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RHO^{Rx}CHI *post*

St. John's University College of Pharmacy & Health Sciences



THIS ISSUE'S FEATURED ARTICLE:

A PHARMACIST'S
GUIDE TO RENAL
TRANSPLANT
THERAPEUTICS
AND ALLOGRAFT
REJECTION

RSV VACCINE: FURTHERING THE EXPANSION OF THE
PHARMACIST'S ROLE

THE NEW "ZOMBIE DRUG"

PHARMACY PEARLS: HOW TO IDENTIFY A RUPTURED
BRAIN ANEURYSM AND SUBARACHNOID HEMORRHAGE

HOW DRUG SHORTAGES HAVE AFFECTED
PHARMACIES, PHARMACISTS, AND PATIENTS

FDA APPROVES FIRST NONPRESCRIPTION ORAL
CONTRACEPTIVE

GENETIC VARIANTS AND ITS LINK TO INDIVIDUALS
ASYMPTOMATIC TO COVID-19

About the Rho Chi Post

The Rho Chi Post was developed by the St. John's University Rho Chi Beta Delta Chapter in October 2011 as an electronic, student-operated newsletter publication with a team of three student editors and one Editor-in-Chief. Today, our newsletter boasts 12 volumes, over 90 published issues, and more than 600 unique articles to date with an editorial team of first to sixth year student pharmacists, as well as returning PharmD graduates.

The newsletter is distributed by St. John's University College of Pharmacy and Health Sciences to more than 1,500 students and faculty members. Our monthly electronic mailing list continues to extend readership far beyond campus.

Mission

The Rho Chi Post is an award-winning, electronic, student-operated, faculty-approved publication that aims to promote the pharmacy profession through creativity and effective communication. Our publication is a profound platform for integrating ideas, opinions, and innovations from students and faculty.

Vision

The Rho Chi Post aims to become the most creative and informative student-operated newsletter within St. John's University College of Pharmacy and Health Sciences. Our newsletter continues to be known for its relatable and useful content. Our editorial team continues to be known for its excellence and professionalism. The Rho Chi Post sets the stage for the development of individual writing skills, collaborative team work, and leadership.

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A Message from the Editor-in-Chief, Isabelle Lim

As we round out the 2023 Fall Semester, I wish everyone happy holidays and a wonderful Winter Break! I would like to take a moment to acknowledge and appreciate the changes made to the Rho Chi Post this year. Through our 13th volume, we have been able to redesign the newsletter and feature even more articles written by our student-led staff. Additionally, it makes me proud to say that we have been able to collaborate with new pharmacy students and pharmacists outside of our Editorial Team. Taking on the role of Editor-in-Chief has given me the unique opportunity to connect with other members of the pharmacy community in an effort to share new information and ideas. I am continuously grateful for this experience and appreciate all the help I have received to run the Rho Chi Post. With that being said, I also want to thank those who take the time to read our newsletter. I wish all students and faculty good luck during the upcoming 2024 Spring Semester!

Frequently Asked Questions

Who can write for the Rho Chi Post Newsletter?

Anyone can write for the Rho Chi Post! Our newsletter is not exclusive to St. John's University students. The Rho Chi Post accepts articles on a daily basis!

How do I submit an article?

You can submit an article by creating an account on our website! Go to www.rhochistj.org/RhoChiPost, click the login button from the upper menu bar, and click register. Upon making an account, you will be able to submit articles to our author inbox.

Who determines article topics?

You are free to choose an article topic of your choice. Take a look at our Author Guidelines for ideas.

What happens after I upload my draft article on the Rho Chi Post website?

Our Editor-In-Chief (EIC) will either edit the article directly or assign the article to a staff editor. If any revisions are needed, the editor will upload the article back to the portal, notifying the author via email. The author can then download the edited article, make the suggested revisions, and reupload the draft back to the portal. Additional drafts will be reevaluated by our copy editors and then EIC, repeating this process. Once no further revisions are needed, the article is accepted for publication.

Is there a deadline for authors to send revisions?

There is no deadline to submit revisions for an article. However, the quicker revisions are made, the quicker the article can move through our editing process. Once an article is accepted for publication, it will be moved into a queue to be placed into an upcoming issue.

RSV Vaccine: Furthering the Expansion of the Pharmacist's Role

By: Ashley Medina, PharmD Candidate c/o 2025

After decades of trial and error, science is ready to offer preventative measures against the respiratory syncytial virus, better known as RSV. Utilizing RSV vaccination tools that have become available will allow for a healthy, fun, and safe transition from winter to spring, often when RSV cases rise. RSV presents similarly to a cold, affecting the nose, throat, and lungs.¹ However, such a lower respiratory tract infection may become fatal for those that make up vulnerable populations including, but not limited to, young children, infants, and older adults.

The past month has allowed pharmacists to collaborate with other healthcare providers and their communities to administer the new RSV vaccines and make a significant impact. On August 8, 2023, the Department of Health (DOH), in partnership with the New York State Education Department (NYSED), authorized pharmacists to administer RSV vaccines to adults aged 60 years and older.² Under the NYS education law, Chapter 555 of the Laws of 2021, pharmacists were granted permission to administer several vaccines with or without patient-specific orders, and two more have just joined the list.³ This news may sound minor at first glance, but it is quite the opposite!

The role of pharmacists as immunizers dates back to 1997, when the American Pharmaceutical Association (APhA) national training program was established.⁴ APhA's program aimed to address the prevalence of infectious

diseases due to few effective preventative measures, such as available vaccines. In 2008, the New York State Education Laws sections 6527, 6801, and 6909 extended pharmacists' authority to administer vaccinations to individuals aged 18 years and older.⁵ To date, vaccines approved for those 18 years and older include pneumococcal, meningococcal, tetanus, diphtheria, pertussis, herpes zoster, hepatitis A and B, human papillomavirus (HPV), measles, mumps, rubella, varicella, coronavirus disease 2019 (COVID-19), and RSV vaccinations.⁶ Influenza vaccine is the exception, in which it may be administered to those two years and older. The roles played in pharmacy practice expanded due to the COVID-19 pandemic. Recalling the events may remind us how pharmacies and their teams have stepped up to join other frontline healthcare workers. While cases were skyrocketing, the approval of new COVID-19 vaccinations strongly encouraged the public to get vaccinated to protect themselves. In March 2020, the Public Readiness and Emergency Preparedness (PREP) Act was born. Under this act, pharmacists can prescribe and administer COVID-19 vaccines to expand vaccine accessibility and decrease the risk of outbreaks.⁷ Thus, pharmacists became crucial educators for vaccine-hesitant patients. In less than half a century, the revolution of the pharmacist role has undoubtedly contributed to the frontlines of healthcare. From here, it should only cultivate more helpful practices to optimize patient care and health.

PHARMACIST'S ROLE IN RSV

The RSV vaccines that are currently available are Arexvy, developed by GlaxoSmithKline, and Abrysvo, developed by Pfizer. Arexvy, approved in May 2023 by the FDA, was granted based on information from an ongoing randomized, placebo-controlled clinical study for individuals 60 years and older.⁸ Abrysvo, also approved in May 2023, is indicated for use in older adults and has been in the works for over a year. With robust efficacy data for both vaccines, further approval for remaining vulnerable populations and the public is ongoing. Designed for the same indication, with similar mechanisms both vaccines serve to combat RSV infection. They both are considered recombinant subunit vaccines, which means small pieces of the virus are in the vaccine, but not enough to cause illness to the individual.^{9,10} This allows the body's immune system to be stimulated to respond appropriately, so it may combat infection if and when the time comes. Like other vaccines, they both exhibit similar side effects, such as injection site and/or muscle pain, and headaches. However, slight differences exist between the two, including ingredients that assist their stability and indication for additional populations. Most notably, as of August 21, 2023, Abrysvo has been granted an indication for pregnant individuals within 32 to 36 weeks of gestational age to protect mothers and infants.¹¹ Such events led to the successful implementation and expansion of the RSV vaccines as preventative care this winter.

What does this mean for the practice of pharmacy? Many will agree that this is another public health triumph, as expanding vaccine administration to pharmacists will educate and protect community members from illnesses, including RSV. Not only is this a chance to teach others, but it is also an

opportunity to improve accessibility. Many patients frequent their local pharmacies to pick up everyday medications, building relationships with their staff and pharmacists. With the trust between patients and their pharmacists, older adults are more likely to receive the RSV vaccines, lowering their risk for infection and recommending their loved ones do the same. Nationwide, this trend will lead to an increased overall vaccination rate.¹² As we have seen with the flu, COVID-19 vaccinations, and several others, a higher vaccination rate provides a healthier environment.

One may be wondering now, should I get the vaccine? The answer ultimately comes down to eligibility. The vaccine was developed to prevent health complications that may arise from contracting RSV. There are three main groups identified by the American Lung Association that are considered high risk for severe cases of RSV.¹³ This categorization consists of adults with chronic lung or heart disease, adults with a weakened immune system, and all older adults predominantly above 65 years old. At the moment, according to physicians, those who will benefit the most from receiving the vaccine are older adults aged 60 years and older. It is also recommended that those vulnerable to severe infection or who can transmit it to these individuals should ask their provider if they are eligible to receive the vaccination. The DOH and SED have announced that the vaccine will fall under Medicare Part D, ensuring that those covered can receive their vaccination without out-of-pocket costs.² Ideally, such coverage will inspire higher vaccination rates. Until then, to defend not just those 60 years and older from RSV, the DOH and CDC recommend practicing good hygiene to protect ourselves and others.

PHARMACIST'S ROLE IN RSV

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For more information and updates, visit [CDC.gov/rsv](https://www.cdc.gov/rsv) or the Department of Health's website.

The New “Zombie Drug”

By: Sandra Jojo, PharmD Candidate c/o 2024

The United States (US) is in the midst of an opioid overdose epidemic. All across the US, opioids continue to be abused regardless of strict laws. Communities suffer the consequences as more and more individuals become addicted to illicit drugs. The Philadelphia Department of Public Health reported that 91% of samples of purported heroin or fentanyl from the local area contained xylazine, making it the most common adulterant in the drug supply.¹

Xylazine is an alpha-2 adrenergic receptor agonist that is a non-opioid sedative and muscle relaxant developed in 1962 as a tranquilizer for animals such as horses, cattle, and other non-human mammals.^{2,3} It is not approved for use in humans and, if used, can cause toxicities such as dangerously low blood pressure, respiratory depression, slowed heart rate, and severe withdrawal symptoms. Xylazine is often abused intravenously but can also be swallowed or snorted.³ Its sedative effect has given xylazine the name “zombie drug”. This drug is also associated with necrotic skin ulcerations. Xylazine-induced skin ulcerations appear diffusely throughout the body, even at sites distant from the injection site. These ulcers are typically progressive, large, and necrotic.²

