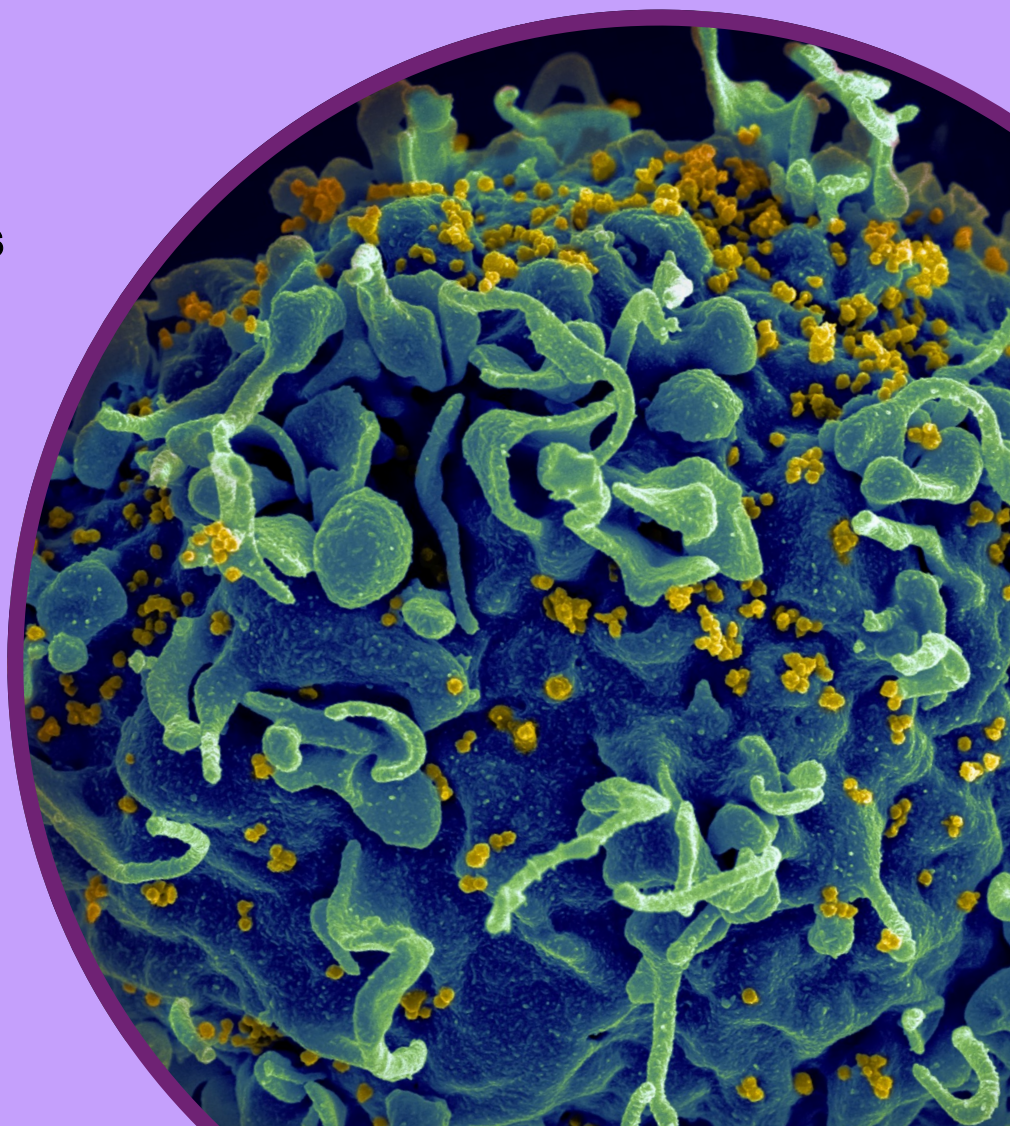
St. John's University - College of Pharmacy & Health Sciences

RHO PX CHI post

Volume 12 | Issue 4 | Apr 2023

Inaugural LEADS Initiative Edition



The 1980's HIV and AIDS Epidemic

A Beacon of Hope for Multi-Drug Resistant HIV Patients: Sunlenca®

Evaluation of Ivermectin for Treatment of COVID-19

Meet the Founders of the LEADS Initiative

RHO CHI post

Table of Contents

From The Editor

Justin Budz

A Message from the Editor-in-Chief

On behalf of the Rho Chi Post, we are excited to announce our Inaugural LEADS Initiative Edition of the Rho Chi Post Newsletter. The LEADS Initiative is a pilot program, in collaboration with the Rho Chi Honor Society - Beta Delta Chapter, looking to promote the professional development of younger pharmacy students by pairing them with students in their professional years. Of the many aspects that the LEADS Initiative offers, my favorite involves the opportunity to earn a national publication in the Rho Chi Post Newsletter. This Issue of the Rho Chi Post showcases the hard work of our mentor-mentee pairs. Each pair of students researched topics in pharmacy and healthcare and worked with the Rho Chi Post Editorial Team to develop their final publications. This Inaugural Issue also holds a collaborative publication between myself and the incoming 2023-2024 Editor-in-Chief, Isabelle Lim. For students interested in the LEADS Initiative for the upcoming 2023-2024 academic school year, turn to the *"About the LEADS Initiative"* section of this newsletter to learn more about the program and how to get involved as a mentor or mentee!

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 revaluated 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.

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.

Contact Information

The Rho Chi Post
St. John's University
College of Pharmacy and Health Sciences
8000 Utopia Parkway, Jamaica, NY 11439

Website: http://rhochistj.org/RhoChiPost
Facebook: http://fb.com/RhoChiPost
Instagram: @sjurhochipost
Email: RhoChiPost@gmail.com

LEADS Initiative

The LEADS Initiative is a pilot program developed in 2022 as a collaborative project between the Rho Chi Post Newsletter and the Rho Chi Honor Society - Beta Delta Chapter. The goal of the LEADS Initiative is to provide an academic mentorship program for pharmacy students to promote scholastic excellence, ethics, service, leadership, and an increased sense of community. The LEADS Initiative provides pharmacy students with an opportunity to pair up with a Fifth-Year Rho Chi LEADS Mentor to partake in program activities and promote professional development.

L: Leadership

Leadership is the principle of the entire initiative wherein a Rho Chi member "leads" an individual/ group of mentee(s) in various activities throughout the school year to aid in professional development.

E: Ethics

Ethics is a valuable characteristic held by all healthcare professionals to promote the highest level of care indiscriminately to all patients. The program offers students the opportunity to speak with faculty from the College of Pharmacy and Health Sciences to learn more about the role of the pharmacist.

A: Academics

Students develop academically by having the opportunity to work with the Rho Chi Post Editorial Team to earn a national publication featured in the Rho Chi Post Newsletter.

D: Development

Professional development is important for all student pharmacists as they move through the pharmacy program. Students have the opportunity to network with faculty and alumni and learn more about different career paths in pharmacy practice by attending Rho Chi's semi-annual Coffeehouse Chats.

S: Service

At St. John's University, service is an important value bestowed upon all university members. This initiative provides multiple service opportunities each semester to allow students to impact and connect with the surrounding Queens Community.

The LEADS Initiative plans to recruit new mentors and mentees during the beginning of the Fall Semester of each academic school year. For more information about the LEADS Initiative, look out for the Rho Chi Honor Society/Rho Chi Post table at the Fall Semester Activities Fair, as well as for email communications from the Rho Chi Honor Society via the College of Pharmacy and Heath Sciences email. If you have any questions about the LEADS Initiative, do not hesitate to email the Rho Chi Honor Society at rhochis@gmail.com. You can also reach out to either of our organizations on Instagram by following us @sjurhochipost or @rhochi_sju.

The 1980's HIV and AIDS Epidemic

By: Christian Porcu, PharmD Candidate c/o 2024 and John Ortiz, PharmD Candidate c/o 2025

Human immunodeficiency virus (HIV) impairs immune cells, leaving patients with an increased susceptibility to opportunistic infections and other illnesses. HIV is transmitted through an exchange of bodily fluids, most often through unprotected sex or sharing drug injection equipment.[1] The first stage of HIV infection is known as acute HIV infection. This first stage persists anywhere from a few days to several weeks. Two-thirds of people with acute HIV infection experience flu-like symptoms, such as swollen lymph nodes, ulcers, and fever. In the second stage of infection, known as clinical latency, HIV can multiply at low levels, present asymptomatic, and remain dormant for 10 to 15 years. If not treated, the virus will progress to the third and most advanced stage of HIV infection, acquired immunodeficiency syndrome (AIDS). Some presentable symptoms include rapid weight loss, diarrhea, and memory loss. Those with AIDS have an average life expectancy of about three years and a high viral load of HIV ribonucleic acid (RNA), making them highly contagious.[1,2] Although the body is unable to eliminate HIV on its own, patients can take antiretroviral therapy (ART) to decrease the viral load of HIV RNA to undetectable levels, virtually nullifying the transmission of HIV.[1]

ART was not always accessible to all patient populations. However, thanks to the efforts of activists, access to therapy was accelerated and became more available to those in need. The AIDS Coalition to Unleash Power (ACT UP) was a prominent activist organization founded by Larry Kramer on March 12, 1987. It served as the forefront of advocacy for the HIV and AIDS epidemic and was primarily composed of young LGBTQ+ and/or HIV-infected members.[3,4] True to their name, ACT UP was a radical and passionate organization that effectively raised awareness through confrontational demonstrations.[3] Their presence pressured drug companies, government agencies, and others to prioritize the treatment of AIDS. Zidovudine (AZT) became the first drug indicated for AIDS with approval from the Food and Drug Administration on March 19, 1987, just a week after ACT UP's foundation. In the same year, Ronald Reagan signed an Executive Order for the first Presidential Commission on AIDS and publicly addressed AIDS after years of silence. The American Medical Association even declared that the medical care of patients with AIDS is an ethical obligation of healthcare professionals.[4]

However, these staggering developments were not without pitfalls. According to a 2018 study on the effects of AIDS activism on ACT UP members active during its peak years, 17% of respondents were consistent with an approximate diagnosis of post-traumatic stress disorder (PTSD), with depression prevalent among those with consistent PTSD symptoms. Those with depression and PTSD also experienced a higher incidence of AIDS survivor syndrome, manifesting as anger, anxiety, and hopelessness. The respondents credit the movement for giving them a sense of community and camaraderie. Along with personal growth, they recounted how the experience gave them a network that empowered them to exercise their agency and regain control in a situation they felt powerless in.[3]

Although the HIV and AIDS epidemic had a slow start in establishing appropriate healthcare, the efforts and sacrifices made by activists, alongside the progress made in drug development, expedited the public's access to treatment, sufficiently suppressing the virus and preventing increasing rates of death from HIV infection. Rather than yielding for the consequences of HIV, young people afflicted with this life-threatening disease mobilized to fight for change, and their impact still resonates to this day.

