A NOTE FROM LINDA GARRELTS MACLEAN

Dear Friends and Colleagues:

Reflecting on our accomplishments and challenges in the past year, I’m grateful for everyone who has given their input and helped us along the way.

Achievements, both big and small, have made all the difference in our mission to advance, promote and protect human health. We have continued our efforts to navigate through challenging waters in pharmacy as it evolves at a fast pace. Proposing solutions on multiple levels and channels, our team is working to improve pharmacy for future generations. Despite the many headwinds, there are several milestones we have reached including graduating our inaugural class in Yakima, leading transformation and innovation with faculty from around the nation at TIPed (Transformation and Innovation in Pharmacy Education), and seeing our students advocate for policy changes to improve state-wide pharmacy education. This would not be possible without the commitment from our faculty and alumni who want every student to not only succeed but also lead the change in pharmacy. Our candid discussions on preparing our future pharmacists have only strengthened our ability to help students adapt to the changes that they will meet once they leave our school.

As we round out the year and move forward into the next decade, I would like to thank alumni, faculty, staff, students, and friends of the college for their unwavering support and guidance. Your hard work, commitment and investment in our college is what has helped us in our upward trajectory as a leading pharmacy school and research enterprise.

From my family to yours, Grant and I would like to wish you and your families a joyful, peaceful, and bright holiday. To bring some festive cheer, I highly recommend watching our season’s greetings video brought to you by our very multi-talented students. I promise it will get you in the holiday spirit!

With much respect,

Linda Garrelts MacLean, interim dean
WSU College of Pharmacy and Pharmaceutical Sciences
Finding the right dosing for children

Prescribe at your own risk. That is the general feeling that most doctors get when prescribing medicine to children. Due to ethical and legal challenges, conducting clinical trials on children has proven to be a major obstacle for drug researchers. In fact, many prescription drugs rarely go through clinical trials using children. As a result, doctors only have two options in pediatric care: 1. Don’t prescribe children drugs shown to be effective in adults, or 2. Prescribe drugs off-label to children at their own risk. That’s where Dr. Bhagwat Prasad, Associate Professor in Pharmaceutical Sciences at WSU, is transforming pediatric precision medicine so that drugs can safely be prescribed to children.

“Only 28 of 399 drugs prescribed to younger children between 1997 and 2010 have been studied for child safety and efficacy levels. Having some point of reference as to how to dose children is critical in understanding the long-term impact on the essential organs such as brain, kidneys and liver,” said Prasad, who recently joined WSU after more than eight years at the University of Washington’s Department of Pharmaceutics.

Children remain one of the most understudied population. The difference in physiology between children and adults is significant, not to mention the variability between genes, sex, and weight, among many other factors including potential drug interactions, which can cause a range of unpredictable outcomes in drug metabolism. For example, UGT2B17, a gene coding responsible for the elimination of potentially toxic xenobiotics and endogenous compounds, is not expressed in pre-pubescent children under the age of nine. If a child were given a drug requiring UGT2B17 enzyme to metabolize the drug, then toxicity would be a very likely outcome.

Prasad’s research aims to bridge the existing gap in the data with a refined and mechanistic understanding of the developmental changes (ontogeny) in drug metabolizing enzymes and transporters in adults versus children population using quantitative mass spectrometry. The quantified proteomics and metabolomics data derived using pediatric tissues and biofluids when combined with drug-dependent parameters is crucial to develop pediatric physiologically-based pharmacokinetic (pPBPK) models. These models help researchers to better understand the lifecycle and metabolism of a drug and give a more accurate dosing recommendation when considering pediatric dosing—particularly in clinical trials.

“If we can better understand all the variables in drug metabolism and possible interactions, it takes the burden off of doctors having to prescribe a dosage to a child based on what little evidence there is on pediatric dosing,” said Prasad.

In the long-term, Prasad’s lab is focused on building refined p-PBPK models integrated with children’s developmental and physiological factors to better predicting safe pediatric dosage levels. “For parents, children are their most valuable assets. By researching and understanding in greater detail the physiology, and mechanisms behind drug metabolism in children, we are safeguarding what is most important to us,” said Prasad.