Currently facing this epidemic is a neighborhood just west of the New Jersey border, Kensington, Philadelphia, where opioids such as heroin and fentanyl are the predominantly

abused drugs.⁴ Scattered across the roads and sidewalks, you can find used needles, naming Kensington America’s largest open-air drug market. Public parks have become a major place for illicit drug use and exchange, one being McPherson Square Park, now known as Needle Park, because of the number of syringes covering the ground. City personnel and local businesses sweep up the needles from the streets and sidewalks every morning just to find even more the next morning. Xylazine, also known as tranq, is often found laced within fentanyl, cocaine, and heroin to enhance its effects.⁴ Using data from the Philadelphia Medical Examiner's Office (MEO), the Philadelphia Department of Public Health analyzed unintentional overdose deaths with heroin and/or fentanyl detections that occurred between 2010 and 2019 in Philadelphia. Between 2010 and 2015, xylazine was detected in 40 (2%) of the 1854 unintentional overdose deaths with heroin and/or fentanyl detections. This increased to 67 (11%) in 2016, 90 (10%) in 2017, 152 (18%) in 2018, and 262 (31%) in 2019.⁵ Additionally, the Drug Enforcement Agency issued a public safety alert warning the American public of a sharp increase in the trafficking of fentanyl mixed with xylazine. The DEA states, “they have seized xylazine and fentanyl mixtures in 48 of 50 states and reports that in 2022 approximately 23% of fentanyl powder and 7% of fentanyl pills contained xylazine.”⁶ In 2018, xylazine use escalated throughout the Northeast, and although predominantly recognized in Philadelphia, other major cities

such as New York City are not immune to the xylazine crisis. A study published in the *Journal of Analytical Toxicology* detected xylazine in the drug supply in 36 states and the District of Columbia. In New York City, xylazine has been found in 25% of drug samples, though health officials say the actual saturation is certainly greater.⁷

Because xylazine is not an opioid, it is resistant to standard opioid overdose reversal treatments, such as naloxone, making overdoses laced with xylazine even more deadly. Healthcare officials still advise the administration of naloxone because xylazine is often combined with fentanyl, heroin, or a benzodiazepine, which can be reversed by naloxone. If the individual seems to still be unconscious but is breathing after the administration of naloxone, this can be because of xylazine, and no more naloxone is needed.³ Fentanyl and xylazine test strips are available in Philadelphia through the Substance Use Prevention and Harm Reduction (SUPHR), which is a division of the Philadelphia Department of Public Health as a means for harm reduction and allows individuals to know what is in their illicit drugs before using and be aware of laced substances.⁸

Addiction, poverty, and violence have ripped the Kensington community apart, forcing families to the streets into inhumane conditions. From selling drugs to abusing them, mothers, fathers, and children are now in the cycle of addiction. In February 2023, Fox News interviewed a recovering addict for a firsthand perspective on the Kensington crisis. Rodriguez, a 42-year-old, was born in Brooklyn, New York, to heroin addicts and moved to Kensington with his mother at eight years of age, looking for a better life.⁹ Kensington

turned out to be no better. He described both places as an “open-air drug market.” To help his mom pay the bills and buy clothes for school, he started selling marijuana, which quickly turned to heroin. After his mom tragically passed from a motor vehicle accident, he became addicted to Percocet (acetaminophen-oxycodone), which turned to sniffing heroin and ultimately shooting heroin. It was only after overdosing during a relapse that he stayed clean. After realizing he was going to be a father and was highly unfit, he packed everything and moved out of Kensington. He said, “I told myself, I have to leave. If I don’t leave, I might not be alive to leave the next time that I want to.”⁹ Rodriguez is now on a mission to humanize addicts. He shows them love and respect because he states, “I still see a human being under there because I know at one time that was me.”⁹

Illicit drugs are destroying individuals as well as their communities. Those in Kensington, Philadelphia have suffered long enough with multiple unintended deaths from overdoses and opioids laced with life-threatening substances such as xylazine. City officials and private organizations coming together to provide resources to help these individuals on the road to recovery from addiction bring hope to restoring the community.

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Rho Chi Talks: A Peek Into Merck's Division of Regulatory Affairs

Featuring: Janelle Derbis, PharmD

By: Serina Lin, PharmD Candidate c/o 2024



Janelle Derbis is a PharmD graduate of Drake University, College of Pharmacy and Health Sciences, located in Des Moines, Iowa. She is currently the Director of Regulatory Affairs at Merck & Co., Inc. She has prior extensive experience in the U.S. Food and Drug Administration's (FDA's) Center for Drug Evaluation and Research and the Office of the Commissioner.

What kind of experiences did you have after graduating from pharmacy school?

My first job out of pharmacy school was working as a pediatric pharmacist in a hospital in Virginia. I transitioned into a role at the FDA and worked there for 21 years. In 2021, I began my career in the pharmaceutical industry with Merck on the regulatory affairs team. It's been almost 2 years!

Can you share a little bit more about your role in the FDA?

At the FDA, I liaised with health professional organizations such as the American Pharmacist Association (APhA), the American Society of Health-System Pharmacists (ASHP), the American Medical Association (AMA), and patient advocacy groups. I worked to ensure that their voice was heard within the agency. So, if a law was passed giving the FDA additional authority, we would have to implement it and oftentimes, it would have a

direct impact on pharmacists, physicians, patients, etc. The FDA wants to make sure these health professional organizations and patient advocacy groups understood what was proposed and that any comments they had were listened to and addressed. In addition, I was the program director of the Advanced Pharmacy Practice Experience (APPE) program. Toward the end of my career at the FDA, I worked on issues related to the opioid epidemic.

Can you describe your time in the Public Health Service?

During my time in the Public Health Service, I served in a leadership role on the pharmacy professional advisory committee, where I collaborated with pharmacists across different agencies within the Department of Health & Human Services. Additionally, I was involved with outreach to pharmacy colleges to teach students about the opportunities for pharmacists within the federal government.

What is your role at Merck? What does

your typical day look like?

In my current role at Merck, I lead regulatory activities related to product shortages and deletions. I also ensure our products are compliant with the Prescription Drug User Fee Act (PDUFA).

What kind of skills did you bring over from the FDA to Merck?

Some of the skills that that I brought from the FDA to Merck include:

- Knowing how the legislative and policy-making process works
- Effective teamwork and communication, especially being able to work collaboratively, even with professionals of different backgrounds
- Having an understanding of the FDA approval process
- Being able to monitor the regulatory landscape

What is your favorite part about your job? What is one challenge that you have to face?

My favorite part about my job is that I am constantly surrounded by innovation, whether that be digital innovation or the next drug that's coming up in the pipeline. One of the challenges that I face in my role is the complexities around drug shortages. It is such a big issue and is so multi-faceted. Not one solution fits all and it needs to be addressed from different angles.

What is some advice you can give students interested in pursuing a career in regulatory or FDA?

- Look for opportunities to get involved in student organizations because that enables networking opportunities
- Taking leadership roles in student organizations
- Seek summer internships to better understand the various opportunities for pharmacists within that organization
- Talk with pharmacists you know in different fields to open your perspectives
- Your first job is not your last job

On behalf of the Rho Chi Post's Editorial Team, we would like to thank Dr. Debris for sharing her experience at the FDA and Merck with the our newsletter!

Pharmacy Pearls: How to Identify a Ruptured Brain Aneurysm and Subarachnoid Hemorrhage

By: Maha Sohail, PharmD Candidate c/o 2024

In the United States, about 6.5 million, or 1 in 50 people, have an unruptured brain aneurysm, with one rupture occurring every 18 minutes.¹ Worldwide, there are almost half a million deaths each year from this medical emergency, of which half the victims are younger than 50 years old. Ruptured brain aneurysms are fatal in about 50% of cases, and those who do survive must often struggle with long-term debilitating health obstacles.¹ It is important to be able to identify the clinical presentation of a suspected rupture and its result, an aneurysmal subarachnoid hemorrhage, as well as recognize patient treatment and brain health lifestyle management after this occurrence.

Cerebral Aneurysms

A cerebral aneurysm, also known as a brain or intracranial aneurysm, is characterized by the inflation of an artery in the brain. The causes are unknown; however, some proposed mechanisms are genetic artery abnormalities or structural changes caused by hypertension or smoking.² There are three different types of cerebral aneurysms, including berry (saccular), fusiform, and mycotic.³ Berry aneurysms are the most common, representing 90% of cerebral aneurysms, where there is a ballooning that inflates from a weakened area of an artery wall, and the balloon is attached to the artery like a berry hanging from a vine.³ Fusiform aneurysms are rare and characterized by an expansion of the artery bulging out from all

sides.³ Mycotic aneurysms are bulging aneurysms similar in shape to fusiform, and they are caused by an infection that affects the brain arteries, leading to the weakening of the artery wall.³

Aneurysmal Subarachnoid Hemorrhage

An aneurysmal subarachnoid hemorrhage (aSAH) is the result of a ruptured aneurysm, causing extravasation of blood into the subarachnoid space, which irritates the lining of the brain and damages the brain cells.⁴ Additionally, the area of the brain where the damaged artery was previously supplying oxygen-rich blood with, becomes blood deprived otherwise known as delayed cerebral ischemia (DCI).⁵ An aSAH is a medical emergency, as it is a life-threatening hemorrhagic stroke.

The subarachnoid space is filled with cerebrospinal fluid (CSF), which protects the brain by acting as a floating cushion. As blood from the aSAH fills up the space, it leads to increased intracranial pressure (ICP), causing the brain to either shift and herniate or be crushed against the skull.⁵ Blockage of CSF circulation will lead to enlarged ventricles, known as hydrocephalus, resulting in confusion, lethargy, and loss of consciousness.⁵

Ruptured Cerebral Aneurysm Presentation and Risk Factors

A ruptured aneurysm presents as the extremely sudden onset of a severe, thunderclap

headache with maximal intensity. Symptoms include a stiff neck, nausea, vomiting, blurred or double vision, photophobia or sensitivity to light, loss of consciousness, seizures, and an altered mental status ranging from mild lethargy to a profound coma.⁶ Brain aneurysms are most prevalent in people ages 35 to 60; however, they can occur in children as well. Women are more likely to suffer from a brain aneurysm than men at a ratio of 3:2.⁶ Other risk factors include having a past medical history of a previously ruptured brain aneurysm, genetics, African-American ethnicity, Hispanic ethnicity, arteriovenous malformation (AVM), and certain connective tissue disorders. Some modifiable risk factors include excessive alcohol consumption, hypertension, smoking, and illicit drug use of sympathomimetics such as cocaine and/or methamphetamine.⁶

Rupture Treatment and aSAH Management

According to the American Heart Association and American Stroke Association guidelines for rupture treatment and aSAH management, there is emerging data that indicates early aneurysm repair combined with aggressive management of complications such as hydrocephalus and DCI leads to improved functional outcomes.⁴ It is recommended to use surgical or endovascular methods of treatment for a rupture, such as open surgery craniotomy (in which a surgical clipping is used) or less invasive therapies, including endovascular surgical coilings, stents, liquid agents, or flow diversion devices.⁷

Since aSAH is frequently misdiagnosed, patients with an acute onset of a severe head-

ache should be highly suspected. Determining the initial clinical severity of aSAH through the use of simple validated scales such as the Hunt and Hess Scale (Table 1) or the World Federation of Neurosurgical Societies Scale (Table 2) is crucial for appropriate management and prognosis prediction.⁷

Table 1. Hunt and Hess Scale⁷

Classification of patients with intracranial aneurysms according to surgical risk

Category*	Criteria
Grade I	Asymptomatic, or minimal headache and slight nuchal rigidity.
Grade II	Moderate to severe headache, nuchal rigidity, no neurological deficit other than cranial nerve palsy.
Grade III	Drowsiness, confusion, or mild focal deficit.
Grade IV	Stupor, moderate to severe hemiparesis, possibly early decerebrate rigidity and vegetative disturbances.
Grade V	Deep coma, decerebrate rigidity, moribund appearance.