References

1. *What are HIV and AIDS?* HIV.gov. https://www.hiv.gov/hiv-basics/overview/about-hiv-and-aids/what-are-hiv-and-aids. Published June 15, 2020. Last Updated January 13, 2023.

2. About HIV/AIDS. Centers for Disease Control and Prevention. https://www.cdc.gov/hiv/basics/whatishiv.html. Published June 1, 2021.

3. Rabkin JG, McElhiney MC, Harrington M, Horn T. Trauma and Growth: Impact of AIDS Activism. *AIDS Research and Treatment*. 2018;2018:1-11. doi:10.1155/2018/9696725.

4. A Timeline of HIV and AIDS. HIV.gov. https://www.hiv.gov/hiv-basics/overview/history/hiv-and-aids-timeline#year-1987.

Meet the Mentor: Christian Porcu

My name is Christian Porcu and I am a fifth-year Pharmacy Major with a Minor in Social Justice Theory. I am part of many organizations both on and off campus, but the most notable are Kappa Psi Pharmaceutical Fraternity and the Scouts of America. I am a proud Eagle Scout with Troop 19 and just graduated the Ozanam Scholar's program here at St. John's University after conducting a Capstone Project targeted towards food insecurity for college students on campus.

I look forward to embarking on my rotations next year as my interests in pharmacy have always been debated. I have an interest in pursuing a specialty form of pharmacy, so residency is in question, but undergoing a fellowship sounds very intriguing to me as well. I am eager to begin experiential learning so I can more confidently find my pharmacy fit.

My favorite thing to do is travel, visit new countries, embrace other cultures, and make new friends along the way. I am currently learning Danish as being bilingual was always something I have coveted. I also like to embrace myself with various media, mostly Marvel, Nintendo, and Survivor, as I am the biggest nerd when it comes to this "trifecta".

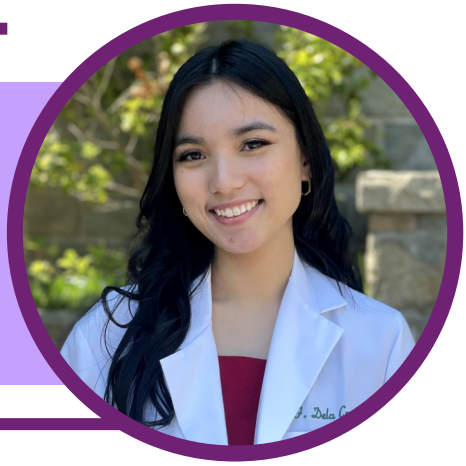
Meet the Mentee: John Ortiz

My name is John Ortiz and I'm currently a P2 pharmacy student. Over the summer I was an orientation leader and currently serve as a content-focused copy editor for the Rho Chi Post, the service chair for PARE, and a career peer for Career Services. I also work at an independent pharmacy.

Currently, I'm interested in pursuing a career in medical writing or scientific communications. I find satisfaction in learning and presenting drug information and disease states. These career paths allow pharmacists to be heavily involved in developing literature and contributing to the overall therapeutic knowledge of the healthcare community.

I like making origami and food. Mushrooms, smoothies, eggs, and garlic steak are some foods I really enjoy. I'd like to learn how to make smoked salmon and dried strawberries, which are my favorite. I also like anime and manga (One Piece, One Punch Man, and Parasyte are some of my favorites). Occasionally I read books and visit Central Park or the American Museum of Natural History during school breaks. When the night is nice enough, I stargaze.

Meet the Founders of the LEADS Initiative



Featuring: Vassilia Plakas, PharmD Candidate c/o 2024 and Frances Alexis Dela Cruz, PharmD Candidate c/o 2024
By: Isabelle Lim, PharmD Candidate c/o 2024

Meet Vassilia (Lia) Plakas

Lia is a fifth-year pharmacy student and the current President of the Rho Chi Honor Society – Beta Delta Chapter. Lia decided to pursue pharmacy as a result of being a NICU graduate. This experience gave her a close relationship with her medical team and instilled the importance of a strong patient-provider relationship. Lia has always had an affinity to medicine and science. She found that pharmacy encompasses these topics while also delving into patient care. She is interested in seeing the continued expansion of the pharmacist's role and impact on patients and families.

What is the purpose of the LEADS Initiative?

The purpose of the LEADS Initiative is to serve as a mentor-mentee program where Rho Chi members lead underclassmen as mentors. It is a way for Rho Chi members to continue to give back to the younger pharmacy students, and to serve as leaders. In this program, mentors and mentees write an article together for the Rho Chi Post and participate in different service/ professional events. These different program initiatives allow pairs to form a network while also promoting professional development and growth.

What inspired you to pursue the creation of the LEADS Initiative?

This initiative has allowed the groups to explore what it means to be a pharmacist at its core through attending the Oath of the Pharmacist event, writing articles for the Rho Chi Post, and sharpening other skillsets along the way. In addition, mentees have a mentor they can talk to if they have any questions regarding the pharmacy program. It stems from each feature mentioned, including leadership, ethics, academics, development, and service. The Rho Chi Society embraces those values at their core. It is fitting that the acronym of this leadership initiative ultimately spelled LEADS!

Meet the Founders

What is your favorite part of the LEADS Initiative?

The best part has been watching the initiative unfold and see all of the pieces come together. Figuring out which events would classify under each letter of the acronym and seeing everything come to fruition with the mentors and mentees connecting and writing together has been a super exciting experience.

Is there anything you would like to see the LEADS Initiative expand on in the future?

We have completed a lot of virtual opportunities over the last couple of years with COVID, which has been wonderful. However, as we transition back to in-person learning and service opportunities, the goal is to increase in-person opportunities available in the future.

What advice would you give future mentors and mentees?

The advice I would give to mentors and mentees is to be open to new experiences within the LEADS Initiative. Regarding advice to the mentees, I suggest keeping an open mind about writing, especially if this is their first publication.

Meet Frances Alexis Dela Cruz

Frances is a fifth-year pharmacy student and the current Vice President of the Rho Chi Honor Society – Beta Delta Chapter. Frances attributes her passion for pharmacy to her father, who had been hospitalized when she was younger. Seeing how something as small as a pill could make such a big difference in his life solidified the pursuit of pharmacy practice for Frances, as she wanted to serve as an advocate to optimize his healthcare and answer any and all of his medication questions.

What is the purpose of the LEADS Initiative?

The LEADS Initiative is a pilot academic mentorship program centered on writing an article for the Rho Chi Post and building an increased sense of community between Rho Chi members and underclassmen. Mentor/mentee groups also participate in several service and professional development activities which promote personal and professional growth.

What inspired you to pursue the creation of the LEADS Initiative?

It all stemmed from trying to fill an unmet need because we saw that a lot of younger pharmacy students were hesitant to write for the Rho Chi Post, whether it be because they lacked experience or were unaware of the opportunity. The LEADS Initiative was built upon trying to meet that need and transformed to become a mentor/mentee program. With this foundation, we were inspired to also include aspects of leadership, ethics, academics, professional development, and service.

What is your favorite part of the LEADS Initiative?

My favorite part of this opportunity has been the ability to create and establish a platform for different years to connect with and learn from one another. Seeing the groups and having all

the pieces and activities come together has been extremely rewarding.

Is there anything you would like to see the LEADS Initiative expand on in the future?

I would like to see the LEADS Initiative further expand and include more mentoring groups. Also, in the initial planning stages of the LEADS Initiative, we aimed to include a scavenger hunt as part of the Ethics component for the mentorship groups to bond and get to know each other. I hope to see this come to fruition in the future.

