

RHO_{Rx}CHI post

VOLUME 3, ISSUE 4

- IN THE NEWS / POLITICS
- LOCAL EVENTS
- CLINICAL ARTICLES
- PROFESSIONAL ADVICE / OPINIONS
- PUZZLES
- CURRENT EDITORIAL TEAM

A STUDENT-OPERATED NEWSLETTER BY THE
ST. JOHN'S UNIVERSITY COLLEGE OF PHARMACY AND HEALTH SCIENCES' RHO CHI BETA DELTA CHAPTER

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Dr. Robert Mangione- From Student to Provost of St. John's University

By: Katharine Cimmino, Editor-in-Chief and Melissa Roy, Co-Copy Editor [Graphics-Focused]

Dr. Mangione has been a prominent member here at St. John's University both as a student and as a leader. Before becoming our dedicated Provost, Dr. Mangione was the Dean of the College of Pharmacy and Health Sciences since 1999. He joined the St. John's University faculty in 1979. He earned his B.S. in Pharmacy, M.S. in Pharmaceutical Sciences (Clinical Pharmacy), as well as a P.D. and an Ed.D. in Administration and Supervision, all from St. John's University.

Along with being involved with our own University, Dr. Mangione was also a clinical faculty member at Nassau Country Medical Center (1979-1981) and Schneider Children's Hospital of Long Island Jewish Medical Center (1981-1990). Before coming to St. John's University, Dr. Mangione interned at Lenox Hill Hospital and was a resident at Mercy Medical Center.

A scholar and a researcher, Dr. Mangione has co-authored more than 100 publications. He has published in numerous journals, including the *Journal of the American Pharmacists Association*, *Journal of Urban Health*, and many more. He also has a professional and personal interest in Celiac Disease and has conducted research projects and published papers on the subject.

The Rho Chi Post was fortunate enough to sit down and talk to Dr. Mangione with his new position as St. John's University's Provost. He gave us some personal insights on what his new job entails and showed us just how devoted he is to the students, faculty, and University.



[Read full interview on page 27](#)

Single Line Stories

-Welcome to our new members Sherine Jaison and Fatema Elias-

- Congratulations to the new Rho Chi inductees and executive board! We thank them for their continuous support of the publication! -

- Follow us on Twitter @RhoChiPost and on Facebook: FB.com/RhoChiPost -

Interested in joining the Rho Chi Post?

Submit an article and letter of intent

by March 10th, 2014

To rhochipost@gmail.com

View the application: <http://rhochistj.org/RhoChiPost/application/>

Below are some FAQ please email us for any other concerns!

Who can join the Rho Chi post? Do I have to be a member of Rho Chi?

You do not have to be a member of the Rho Chi Honor Society to contribute to the newsletter. You can be in any year of your Pharmacy education to join the Rho Chi Post. In fact, any member of the College of Pharmacy and Health Sciences can join our team!

What positions can I apply for to become a permanent member of the team?

1. Staff Writer: Commitment per issue: 2 contributions- either pieces that you write or pieces that you get from your friends
2. Staff Designer
 - Web based: Commitment per issue: Redesign and upkeep of the website
 - Graphic based: Commitment per issue: Any graphic designing that goes into creating the issue.
3. Staff Editor: Commitment per issue: 1 contribution, 2 articles edited
 - Note: for this position you need to show past editing experience.

What can I write about?

Feel free to write about any topic that interests you! Please just email us with your topic so there are no duplicates. For suggestions check out our list: <http://rhochistj.org/RhoChiPost/article-signup/>

*Log in username is required

How long will it take to review my application?

After we accept your article for publication, we will respond to you via email within 7 days.

Besides the article requirement, how time consuming is being a member?

We only meet a few times each semester! Most of our communications are done online. Besides the meetings just meet your monthly requirements!

Are there any dues?

No dues are required to become a member!

If you don't want to commit to a permanent position, we welcome any submission at any time. There is no minimum or maximum to how many articles a person can submit!

Do You Know Your ORGS?

American Pharmacists Association Academy of Student Pharmacists (APhA-ASP)

The mission of the American Pharmacists Association Academy of Student Pharmacists (APhA-ASP) is to be the collective voice of student pharmacists, to provide opportunities for professional growth, to improve patient care, and to envision and advance the future of pharmacy.