* Serious systemic disease such as hypertension, diabetes, severe arteriosclerosis, chronic pulmonary disease, and severe vasospasm seen on arteriography, result in placement of the patient in the next less favorable category.

Table 2. World Federation of Neurosurgical Societies Grading Scale⁸

WFNS Grade	GCS Score	Motor Deficit
I	15	absent
II	14–13	absent
III	14–13	present
IV	12–7	present or absent
V	6–3	present or absent

*WFNS = World Federation of Neurological surgeons; SAH = subarachnoid hemorrhage; GCS = Glasgow Coma Scale.

Narrowing of the arteries, or vasospasm, after an aSAH is common and occurs 7 to 10 days after an aneurysm rupture and spontaneously resolves after 21 days. DCI associated with arterial vasospasm is a major cause of death and disability in aSAH patients.⁷ The management of aSAH-induced vasospasm and DCI entails administering nimodipine, a second-generation dihydropyridine calcium channel blocker, 60 mg by mouth every 4 hours for 21 days, with a recent comprehensive meta-analysis study confirming improved neurological outcomes. Nimodipine should be administered to all patients with aSAH, and maintenance of euvolemia and normal circulating blood volume is recommended to prevent DCI.⁷

Seizures associated with aSAH remain a controversy as management on prophylaxis or treatment has been poorly supported by randomized, controlled trials. Around 8 to 15% of patients experience seizure-like episodes; however, there is still uncertainty regarding whether these episodes are epileptic in origin.⁴ The guidelines recommend that the use of prophylactic anticonvulsants may be considered in the immediate post-hemorrhagic period, such as levetiracetam 1000 mg by mouth every 12 hours; however, the routine long-term use of anticonvulsants is not recommended. They may be considered only if patients have known risk factors for delayed seizure disorder, such as prior seizure, intracerebral hematoma, intractable hypertension, infarction, or a middle cerebral artery aneurysm.⁷

Hypernatremia and hyponatremia are both acutely observed after aSAH, and hyponatremia is chronologically linked with the onset of clinical vasospasm. It can develop via multiple different mechanisms after aSAH,

with one being cerebral salt wasting syndrome, which results from an oversecretion of natriuretic peptides.⁷ This leads to excessive excretion of sodium in the urine, or natriuresis, and ultimately induces hyponatremia as well as volume depletion. Guidelines suggest that the use of fludrocortisone acetate and hypertonic saline solution is reasonable for preventing and correcting hyponatremia.⁷

Pain management for the head, neck, and other areas is typically treated initially with acetaminophen. However, oftentimes, pain relief is not achieved by the use of acetaminophen alone, warranting the use of opiates such as morphine or codeine.⁹ Patients with acute aSAH are also given stool softeners and kept at bedrest to ease hemodynamic fluctuations and lower risks of rebleeds.¹⁰

Lifestyle Management and Patient Education

Effective lifestyle management plays a crucial role in promoting recovery and reducing the risks of experiencing another aneurysm. These include keeping a healthy body and a healthy mind. Some non-pharmacological therapies for stress reduction include engaging in yoga, meditation, ear plugs or noise-canceling headphones, and aromatherapy such as lavender scents for soothing.¹¹ There is evidence for the use of aromatherapy demonstrating effectiveness in lowering heart rate and blood pressure after massage sessions associated with essential oils of lavender and geranium.¹¹

Adopting the MIND Diet, otherwise known as the Mediterranean-DASH Intervention for Neurodegenerative Delay Diet, targets brain health due to the preservation of cognitive

functions via protection against cardiovascular diseases. The diet includes plant-based foods while limiting the intake of animal and high saturated fat foods.¹¹ The MIND Diet guidelines suggest servings of whole grains, green leafy vegetables, nuts, beans, berries, poultry, fish, and olive oil instead of other oils or fats.¹² Unhealthy foods include red meat, cheese, butter/margarine, pastries, and sweets.¹²

Patient education entails counseling on the symptoms of a stroke. The acronym BE-FAST will allow patients to have awareness of the warning signs and get help quickly. BE-FAST stands for balance, eyes, face, arm, speech, and time. These indicate loss of balance, blurred vision, facial droop, arm or leg weakness, speech difficulty, and time to call an ambulance, respectively.¹³

Conclusion

In conclusion, cerebral aneurysms, aSAH, and their complications are a significant public health concern that demands continued research, awareness, improved care pathways, and patient advocacy. The pharmacist's role includes identification of its clinical presentation and recognition of pharmacological treatment and lifestyle management. With early detection, proper management, and an emphasis on a commitment to a healthy lifestyle, we can work towards reducing the impact of this life-threatening medical emergency and improving the quality of life for those affected.

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RENAL TRANSPLANTATION



A Pharmacist's Guide to Renal Transplant Therapeutics and Allograft Rejection

By: Omar Elhoriny, PharmD Candidate c/o 2024 and Nancy Yousry, PharmD Candidate c/o 2024

The therapeutic space of solid organ transplantation holds great relevance to practicing pharmacists and yet is rarely a topic of discussion in didactic teaching. The field of renal transplant therapeutics has made remarkable strides over the years, offering new hope to patients suffering from end-stage renal disease. Pharmacists play a pivotal role in ensuring the success of renal transplant procedures, as their expertise extends beyond medication dispensing to encompass pre- and post-transplant services. In this article, we will explore the critical role of pharmacists in renal transplant care and the evolving landscape of allograft rejection management.

Understanding Renal Transplantation

Renal transplantation is often considered the optimal treatment for patients with end-stage renal disease, providing improved quality of life and extended longevity. However, the success of a renal transplant heavily depends on preventing and managing complications, such as allograft rejection.

Patients are typically eligible for renal transplantation if they have end-stage renal disease on dialysis or chronic kidney disease approaching the need for dialysis.¹ End-stage renal disease is characterized by an estimated glomerular filtration rate (eGFR) of less than 15 mL/min, and its causes include diabetic nephropathy, hypertension, lupus, and nephrotic syndrome.² There are several contraindications that prevent certain patients from receiving a new kidney, including metastatic cancer, unresolved active infection, inability to receive surgery due to respiratory or cardiovascular complications, early loss of two previous transplants, or existing unstable mental health conditions.³

Many factors come into play when predicting a transplant's success in a patient, one being the kidney donor profile index (KDPI). KDPI is a measurement that assesses a donor's kidney to predict the likelihood of graft failure.⁴ A lower KDPI score signifies that the kidney will function longer. For instance, a donated kidney with a score of 10% will have a short-

er longevity than 10% of all donated kidneys but a longer longevity than 90% of all donated kidneys.⁵ Another testing method used is calculated panel reactive antibodies (CPRa), which determines the compatibility between a recipient and a donor based on the presence of specific human leukocyte antigen (HLA) antibodies a candidate may possess.⁵ Renal allograft rejection is mediated by immune recognition of the donated kidney's non-self (foreign) antigens. Past exposure to foreign HLA, such as a history of pregnancy or blood transfusion, leads to HLA sensitization, which may bode poorly for graft survival. A CPRa involves testing a candidate's serum against lymphocytes from a panel of about 100 blood donors. The blood donors represent the HLA makeup from a donor in that area. If there is no reaction between a candidate's serum and samples, the candidate is not HLA sensitized and has a CPRa of 0.⁵ If a candidate's serum reacts with a certain number of samples, their CPRa is that corresponding percentage (e.g., 60 samples out of 100 corresponds to a CPRa of 60%). A higher percentage of CPRa means a higher chance of acute rejection. KDPI, CPRa, and concomitant diseases like diabetes elevate the chance of graft failure, usually immediately after transplantation. This acute failure is known as delayed graft function (DGF). Appearing as a manifestation of acute kidney injury post-transplantation, DGF is usually defined by the need for dialysis within the first week after transplant surgery. Poor kidney function within the first week and beyond may be an indicator of poor longevity of the graft.⁶ Characteristics of the donor kidney itself, such as ischemic time, may be possible contributors. Ischemic time is the period in which the donated organ is not receiving blood, and therefore oxygen, before being transplanted. Warm ischemic time refers to the time between the removal of the

organ and storage in ice. Cold ischemic time is the amount of time spent in ice storage. A warm ischemic time of at least 30 minutes corresponds to more tissue damage than a cold ischemic time of more than 24 hours.⁷ DGF can be perpetuated by a prolonged ischemic time, both warm and cold. The cause of death from deceased donors also plays a role in DGF. Donations after cardiac death (DCD) transplants have a higher chance for DGF compared to standard-criteria donors (42 to 51% and 24%, respectively).⁶

The Pharmacist's Role

The selection process for transplant patients is rigorous and involves a multidisciplinary team of surgeons, social workers, nurses, nutritionists, nephrologists, pharmacists, and others. Not only are patients assessed on their likelihood of experiencing rejection, but they are also evaluated by social factors like adequate support systems and medication adherence.⁸ Pharmacists are critical members of the transplant team who help discern a patient's candidacy, treatment, and monitoring in the acute phase after surgery and beyond.

Transplant pharmacists present their objective assessments at the multidisciplinary patient selection meeting.⁸ They assess the patient's medication history for drug interactions and other possible concerns. Many of the maintenance immunosuppressive drugs used in the transplant setting interact with CYP3A4-interacting drugs (e.g., azole antifungals, verapamil, phenytoin, rifampin, and cyclosporine). It is also common for transplant pharmacists to speak with candidates and conduct medication reconciliations to assess health literacy and adherence. It is imperative for transplant candidates to prove their adherence as the

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immunosuppressive regimen post-surgery will be a lifelong treatment. Transplant pharmacists also conduct educational sessions for patients when their surgery date grows near. Such education covers the medications they will be on after surgery and the associated risks. Post-operative responsibilities encompass routine laboratory checks and constant monitoring of the several medications patients will be started on. Monitoring is very critical in post-operative transplant patients as any changes in electrolytes or increases in creatinine may be signs of DGF. Generally, the transition of care from inpatient transplantation to routine post-transplantation clinic visits is a critical duty for transplant pharmacists.⁸

Allograft Rejection Diagnosis

Diagnosing allograft rejection is a complex process, but it is an area where pharmacists can make a significant impact. Transplantation rejection can be classified into three categories: hyperacute, acute, and chronic. Hyperacute rejection is caused by specific antibodies against the graft and occurs within minutes or hours after grafting. Acute rejection occurs days or weeks after transplantation and can be caused by specific lymphocytes in the recipient that recognize human leukocyte antigens in the tissue or organ grafted. Finally, chronic rejection usually occurs months or years after organ or tissue transplantation.⁹ Chronic allograft rejection is caused by the development of interstitial fibrosis/tubular atrophy (IF/TA), previously known as chronic allograft nephropathy (CAN). Several pathophysiological mechanisms, such as inflammation and activation of renal fibroblasts, have been associated with IF/TA.¹⁰

Diagnostic Markers

Useful laboratory markers that assist in the recognition of allograft rejection involve the collection of various laboratory values which include urine sampling, complete blood cell count, histological studies, as well as HLA typing for assessment of histocompatibility between donor and recipient, as well as serology testing for HIV, hepatitis B, and hepatitis C.¹¹

Acute Rejection Treatment Approach

The treatment of organ rejection depends on the type of injury. Comorbid complications, such as arterial hypertension, pulmonary edema, and uremia, can be involved in chronic kidney rejection. Thus, the required treatment involves hemodialysis, hemofiltration, and the use of diuretics. The approach to treatment for the transplant recipient with acute rejection relies on accurate diagnosis and classification of the immunologic pathology. Treatment strategies differ between T cell-mediated rejection and antibody-mediated rejection and the aggressiveness of such treatment on a case-to-case basis.¹² Once non-immunologic causes of acute rejection are ruled out, allograft biopsy and donor-specific antigen (DSA) assessments should be performed to determine treatment approach.¹² Information on potential treatment options for acute rejection can be found in Table 1, and an algorithm for the treatment of acute rejection can be found in Figure 1.