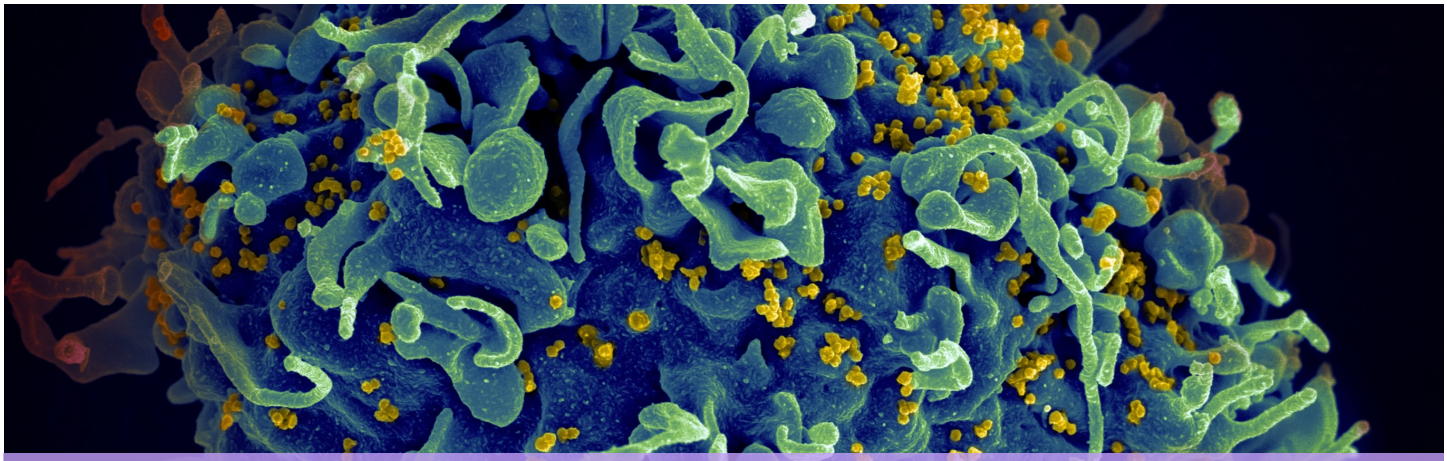
What advice would you give future mentors and mentees?

Don't be afraid to take that step and sign up because participation in the LEADS Initiative provides an opportunity for personal and professional growth. The initiative emphasizes attributes that are rooted in the pharmacy profession at its core. It is a wonderful way to learn and build yourself professionally and network with other pharmacy students.

On behalf of the Rho Chi Post, we would like to thank Lia and Frances for all the time and effort they put in to bring the LEADS Initiative to life!

The Rho Chi Society

Membership in the Rho Chi Society is a privilege accorded to the very few who distinguish themselves by their academic and professional achievements and who aspire to the mission and vision of the society. Members may be elected as professional or graduate students in pharmacy, as members of faculties of schools and colleges of pharmacy, as alumni who distinguish themselves in the profession, or as honorary members by special action of the society's Executive Council. By its very existence, the honor society reflects Western cultural beliefs in education and the pursuit of intellectual excellence. The honor society aims to recognize and reward outstanding scholarly attainment, and encourages and stimulates outstanding scholarship.



A Beacon of Hope for Multi-Drug Resistant HIV Patients: Sunlenca®

By: Debika Kundu, PharmD Candidate c/o 2024 and Jeilyn Nunez, PharmD Candidate c/o 2025

Human immunodeficiency virus (HIV) is a virus that targets one's immune system and renders it weak against many diseases, such as influenza, Coronavirus disease 2019 (COVID-19), and cancer. HIV can enter one's body through various modes of transmission, including anal or vaginal sexual intercourse; mother to fetus during pregnancy; or shared needles, syringes, and other injection equipment that can transfer bodily fluids from one person to another.[1] Populations with a high risk of acquiring HIV infection consist of men who have sex with men (MSM), African Americans, Latinos, injection drug users (IDUs), and transgender individuals.[2] Although MSM only make up approximately 2% of the total population in the United States (US), they comprised about 61% of new HIV infections in the US in 2009; hence, they are the group at highest risk of HIV transmission.[3]

HIV primarily attacks CD4 receptors on the surface of T-cells, impairing their immune response. The viral surface and transmembrane glycoproteins gp120 and gp41 form the envelope glycoprotein complex. Upon binding to CD4 receptors, gp120 achieves greater affinity for and binds to the secondary "coreceptor," which then enables the fusion and entry of HIV type 1 (HIV-1) into the cell's cytoplasm.[4,5] Inside the cytoplasm, the virus releases reverse transcriptase to transform HIV ribonucleic acid (RNA), containing viral genetic information, into HIV deoxyribonucleic acid (DNA).[6] The DNA can then enter the nucleus and combine with the host cell's own DNA. Altered host cell DNA goes through transcription facilitated by RNA polymerase, which in turn makes viral mRNA and synthesizes protein chains, replicating the HIV DNA. New HIV proteins and RNA emerge from the host cell as immature (noninfectious) HIV. The virus can then releases protease to form the mature (infectious) virus.[6] Once mature, the virus can either continue to infect other cells in the body or spread to other hosts via the aforementioned modes of transmission. As this cycle continues in the body, there is an increase in the HIV viral load and a decline in CD4+ T-cells, as well as dendritic cells and macrophages.[7,8]

There are two types of HIV diseases: HIV-1 and HIV type 2 (HIV-2). Although they share similar pathologies, replication pathways, and transcription methods, HIV-2 is associated with a lower blood plasma viral load and is less likely to be transmitted among individuals.[9] Therefore, HIV-2 is less likely to progress to a

more severe form of the disease, whereas HIV-1 has a greater tendency to progress into acquired immunodeficiency syndrome (AIDS). HIV-2 is considered endemic as it is mainly limited to West Africa, while HIV-1 is considered pandemic due to its prevalence in a plethora of countries.[9] Common signs and symptoms between HIV-1 and HIV-2 patients include fever, lymph node enlargement, fatigue, rash, and gastrointestinal symptoms.[10]

Current Treatment Options for HIV

HIV treatment consists of antiretroviral therapy, which does not cure the disease but instead prolongs the life expectancy of patients. The primary goal of treatment is to achieve viral suppression by decreasing the viral load to undetectable levels (less than 50 copies of HIV RNA per milliliter of blood)[11] and preventing its transmission. Antiretroviral therapy comprises of various drug classes, including nucleoside reverse transcriptase inhibitors (NRTIs), non-nucleoside reverse transcriptase Inhibitors (NNRTIs), protease inhibitors, fusion inhibitors, integrase inhibitors, and post-attachment inhibitors.[12] Some examples of the most commonly used HIV medications include Biktarvy®, Trimeq®, and Tivicay®, in combination with either Truvada®, Descovy®, Cimduo®, or Temixys®. Prophylaxis therapy may be administered to anyone who suspects that they have been exposed to HIV. Truvada® and Descovy® are the only medications approved for pre-exposure prophylaxis (PrEP), while Apretude® has recently been approved by the Food and Drug Administration (FDA) as the first and only injectable suspension.[13,14] Post-exposure prophylaxis (PEP) is short-term antiretroviral therapy that is used in emergency settings. PEP must be initiated within 36 to 72 hours after suspected exposure to HIV and continued for a total of 28 days. Initiation of PEP after 72 hours may be ineffective.[15]

Sunlenca's Unique Mechanism of Action

HIV is a serious condition that can lead to additional health complications within treatment-experienced patients who cannot receive widely used treatment regimens due to drug resistance, intolerance, contraindications, or other safety concerns. Sunlenca® (lenacapavir) is an anti-HIV medication that may be a safe and effective treatment option for multidrug resistant (MDR) patients who have exhausted most, if not all, of the conventional treatment options.[16] Lenacapavir is the first medication to be manufactured in a new class of drugs termed capsid inhibitors. Their mechanism of action involves blocking the HIV-1 virus' capsid, which is a protein shell that encases and protects the viral genome and ensures its delivery into healthy human cells for infection.[16,17] As a result, lenacapavir prohibits the virus from progressing through its life cycle and maturing into its infectious form.

Prescribing Information

Lenacapavir's convenient dosing regimen can strongly encourage adherence among patients. It is provided as either a 300 mg tablet or a 463.5 mg/1.5 mL single-dose vial.[17] Patients taking lenacapavir have the option to choose between two initiation options, both of which are followed by biannual doses. The first initiation option includes injecting 927 mg (two 1.5 mL syringes) subcutaneously on day 1, followed by oral consumption of two 300 mg tablets on that same day. On day 2, patients take two 300 mg tablets, concluding this initiation option. The second initiation option requires patients to take two 300 mg tablets on days 1 and 2, followed by one 300 mg tablet on day 8

and a subcutaneous injection of 927 mg on day 15.

Regardless of the initiation option chosen, the maintenance dosing remains the same, requiring a 927 mg subcutaneous injection every 6 months, or 26 weeks, from the date of the last injection. The patient may take the maintenance dose either 2 weeks before or after the scheduled dose; however, surpassing the 2-week window is not recommended.[17] Patients must be counseled on the significance and urgency of the maintenance dose every 6 months, as failure to do so may lead to loss of virologic response and resistance development. If a patient has missed their scheduled dose and more than 28 weeks have passed since the last injection, then initiation should be restarted using either of the two initiation options.[17]

The use of lenacapavir is contraindicated in those taking medications that are CYP3A4 inducers, such as phenobarbital, phenytoin, rifampin, and glucocorticoids.[16] Administration of lenacapavir with any of these medications can decrease the levels of the former, hence reducing its therapeutic efficacy and increasing the possibility of resistance against it. The most commonly experienced adverse effects include injection-site reactions, which can consist of swelling, pain, redness, induration, pruritus, and/or extravasation.[17]

CAPELLA: the Clinical Study that Led to Lenacapavir's Approval

The FDA's decision to approve lenacapavir was based on the international phase 3 CAPELLA study, which explored the drug's safety and efficacy.[18] Eligible patients had to be at least 12 years of age receiving stable yet ineffective therapy for at least 8 weeks. They also had to have documented resistance to two or more antiretroviral medications each from at least three of the four main classes (NRTIs, NNRTIs, protease inhibitors, and integrase strand-transfer inhibitors). Of the remaining drugs that the patient is not resistant to, there could be no more than two fully active antiretrovirals from these main classes that could be combined to form a viable therapeutic regimen.[18] The study participants were divided into two cohorts based on the magnitude of the decrease in plasma HIV-1 RNA levels between the screening and cohort selection visits.