Army combat veteran on her journey to becoming a pharmacist

Monica Sines never imagined a career in pharmacy. As a driver in Tikrit and Mosul in Iraq, transporting Iranian, Iraqi and Pakistani workers safely to their destinations, 19-year-old Sines witnessed harrowing scenes while serving in the military.

“I saw things that people at that age should not see,” said Sines, who is now 35 and a third year at the College of Pharmacy and Pharmaceutical Sciences pursuing her Doctor in Pharmacy.
Sines joined the military in November 2002 at age 18, just before the March 2003 invasion of Iraq. After six years of service, Sines left the military in 2008 and received her bachelor’s degree in biology at Hawaii Pacific University in 2016. Her passion for problem solving and collaborating with nurses and physicians while working at the Tripler Army Medical Center, sparked her interest in the health care field.

However, it wasn’t until 2012 after Sine’s father passed away, that she found her calling as a pharmacist. Due to negligence and poor communication, Sine’s father who was on Medicare at the time, died due to complications in treatment. From this experience, Sines found her motivation.

“My main goal is to provide the best care for anyone, no matter their social class, by communicating effectively with physicians,” said Sines. “These life experiences, along with my drive, my eagerness to learn more about the field and wanting to provide for my family, has led me to choose a career in pharmacy.”

For Sines, getting through pharmacy school has not been an easy path. As a mother of two young children, she has had to work tirelessly to keep up with her studies. Her experience in the military has kept her and her family disciplined and regimented. Each night, Sines lays out clothes and prepares lunch for her children for the next day. After everyone has gone to sleep, she begins preparing for class the following day. Paying tuition has also been a challenge, but meticulous planning has helped to minimize some of the costs. Earlier this year, Sines received some much-needed help when she accepted the first ever William and Felicia Gaskins Scholarship.

With the scholarship, Sines plans to pay it forward. Her goal is to work in urban areas with low-income populations to increase their understanding of medications and empower them to improve their health.

“I’m almost through the first semester of my third year of pharmacy school, and it’s been both challenging and rewarding,” said Sines during her acceptance speech for the scholarship, “It’s helping my goals come to fruition.”

**New technology promises improved treatment of inflammatory diseases**

By Judith Van Dongen, Office of Research, WSU Health Sciences Spokane

SPOKANE, Wash. – A study led by researchers at Washington State University has uncovered a potential new treatment approach for diseases associated with inflammation, including sepsis, stroke, rheumatoid arthritis, acute lung injury, and atherosclerosis.

Published in the open-access journal Science Advances, their paper describes a novel, patent-pending technology that uses nanosized particles to transport cell-killing drugs directly to activated neutrophils, the cells that drive the exaggerated immune response involved in inflammatory diseases. They also demonstrated the technology’s feasibility at selectively killing activated neutrophils without harming other cell types or compromising the immune system.

“Scientists have started realizing that neutrophils—which were always seen as the ‘good guys’ for the key role they play in our immune system—are actually also contributing to the pathology of all kinds of diseases,” said the study’s senior author Zhenjia Wang, an associate professor in the WSU College of Pharmacy and Pharmaceutical Sciences.

You might think of them as beneficial cells that have gone rogue. Neutrophils, which make up as much as 70 percent of the body’s white blood cells, are the immune system’s first line of defense. Produced in bone marrow, they quietly patrol the blood stream, looking for viruses, bacteria, and other invading pathogens to fend off. They normally circulate through the blood for 8 to 20 hours before returning to the bone marrow to die as part of a natural process known as apoptosis—or programmed cell death—which helps keep the immune system in balance.
However, inflammation caused by pathogens or damaged tissue can activate neutrophils and keep them alive long beyond their normal lifespan. This increases neutrophil numbers in the blood and allows them to invade and accumulate in healthy tissue, resulting in damage that can harm organs and lead to death.