In situations where a biopsy is attained and a cellular T cell-mediated rejection is determined, intravenous steroids and the usage of anti-thymocyte globulin are involved. However, when antibody-mediated rejection is diagnosed, plasma exchange and immunoglobulin (IG) are also proposed as treatment pathways.¹²

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Table 1. Treatment Options for Acute Allograft Rejection¹²

Treatment	Indication	Mechanism	Adverse Effects
Methylprednisolone	TCR: Banff Ia, Ib	Multiple, anti-inflammatory glucocorticoid	Hyperglycemia, hypertension, other metabolic effects
rATG	TCR: Banff Ib, IIa, IIb, III	T cell depletion	Fever, chills, hypertension, hypotension, leukopenia, infusion reaction, serum sickness
Plasma exchange	AMR	Antibody removal	Fever ^a , chills ^a , urticaria ^a , TRALI ^a , bleeding
IVIG	AMR	Multiple “immunomodulatory” effects including antibody clearance, neutralization, and inhibited production, Fc receptor saturation, complement inhibition	Infusion reaction including headache, fever, chills, urticaria, back pain, abdominal pain, nausea, vomiting
Rituximab	AMR	Anti-CD20 B cell depletion	Infusion reaction, HBV reactivation, PML
Bortezomib	AMR	Plasma cell apoptosis <i>via</i> proteasome inhibition	Peripheral neuropathy, fatigue, generalized weakness
Eculizumab	AMR	Terminal complement C5 inhibition	Meningococcal infection, influenza, peritonitis
C1-INH	AMR	Classic complement pathway inhibition	Headache

TCR, T cell-mediated rejection; rATG, rabbit anti-thymocyte globulin; AMR, antibody-mediated rejection; TRALI, transfusion-related acute lung injury; IVIG, intravenous immunoglobulin; HBV, hepatitis B virus; PML, progressive multifocal leukoencephalopathy; C1-INH, C1-esterase inhibitors.

^aAssociated more with plasma as replacement fluid.

By contrast, when the biopsy is found to not be safe or feasible, treatment approaches empirically involve Solu-Medrol (methylprednisolone), yet further interventions are stratified based on acute kidney injury (AKI) status. If a patient’s status of AKI is resolved, monitoring of graft function and optimization of immunotherapy is warranted, along with a confirmation that the patient has tested negative for DSA. If a patient’s AKI status is unresolved, anti-thymocyte globulin and intravenous IG are also recommended.¹²

Conclusion

Pharmacists play a critical role as part of the interdisciplinary team, attending to the needs of patients on an individualized basis for optimization of therapeutic benefit while minimizing harm in efforts to ensure survival for patients post allograft rejection. Several medication approaches have been studied and found to be useful based on differential diagnoses of the type of rejection. Further research is being conducted to define the qualitative guidelines that determine the

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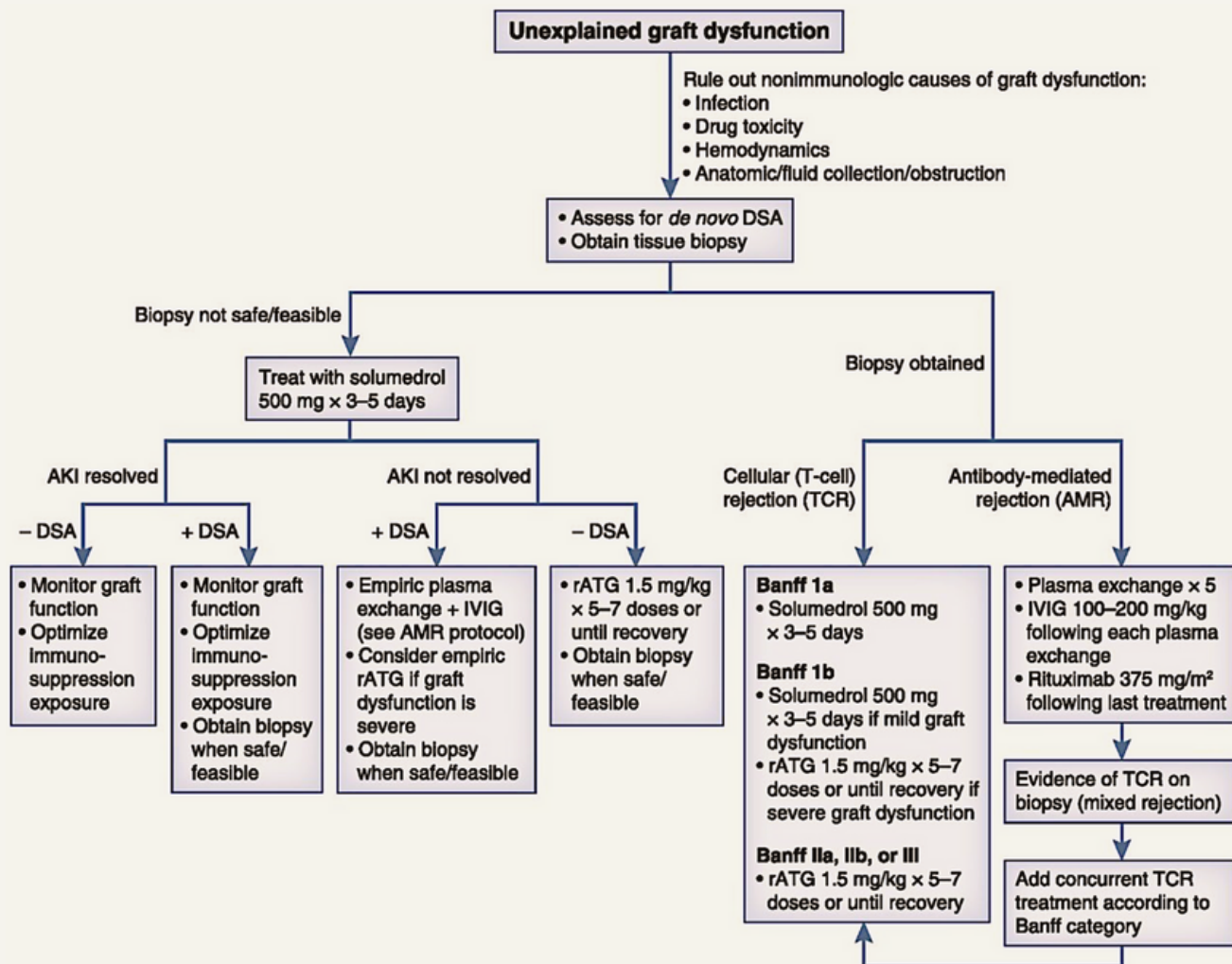


Figure 1. Proposed Algorithm For Treatment Of Presumed and Biopsy-Proven Acute Kidney Allograft Rejection¹²

trajectory of kidney transplant post-allograft rejection.

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How Drug Shortages Have Affected Pharmacies, Pharmacists, and Patients

By: Jennalynn Fung, PharmD Candidate c/o 2025

Drug shortages are not new; however, their frequency has significantly increased over the years. Dr. Peter Chin-Hong, an infectious disease doctor and professor at the University of California, San Francisco, stated, “[i]t’s something that I’ve seen from time to time since I started practice about 20 years ago, but it’s gotten worse in the last few years.”¹

Shortages can occur for a multitude of reasons, ranging from manufacturing and quality problems to delays, and discontinuations. The Food and Drug Administration (FDA) has even released notices regarding natural disasters, such as their notice of a tornado that had damaged Pfizer’s sterile injectable site in Rocky Mount, North Carolina in August 2023.²

One could even consider a shortage a new “status quo” of the industry, considering the FDA has identified over 100 drug shortages per year since 2007. This number rose to 267 drugs in 2011. In 2022, at its peak, there were 295 drugs in shortage, and many fear that under the current regulatory system, the problem will only grow. In April 2023, the American Society of Health-System Pharmacists (ASHP) reported that 301 drugs were in short supply. In June 2023, ASHP reported more than 300 active drug shortages, the most in nearly a decade.³

The most common drug classes that have experienced a short supply, according to

ASHP’s data in Specialty Pharmacy Continuum from April 2023, can be found in Table 1. Central nervous system (CNS) drug shortages are often due to the complex manufacturing required to ensure that injectable medications like fentanyl, morphine, and hydromorphone are sterile. Although the quantity of chemotherapy drugs in short supply is less than those of other drug classes, there are often no available or approved substitutes for chemotherapeutic drugs.

Table 1. Drugs in Short Supply

Drug class	Quantity of drugs in short supply
All classes	301
CNS	52
Antimicrobials	35
Fluid and electrolytes	30
Hormones	27
Chemotherapy	23

Pharmacists frequently utilize the FDA Drug Shortage database to determine if a specific medication is still in shortage or not. One can search for a drug on the website and the status of the drug will pop up on the right side of the table. There are also sections for

discontinuations, therapeutic categories, and updates. Unfortunately, one crucial piece of information that drug companies are not required to reveal is why exactly there is a shortage – that is allowed to be kept as classified information.⁴ The lack of transparency from drug companies jeopardizes pharmacists and pharmacies by forcing them to make inferences from this FDA data that it is a manufacturing problem, without knowing the true cause. This makes it more difficult for pharmacies to assist their patients too.

Dr. Erin Fox, a pharmacist and national expert on drug shortages at the University of Utah, mentioned that issues with manufacturing are a primary factor associated with drug shortages.⁵ Issues in manufacturing noticeably increased during the emergence and peak of coronavirus disease 2019 (COVID-19), as the FDA did not conduct overseas inspections due to pandemic legislation, which prevented free travel across borders. The actions that the FDA is currently taking against many manufacturers and their factories are rippling through the supply chain, worsening the shortage post-pandemic.

Fox stated that the manufacturing problem is what happened with many chemotherapy shortages in 2022. For instance, Intas Pharmaceuticals, a pharmaceutical company in India that produces chemotherapy drugs, was inspected by the FDA in December 2022. The agency found a variety of concerns, ranging from microbial contamination risk, poor record keeping, and undefined procedures and controls. As a result, the company was forced to close down in order to resolve the issues. Other companies cannot supply that product difference, thus leading to a deficit in chemotherapy drugs, like cisplatin.

During the shortage, doctors were forced to choose which patients received cisplatin, and who did not. When Intas Pharmaceuticals resumed production following their enforced closure, the pharmacies ordered Cisplatin in bulk to protect their patients. These shortages are changing the way hospitals and pharmacies behave when ordering medication.

