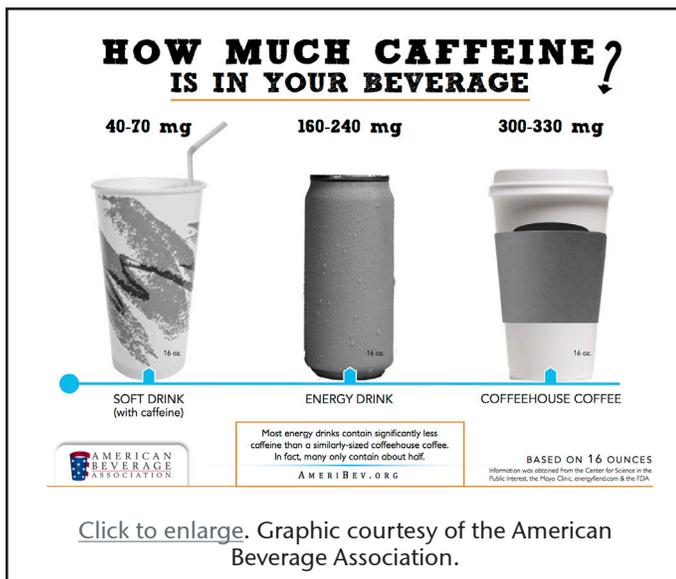


Coffee and energy drinks recently went head to head in a clinical trial at Washington State University (WSU) Health Sciences in Spokane, in order to determine if there was any difference in caffeine absorption in the body.

“Concerns have been expressed that energy drinks consumed rapidly provide a dangerous jolt of caffeine,” said [John White](#) from the College of Pharmacy, who was the principal investigator on the study. The research team included health sciences faculty from the WSU Colleges of Pharmacy, Medicine and Nursing.

White has served as an expert witness in regard to the pharmacokinetics of coffee to an array of government agencies and legislative bodies, some of which were attempting to restrict the availability of energy drinks without any supporting science that demonstrated a need to do so. Since there wasn't an official study

comparing coffee to energy drinks, or studies on the rate of consumption or hot versus cold, White submitted a proposal to the American Beverage Association (ABA) in order to conduct one. As a result, the ABA granted WSU \$263,000 for a clinical trial.



They wanted to see if there was statistical significance in caffeine absorption rates between the two beverage options. The team compared coffee to energy drink, hot to cold, and rapid to slow consumption rates. Essentially, they wanted to see if you would get a higher, more rapid peak caffeine level if you slammed your coffee cold, as opposed to slowly sipping your coffee hot. They also compared coffee to energy drinks to address the concern that, ounce for ounce, rapidly consumed energy drinks provide a greater “jolt” of caffeine concentration in the body.

The study used a standard dose of 160 mg of caffeine. “This represents the ‘middle of the road’ amount of caffeine available in beverages on the market,” said White.

The verdict? According to their findings published in the journal Clinical Toxicology this April, “caffeine exposure was very similar between the five conditions studied,” and “would not be expected to result in clinically significant differences in effect.”

Further, the differences between absorption rates in men and women closely followed differences in body mass, so it could be said that pound for pound of person, and ounce for ounce of caffeine, the effect is relatively the same.

The WSU study is the first published comparison of the caffeine exposure after consumption of coffee versus an energy drink and the impact of temperature and rate of consumption.

“The study suggests that in terms of caffeine absorption and metabolism, coffee and energy drinks are very similar and that rate of consumption and temperature of drink don’t significantly alter caffeine absorption,” said White.

The study also confirmed previously reported metabolic parameters for caffeine.

Variables not evaluated in this trial in regard to caffeine pharmacokinetics included the potential compound effects of beverages containing sugar, the differences in higher concentration to lower volume of caffeine in certain beverages or supplements and beverages that contain other non-caffeine constituents (alcohol or B vitamins, for example).

This study specifically measured concentration of caffeine in the body, not effects of caffeine on the brain, which varies between individuals depending on two major factors: how fast a person metabolizes caffeine, and the individual’s genetic array of caffeine receptors in the brain, said White.

The ABA is funding a follow up study that has sent the research team back to the data they collected to look at

how it relates to the genetic information of the individuals. Over the next six months, they will be evaluating to see how genetics effect whether a person has a “slow” or “fast” caffeine metabolism.

“Our goal is to further the understanding of the metabolism and effects of caffeine,” said White. “Specifically, the genetic differences in metabolism and effect between individuals. We would also like to investigate the prescription drug or caffeine interactions potentially caused by the components of commonly consumed energy drinks.”



Nasal spray may ease Parkinson’s, other disease symptoms

Antioxidant delivery research aims to improve quality of life for patients



Dr. Jeannie Padowski

WSU collaboration on a pilot study using magnetic resonance spectroscopy produces first evidence that intranasal administration of the antioxidant glutathione can increase brain antioxidant levels in Parkinson’s disease.

[Jeannie Padowski](#) is a researcher at WSU Health Sciences in Spokane. She holds appointments in both the Colleges of Medicine and Pharmacy, and her main area of expertise is mathematical modeling of drug disposition in the central nervous system. This means Padowski studies and has extensive knowledge of pharmacokinetics and pharmacodynamics in relation to the central nervous system.