“Neutrophils don’t know who the enemies are,” Wang said. “They just attack, releasing all kinds of harmful proteins in the blood stream. They will kill bacteria, but they will also kill healthy tissue in the body at the same time.”

**NANOPARTICLE DESIGN TARGETS INFLAMMATORY NEUTROPHILS**

Wang said previously studied approaches to target these activated, or inflammatory, neutrophils had a significant flaw: they not only killed off the harmful inflammatory neutrophils, but also the beneficial resting neutrophils in the bone marrow. This compromises the immune system and increases the chance of life-threatening, secondary infections.

To address that issue, Wang and his research team created nanoparticles that are capable of carrying molecules of doxorubicin—a commonly used chemotherapy drug—into inflammatory neutrophils and release their drug load once inside.

They created these nanoparticles from albumin, a protein that naturally occurs in the blood stream. The technology relies on their discovery that Fc-gamma receptors—a specific type of receptor cells that are found on the surface of all neutrophils—are activated in inflammatory neutrophils, but not in resting neutrophils. Thus, the nanoparticles will only bind to—and kill—inflammatory neutrophils, leaving resting neutrophils unharmed.

To ensure that the drug doesn’t get released before it reaches the inflammatory neutrophils, the researchers designed the bond between the nanoparticle and the drug molecules to be sensitive to acid. Blood is slightly alkaline, so this design allows the nanoparticles to travel through the blood stream intact. Once the nanoparticles reach the neutrophils’ acidic interior, the bond between the nanoparticle and the drug molecule is cleaved and the drug is released.

**FINDINGS CONFIRM FEASIBILITY**

To test the feasibility of their technology, Wang’s team conducted studies that used rodent models of two inflammatory conditions: sepsis—a life-threatening condition caused by widespread inflammation in the body and the cause of more than a third of all hospital deaths—and ischemic stroke, which is caused by a blood clot that obstructs blood and oxygen flow to the brain and triggers a harmful inflammatory response when blood flow is restored. Findings from their study suggest that the nanoparticles could be successfully used to increase survival in sepsis and minimize neurological damage from stroke.

“Our experiment found that our doxorubicin albumin nanoparticles can decrease the lifespan of harmful neutrophils in the blood stream,” Wang said. “More importantly, we also found that our nanoparticles don’t inhibit the neutrophils’ function in the bone marrow.”

Wang and his team plan to conduct additional research to delve deeper into how their technology works on a molecular basis and to further optimize it. The next step would be to test the technology in human clinical trials before it could be developed into a commercially available treatment strategy that could benefit patients.

Wang’s collaborators on the study include first author Can Yang Zhang and Xinyue Dong, Jin Gao, and Ze Liu of Washington State University, as well as Wenjing Ling of Guangdong University of Technology in Guangzhou, China.

This work was funded by the National Institute for General Medical Sciences, a component of the National Institutes of Health, under grant number R01GM116823.
Spotlight on Success

Pharmacy students help out to stop Hepatitis A outbreak in Yakima

During a recent Hepatitis A outbreak in the Yakima Valley, student pharmacists mobilized to help distribute vaccines to the community. After a Safeway pharmacy manager reached out to Yakima WSU College of Pharmacy and Pharmaceutical Sciences Clinical Assistant Professor Christina Buchman, her and several student pharmacists stepped up.

“[The students] love to be out in the community and provide the services,” said Buchman.

You can read the full story from the Yakima Herald.

Fourth year named Washington State Student Pharmacist of the Year

Brandy Seignemartin, class of 2020, was named the Washington State Student Pharmacist of the Year for her contributions toward the growth and development of pharmacy student participation on both a local and state level. She received the award November 9 from the Washington State Pharmacy Association.

She has shown an ongoing devotion to advocacy in the pharmacy profession even working toward the passage of House Bill 1726 which amends state law to allow pharmacy, medicine and nursing students to be supervised by preceptors from any of those professions while taking vital signs at health fairs and other such volunteer activities as long as the care provided is within the proper scope of practice.