Dr. Michael Ganio, PharmD, pointed out that Intas is a contracted manufacturer for Accord Pharmaceuticals, making this inspection even more concerning. “When you see smoke, there’s probably fire,” Dr. Ganio said to Specialty Pharmacy Continuum.⁶

COVID-19 lockdowns in China also impacted the global supply.⁷ In April 2022, a GE HealthCare factory in Shanghai that produced iodine-based contrast media was shut down due to stringent Chinese COVID-19 policies. The United States (US) healthcare system felt the impact of this closure immediately, with many doctors scrambling to find the dye so that they could perform scans for their patients. Dr. Andrew Shuman, a head and neck surgeon at the US Department of Veterans Affairs, told CNN Health that this impacted veterans overnight – medical practitioners who were depending on the dye to evaluate conditions like cancer or heart disease were unable to, inevitably forcing some physicians to make some difficult decisions on who should receive the radiographic tests.⁸

The increase in these recent shortages, though, is less related to COVID-19 and may be more attributed to the low-profit margin of generic drugs; companies are less likely to see a profit in these medications and may decide to discontinue production, even if demand is still high. The Association for Accessible

DRUG SHORTAGES

Medicines found that generic drugs account for 90% of all prescriptions filled, yet they only represent about 20% of the drug spending in the US.⁹ The decline in profits that generic manufacturers face is why so many companies have had to file for bankruptcy or close entirely. For example, Athenex, a company in the injectable generic market, filed for bankruptcy and closed its physical locations in New York, which directly impacted the hospital's pharmacy supply.

Many larger manufacturers play a crucial role in the pharmaceutical supply chain. One example being Akorn Pharmaceuticals which closed down for good in February 2023, which impaired the healthcare system severely. This company was responsible for producing 75 different generics.¹⁰ The pharmacy of a hospital (name, undisclosed) in New York City was impacted directly by their closure; the supervisor for the pharmacy stockroom stated that the lack of Akorn products made delivering quality patient care all the more difficult. To combat this, the pharmacy has scrambled to find suitable substitutions for these newly discontinued products. For example, lidocaine 2% gel, which is utilized in the operating room trays for surgery, is no longer made, warranting the use of lidocaine 4% cream when necessary. However, for most trays, the section designated for Akorn's product is simply empty. Similarly, viscous lidocaine hydrochloride solution no longer comes in unit-dosed cups. Instead, the pharmacy must send this medication to Safecor Health, a company that provides unit-dose repackaging and other services to hospital pharmacies that do not have the correct equipment to perform these services themselves. Large bottles of the solution are repackaged into unit dose cups sterilely. Other substitutions for Akorn products are

listed in the Table 2.

Table 2. Akorn Drug Discontinuations and Substitutions

Akorn drug discontinuation	Substitute/ alternative
Lidocaine 2% gel	Lidocaine 4% cream
Viscous lidocaine hydrochloride solution (cups)	Safecor compounding of unit-dose cups
Fluorescein injection	Trypan blue ophthalmic solution or fluorescein ophthalmic strip
Calcitriol	Paricalcitol

Shortages in antibiotics also directly impact patient health and care. Due to the high possibility of antibiotic shortages, hospitals, and pharmacies will carry multiple different drugs in case they need to be substituted. However, every time a person takes an antibiotic, they increase their likelihood of developing bacterial resistance. Taking a multitude of antibiotics also increases the possibility of more side effects, drug interactions, and errors. When patients are not treated with the appropriate medication, they have worse health outcomes. This not only goes for antibiotics. For example, a study done by Vail et al. found that there was a 3.7% increase in mortality rate amongst those treated with sepsis when there was a shortage of norepinephrine.¹¹

How can drug shortages be better managed in the future? The FDA wrote its tenth Annual Report to Congress on Drug Shortages about how to prevent this significant public health threat in 2022. In it, they write that “manu-

facturers are notifying FDA earlier than in the past about certain manufacturing interruptions and discontinuances that can lead to shortages. These early notifications give FDA additional time to work” on preventing extenuating circumstances for pharmacies and patients, alike.¹² In the FDA report’s conclusion, the agency states that they will work on gaining better insight into the supply chain by increasing their communication with manufacturers and other partners involved in the pharmaceutical process. Manufacturers will also be expected to improve their current operations by increasing preparation, safety, and sterility.¹²

Congress is also currently trying to address this issue; they want to pass legislation that will grant the FDA the ability to require drugmakers to alert them of increasing demands for certain drugs.¹³ This could improve the supply of drugs that are over the counter, like children’s pain relievers and antibiotics, which frequently spike during winter during the flu and cold season. Other lawmakers want the quantities of resources needed to create in-demand drugs to become public information as well.

The future of drug shortages in this country does not look bright – all things considered, it seems that shortages will only grow more and more frequent. The supply depends on a complex interplay of factors such as regulatory changes, supply chain improvements, manufacturing innovations, and global events. Efforts to address drug shortages may involve regulatory reforms, incentives for manufacturers, and investment in diversified supply chains. While collaboration between health-care professionals, manufacturers, regulators, and policymakers is key to mitigating the impact of drug shortages on patient care, the

problem remains that there are simply not enough manufacturers to satisfy current patient demand.

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Rho Chi Talks: Meet the President of SCCP

Featuring: Erica Kohen, PharmD Candidate c/o 2024

By: Isabelle Lim, PharmD Candidate c/o 2024



Erica Kohen is a sixth-year pharmacy student at St. John's University, College of Pharmacy and Health Sciences. During her time at St. John's, Erica served as the Secretary and President-Elect and is currently serving as President of the Student College of Clinical Pharmacy (SCCP). She decided to pursue these positions because she felt that SCCP's purpose and mission align with her interest in clinical pharmacy, and she had many ideas to contribute to the organization.

What are SCCP's goals/mission statements? What sets SCCP apart from other pharmacy organizations at St. John's?

SCCP is the student chapter of ACCP (American College of Clinical Pharmacy). Our mission is to inform our members of opportunities in a clinical pharmacy setting, the various specialties available within clinical pharmacy, and how to become a stronger residency candidate. Although there are many professional pharmacy organizations at St. John's, I think what makes SCCP stand out is our connection with ACCP, which provides many opportunities for students interested in clinical pharmacy, such as the annual Clinical Pharmacy Challenge and Clinical Research Challenge.

What special events/programs hosted by SCCP would you like to highlight? How do these events uniquely benefit pharmacy students?

SCCP holds many events throughout the year,

but some of our signature events include the Simulation (Sim) Man challenge, hospital intern panel, and alumni panel. The Sim Man challenge entails 4th- to 6th-year pharmacy students working together in groups with St. John's University physician assistant students to treat a patient case. I would say that the Sim Man challenge is my favorite event because it provides students the chance to treat a patient case in an interprofessional setting that simulates the role of a clinical pharmacist. The hospital intern panel features current hospital pharmacy interns sharing their experiences and advice to pharmacy students aspiring to work in a hospital setting. This is one of our most popular events because many students are interested in gaining work experience in a hospital and appreciate the tips provided by their fellow peers. Lastly, the alumni panel is one of SCCP's staple events in which St. John's University pharmacy alumni share their experiences as pharmacists. Something that I like about this event is that we try to include not only clinical pharmacists who work in a

6TH YEAR PERSPECTIVE



SCCP's annual Simulation Man event held on October 25, 2023

hospital setting but also ambulatory care pharmacists and pharmacists working in the industry field. I believe these events play a crucial role in aiding pharmacy students in deciding if clinical pharmacy is a career path they are interested in pursuing and what steps they can take to reach their goals.

What initially drew you into SCCP?

In my first year of pharmacy school, I came across flyers promoting the SCCP general body meeting (GBM), featuring a clinical pearl presentation by an APPE student. I decided to join that event to learn more about clinical pharmacy and to hear the experiences the APPE student would share about their rotations. After joining the GBM, I learned about the SCCP mentoring program in which 1st- to 4th-year pharmacy students had the chance to be mentored by a 5th-6th year pharmacy student. I was excited about this opportunity and ended up participating

in the SCCP mentoring program throughout my pharmacy school career, initially as a mentee and eventually as a current mentor.

What is something you have accomplished as President or President-Elect that you are most proud of?

I am proud of the collaborative service outreach event with the Rho Chi Honor Society, where we presented information on flu, cold, RSV, and COVID-19 viruses to elementary students at PS173. This initiative was particularly meaningful to me during my time on the SCCP Executive Board (E-Board) because it aligned with my goal to implement more public service events. I strongly believe that conducting such events not only educates our community but also reinforces the vital role pharmacists play in our community.

How do you balance being on APPE rotations and serving as President of

this organization?

I can balance being on APPE rotations and serving as President because of my wonderful E-Board and proper planning! Due to my experience serving as Secretary and President-Elect in years prior I know how important it is for the President to delegate tasks and ensure I give the E-Board ample time and guidance on completing them. Raya, the current President-Elect, serves as the main speaker at most of our events, and we work together to delegate tasks and follow up on our E-Board chair members.

What is one challenge you faced this year?

One challenge I faced was scheduling events to maximize student attendance while allowing my participation. Since most pharmacy students are available during common hour, but many of our E-Board members and I are on rotations at that time, we decided it would be best to hold our events in the evening. However, to ensure that we are still getting a good turnout of students joining the events, we decided to keep some of our events virtual for the ease of student participation.

How has being a part of SCCP's E-board benefited you and helped to shape who you are as a pharmacy

student?

SCCP has been crucial in my pharmacy school journey, helping me find mentors, make connections and build on key skills in time management, communication, and leadership. By working together with fellow pharmacy students in hosting and planning events, I was able to collaborate with other students for a common cause. I think SCCP has helped me learn more about the pharmacy profession and the different postgraduate opportunities available.

What advice would you give to students who are interested in being more involved in pharmacy organizations but don't know where to start?

If you are a pharmacy student interested in being involved, I would recommend joining a couple of general body meetings or events you are interested in. Use this time to meet new people and make connections because the more events you attend, the more you will start to know what you want to do after graduation and how you can get there. One of the most beneficial parts of joining an organization while in pharmacy school is you get to make the most of your experience and build on important skills you use as an E-Board member and eventually as a future pharmacist.

On behalf of the Rho Chi Post, we would like to thank Erica for sharing her experiences as an SCCP E-board member with our community!