The first cohort consisted of 36 patients who experienced a decrease of less than 0.5 $\log_{10}$ copies per milliliter between the two visits and an HIV-1 RNA level of at least 400 copies per milliliter (indicative of failure of stable viremia).[18] These patients were further divided into a lenacapavir group and a placebo group in a 2:1 ratio, receiving either the treatment or a placebo in a double-blind fashion. 24 patients in the lenacapavir group received oral lenacapavir tablets on days 1, 2, and 8 while 12 patients in the placebo group received placebo on those same days for the initial treatment (days 1 to 14).[18] During this 14-day period, these patients also continued their failing antiretroviral therapy. After the end of the first 14 days, the patients in the lenacapavir group received maintenance treatment with a subcutaneous injection of lenacapavir once every 6 months.[18] Patients in the placebo group received maintenance treatment with oral lenacapavir, which was followed by subcutaneous injection of lenacapavir once every 6 months. During the maintenance treatment period, both groups also received optimized background therapy. By day 15, there was an 87.5% decrease in the HIV-1 viral load by at least 0.5 $\log_{10}$ copies within the lenacapavir group compared to a 16.7% decrease within the placebo group

(absolute difference 71%; 95% confidence interval 35 to 90; P < 0.001).[18]

The second cohort was nonrandomized and comprised of 36 patients with lower viremia who experienced a decline of at least 0.5 log_{10} copies per milliliter between the screening and cohort-selection visits, had an HIV-1 RNA level of less than 400 copies per milliliter, or both.[18] Furthermore, patients who met eligibility criteria for cohort 1, but could not join due to enrollment closure, were added to cohort 2. From days 1 to 15, these patients received open-label oral lenacapavir, along with optimized background therapy. On day 15, they received subcutaneous lenacapavir, which was repeated once every 6 months. Within this group, 83% of the participants achieved a viral load of fewer than 50 copies per milliliter, which is considered undetectable.[18]

Conclusion

Today, HIV prophylaxis and treatment options have greatly evolved over the years due to our expanded knowledge on the disease and its progression. The pharmaceutical and healthcare industries continue to collaborate to ensure that a wide variety of treatment options are available for patients suffering from HIV. Despite this, a plethora of patients may fail multiple medication regimens, which can be emotionally and physically debilitating. Lenacapavir, which is the first manufactured capsid inhibitor, provides a beacon of hope to treatment-experienced, MDR patients. Lenacapavir's convenient treatment regimen holds the promise of decreasing a patient's viral load to undetectable levels, improving their quality of life, and prolonging their life expectancy.

References

1. Shaw GM, Hunter E. HIV Transmission. *Cold Spring Harb Perspect Med*. 2012;2(11):a006965-a006965. doi:10.1101/cshperspect.a006965

2. High-Impact HIV Prevention: CDC's Approach to Reducing HIV Infections in the United States. Last Updated 08/28/2017.

3. Purcell DW, Johnson CH, Lansky A, et al. Estimating the Population Size of Men Who Have Sex with Men in the United States to Obtain HIV and Syphilis Rates. *Open AIDS J*. 2012;6(1):98-107. doi:10.2174/1874613601206010098

4. Checkley MA, Luttge BG, Freed EO. HIV-1 Envelope Glycoprotein Biosynthesis, Trafficking, and Incorporation. *J Mol Biol*. 2011;410(4):582-608. doi:10.1016/j.jmb.2011.04.042

5. Doms RW, Moore JP. HIV-1 Membrane Fusion: Targets of Opportunity. *J Cell Biol*. 2000;151.

6. Hu WS, Hughes SH. HIV-1 Reverse Transcription. *Cold Spring Harb Perspect Med*. 2012;2(10):a006882-a006882. doi:10.1101/cshperspect.a006882

7. Moris A, Pajot A, Blanchet F, Guivel-Benhassine F, Salcedo M, Schwartz O. Dendritic cells and HIV-specific CD4+ T cells: HIV antigen presentation, T-cell activation, and viral transfer. *Blood*. 2006;108(5):1643-1651. doi:10.1182/blood-2006-02-006361

8. Vidya Vijayan KK, Karthigeyan KP, Tripathi SP, Hanna LE. Pathophysiology of CD4+ T-Cell Depletion in HIV-1 and HIV-2 Infections. *Front Immunol*. 2017;8:580. doi:10.3389/fimmu.2017.00580

9. Esbjörnsson J, Jansson M, Jespersen S, et al. HIV-2 as a model to identify a functional HIV cure. *AIDS Res Ther*. 2019;16(1):24. doi:10.1186/s12981-019-0239-x

10. German Advisory Committee Blood (Arbeitskreis Blut), Subgroup 'Assessment of Pathogens Transmissible by Blood'. Human Immunodeficiency Virus (HIV). *Transfus Med Hemotherapy*. 2016;43(3):203-222. doi:10.1159/000445852

11. Morey SS. HHS updates and guidelines for antiretroviral therapy in HIV infection. Health and Human Services. Am Fam Physician. 2000 Aug

1;62(3):661-2, 665. PMID: 10950219.

12. Kemnic TR, Gulick PG. HIV Antiretroviral Therapy. 2022 Sep 20. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2023 Jan–. PMID: 30020680.

13. FDA Approves First Injectable Treatment for HIV Pre-Exposure Prevention. FDA. Published 12/20/2021.

14. Fields SD, Tung E. Patient-Focused Selection of PrEP Medication for Individuals at Risk of HIV: A Narrative Review. *Infect Dis Ther*. 2021;10(1):165-186. doi:10.1007/s40121-020-00384-5

15. Sultan B, Benn P, Waters L. Current perspectives in HIV post-exposure prophylaxis. *HIV AIDS (Auckl).* 2014;6:147-158. Published 2014 Oct 24. doi:10.2147/HIV.S46585

16. Dvory-Sobol H, Shaik N, Callebaut C, Rhee MS. Lenacapavir: a first-in-class HIV-1 capsid inhibitor. *Curr Opin HIV AIDS*. 2022;17(1):15-21. doi:10.1097/COH.0000000000000713

17. Sunlenca (lenacapavir) [package insert]. Foster City, CA; Gilead Sciences, Inc.; Revised 12/31/2022.

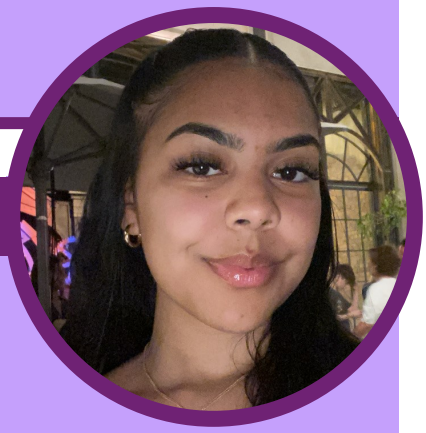
18. Segal-Maurer S, DeJesus E, Stellbrink HJ, et al. Capsid Inhibition with Lenacapavir in Multidrug-Resistant HIV-1 Infection. *N Engl J Med*. 2022;386(19):1793-1803. doi:10.1056/NEJMoa2115542

Meet the Mentor: Debika Kundu

My name is Debika Kundu and I am currently a P3 student pharmacist. On campus, I serve as the President of the American Pharmacists Association – Academy of Student Pharmacists (APhA-ASP) and a LEADS mentor for the Rho Chi Honor Society. I also work as an intern pharmacist at New York-Presbyterian Hospital/ Columbia University Irving Medical Center and Calvary Hospital.

I am interested in pursuing clinical pharmacy because I want to directly contribute to patient care by collaborating with physicians, nurses, and other integral members of the interdisciplinary team. I want to apply my six years of education to real-life patient cases and continue expanding my knowledge. As a clinical pharmacist, I would also strive to achieve BCPS certification and precept students and residents.

I have recently had more time to start reading again! My favorite genres include mystery, thriller, historical fiction, and self-help books. Besides reading, I also love going to movie theaters, doing Pilates, and exploring new cafes.



Meet the Mentee: Jeilyn Nunez

My name is Jeilyn Nunez and I am a pharmacy major in my P2 year. Currently, I am working at New York Presbyterian Weil Cornell and Walgreens as a pharmacy intern.

I am still looking forward to expanding on my experiences and academic career as a life-long learner. I am 21 years old, and I am grateful to say I have an amazing support system which includes my family, friends, and colleagues. As for my career path, I am still deciding what field I would like to pursue as many pathways are interesting to me. While in school my goal is to be very versatile and gain as much knowledge as I can in each aspect that pharmacy has to offer.

I love baseball (my favorite team is the Yankees) and I enjoy going to new places. I also enjoy spending time with my family and most of all we can't forget about self-care. Music is therapy for me it helps me go through the different motions in life.