Wave the Flag for Pharmacy Winner!

Congratulations to BriAnna Goll, class of 2011, our 2019 Wave the Flag for Pharmacy winner! She sent us this amazing photo from Tortola, British Virgin Islands.

And thank you to all of our alumni who sent us their Wave the Flag photos from their summer travels.

PHILANTHROPY FOCUS

Great News! The Russell and Sheri Crawford Legacy Scholarship in Pharmacy is being established with a major gift from Rusty (class of 1987) and Sheri (class of 1988). Rusty recently retired after a 30+ year career as pharmacy director at the VA Hospital in Tucson. Sheri also spent her career in hospital pharmacy and is retired, too. This new scholarship endowment will provide financial support to student pharmacists at the WSU CPPS.
Alumni Updates

**Leen Kawas**, Ph.D. class of 2011 was recently named one of 7 millennial influencers in the Biotech industry.

We had a chance to visit with **Dorothy Brink**, class of 1958, in early November. Dorothy lives in Yakima and enjoyed a 25+ year career in community pharmacy before retiring in the 1980s. One of the joys in her life is the time she spent in the United State Air Force, in the early 1950s, where she was part of the WAF (Womens’ Air Force Band.) Until 2018, Dorothy and her bandmates would get together for a yearly reunion and concert. Check out this YouTube video of the band playing at the Kennedy Music Center on August 29, 2019. Be sure and turn up your speakers!

**Courtney Mayo**, class of 2017, is now residing in Tucson, Arizona, where she is an inpatient pharmacist at Banner Medical Center, part of the University of Arizona medical complex.

**Victoria Starr**, class of 1995, has launched a new business venture related to medicinal cannabis. Sage Life provides professional, individualized consulting services to clients with a variety of multifaceted health issues. Victoria, who lives in Portland, Oregon, is also enrolled in the University of Maryland’s M.S. in Medical Cannabis Science and Therapeutics program.

Three alumni received awards from the Washington State Pharmacy Association on November 9, 2019:

- **Kirk Heinz**, B.Pharm. class of 1986, was awarded Washington State Pharmacist of the Year.
- **Steven Saxe**, class of 1977, received the Distinguished Leadership Service Award.
- **Dianna Gatto**, B.Pharm. class of 1992, was awarded Health-System Pharmacist of the Year.

Want to be listed in our alumni updates? Send us your career information or let us know what you’ve been up to at gocougs@pharmacy.wsu.edu!

Other News

**CPPS faculty member recognized by provost**

Pharmacotherapy Clinical Associate Professor Julie Akers was named the Provost’s Featured Faculty Member at the WSU vs. Oregon State football game on Saturday, November 23.

Read more

**Former College of Pharmacy dean awarded by WSPA**

William E. Fassett, who served as dean of the college from 1999 to 2005, recently received the David Almquist Award from the Washington State Pharmacy Association (WSPA) for his guidance and education related to compliance with Washington State pharmacy law.

**A new ‘breakthrough’ cystic fibrosis treatment is worth looking into**

John White, Pharmacotherapy Chair & R. Keith Campbell Distinguished Professor in Diabetes Care, wrote a piece in Health and Home Magazine, a publication from The Inlander, about a recently approved medication for the treatment of cystic fibrosis.

Read more from the Inlander

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**TIPed 2020**

June 23-25 | Spokane, WA

Seeking thought leaders and educators. This is your chance to share bold ideas on the future of pharmacy. Submit your proposal today for a chance to present.
Faculty Scholarship

PUBLICATIONS
Pharmacotherapy Clinical Associate Professor Kimberly McKeirnan and two co-authors published, “The value and potential integration of pharmacy technician national certification into processes that help assure a competent workforce,” in the peer-reviewed journal Pharmacy in September 2019 as part of the Special Issue Pharmacy Workforce Support Personnel. Read article »

Kim McKeirnan and one co-author published, “Implementing immunizing pharmacy technicians in a federal healthcare facility,” in Pharmacy in October 2019 as part of the Special Issue Pharmacy-based Immunization Services. Read article »