FDA Approves First Nonprescription Oral Contraceptive

By: Bhojranie Brahmanand, PharmD Candidate c/o 2025

Traditionally, a prescription has always been required for contraceptives such as birth control. However, on July 13, 2023, the Food and Drug Administration (FDA) approved Perrigo's Opill®, a daily progestin-only oral contraceptive (POC) as the first over-the-counter (OTC) birth control pill.¹ This drug was originally approved for prescription (Rx) use in 1973. It is indicated for use in women capable of reproduction to prevent pregnancy and has a 93% effective rate.² Each Opill® tablet contains 0.075 mg of norgestrel, a synthetic progestogen. POCs work by thickening the cervical mucus to impede sperm penetration, lowering the midcycle luteinizing hormone (LH) and follicle-stimulating hormone (FSH) peaks accountable for decelerating the ovum's passage within the fallopian tubes and altering the endometrium. Approximately two hours after oral administration of this medication, serum progestin levels reach their peak followed by rapid distribution and elimination. Around 24 hours after drug ingestion, serum levels return close to the initial baseline suggesting that efficacy is dependent upon rigid adherence to the dosing schedule.²

Justification for the Rx-to-OTC Switch

The primary motivation to switch Opill® from an Rx-only to OTC medication arose from the recent implementation of abortion laws across the United States (US), making it increasingly difficult for women to obtain access to abortion care. In 2011, 75% of all unplanned pregnancies in the US occurred in women aged 15 to 49 years.³ Those at risk of

unintended pregnancy include women who reported either current use of a contraceptive method (with potential for failure of treatment) or no current contraceptive method (despite being sexually active). For many women, the need to obtain a prescription or visit the doctor can be challenging and time-consuming. In a study that assessed women's perspectives on having OTC access to a POC, it was found that many women supported this decision since it offered convenience and discretion.⁴

The ACCESS Study

The Adherence with Continuous-dose Oral Contraceptive: Evaluation of Self-Selection and Use (ACCESS) study played a crucial role in granting Opill® OTC status. ACCESS was a single-arm, open-label, multicenter, 24-week prospective study that involved assessing patient use of Opill® as an OTC product.⁵ The purpose of this study was to evaluate the adequacy of the OTC label in guiding appropriate consumer selection. Among the 883 women in the user population, six participants reported pregnancies in which conception was estimated to have occurred during the use of Opill®, and five participants reported pregnancies in which Opill® was discontinued prior to the estimated day of conception.⁵

Previous Clinical Trials

Since Opill® had previously been approved by the FDA for prescription use by females of reproductive potential to prevent pregnancy, no new clinical trials assessing product

efficacy were conducted as part of the switch development program. Its efficacy as a POC was demonstrated in eight clinical studies held in the US. Those included in these studies were women aged 15 to 49 years. These studies involved a total of 2,173 participants who completed at least one treatment cycle and 648 participants who had completed at least 13 cycles, providing a total of 21,856 28-day cycles of exposure to the drug. The observed pregnancy rate in these studies was approximately 2 pregnancies per 100 woman-years.⁶ HRA Pharma also conducted its own meta-analysis of eight separate clinical trials that assessed the efficacy of norgestrel 0.075 mg tablets. From a population of 7,584 participants across 66,409 cycles, 98 pregnancies were reported [95% confidence interval (CI), 1.09 to 3.49].⁵ It was estimated that 7% of women will experience an unintended pregnancy during the first year of typical use.⁷

The most common side effects that participants in these studies experienced included headache, dizziness, nausea, fatigue, and acne. Additionally, use of Opill® may be associated with an increased risk of delayed follicular atresia, menstrual irregularity, changes in menstrual flow, and prolonged bleeding. Opill® tablets are contraindicated for use by women who might have a suspected pregnancy, suspected carcinoma of the breast, abnormal uterine bleeding, or liver tumors.^{6,8} However, because Opill® only contains progestin, it presents no risk of venous thromboembolism compared to contraceptives containing estrogen. Hence, it is considered much safer and more appropriate for a broader population of women.

Conclusion

Birth control pills are an easy method to pre-

vent pregnancy. They provide consistent contraception and help women stay in control of their fertility. Any of women at risk of unintended pregnancy in the US could benefit from the use of an easily accessible and effective contraceptive option at some point over the course of their reproductive lives. Opill® is expected to be sold at pharmacies, convenience stores, and online in early 2024. Perrigo has not yet released pricing information but plans to in the coming months. Overall, Opill® has a promising future as a reliable and convenient oral contraceptive option.

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If you have any questions, feel free to email us at rhochipost@gmail.com

Genetic Variants and its Link to Individuals Asymptomatic to COVID-19

By: Ariella Zadrima, PharmD Candidate c/o 2026

Since coronavirus disease 2019 (COVID-19) first made its appearance in December of 2019, its pathology has been a topic of research for many years. COVID-19 is a respiratory illness that can be spread through droplets. It is known that COVID-19 is caused by infection of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). As time passed, research done on the basic route of infection for this virus began to provide more insight into who can be affected by the disease and how some of the common side effects individuals experienced came to be. It has been found that SARS-CoV-2 infects our body through the expression of angiotensin-converting enzyme 2 (ACE2), the main host receptor of this virus. ACE2 is found on the surface of cells found in our airways, including type II alveolar epithelium.¹ From there, the virus continues to spread and cause damage to the alveolar spaces as well as the rest of the body in multiple stages. Stage 1, or the exudative stage, entails forming a hyaline membrane along the alveolar wall coupled with inflammatory cell infiltration.¹ At stage 2, or the organizing stage, lesions continue to spread through the alveolar space and a more defined hyaline membrane can be seen. In this stage, we can observe the detachment of alveolar epithelial cells, hyperplasia of type II alveolar epithelial cells, and congestion and hemorrhage in the alveolar space.¹ Finally, stage 3, or the fibrotic stage, consists of the proliferation of fibroblasts, worsening of lesions, and collagen fiber deposit, leading to the obstruction of alveolar space and

modification of alveolar structure.¹

Human Leukocyte Antigens and Their Role in COVID-19 Response

Not only has the pathology of COVID-19 been uncovered but through new research, it has also been found that specific genotypes play a significant role in pre-determining which individuals are more susceptible to contracting this virus, as well as the severity this virus may have on this person.² More specifically, human leukocyte antigen (HLA) alleles are used by our immune system to differentiate foreign cells in our body by encoding for the expression of cell surface glycoproteins that help present antigens to T cells. In the case of COVID-19, specific HLA alleles contain a varying binding affinity to certain viral peptides expressed on the surface of SARS-CoV-2.² Therefore, depending on an individual's specific allele of these HLA proteins, one may have a higher or lower binding affinity to SARS-CoV-2 cells compared to others, leading to varying degrees of immune system response.

Literature Review

To test these theories, Nguyen et al. ran an in silico analysis of the binding affinity between multiple alleles of HLA and SARS-CoV-2 peptides.³ By pairing certain HLA genotypes with SARS-CoV-2 proteins, such as the spike glycoprotein (S protein) and open reading frame 1ab (ORF1ab) polyprotein, the researchers of this study were able to examine the potential relationship between

viral presentation and type of HLA allele. This was a first-of-its-kind study that demonstrated genotype variability may be associated with severity of viral infection. From the results gathered, it was seen that the presence of the HLA-B*46:01 gene could be associated with the development of a more severe COVID-19 illness. However, it was also revealed that this gene had the ability to present highly conserved SARS-CoV-2 peptides that are shared among other coronaviruses, suggesting that it could enable cross-protective T-cell-based immunity.³

Furthermore, another study conducted by Charonis et al. involved a similar simulation, testing the binding affinities of 61 common HLA class I alleles to epitopes from the S protein and ORF1ab polyprotein.⁴ These proteins play a crucial role in the antigenic effect of SARS-CoV-2.⁴ It was concluded that all 61 alleles showed good binding affinities to both proteins assessed. Though there were no major differences in binding affinities between the two proteins, it was observed that a difference existed among the various HLA genotypes. HLA gene A (HLA-A) was the most effective at binding to the S protein and ORF1ab epitopes compared to gene B (HLA-B) and C (HLA-C). It was noted that this result may not apply to all populations around the world, and further studies must be done to truly narrow down how HLA genotypes affect viral susceptibility.⁴

When it comes to asymptomatic patients, genotyping also plays a prevalent role in determining who is affected by SARS-CoV-2 and to what degree. As shown by a study done by Augusto et al., a specific variant of HLA, the HLA-B*1501 genotype, can allow for some individuals to be asymptomatic while having COVID-19.⁵ Over 1,400 participants were

included in the cohort study due to being unvaccinated and reporting a positive SARS-CoV-2 test. The results of this study demonstrated that there was a high frequency of carrying the HLA-B*15:01 genotype among those who were asymptomatic (20%) as compared to those who were symptomatic (9%) after SARS-CoV-2 infection.⁴ Upon this observation, the investigators then decided to observe how this specific gene variant affects the ability of T-cells to recognize SARS-CoV-2. It was seen that T-cells not only recognized these SARS-CoV-2 segments, or more specifically the NQK-Q8 peptide accompanied with the virus, but also other coronavirus segments containing a similar peptide, NQK-A8, which causes seasonal colds.⁵ Therefore, it was concluded that because these two viral peptide segments bound to the HLA-B*15:01 protein in a similar manner, the T-cells of these individuals with the HLA-B*15:01 mutation can learn to recognize these segments and attack immediately, eliminating the threat of the virus before symptoms can develop. Therefore, this study concluded that a majority of asymptomatic individuals contain the HLA-B*15:01 genotype mutation, which grants them almost immediate protection against an invading viral peptide segment, further preventing any symptoms of infection to occur in the body and allowing an individual to appear and feel seemingly healthy as compared to those missing this HLA gene.⁵

Conclusion

Many factors can contribute to how one reacts to an illness like COVID-19, including age, social support, and comorbidities. However, our genes play a major role in dictating our personal immune responses to SARS-CoV-2. Although not every individual who presents asymptotically possesses this

HLA genetic mutation, the discovery of this mutation provides insight into how an individual may become asymptomatic and fight off COVID-19 differently than others.

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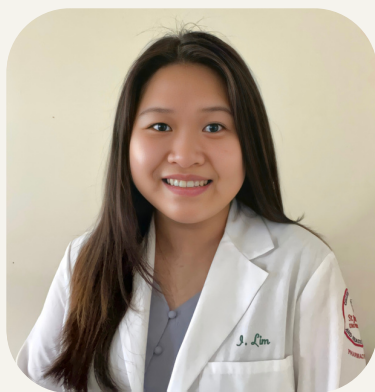
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MEET THE TEAM

Meet the 2023-2024 Team Members



Editorial Team & Production



Isabelle Lim
Editor-in-Chief

The Rho Chi Post serves as a platform for students and faculty to collaborate in sharing their knowledge and ideas with the pharmacy community while offering a unique experience to develop writing skills outside of the classroom. As future pharmacists, it is important that we continuously keep ourselves updated as well as voice our opinions on healthcare matters. I am honored to be a part of the Editorial Team and look forward to serving as this year's Editor-in-Chief!

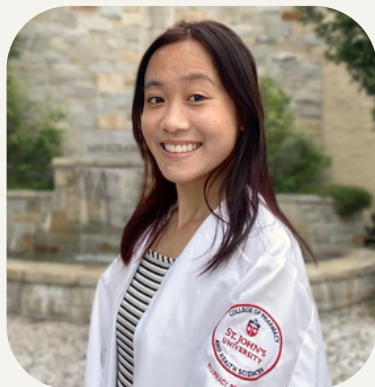
John Ortiz
Senior Content-Focused Copy Editor

Rho Chi Post is an opportunity for students to foster their writing and investigative skills concerning the pharmacy practice. Through Rho Chi Post, students are also exposed to novel information and perspectives that are present in the pharmacy community and in our own student body. By honing our understanding of new innovations and developments in pharmacy, we will be better adept at providing accurate information to readers and maintaining the continuous education expected of pharmacists.



Joanne Fung
Senior Content-Focused Copy Editor

To me, Rho Chi is a great opportunity for all pharmacy students to advance themselves. This society offers something to everyone, whether you are a member of the society, a part of the newsletter staff, or a student taking advantage of the resources offered by Rho Chi. The effort put forth by every person affiliated with Rho Chi is amazing, and I will always appreciate this society's mission and values.



MEET THE TEAM



Maliha Akter
Content-Focused Copy Editor

In my pursuit of becoming a knowledgeable and skilled pharmacist, I remain committed to staying informed about disease treatment and public-health policy. Being a part of Rho Chi Post provides an excellent platform for continuous education and knowledge-sharing with peers. Engaging with individuals from diverse backgrounds fosters critical viewpoints and discussions, all focused on enhancing patient-centered care. Additionally, the newsletter enables me to nurture my lifelong passion for writing while staying updated on the latest healthcare developments. As I embrace this transformative journey, I am dedicated to adapting, learning, and making a positive impact on patient well-being as a compassionate and competent pharmacist.