Glutathione deficiency has been documented in a variety of central nervous system disorders, including Parkinson’s disease. There is anecdotal evidence that supplementing glutathione can help alleviate symptoms, says Padowski.

Padowski recently teamed up with researchers at the University of Washington and Bastyr University Research Institute in Seattle, and looked at the effects of intranasal delivery of the antioxidant glutathione in patients with Parkinson’s disease. The intranasal delivery aspect of the project was particularly important because orally-administered glutathione is not well-absorbed. Intranasal delivery can sometimes be useful for targeting drugs to the brain.

The research team compounded a glutathione concentrate into a nasal spray and had study participants give themselves a single dose while undergoing MRI scanning. Using the brain scans of participants before the dose and at intervals in the following hour, the team was able to observe how well the treatment method delivered the antioxidant across the blood brain barrier. Padowski assisted with the data interpretation and analysis of the study.

“When you’re doing MRI, you’re using magnetic and radio pulses to generate an image of the body. That’s what people usually use MRI machines for—looking for tumors, injuries and such,” said Padowski. “But you can also program that same machine to apply the magnetic and radio pulses in a slightly different way, so that instead of

generating an image, you generate a spectrum (a series of peaks along an axis), where each peak corresponds to an amount of a certain chemical in that tissue. This is usually only done for research purposes, it's not a routine clinical procedure at this point."

Part of Padowski's previous research was implementation of this method for measuring glutathione levels in the brain, something that is challenging, she says.

"The use of magnetic resonance spectroscopy to observe changes in chemical composition of the brain over time is novel, and glutathione happens to be one of the few antioxidants you can detect with this approach," said Padowski.

Their "proof-of-concept" study was the first of its kind to demonstrate a noninvasive, self-administered therapy that has potential for boosting glutathione levels in the brain. The investigators reported a 240% increase in brain glutathione within one hour of administration, and their results were published in the journal [NPL Parkinson's Disease](#) in February.

There were 15 people in the study, all with mid-stage Parkinson's disease. Funding for the project came from the Michael J. Fox Foundation. Additional collaborators on the study included the Michael J. Crescenzi VA Medical Center and the University of Pennsylvania School of Medicine in Philadelphia.

"Studies like this provide important information regarding how brain chemistry may change in response to disease and to therapeutic intervention. When successful, they can provide us with clues that could lead to the next treatment breakthrough," said Padowski.

While increasing antioxidant levels alone will not stop Parkinson's disease, glutathione administration has been reported to reduce Parkinson's symptoms. This could provide Parkinson's patients with a supplement to their standard drug therapy regimen that has the potential to improve their quality of life.

For Padowski and her team, the work is far from over.

The research group has a new batch of volunteers who are completing a longer-term study. Study participants self-administer nasal glutathione three times daily, and undergo MR spectroscopy before and after three months of glutathione therapy. These measurements will allow the research team to compare changes in glutathione levels with reported symptoms.

Other central nervous system disorders for which glutathione deficiency and glutathione-related enzyme deficits have been documented include multiple sclerosis, autism, Alzheimer's disease, schizophrenia, and bipolar disease. Further studies will be required to evaluate if glutathione augmentation could be a beneficial therapeutic or neuroprotective approach for these conditions as well.

Research at the WSU College of Pharmacy supports the university's land-grant mission to address some of society's most complex issues, specifically WSU's efforts surrounding developing practical solutions to challenging problems in health care delivery, health care access and disease prevention.



Dr. Joshua Neumiller

WSU pharmacist joins national ADA committee



Dr. Joshua Neumiller

[Joshua Neumiller](#), pharmacotherapy associate professor at the WSU College of Pharmacy, was recently appointed to serve a two-year term on the American Diabetes Association's Professional Practice Committee.

According to Neumiller, the primary responsibility of the committee each year will be to update the ADA's Standards of Medical Care in Diabetes. The standards are comprehensive evidence-based clinical practice recommendations that guide health care providers.

"I am very much looking forward to engaging in the process," said Neumiller. "These guidelines are widely followed by providers around the world, with the work done having a significant impact on care for people with diabetes."

The committee also reviews and approves the ADA's position and scientific statements, which represent official ADA opinion and are published in scholarly journals. The statements may also include scholarly synopses and clinical recommendations, said Neumiller.

"This provides a huge opportunity for me to extend my scholarship and service contributions to the ADA and represent the WSU College of Pharmacy on a national level," he said.

Neumiller has been an active ADA member for a number of years, serving currently as editor for the organization's journal *Diabetes Spectrum* and as a member of several ADA work groups. He is also a certified diabetes educator and fellow of the American Society of Consultant Pharmacists. A WSU alumnus and Spokane native, he received the national Albert B. Prescott Leadership Award this year from the Pharmacy Leadership and Education Institute, an honor given annually to a pharmacist less than 10 years into his or her career who has demonstrated the potential to become an influential force in pharmacy.