Pharmacotherapy Clinical Assistant Professor Lauren Marcath and two co-authors published, “Challenges to assess substrate-dependent allelic effects in CYP450 enzymes and the potential clinical implications,” in the Pharmacogenomics Journal in October 2019. Read article »

Allen I. White Distinguished Associate Professor Joshua Neumiller and co-authors published, “Rationale and design of a multicenter Chronic Kidney Disease (CKD) and at-risk for CKD electronic health records-based registry: CURE-CKD,” in the BMC Nephrology online journal in November 2019. Read article »

PRESENTATIONS
Pharmaceutical Sciences Assistant Research Professor Anil K. Singh (Ahmed lab) presented the poster, “Interleukin-6 promotes osteoclast-like phenotype in human rheumatoid arthritis synovial fibroblasts,” at the annual meeting of the American College of Rheumatology in Atlanta, Georgia on November 8-13, 2019. WSU co-authors include graduate student Mahamudul Haque and Pharmaceutical Sciences Professor Salah-uddin Ahmed.


J. Roberts and Marcia Fosberg Distinguished Professor in Pharmacotherapy Danial Baker presented, “Critical appraisal of systematic reviews,” for the Gulf Medical University College of Pharmacy in Ajman, United Arab Emirates on November 19, 2019.

SERVICE
Pharmacotherapy Clinical Assistant Professor (Yakima) Christina Buchman and several Yakima student pharmacists helped a local Yakima pharmacy respond to a large Hepatitis A vaccination effort in response to a local outbreak in the community on November 7, 2019. Read more »
STUDENT ACHIEVEMENT

DOCTOR OF PHILOSOPHY (PH.D) STUDENTS

Mahamudul Haque (pharmaceutical sciences, Ahmed lab) presented the poster, “Regulation of Interleukin-1β (IL-1β)-induced COX-2 expression and IL-6 and MMP-1 production in human OA synovial fibroblasts by guanylate binding protein 5,” at the annual meeting of the American College of Rheumatology in Atlanta, Georgia on November 8-13, 2019. Faculty co-authors include Anil K. Singh and Salah-uddin Ahmed.

Mahamudul Haque received a $500 ASWSU travel award and $500 in support from the Erwin & Jennie Foisy Scholarship fund to present his work at the 2019 annual meeting of the American College of Rheumatology.

Ruby J. Siegel (pharmaceutical sciences, Ahmed lab) presented the poster, “A novel role for extracellular sulfatase-2 in mediating IL-6-induced adhesion and migration molecules in human rheumatoid arthritis synovial fibroblasts,” at the annual meeting of the American College of Rheumatology in Atlanta, Georgia on November 8-13, 2019; with faculty co-author Salah-uddin Ahmed.

Ruby J. Siegel received a $500 Erwin and Jennie Foisy scholarship to present her work at the 2019 annual meeting of the American College of Rheumatology.

Ana Vergara (pharmaceutical sciences, Lazarus lab) attended a board of directors meeting for the Society for Advancement of Chicanos/Hispanic and Native Americans in Science (SACNAS) in Honolulu, Hawaii from October 28 – 29, 2019.

Ana Vergara with faculty co-author Pharmaceutical Sciences Chair and Boeing Distinguished Professor Philip Lazarus and two others, presented the poster, “Glycosylation of polycyclic aromatic hydrocarbons by UDP-glycosyltransferase 3A2 (UGT3A2) and in tobacco-target tissues,” at the SACNAS conference in Honolulu, Hawaii on October 31, 2019.

DOCTOR OF PHARMACY (PHARM.D.) STUDENTS

Several Yakima student pharmacists helped a local Yakima pharmacy respond to a large Hepatitis A vaccination effort in response to a local outbreak in the community on November 7, 2019. Read more »

Brandy Seignemartin received the Washington State Pharmacy Association (WSPA) Student Pharmacist of the Year award at the WSPA 2019 Awards of Distinction Ceremony on November 9, 2019. View awards program »