Bao Qi Chen
Content-Focused Copy Editor

The Rho Chi Post is a bridge between students and the world we will soon enter once we graduate. My ambition is to promote intellect, values, and opportunities that not only allow students to be heard but also impact the pharmacy profession as a whole. I am honored to be a part of the Rho Chi Post's editorial team and work with colleagues who share this ambition. I am excited and grateful for this opportunity, and I look forward to working with everyone!



Warda Basher
Content-Focused Copy Editor

Joining this esteemed team excites me with the opportunity to gain invaluable experience and insights into the latest trends in pharmacy. I am eager to expand my professional network and make significant contributions to the field. As a member of the editorial team, I'll be at the forefront of disseminating the most current news and knowledge, effectively impacting pharmacy professionals worldwide with timely and relevant information.

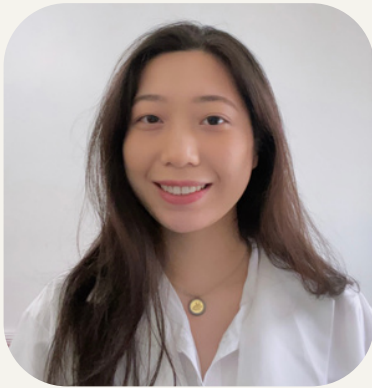


Kristen Joy Mathew
Content-Focused Copy Editor

Being a part of the Rho Chi Post is a rewarding experience where I can work with other students and colleagues to bring forth educational and pertinent information in a renowned newsletter publication. This is a rewarding experience to express my passion for pharmacy and spread awareness of current issues. Collaborating with other students, faculty, alumni, and professionals, it is an incredible experience to continually learn from numerous perspectives and incorporate such experiences into a publication. Working as a Content-Focused Copy Editor, I am happy to be alongside this wonderful team in producing well-researched articles in a respected and widely read newsletter.



MEET THE TEAM



Mandy Zheng
Senior Graphics-Focused Copy Editor

The Rho Chi Post allows pharmacy students the opportunity to be well informed about the amazing contributions in the field of pharmacy. It is a great platform for students to report current advancements in healthcare. My passionate for writing began at a young age as I began to understand just how powerful words can be to communicate. I look forward to being a part of the editorial team and to share new information to my peers. I am so excited to be a part of the Rho Chi Post team.

Ruksabha Zaman
Senior Graphics-Focused Copy Editor

It is an honor to be able to contribute to the Rho Chi Post, a publication that promotes intellect, values, and inclusivity in order to allow student voices to make an impact not only in our school but in the pharmacy profession as a whole. The role of pharmacists is constantly evolving and it is more important than ever for us to not only be aware of the changes and new discoveries that are occurring in our field of practice but to be able to collaborate with other professionals on our team as well. The Rho Chi Post serves as a bridge between students, faculty, pharmacists, and other healthcare professionals outside of the classroom. I look forward to gaining new knowledge on current events from my peers and providing my own insight to further the excellence of this newsletter.



Celestine Van Sertima
Graphics-Focused Copy Editor

When applying to the Rho Chi Post, I was initially fascinated by their goals of providing the highest quality of information to the St. John's community through a student operated newsletter that cultivates both student spirit and expansion of knowledge. Through my passion for writing and health care, combined with my experience in graphic designing, I look forward to what I can contribute to the Rho Chi Post.



Nalisha Xu
Graphics-Focused Copy Editor

By becoming a part of the Rho Chi editorial team, I wish to learn more about the pharmacy field and community by gaining insight through our publications. This position will not only allow me to broaden my views on the profession of pharmacy, but also explore topics related to the medical field as a whole. Through Rho Chi's team, I will utilize this experience to grow professionally, develop leadership skills, and be more involved in our community to improve my confidence and professionalism on my journey to becoming a pharmacist.



MEET THE TEAM



Zainab Masood
Graphics-Focused Copy Editor

Being part of Rho Chi Post, which provides information on discoveries and research to others, is an honor. Taking insight from professionals and peers to educate others is a rather significant effort in the expanding and evolving role of pharmacists. I look forward to collaborating with the team in pushing this effort further while also learning from them.

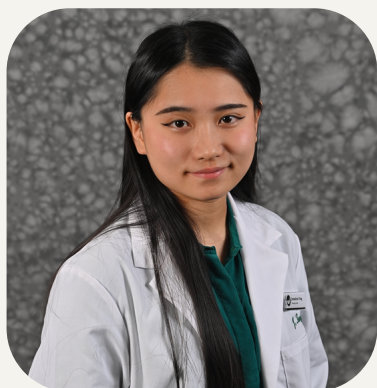
Sana Ahmed
Senior Staff Editor

I believe Rho Chi Post is a means to serve the university and impact its professional and health-oriented student community through its various stories. With exposure to a myriad of areas of the healthcare field throughout my work experience, I have secured much knowledge from assisting a diverse array of patients. I will prioritize staying up to date and aiding student writers in presenting the latest pharmaceutical and medical advancements. Through Rho Chi Post, I intend to promote the pharmacy profession through creativity and effective communication. I am honored to serve as a Staff Editor for this organization and hope it will facilitate meaningful connections with my peers.



Jennalynn Fung
Staff Editor

I am thrilled to have the opportunity to express my creativity, critical thinking, and research skills through contributing to the Rho Chi Post. The mission to promote intellectual discourse and showcase diverse perspectives aligns with my values; I look forward to putting my writing and editing experience to use in each issue, and hope that my involvement can ensure that future cohorts will also have this valuable platform available to them.



Paulina Maczko
Staff Editor

As pharmacy students, I believe we have an obligation of staying informed on current healthcare topics, topics that the Rho Chi Post sheds light on. To be part of such a team is an honor, as students are granted the opportunity of a creative outlet, whether that is by writing the articles or organizing the newsletter. As a copy editor, I look forward to seeing first-hand how students voice their opinions, thoughts, and academic learnings. I'm grateful to be part of a team that allows students to understand what they are capable of, and simultaneously advance their writing, comprehension, and communication skills.



MEET THE TEAM



Shakhzoda Rakhimova

Staff Editor

As a staff editor for the Rho Chi Post, I am thrilled to have the opportunity to be part of a team that is dedicated to providing high-quality and thought-provoking content that is relevant to pharmacists, healthcare professionals, and the broader public. I am excited to bring my skills and knowledge to the table as we work together to create meaningful and impactful content for our readers.

Natalia Turowska

Staff Editor

Joining the Rho Chi Post is an opportunity I am immensely grateful for! I am very excited to be a part of an award-winning publication that promotes the pharmacy profession through creativity and effective communication like the Rho Chi Post.

In being a Staff Editor, I look forward to reading about ideas, opinions, and innovations, as well as seeing these topics blossom into articles for others to enjoy. I know that throughout holding this position, I will grow in terms of professionalism, teamwork, and creativity, which are all key attributes in the pharmacy world!



Sharupa Azmal

Staff Editor

The Rho Chi Post serves as a notable forum for pharmacy students who wish to expose themselves to medical journalism. Being a staff editor of the Rho Chi Post means amplifying the voices of our writers and educating our readers regarding current events in healthcare. This role provides me with the opportunity to present insightful stories that are relevant to the pharmacy community and contribute to the advancement of the profession through writing.



Nimra Gul

Staff Editor

My name is Nimra Gul and I am currently entering my 6th year of the pharmacy program at St. Johns. Being involved in a cause that serves to educate those pursuing a career in the healthcare field allows me to contribute to the knowledge that these very people will utilize in practice. I hope that my time with the Rho Chi Post Editorial Team will be memorable with much to contribute!



MEET THE TEAM

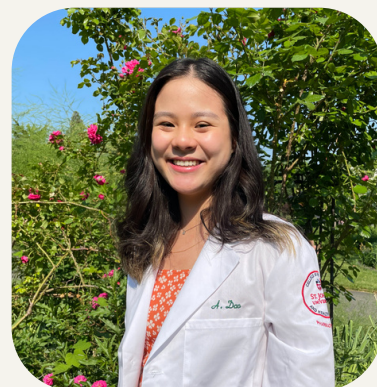


Nancy Yousry
Senior Staff Writer

It was such an amazing opportunity to become part of Rho Chi Post's Editorial Board last year, and I am really excited to continue being a part of Rho Chi Post this year! I believe one of our responsibilities as Student Pharmacists is to be aware of the current events impacting our profession as well as the critical and unique role Pharmacists play in a variety of healthcare settings. As a Staff Writer and Engagement & Outreach Manager, I look forward to bringing these current events to light and to serve as an educational resource for passionate readers and writers alike.

Ashley Dao
Senior Staff Writer

Rho Chi Post is an opportunity for students to be involved in publication regardless of their year or interest. I have always had an interest in writing and research, and I was afraid I would lose these skills in pharmacy school. Being part of Rho Chi Post has allowed me to continue writing and learning beyond the classroom!



Sairah Sheikh
Senior Staff Writer

Ever since I was little, writing has always been a passion of mine. As a senior staff writer for Rho Chi Post, I am excited to merge the knowledge I have gained in pharmacy school with my love for writing to create thought-provoking pieces for our community to read. Since pharmacy is an ever-evolving profession, it is important for our community to stay informed on the latest events in our field and I am looking forward to playing a part in that as a member of the incredible Rho Chi editorial team,



Urooj K. Malik
Staff Writer

The Rho Chi Post is a valuable platform that connects students and faculty with the most up-to-date information within the pharmacy profession. The field of pharmacy is constantly expanding with vital developments, so it is important for us to stay informed in the world of healthcare. The Rho Chi Post serves as a creative outlet for student pharmacists to voice their various perspectives and ideas for others to utilize as an educational resource. As a staff writer, I hope to channel my passions and interests through this newsletter in an effort to impact those around me.



MEET THE TEAM



John Ortiz
Staff Writer

Rho Chi Post is an opportunity for students to foster their writing and investigative skills concerning the pharmacy practice. Through Rho Chi Post, students are also exposed to novel information and perspectives that are present in the pharmacy community and in our own student body. By honing our understanding of new innovations and developments in pharmacy, we will be better adept at providing accurate information to readers and maintaining the continuous education expected of pharmacists.

Anureet Kaur
Staff Writer

Professional writing is a powerful tool. As pharmacists, amongst many other things, we can use our writing to advocate for our profession, to summarize new guidelines, and to spread the word about novel drugs. Thus, being a part of the Rho Chi Post 2023-2024 Editorial Team will help me strengthen the skills I need to be a capable pharmacist in the future. I am very excited to contribute to RCP!



Enjelique R. Adams
Staff Writer

Being a member of the Rho Chi Post will qualify and enable me to branch out to network and connect with others who are older than me and are a part of the Rho Chi Honor Society and others who are a U1, U2, or P1 who have an interest in writing. This opportunity that was blessed and given to me can expand my passion and love for writing to another level. Writing for this post can grant me the chance to learn more about my level of pharmacy through a different scope by reading about current events on insurance, Big Pharma, the FDA, and new medications coming out but also use the knowledge I have from my classes and working at an independent community pharmacy and apply it to my work. Rho Chi Post is an additional additive to the list of organizations and extracurriculars that I partake in; however, this is a new step to a new beginning for my P2 year that I cannot wait to take on.