Other College News

FACULTY SCHOLARSHIP

Publications

- Pharmacotherapy Clinical Associate Professor and Assistant Dean for Assessment and Accreditation [Brenda S. Bray](#), Pharmacotherapy Clinical Associate Professor [Lisa J. Woodard](#), Pharmacotherapy Clinical Associate Professor [Megan N. Willson](#), and eight co-authors published, "Development, implementation and evaluation of a longitudinal interprofessional education project," in the *Journal of Interprofessional Education and Practice*, the official journal of the National Academies of Practice, in April 2016. [read article](#)
- Experimental and Systems Pharmacology Clinical Professor [Jean-Baptiste Rouillet](#), Experimental and Systems

Pharmacology Postdoctoral Research Associate **Garrett Ainslie** (Gibson lab), Experimental and Systems Pharmacology Postdoctoral Research Associate **Kara Vogel** (Gibson lab), Allen I. White Distinguished Professor and Experimental and Systems Pharmacology Chair **K. Michael Gibson**, and two co-authors published, “Succinic semialdehyde dehydrogenase deficiency (SSADHD): pathophysiological complexity and multifactorial trait associations in a rare monogenic disorder of GABA metabolism,” in the journal *Neurochemistry International*, available online June 14, 2016. [read abstract](#)

- **Kara Vogel**, **Garrett Ainslie** and **K. Michael Gibson** published, “mTOR inhibitors rescue premature lethality and attenuate dysregulation of GABAergic/glutamatergic transcription in murine succinate semialdehyde dehydrogenase deficiency, a disorder of GABA metabolism,” in the *Journal of Inherited Metabolic Disease*, the official journal of the Society for the Study of Inborn Errors of Metabolism.
- **K. Michael Gibson** co-authored with 10 others, “Preservation of mitochondrial function using curcumin-PAK peptide conjugates mitigates acute limb ischemia/reperfusion injury,” published in the *Journal of Medicinal Chemistry*.
- Pharmaceutical Sciences Postdoctoral Research Associate **Fan Zhang** (Zhu lab), Pharmaceutical Sciences Postdoctoral Research Associate **De Cheng** (Zhu lab), Pharmaceutical Sciences Clinical Associate Professor **Shuwen Wang**, Pharmaceutical Sciences Professor **Jiyue Zhu**, and one co-author published the review article, “Human specific regulation of the telomerase reverse transcriptase gene,” in *Genes*, a peer-reviewed journal in molecular biology. [read abstract](#)

Service

- Pharmacotherapy Clinical Professor **Linda Garrelts MacLean** has been named vice dean for external relations.
- Pharmacotherapy Clinical Associate Professor **Jennifer Robinson** has been named assistant dean for recruitment and student services.
- **Brenda Bray** has been named assistant dean for assessment and accreditation.
- Pharmacotherapy Clinical Associate Professor **Angela Stewart** has been named assistant dean for Yakima extension of the Doctor of Pharmacy program.

Grants

- Pharmaceutical Sciences Associate Professor **Salah-uddin Ahmed** received \$368,738 over two years from the National Institutes of Health for the NIH R21 grant titled, “Novel targeted therapeutics for regulating synovial hyperplasia in RA.”
- Boeing Distinguished Professor and Pharmaceutical Sciences Chair **Philip Lazarus** and one other received an administrative supplement in the amount of \$104,213 over two years to the current NIH R01 funded project, “The UGT2A and 3A metabolizing enzymes and tobacco-related cancer risk,” to promote diversity in health-related research.

Awards

- **Jiyue Zhu** and his laboratory received a Blue Flame Award from Addgene, a non-profit plasmid repository, in recognition of distribution of a plasmid more than 100 times to the research community.

STUDENT ACHIEVEMENT

Doctor of Philosophy (Ph.D.) students

- **Sara Dumit** (Tolmachev lab, pharmaceutical sciences) received a \$1,000 scholarship from the Columbia Chapter of the Health Physics Society on June 8, 2016.
- **Sihan Wang** (Zhenjia Wang lab, pharmaceutical sciences) received a James and Diann Robbers Student Research Award on May 5 by the College of Pharmacy graduate education committee to support her research project, “Bacterium membrane-derived nanovesicles as a vaccine for prevention of *Pseudomonas aeruginosa* infection.” James and Diann Robbers established this endowment to support deserving students in their exploration of the exciting world of research, as a way of honoring Professor Gibson, and in appreciation of the outstanding education that they received at WSU from dedicated faculty.
- **Ana Vegara** (Lazarus lab, pharmaceutical sciences) with faculty mentor **Philip Lazarus** received an administrative supplement in the amount of \$104,213 over two years to the research project, “The UGT2A and 3A metabolizing enzymes and tobacco-related cancer risk,” to promote diversity in health-related research.

Coming Events

- July 17-21, 2016 | 61st Annual Health Physics Society Meeting, Spokane, Washington
The USTUR will host the special session, “Five decade follow-up of plutonium and uranium workers.” USTUR staff will also conduct four podium presentations, and will co-present five podium presentations.
- August 12, 2016 | WSU College of Pharmacy Research Day
The College of Pharmacy will once again host a Research Day at WSU Health Sciences in Spokane, Washington. The event will include postdoctoral talks, poster presentations and a career panel.



College of Pharmacy

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