Meet the Founders of the LEADS Initiative

Featuring: Justin Budz, PharmD Candidate c/o 2023
By: Isabelle Lim, PharmD Candidate c/o 2024

Justin is a sixth-year pharmacy student and the current Editor-in-Chief of the Rho Chi Post. Justin views pharmacy as a healthy medium between science and healthcare. Studying pharmacy provided him with the opportunity to learn more about the biological processes behind medications working in the body and how everything comes together to help better a patient's conditions. Pharmacy also offered him the opportunity to practice in healthcare where he was motivated by his ability to work with providers to see his interventions impact the lives of patients. As Justin progressed through pharmacy school, he was inspired to pursue a career in the pharmaceutical industry as he admired the idea of using the information and skillsets he had learned in school to bring benefit to a global population of patients. He looks forward to seeing his impact on bringing drug products into the market to provide benefit to a wide range of patients. Following his graduation from St. John's, Justin will begin a two-year Post-Doctoral Fellowship in Pharmaceutical Marketing with RevHealth.

What is the purpose of the LEADS Initiative?

The LEADS Initiative is a way to join together older pharmacy students with those in their preprofessional years. The Rho Chi Honor Society mainly involves upperclassmen, as you are first eligible for induction in your fourth year of school. When I was on the Executive Board of Rho Chi, I found that a lot of younger students didn't know about Rho Chi and what our organization was all about. We created the LEADS Initiative as a means to not only help students learn more about Rho Chi but more importantly aid in their professional development by offering different activities provided throughout the year.

What inspired you to pursue the creation of the LEADS Initiative?

It stemmed back to when I was on the Executive Board of Rho Chi. We noticed a lack of involvement from younger students at our events and we wanted to change that, especially because Rho Chi provides numerous events to aid in professional development. For example, our Coffeehouse Chats allow students to network with alumni from St. John's who are now in various career paths in pharmacy. There's a large potential of growth possible through Rho Chi and we wanted to open that avenue to a larger array of students earlier on in their education. The LEADS Initiative is here to help students grow as leaders and professionals by finding different ways to grow their networks,

develop writing and critical thinking skillsets, and give back to the community through service opportunities.

What is your favorite part of the LEADS Initiative?

I have some bias being the Editor-in-Chief of the Rho Chi Post, but my favorite part is the writing aspect. I think being able to write and analyze literature showcases skillsets that are not only important for each student in their own professional growth, but also for applying to post-graduation opportunities. Being able to put together a comprehensive piece of writing translates into being able to educate and communicate with a wide population of patients and healthcare providers. Strengthening those writing skillsets can benefit you as a pharmacist by helping you learn how to retrieve data from multiple complex sources and condense that information to communicate it efficiently. Being involved in our newsletter is a unique opportunity to gain a national publication and is a great aspect to include on resumes to help stand out as candidates when applying for post-graduate opportunities.

Is there anything you would like to see the LEADS Initiative expand on in the future?

I think one of the handicaps of the LEADS Initiative is that the program may offer an overwhelming number of opportunities for students. These include the Rho Chi Coffeehouse Chats, service opportunities, speaker events, and a publication opportunity with the Rho Chi Post. Although these are all great experiences, it can be an additional struggle for some students trying to balance their work life, student life, and personal life. Although taking part in the LEADS Initiative has been very manageable for our students this year, I would like to see our program find a way to better balance these experiences so that more students can gain benefit from the LEADS Initiative.

What advice would you give future mentors and mentees?

Definitely be open to all the opportunities that the LEADS Initiative provides. During my time with the Rho Chi Honor Society, I participated in a lot of events where I initially didn't think I would learn too much. A prominent memory of mine with Rho Chi was attending a Residency and Fellowship Workshop partnered with APhA, IPhO, and SSHP. The event featured alumni from St. John's who were currently residents and fellows. Through this experience, I got to learn more about what residencies and fellowships were and what their respective application processes looked like. Most importantly, I got to learn about how I should structure my learning experiences and professional growth in my last 2 years of school to help me stand out as a future candidate. I'll forever be grateful for the conversations I had that day as those tips and insights helped me prepare for applications and eventually acquire a post-doctoral fellowship in pharmaceutical marketing with RevHealth. As a student, you should go into every event with an open mind because you never know what conversation may inspire and motivate you towards a specific career path within pharmacy practice.

On behalf of the Rho Chi Post, we would like to thank Justin for his effort in bringing the LEADS Initiative to life and helping our mentors/mentees earn a national publication!

Evaluation of Ivermectin for Treatment of COVID-19

By: Isabelle Lim, PharmD Candidate c/o 2024 and Justin Budz, PharmD Candidate c/o 2023

Coronavirus disease 2019 (COVID-19) is an illness caused by severe acute respiratory system coronavirus 2 (SARS-CoV-2) that primarily affects the respiratory system.[1] In order to enter human cells, the virus' spike protein receptor-binding domain (RBD) must bind to a cell membrane-bound angiotensin-converting enzyme 2 (ACE2) before endocytosis can begin.[2] Once bound to its receptor, the RBD is activated by human proteases, including transmembrane serine protease 2 (TMPRSS2) and lysosomal protease cathepsins, which allows for the fusion of SARS-CoV-2 into the cell cytoplasm.[2] Inside the cell, the virus can enter the cell nucleus via a transport pathway mediated by the importin (IMP) α/β1 heterodimer.[3] It is necessary for the virus to cross into the nucleus to replicate and further carry out its infection of the host.

Current Treatment Guidelines for COVID-19

The COVID-19 Treatment Guidelines Panel strongly recommends symptom treatment as the primary form of management in all non-hospitalized adults with mild to moderate COVID-19 who do not require supplemental oxygen. These patients are urged to utilize over-the-counter (OTC) medications to decrease the severity of typical symptoms including fever, headache, muscle pain, and cough.[4] Nonhospitalized patients at high risk of advancing to severe COVID-19 should also receive Paxlovid (ritonavir-boosted nirmatrelvir) or Veklury® (remdesivir), with the former receiving a stronger recommendation than the latter.[4] Alternatively, Lagevrio (molnupiravir) may be considered for use when the aforementioned medications are unavailable or inappropriate for the patient.[4]

Role of Ivermectin in Treatment of COVID-19

Since the emergence of COVID-19, medical experts have scrambled to find efficacious modes of treatment. Some focused on developing novel antivirals, while others explored the option of repurposing existing medications. Ivermectin, a well-known antiparasitic agent, rapidly became a drug product of interest in those seeking anti-COVID-19 therapy during the height of the pandemic. Oral ivermectin tablets are indicated for the treatment of strongyloidiasis of the intestinal tract as well as onchocerciasis.[5] Ivermectin acts by selectively binding to glutamate-gated chloride ion channels found in the nerve and muscle cells of invertebrates such as nematodes. Once bound, the cell's membrane becomes increasingly permeable to chloride ions, leading to hyperpolarization of the cell and ultimately, the paralysis and death of the parasite.[5]

Thus far, ivermectin has not been approved by the Food and Drug Administration (FDA) for the treatment of any viral disease.[6] However, it possesses many properties holding potential for the treatment of viruses, including COVID-19. One of ivermectin's unique antiviral mechanisms of action involves preventing SARS-CoV-2 from entering host cells by inhibiting attachment of the virus' spike protein to cell-membrane bound ACE2.[8] Additionally, ivermectin has shown to inhibit IMPα/β1-mediated nuclear import of viruses, and consequently, viral replication.[7] Furthermore, it is hypothesized that those infected with COVID-19 can benefit from ivermectin's anti-inflammatory effects.[6]

In response to the surge in demand for ivermectin based on its observed potential as an effective antiviral, many states have felt the need to increase the accessibility of the medication. To do so, some states began to allow pharmacists to dispense ivermectin without a valid prescription, despite the lack of concrete evidence supporting its use in patients with COVID-19. In March 2022, the state of New Hampshire proposed a bill which would allow pharmacists to dispense ivermectin through a standing order. The bill was approved by New Hampshire's Senate and House of Representatives but was ultimately vetoed by Governor Sununu.[9] New Hampshire representatives supporting the bill justified it as a way to prevent people from using

inappropriate, and possibly harmful, formulations of ivermectin. One New Hampshire House Representative, Mark Pearson, stated that some individuals, after not having access to prescription ivermectin, had begun to seek alternative forms of ivermectin intended for use in livestock.[10] In April 2022, Tennessee followed suit by passing a bill allowing ivermectin to be sold as an OTC medication pursuant to a collaborative agreement with a physician.[11] The sponsor of this bill, Senator Frank Nicelely, stated it would be much safer for patients to have access to OTC ivermectin and be able to consult a pharmacist in terms of dosing rather than having to resort to guessing "what size horse [they] are" when considering veterinary formulations.[12]

A pre-clinical trial done by Caly et al. demonstrated ivermectin's ability to reduce the spread of infection of SARS-CoV-2, adding to the support of ivermectin as a possible treatment option for COVID-19.[13] In this *in vitro* study, infected cells treated with 5 µM of ivermectin showed a 93% decrease in SARS-CoV-2 RNA levels after 24 hours and a subsequent ~5000-fold decrease after 48 hours.[13] However, it is important to note that 5 µM of ivermectin would be equivalent to 100-times the plasma concentration of a patient on 200 mcg/kg of ivermectin, which is a standard dose used in the treatment of onchocerciasis.[14] Although the ability to achieve similar plasma concentrations in humans is not possible with currently approved ivermectin dosing, this study acknowledges that ivermectin does hold activity against SARS-CoV-2 *in vitro* and could potentially be clinically effective. Soon after the results of Caly et al. were published, additional clinical trials were conducted to further assess the safety and efficacy of ivermectin in the treatment of COVID-19.