Our main purpose as a student chapter is to provide means for student pharmacists to develop professionally and academically through leadership opportunities, patient care projects, professional activities, and social networking. The goal is that upon graduation, each student member will have become the most competent pharmacist that one could ask for—a practitioner who cares about his or her profession and a human being who cares for his or her patients.

Student pharmacists have an opportunity to become leaders in their profession at the local, regional, national, and international levels with APhA-ASP. Involvement also affords the students the opportunity to apply for a variety of awards and scholarships.

APhA-ASP has five patient care and community service projects: *Generation Rx*, *Operation Diabetes*, *Operation Immunization*, and *Operation Self-Care*. The *Generation Rx* is an educational program that encourages public prescription medication use, encourages health community leaders, and college students to actively work to prevent such abuse. Through *Operation Diabetes*, *Operation Heart*, *Operation Immunization*, and *Operation Self-Care*, student pharmacists have the opportunity to take their knowledge outside the classroom and make a difference in the community. We work in our school and local communities to encourage lifestyle modifications, monitor associated risk factors, and provide education about medications.



Operation Self-Care is a program that increases awareness of medication abuse and encourages health care providers, parents, teens,

Professional development programs include the *National Patient Counseling Competition* and the *PharmFlix Video Contest*. APhA-ASP also offers international opportunities because we are the Full Member Organization representing the United States in the International Pharmaceutical Students' Federation (IPSF). As a member of APhA-ASP one is automatically a member of IPSF.

APhA has meetings for student pharmacists throughout the year and across the country. In the fall, our chapter attends the *Midyear Regional Meeting*. The APhA-ASP *Midyear Regional Meetings* (MRMs) are held every fall for each of the APhA-ASP regions in the country. The MRMs are the only meetings in the U.S. designed exclusively for student pharmacists. These meetings offer great networking, professional, and leadership development opportunities, as well as educational programming and much more. In the spring, we attend the *APhA Annual Meeting & Exposition*. This APhA event has comprehensive pharmacy programming for pharmacists and student pharmacists alike, along with programming specifically for students and student chapters.

For more information, feel free to contact us at aphastjohns@gmail.com!

Drug Information Association (DIA)

The mission of the DIA Student chapter is to cultivate an awareness of opportunities in the pharmaceutical industry and public health needs for PharmD and allied health professions candidates. Goals of the chapter include: informing student members of opportunities that exist within the pharmaceutical industry, providing tools to facilitate student career goals, and contributing in a variety of ways to create innovative ideas that meet the needs of the industry. The chapter hosts many on-campus workshops and presentations by industry guest speakers. Last year, the DIA invited a guest speaker Jason Lee, a SJU alum, shortly after graduating, to share his career experiences. DIA members also attend seminars around the country that are designed to broaden knowledge about the latest developments of the pharmaceutical industry and serve as invaluable networking opportunities. For more information, check out the DIA Student Chapter Facebook page at: <https://www.facebook.com/groups/diastudentchapter/>.



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Student College of Clinical Pharmacy (SCCP)

The St. John's University Student College of Clinical Pharmacy is an organization for anyone interested in pursuing clinical pharmacy after graduation. Clinical pharmacists work directly with physicians and other healthcare professionals in order to properly assess the use of medication and ensure the best possible patient care. SJU-SCCP is nationally recognized by its parent organization, the American College of Clinical Pharmacy (ACCP), and is one of the first 12 recognized student chapters in the country. The organization focuses on small group interactive learning through a "Clinical Workshop Series" in order to prepare St. John's students for careers in clinical pharmacy. Some of our events include *Guest Speaker Panel*, *Student Research Showcase*, and *Series occur at the end of every general body meeting* and students are split into groups regarding important skills needed for clinical pharmacy. How to find and use guidelines and interpret lab data are among some of the past topics of discussion. SJU-SCCP is an organization determined to provide the resources necessary to produce student pharmacists ready and able to step into the world of clinical pharmacy.



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For more information, feel free to contact us at SJUSCCP@gmail.com

Student Society of Health-system Pharmacy (SSHP)

The Student Society of Health-system Pharmacy (SSHP) seeks to educate pharmacy students on the future of clinical pharmacy practice and the role that health-system pharmacists play as vital healthcare professionals. The Society fosters professional and personal development, provides a strong network of support in both the American Society of Health-System Pharmacists (ASHP) and the New York State Council of Health-System Pharmacists (NYSCHP). The society also hopes to advance student awareness and understanding of the scope of clinical pharmacy practice. It is the only student society officially recognized ASHP. Some of our events include the Annual ASHP Clinical Skills Competition, Professional Pharmacy Residency & Fellowship Showcase, Annual Pharmacy Speed-Dating (features faculty, pharmacist residents, and non-faculty pharmacists to learn about the backgrounds and career paths of the professionals), CV Workshop, and PhORCAS (for the Midyear Meeting).