Holly Nguyen
Staff Writer

Being a member of the Rho Chi Post will qualify and enable me to branch out to network and connect with others who are older than me and are a part of the Rho Chi Honor Society and others who are a U1, U2, or P1 who have an interest in writing. This opportunity that was blessed and given to me can expand my passion and love for writing to another level. Writing for this post can grant me the chance to learn more about my level of pharmacy through a different scope by reading about current events on insurance, Big Pharma, the FDA, and new medications coming out but also use the knowledge I have from my classes and working at an independent community pharmacy and apply it to my work. Rho Chi Post is an additional additive to the list of organizations and extracurriculars that I partake in; however, this is a new step to a new beginning for my P2 year that I cannot wait to take on.



MEET THE TEAM



Bhojranie Brahmanand

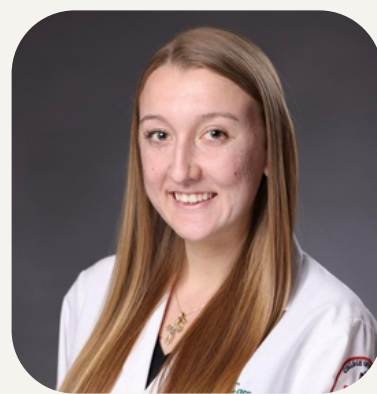
Staff Writer

The Rho Chi Post uses its platform to spread knowledge of groundbreaking discoveries that are changing the standard of care for society. It delivers a creative and innovative scope of the pharmacy world. As a school of pharmacy, it is pivotal to become aware of healthcare matters. In turn, we can strengthen our understanding of the field and become more competent pharmacy practitioners. I am excited to be joining the team this year as a staff writer. I look forward to working alongside like-minded individuals in cultivating writing pieces that will share the importance of this profession.

Giavanna Carr

Staff Writer

Rho Chi is a society with members who all have the same goal, which is to excel in their academic careers. As a member of this society, we use our skills and knowledge in order to better our education as well as assist our peers in the process. Being part of this society has been so rewarding thus far, and I look forward to further developing Rho Chi in my time with the organization!



Sheena Nagpal

Staff Writer

As the world is constantly changing in the world of medicine, it can be difficult as a pharmacy student to keep up. The Rho Chi Post is a way for students, educators and practitioners to stay up to date with new developments, discoveries and research. Thus, I am excited to be joining the Post as a new Staff Writer and to be a voice in the community to integrate new ideas and innovations so that we may advance as future pharmacists!

Ariella Zadrma

Staff Writer

As a pharmacy student and future pharmacist, I believe it is a quintessential duty to educate ourselves on current media regarding the medical field and continuously adapt to the new ideas we may face as we enter the pharmacy profession. With topics from emerging diseases to scientific advances made, it is important to be accustomed to new ideas that pertain to our potential responsibilities as a pharmacist. As a Rho Chi Staff Writer, I hope to discuss matters that will inform not only pharmacy students but the St. John's community as a whole on topics that have to do with general health and scientific developments. With my interest in writing and the pharmacy field, I hope to touch upon subjects passionate to me that can benefit our community and inspire our readers to integrate themselves into the ever-growing profession of pharmacy.



MEET THE TEAM



Ashley Medina
Staff Writer

It is an honor to be welcomed as a new member of a prestigious team of students contributing to the pharmacy profession through its publications that reach an audience beyond our campus. The Rho Chi Post has provided students with an opportunity to express themselves creatively and fosters professionalism through impactful communication. Joining the team will allow me to give back through writing that will embody the ideas and ambition that house my passion for the pharmaceutical profession. I am looking forward to providing relevant and up-to-date information to my audience and am eager to operate with fellow students to provide high-quality content that is devoted to the advancement and encouragement of our student body.

Sandra Jojo
Staff Writer

Hi everyone, I am excited to join Rho Chi Post's team as a staff writer. As a P4 student who has read many of the articles published throughout my college career, I am motivated to write articles that inspire conversation among students. The Rho Chi Post gives students the freedom to research and learn about topics beyond the classroom setting. I am looking forward to conveying knowledge about new developments to other rising healthcare professionals in efforts to advance patient care.



MEET THE TEAM

Social Media & Outreach



Anjali Thykattil

Engagement & Outreach Manager

I am beyond grateful for this opportunity, and I am excited to have the honor of serving on the Executive Board as the Engagement and Outreach Manager. The Rho Chi Post is not only a creative outlet for students, but also one that is invariably relevant to the ever-changing world of healthcare. In this position, I aim to further expand the growth of the Rho Chi Post among pharmacy students here at St. John's. Let's not forget, it is us students who will become the healthcare leaders of tomorrow.

Nancy Yousry

Engagement & Outreach Manager

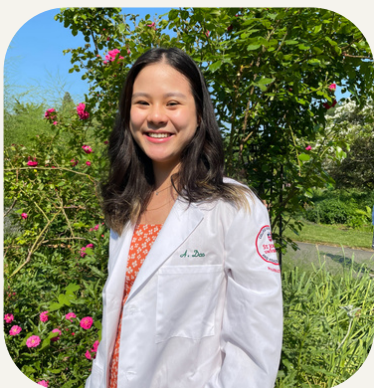
It was such an amazing opportunity to become part of Rho Chi Post's Editorial Board last year, and I am really excited to continue being a part of Rho Chi Post this year! I believe one of our responsibilities as Student Pharmacists is to be aware of the current events impacting our profession as well as the critical and unique role Pharmacists play in a variety of healthcare settings. As a Staff Writer and Engagement & Outreach Manager, I look forward to bringing these current events to light and to serve as an educational resource for passionate readers and writers alike.



Ashley Dao

Engagement & Outreach Manager

Rho Chi Post is an opportunity for students to be involved in publication regardless of their year or interest. I have always had an interest in writing and research, and I was afraid I would lose these skills in pharmacy school. Being part of Rho Chi Post has allowed me to continue writing and learning beyond the classroom!



MEET THE TEAM

Advisors



Dr. Ketan Patel
MPharm, PhD

It is an honor to serve as a faculty advisor of Beta Delta Chapter of a 100-year-old prestigious society of pharmaceutical professionals – The Rho Chi Society. With great enthusiasm, I am committed to assist the Rho Chi member's endeavors in: (1) disseminating the latest information/technology in healthcare system; (2) promoting pharmaceutical field & career propulsive networking of current students, alumni, and faculties; and (3) facilitating the scholastic activities and recognizing the scholars.

Dr. Joseph Etzel
BS Pharm, PharmD

Dr. Etzel served as the Rho Chi Post's interim faculty advisor for the 2022-2023 academic school year and continues to aid the Rho Chi Honor Society as we welcome in our new advisor. Dr. Etzel is not new to our organization, as he has previously served as the faculty advisor for the Rho Chi Honor Society. He has been a huge influence to the success of Rho Chi in the past, and we look forward to continue working with him!



Dr. Mohammad Rattu
PharmD, BCOP, BCPS, BCGP

I am thankful to have been the 2012 editor-in-chief of the Rho ChiPost newsletter, as well as on the 2019 alumni honor roll of the national Rho Chi organization. This is one of the most successful longitudinal projects at my alma mater, as evidenced by its decade-long persistence and teams of highly-motivated students. I remain available for professional support and assistance with the new year's initiatives.



The Rho Chi Society

Executive Board



Geraldine Ciaccio

President

The Rho Chi Society prides itself on fostering intellectual achievement and cultivating professional development. It provides opportunities for students, faculty, alumni, and colleagues to expand their knowledge of pharmacy practice. Through events, seminars, and fundraisers, Rho Chi allows pharmacy students to develop leadership skills that are vital to the profession. I have learned valuable lessons about pharmacy and myself from Rho Chi thus far, and I am honored to be able to give back to the organization. I am humbled to hold such a position and work with a dedicated executive board.

Javeria Amir

Vice President

The Rho Chi Society is an organization that contributes to the development of intellectual leaders in pharmacy. Through this, Rho Chi Society fosters collaboration and initiatives to advance learning in the field of pharmacy. Being part of this organization has allowed me to reach out for help when needed, and continuously improve my skills as a future pharmacist. To be a part of the executive board that will continue to uphold these initiatives is an honor and responsibility I take on with pride. Wishing all a wonderful and successful academic year ahead of us!



Anjali Rana

Secretary

Being a part of Rho Chi has provided me with invaluable opportunities for professional development, connection, and mentorship. The society's commitment to academic excellence and ethical pharmacy practice has inspired me to strive for continuous improvement in my studies and future career. Serving on this year's executive board, provides a sense of belonging among a supportive and inclusive community.



Giavanna Carr

Treasurer

The Rho Chi Honor Society encourages and recognizes intellectual achievements, stimulates critical inquiry in order to advance the future of pharmacy, provides its members with the ability to develop into intellectual leaders, promotes high ethical standards for its members, and fosters collaboration. Through being a member of Rho Chi, we are able not only to grow ourselves, but to help uplift our colleagues and allow them the chance to excel academically through the events we provide. Rho Chi has been a great influence on my studies during my time in this program and being given the opportunity to serve on the executive board allows me to become the influence for the younger students in our program. I'm inspired by every member of this year's executive board and can't wait to see all we're able to accomplish together this year!



The Rho Chi Society

Executive Board



Christine Mauceri

Historian

Rho Chi is an amazing organization that encourages leadership and support among its members. Not only does it offer a space where all pharmacy students can help each other academically, but the opportunities for networking and professional growth are endless. I am proud to be a part of an organization that has helped me immensely throughout my studies, and I am excited to give back to my pharmacy community!

Sammi Wu

Development and Outreach Coordinator

The Rho Chi Society is committed to the development of future pharmacists that excel in both areas of professional expertise and acts of service. It forms a community for pharmacy students to motivate each other's academic growth and provide support within a challenging degree program. It also keeps students informed on news related to breakthroughs in drug therapy and patient care. I am honored to accept my position on the executive board for this upcoming academic year and I hope to fulfill my duties so Rho Chi can continue to have its positive impact on the pharmacy profession!



Daya Biju

Academic Committee Chair

The Rho Chi Honor Society is a distinguished academic organization that recognizes excellence in pharmaceutical studies. It promotes ethical conduct, leadership, and research in pharmacy education. With chapters across the United States, Rho Chi fosters a sense of community and offers valuable networking and mentorship opportunities. Members actively engage in service projects to improve public health awareness. I am truly honored to serve this esteemed organization and embrace the opportunities it offers for personal and professional growth.



Angel Gao

Academic Committee Chair

Rho Chi fosters a community where students can collaborate with each other, upholding the core principles of service and professional development. Being a part of this supportive community is an honor, and I take pride in contributing to the culture of excellence that Rho Chi cultivates.



RHO^{Rx}CHI post

St. John's University College of Pharmacy & Health Sciences

DECEMBER

SUN	MON	TUE	WED	THU	FRI	SAT
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

JANUARY

SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Dec 7-8: Study/Snow Day - No classes

Dec 9: Saturday classes held

Dec 11-16: Final exam week

Jan 15: Martin Luther King, Jr. Day - University closed/No classes

Jan 17: First day of classes

Jan 23: Last day to add/drop classes

The Rho Chi Post wants to wish everyone good luck on finals and a happy New Year!

Interested in writing for the Rho Chi Post?

Go to <http://rhochistj.org/RhoChiPost> and click on the login option from the menu bar to make an account! With an account, you'll have access to the article submission portal where you can submit your writing for publication in an upcoming issue!

Remember, you do NOT have to be a member of Rho Chi, a member of the editorial team, or a student of St. John's to write for our newsletter!

If you have any questions, feel free to email us at rhochipost@gmail.com!