Literature Review: IVERCOR-COVID19 Study

The *Ivermectin to Prevent Hospitalization in Patients with COVID-19* (IVERCOR-COVID19) study was a randomized, double-blind, placebo-controlled clinical trial done in Corrientes, Argentina to determine whether ivermectin would be effective in preventing the hospitalization of patients with early onset COVID-19.[15] Patients over 18 years old with a positive SARS-CoV-2 reverse transcription-polymerase chain reaction (RT-PCR) test result within the last 48 hours were recruited to participate in the trial. Those that required supplemental oxygen or were concomitantly using hydroxychloroquine, chloroquine or other antiviral drugs were excluded from the study. Individuals who had used ivermectin within a week before randomization were also not included.[15]

A total of 501 patients were randomized to either the ivermectin plus standard of care (SOC) arm (n = 250) or the placebo plus SOC arm (n = 251). The ivermectin group received staggered weight-based doses of ivermectin. Those that weighed ≤ 80 kg received 12 mg (two 6 mg tablets) of oral ivermectin at the time of inclusion and then again 24 hours after, for a total of 24 mg. Similar dosing schedules were given in subsequent weight groups, with only a change in dose. The dose for those weighing 80 to 110 kg was 18 mg (three tablets), for a total of 36 mg. Lastly, those weighing ≥ 110 kg received 24 mg (four tablets), for a total dose of 48 mg. Participants in the placebo group received the corresponding number of placebo tablets to the ivermectin weight-based regimen, both at baseline and 24 hours after.[15]

The primary outcome of this study measured was the number of hospitalizations in patients with COVID-19.[15] 14 individuals (5.60%) from the ivermectin group and 21 individuals (8.37%) from the placebo group required hospitalization within any point of the trial. The difference in hospitalization rates between ivermectin and placebo was not statistically significant (Odds Ratio [OR] 0.65; 95% Confidence Interval [CI] 0.32 to 1.31; p = 0.227), indicating that ivermectin had no significant effect in preventing hospitalization in patients with mild to moderate COVID-19.[15]

Literature Review: I-TECH Study

The *Ivermectin Treatment Efficacy in COVID-19 High-Risk Patients* (I-TECH) study

was an open-label randomized clinical trial conducted across 20 public hospitals and 1 COVID -19 quarantine center all located in Malaysia.[16] This study looked to determine the efficacy of ivermectin in preventing the progression to severe COVID-19 in high-risk populations with mild-to-moderate COVID-19. Participants of the study had to be at least 50 years old, have at least 1 comorbidity, and produce a positive SARS-CoV-2 RT-PCR test or antigen test within 7 days of their symptom onset.[16] Individuals were excluded from the study if they required supplemental oxygen, had a pulse oximetry oxygen saturation (SpO_2) level less than 95% at rest, or had severe hepatic impairment (alanine transaminase (ALT) level greater than 10 times that of the upper limit of normal). They were also not to have a history of anti-COVID-19 drug use, including ivermectin use, in the past 7 days.[16]

During this trial, 500 patients were randomized in a 1:1 ratio into either the treatment group, which received 400 mcg/kg of oral ivermectin plus SOC (n = 241), or the control group, which received only SOC (n = 249). Participants in the treatment group received a dosage of ivermectin based on weight and rounded to the nearest 6 mg or 12 mg tablet, with a total treatment duration of 5 days.[16]

The primary outcome of this study was the proportion of patients who progressed to severe COVID-19, defined as having hypoxia and requiring supplemental oxygen to maintain a SpO_2 of 95% or greater.[16] Of the 490 patients included in the primary analysis, 52 participants (21.6%) from the treatment group progressed to severe COVID-19 versus 43 participants (17.3%) from the control group (Relative Risk [RR] 1.25; 95% CI 0.87 to 1.80; p = 0.25).[16] These results lacked statistical significance, but still suggest that ivermectin was not able to reduce the risk of progression to severe COVID-19 in high-risk populations.[16]

Literature Review: RIVET-COV Study

The *Single-Dose Oral Ivermectin in Mild and Moderate COVID-19* (RIVET-COV) study was a pilot, double-blind, three-arm, placebo-controlled randomized control trial conducted at the COVID-19 facility of the National Cancer Institute in New Delhi, India.[17] This study aimed to determine the safety and efficacy of ivermectin elixir in the treatment of COVID-19. Individuals over 18 years old were considered for the study if they had non-severe COVID-19, confirmed by a positive SARS-CoV-2 RT-PCR or rapid antigen test and an SpO_2 greater than 90%.[17] Patients were excluded if they had a creatinine clearance (CrCl) < 30 mL/min, elevated transaminase levels (> 5 times the upper limit of normal), or any severe comorbidities.[17]

In this study, 157 patients were randomized in a 1:1:1 ratio to receive either 12 mg of ivermectin (n = 40), 24 mg of ivermectin (n = 40), or placebo (n = 45). Ultimately, 125 patients received a positive SARS-CoV-2 RT-PCR on the day of enrollment and were included in the modified intention-to-treat (mITT) group. Of this population, 80 patients (64%) had mild COVID-19 and 45 (36%) had moderate COVID-19.[17]

The two primary outcomes of this trial assessed the proportion of participants that achieved negative RT-PCR results, as well as attained a decreased viral load (VL) at day 5 of enrollment. Regarding negative RT-PCR results by day 5, 47.5% of the ivermectin 24 mg arm had tested negative on a RT-PCR test, versus 35.0% from the ivermectin 12 mg arm and 31.1% from the placebo arm. These results were found to not be statistically significant (p = 0.3).[17] Upon conclusion of the study, data also demonstrated a decrease in VL by day 5 across all arms. The VL of the ivermectin 24 mg, ivermectin 12 mg, and placebo groups decreased by 3.05 (SD 2.50), 3.04 (SD 2.05), and 3.08 (SD 1.98) $\log_{10}$ viral copies/mL between day 0 to 5, respectively. However, these results were again found to not be statistically significant (p = 0.76).[17] It was determined that the use of ivermectin elixir, regardless of dosage, was unable to show significant trends in producing negative RT-PCR results and declines of SARS-CoV-2 VL in patients with mild to moderate COVID-19.[17]

Literature Review: COVER Study

The *High-Dose Ivermectin for Early Treatment of COVID-19* (COVER) study was a randomized, investigator-initiated, double-blind, phase 2, dose-finding, proof-of-concept clinical trial conducted with adult patients that were diagnosed with COVID-19 across four sites in Italy.[18] Those recruited had to confirm SARS-CoV-2 infection through a positive real-time RT -PCR test and had to be asymptomatic or oligosymptomatic, without hospitalization or the need for supplemental oxygen.[18] Individuals were excluded from the study if they had any central nervous system (CNS) disease; required dialysis; or used warfarin, antiviral treatment, chloroquine, or hydroxychloroquine.[18]

93 participants were randomized in a 1:1:1 ratio in arms A, B, and C. Individuals in arm A (n = 32) received placebo, while those in arm B (n = 29) received 600 mcg/kg of ivermectin and placebo for 5 days, and those in arm C (n = 32) received 1200 mcg/kg of ivermectin for 5 days.[18]

The primary outcome of this study evaluated the number of serious adverse drug reactions (SADRs) that occurred and the mean log--$_{10}$ reduction in VL on day 7 of the trial. Regarding the number of SADRs, none were reported by day 7.[18] However, it is important to note that of the 14 participants who discontinued treatment, 11 of them were from the high dose ivermectin treatment arm and stated intolerability as their reason for discontinuation.[18] As for change in VL by day 7, reductions of 2.0, 2.5, and 2.9 were noted in arms A, B, and C, respectively. These reductions were not significant, with results from arm C having a p-value of 0.066 and Arm B having a p-value of 0.122.[18] Although this study shows that high doses of ivermectin can be considered safe, there was no clear clinical benefit observed in its administration for the treatment of COVID-19.[18]

Conclusion

It is imperative that pharmacists remain diligent in keeping up to date with treatment guidelines, especially in the case of COVID-19 where the treatment landscape is continuously evolving. As seen throughout the pandemic, it is easy for misinformation to spread quickly and influence the minds of many. Although ivermectin was once popularized for the belief that it could potentially cure COVID-19, the aforementioned clinical trials indicate that ivermectin has no clinical benefit in the management or treatment of COVID-19. Pharmacists should urge against the use of ivermectin and instead recommend OTC analgesics, antipyretics, and/or antitussives for the management of COVID-19 symptoms, as well as considering ritonavir-boosted nirmatrelvir, remdesivir, or molnupiravir for those at high risk of progressing to severe COVID-19.

References

1. Basics of COVID-19. Centers for Disease Control and Prevention. https://www.cdc.gov/coronavirus/2019-ncov/your-health/about-covid-19/basics-covid-19.html. Last Updated 11/04/2021

2. Shang J, Wan Y, Luo C, et al. Cell entry mechanisms of SARS-CoV-2. Proc Natl Acad Sci U S A. 2020;117(21):11727-11734. doi:10.1073/pnas.2003138117

3. Arévalo AP, Pagotto R, Pórfido JL, et al. Ivermectin reduces in vivo coronavirus infection in a mouse experimental model. Sci Rep. 2021;11(1):7132. Published 2021 Mar 30. doi:10.1038/s41598-021-86679-0

4. COVID-19 Treatment Guidelines Panel. Therapeutic Management of Nonhospitalized Adults With COVID-19. National Institutes of Health. https://www.covid19treatmentguidelines.nih.gov/management/clinical-management-of-adults/nonhospitalized-adults--therapeutic-management/. Last Updated 12/28/2022.

5. Ivermectin [package insert]. Parsippany, NJ; Edenbridge Pharmaceuticals LLC; Revised 03/01/2022.

6. Ivermectin. National Institutes of Health.

https://www.covid19treatmentguidelines.nih.gov/therapies/miscellaneous-drugs/ivermectin/. Last Update 04/29/2022.

7. King CR, Tessier TM, Dodge MJ, Weinberg JB, Mymryk JS. Inhibition of Human Adenovirus Replication by the Importin α/β1 Nuclear Import Inhibitor Ivermectin. J Virol. 2020;94(18):e00710-20. Published 2020 Aug 31. doi:10.1128/JVI.00710-20

8. Lehrer S, Rheinstein PH. Ivermectin Docks to the SARS-CoV-2 Spike Receptor-binding Domain Attached to ACE2. In Vivo. 2020;34(5):3023-3026. doi:10.21873/invivo.12134

9. Cushman L. HB1022 (2022) detail. New Hampshire Liberty Alliance Bills. https://bills.nhliberty.org/bills/2022/HB1022. Published 10/29/2021. Last Updated 09/15/2022.

10. Sexton A. New Hampshire House approves Bill to allow pharmacists to dispense ivermectin for COVID-19. WMUR. https://www.wmur.com/article/new-hampshire-house-bill-pharmacists-dispense-ivermectin-covid-19/39456443. Published March 16, 2022.

11. Niceley F. SB2188. Tennessee General Assembly. https://wapp.capitol.tn.gov/apps/BillInfo/default.aspx?BillNumber=SB2188&GA=112. Published 01/31/2022. Last Updated 04/26/2022.

12. Farmer, B. Tennessee Will Make Ivermectin Available Without a Prescription, Despite Research Showing no Benefit for COVID Treatment. WPLN News. https://wpln.org/post/tennessee-to-make-ivermectin-available-without-a-prescription-despite-research-showing-no-benefit-for-covid-treatment/ Published April 07, 2022.

13. Caly L, Druce JD, Catton MG, Jans DA, Wagstaff KM. The FDA-approved drug ivermectin inhibits the replication of SARS-CoV-2 in vitro. Antiviral Res. 2020;178:104787. doi:10.1016/j.antiviral.2020.104787

14. Chaccour C, Hammann F, Ramón-García S, Rabinovich NR. Ivermectin and COVID-19: Keeping Rigor in Times of Urgency. Am J Trop Med Hyg. 2020;102(6):1156-1157. doi:10.4269/ajtmh.20-0271

15. Vallejos J, Zoni R, Bangher M, et al. Ivermectin to prevent hospitalizations in patients with COVID-19 (IVERCOR-COVID19) a randomized, double-blind, placebo-controlled trial. BMC Infect Dis. 2021;21(1):635. Published 2021 Jul 2. doi:10.1186/s12879-021-06348-5

16. Lim SCL, Hor CP, et al. Efficacy of Ivermectin Treatment on Disease Progression Among Adults With Mild to Moderate COVID-19 and Comorbidities: The I-TECH Randomized Clinical Trial [published correction appears in JAMA Intern Med. 2022 Jun 1;182(6):690]. JAMA Intern Med. 2022;182(4):426-435. doi:10.1001/jamainternmed.2022.0189

17. Mohan A, Tiwari P, Suri TM, et al. Single-dose oral ivermectin in mild and moderate COVID-19 (RIVET-COV): A single-centre randomized, placebo-controlled trial. J Infect Chemother. 2021;27(12):1743-1749. doi:10.1016/j.jiac.2021.08.021

18. Buonfrate D, Chesini F, Martini D, et al. High-dose ivermectin for early treatment of COVID-19 (COVER study): a randomised, double-blind, multicentre, phase II, dose-finding, proof-of-concept clinical trial. Int J Antimicrob Agents. 2022;59(2):106516. doi:10.1016/j.ijantimicag.2021.106516

Want to learn more about the most up to date guidelines for COVID-19? Visit the NIH COVID-19 Treatment Guidelines at:

www.covid19treatmentguidelines.nih.gov

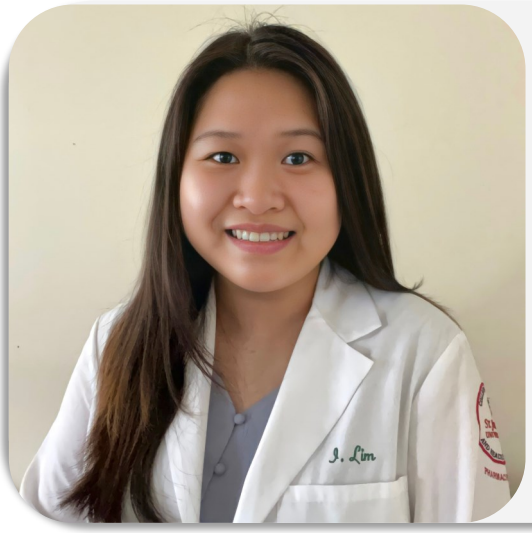
RHO Rx CHI post

Meet Our 2022-2023 Editorial Team

Editorial Team & Production

Justin Budz
Editor-in-Chief

Over the past year, I had the pleasure of serving as the Development and Outreach Coordinator for the Rho Chi - Beta Delta Chapter. The most invaluable aspect of serving a role on their executive board was to continue the tradition of developing and distributing resources to stimulate intellectual leaders in our college of pharmacy student body. As the new Editor-In-Chief, I look forward to working alongside the talented students and graduates to produce publications that will follow advancements in healthcare and pharmaceutics in order to continue that same tradition of promoting intellectual leadership among our readers.



Isabelle Lim
Managing Editor

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

John Ortiz

Content-Focused Copy Editor

Rho Chi Post is an opportunity for students to foster their writing and investigative skills concerning pharmacy practice. By honing our understanding of new innovations and developments in pharmacy, we will be better at providing accurate information to readers and maintaining the continuous education expected of pharmacists.

Helen Li

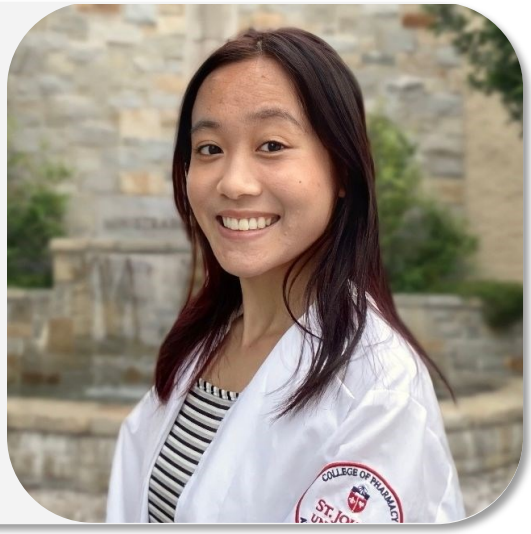
Content-Focused Copy Editor

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.

Joanne Fung

Content-Focused Copy Editor

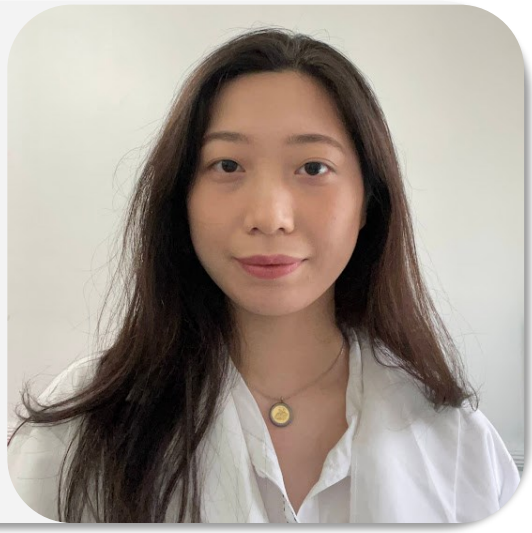
If there is one thing that pharmacists and students should understand, it is that the world's knowledge regarding drugs, disease states, and public health matters is ever-growing. As a pharmacy student, I feel responsible for keeping myself and others up to date. Being a part of the Rho Chi Post's editorial team is a unique and creative way to educate myself and help relay important information to my peers. It is also an excellent opportunity to expose myself to a variety of perspectives. I appreciate the newsletter for providing me an opportunity to not only pursue one of my lifelong interests of writing, but to start delving even deeper into the field of pharmacy unlike ever before.



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

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.

Emily Kelley

Staff Editor

As a part of the Rho Chi Post team, I aspire to expand the importance of the health education programs by empowering and educating the community to live healthier lives. Knowing that my work and research could change the lives of millions is inspiring and motivating.

Sana Ahmed

Staff Editor

I believe the 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 the 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.

Geraldine Ciaccio

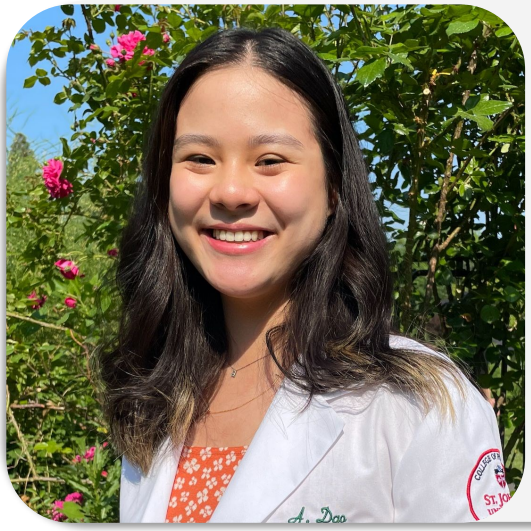
Staff Writer

The pharmacy profession is constantly growing as it drives for discovery. The Rho Chi Post allows student pharmacists to expand their knowledge of pharmacy while offering a space of collaboration and encouragement. I have always enjoyed writing, and I am so honored to be a Staff Writer for the Rho Chi Post this year. This opportunity will allow me to explore my personal interests within the pharmacy profession as well as encourage my peers to do the same. I am excited to collaborate with and learn from faculty, alumni, and my fellow students. These conversations are vital for change and discovery to occur. Taking a step beyond the classroom and building on previous knowledge is all it takes to grow as professional student pharmacists

Jennifer Galvet

Staff Writer

With the pharmacy profession constantly evolving and shifting its focus to advanced patient care, it is important to be knowledgeable of these changes. Although never formally part of the Rho Chi Post e-board before, I was able to utilize this platform in the past to share my writing on various pharmacy topics. I am looking forward to serving as a staff writer this upcoming year and continuing to share my passion about vital developments in healthcare through my writing. As I enter my fifth year of pharmacy school, I hope to keep fellow students informed, while simultaneously inspiring them to expand their knowledge on our ever-changing profession.



Ashley Dao

Staff Writer

The Rho Chi Post offers a place for students, alumni, and faculty to collaborate and share their experiences. Last year, I had the opportunity to serve as the Website Liaison of RCP and I am happy to come back this year as a Staff Writer. As someone who has always had a love for writing, I am grateful for the voice that the Rho Chi Post has given me. I hope that I can encourage more students to contribute to the Rho Chi Post. After all, without conversations, there can be no change.

Imaan Sekhery

Staff Writer

As students in pharmacy, it's our responsibility to educate and update, not only our peers on new medical advancements, but also educate ourselves. Being apart of the Rho Chi Post team allows us to consistently keep up to date with the ongoing improvements and innovations within the pharmaceutical field. There is only so much we can learn from our day-to-day classes, Rho Chi Post stands as another gateway to familiarizing ourselves with the professional world we will soon enter. The world around us continues to evolve, it is up to us to remain in the know. As a staff writer, I am delighted to join the editorial team and look forward to contributing in the aspect of benefitting the pharmacy community as a whole.

Sairah Sheikh
Staff Writer

Ever since I was little, writing has always been a passion of mine. I would find joy in editing my friends' and family's works of writing. I would create short stories and eagerly read them out loud to entertain guests at social gatherings, which they would take great joy in listening to. As a staff writer now for the 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 small part in that as a member of the incredible editorial team.

Urooj 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 .

Aditi Ghosh
Staff Writer

Being a part of the Rho Chi Post allows me to share news, updates, and information with the St. John's community. It is very rewarding to have the opportunity to write about topics pertaining to healthcare while also being able to educate our readers.

Social Media & Outreach

Noor-ul-ain Buksh
Engagement & Outreach Manager

I am incredibly grateful to be serving as an Engagement and Outreach Manager for the Rho Chi Post. As someone who has frequently seen people silenced in the media, I strongly feel that it is important that our newsletter displays diverse perspectives on pharmaceutical topics and I hope to play a meaningful part in helping that happen. Oftentimes, it is easy to lose connection with the student community. I want to avoid that and prioritize the opinions of our readers and writers. While upholding the Rho Chi Post's mission, I plan to work my hardest to promote inclusivity and stay connected with the student body. The pharmaceutical world is never static so I am excited to learn and work alongside my peers.

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 as 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 incoming Staff Writer, I look forward to bringing these current events to light and to serve as an educational resource for passionate readers and writers alike.

Dr. Elsen Jacob

PharmD, MS, BCPS, BCGP, CPPS

As the faculty advisor for the Rho Chi Society and Rho Chi Post, I've had the opportunity to work closely with exceptional students who have a genuine passion for learning, service, leadership, and innovation. I look forward to what Rho Chi will accomplish this year!

Dr. Joseph Etzel

PharmD

Dr. Joseph Etzel is serving as the Rho Chi Post's interim faculty advisor for the 2022-2023 academic school year. 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 working with him this year!

Dr. Mohammad Rattu

PharmD, BCOP, BCPS, BCGP

I am thankful to have been the 2012 editor-in-chief of the Rho Chi Post 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.

Meet Our 2022-2023 Rho Chi Executive Board

Executive Board

Vassilia Plakas
President

Rho Chi represents academic excellence, professional development, and service to our younger peers and fellow colleagues. Our programs and events reflect the value of scholastic leadership. Being part of Rho Chi has been such a wonderful experience so far; I am humbled and grateful to work with a strong executive board and a dedicated fifth year class.

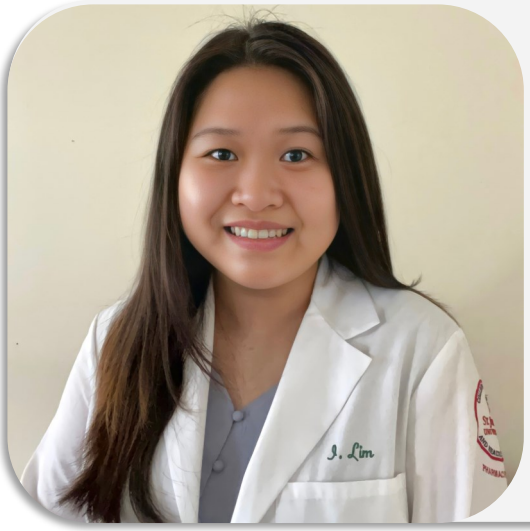
Frances Alexis Dela Cruz
Vice President

Rho Chi is a community that promotes academic excellence and service to others. By providing academic assistance and professional development opportunities, we strive to foster a supportive space for our members and younger peers to succeed. Rho Chi has played a significant role in my pharmacy journey thus far, and I am honored and humbled to be a part of this organization.

Rachel Kneitel

Secretary

Rho Chi to me is a collaborative space where students can encourage and support each other to excel. This organization allows students to spark stimulating conversations about pharmacy and healthcare as a whole.



Isabelle Lim

Treasurer

Rho Chi serves as an opportunity for students to academically support and collaborate with one another. Over the years, I personally have come to appreciate Rho Chi's study materials and review sessions as an integral resource when preparing for exams. I am honored to be a part of Rho Chi in a way where I can help other students just as Rho Chi has helped me in previous years.

Amanda Schleider

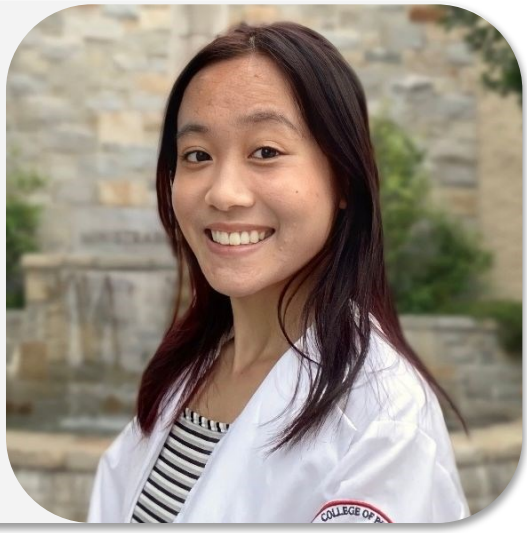
Historian

As the top students in our class, we have a unique opportunity to help our fellow classmates and younger pharmacy students succeed. This is a challenging program, and we all want to get through it. I am proud to be part of an organization that values assisting pharmacy students with their studies and connecting them with alumni and faculty members at our famous coffeehouse chats!

Joanne Fung

Development & Outreach Coordinator

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.



Shankun Lin

Academic Committee Coordinator

Rho Chi is an honor and an accomplishment that I am proud of. As a Rho Chi member, we should be humble and give back to our community for intellectual and professional success

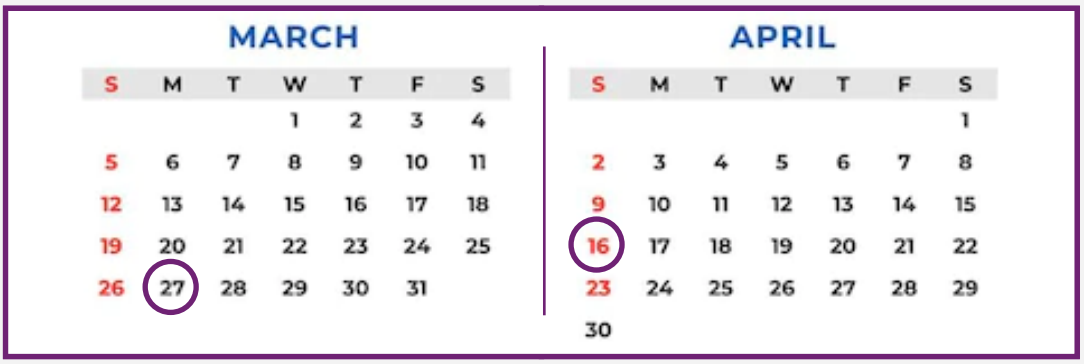
Riya Vinoy

Academic Committee Coordinator

Rho Chi is a collaboration of individuals that are committed to advancing the field of pharmacy that recognizes and promotes intellectual leadership. This collaboration fosters the growth of intellectual leaders by providing resources that can assist in achieving academic excellence.

RHO Rx CHI post

Mark Your Calendars for our 2023 Spring Semester Events!



Mar. 27th: Writing Workshop

Apr. 16th: 2023-2024 Editorial Team Applications Due

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!

Interested in joining our 2023-2024 Editorial Team?

The Rho Chi Post currently has applications open for staff writers, staff editors, content-focused copy editors, and graphics-focused copy editors. Scan the QR Code below to learn more about these positions and to apply for a spot on our editorial team!