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To learn more, students can like our Facebook page (<https://www.facebook.com/sjusshp>) for notifications on upcoming events and join our group (<https://www.facebook.com/groups/sjusshp/>).

Lambda Kappa Sigma (LKS)

Lambda Kappa Sigma is an international professional pharmacy fraternity that provides opportunities to women in pharmacy through professional excellence and personal growth. It was founded at the Massachusetts College of Pharmacy and Health Sciences in 1913, and has grown to over 24,000 members since its inception. Our St. John's University Alpha Pi chapter has 73 sisters, all who are very active in both professional and service activities. Although our organization has Greek letters, we are not a Greek fraternity on campus. Our biggest chapter achievement has been *Relay for Life*, the top fundraising society since 2006. This raised \$16,385 for the society. Other than our we also share many school. There's a say-side looking in you and from the inside explain it." Our sisterhood is almost impossible to put in words; through the hardships of pharmacy school and the crazy journey of life, we will always be lambs forever. Please don't be shy to contact us to learn more about our organization, or to get to know our wonderful sisters. Contact us via email, Facebook, or our website!



where we have been group in the Univer-past spring, we American Cancer So-activities on campus, memories outside of ing, "From the out-can't understand it, looking out you can't

For more information, visit our website <http://lksalphapi.weebly.com/> or email us at lksalphapi@gmail.com

Phi Delta Chi (PDC)

Phi Delta Chi is a national professional Pharmacy fraternity, which has been on the St. John's University campus since 1958. Phi Delta Chi works with many other organizations to advance the science of pharmacy and allied interests both on and off campus. The brothers of Phi Delta Chi have hosted and attended many events, both professional and social this past semester, such as a *Drug Abuse Awareness Presentation*, the and *University Service Day*. The broth-Day, where they worked with faculty also worked in collaboration with Lambda Kappa Sigma, APhA-ASP, events and promote pharmacy. Some *Formal* and *Thanksgiving Dinner* with loween with PLS, and *Generation Rx*, a project, with APhA-ASP. Outside of the together with other sororities on campus, from mixing with Gamma Phi Beta to participating in Phi Sigma Sigma's beauty pageant. Phi Delta Chi gets to see the best of both worlds as they advance socially and professionally. The relationships formed make pharmacy school much easier, and older brothers offer advice and help with studying.



Breast Cancer and *Alzheimer's Walks*, ers also participated in *Drug Take Back* members in several locations. They have other pharmacy organizations such as and Phi Lambda Sigma to host many of these events have included *Winter LKS*, *World AIDS Day* and *Healthy Hal-* drug abuse awareness patient care pharmacy world, they have gotten to-

If you have any questions or are interested in the Phi Delta Chi Professional Pharmacy Fraternity, please visit: <https://m.facebook.com/PhiDeltaChiStj>.

Phi Lambda Sigma (PLS)

Phi Lambda Sigma is a nationally recognized Pharmacy Leadership Society. As the St. John's Xi Chapter, our organization acknowledges pharmacy students for their leadership in school and in their communities. We provide support for members to become effective leaders as they transition into their careers. We work to foster leadership development in some of the programs we work with, such as *Healthy Halloween* and *My Vascular Valentine*.



If you would like to contact us, our email address is sjuphilambdasigma@gmail.com, or you can request to join our Pharmacy Leadership Society facebook page at <https://www.facebook.com/groups/sjuphilambdasigma/>.

The Rho Chi Society

The Rho Chi Society is an Academic Honor Society in Pharmacy. Pharmacy students in their professional years of study are invited to join based on academic standing. The Mission of the Society is to encourage and recognize excellence in intellectual achievement and foster fellowship amongst Delta Chapter at St. John's University participates in various com-professional activities, CV Workshops, Coffee-coming a Strong PGY1 addition, we often work pharmacy organizations such as *Healthy Hallow-*



its members. Our Beta John's University par-munity service and including *Relay for Life*, *house Chats*, and *Be-Residency Candidate*. In closely with other on campus in events

een and the new *Doc-tor of Pharmacy Mentoring Program*. We aim to hold events pharmacy students can both benefit from and enjoy.

For more information, visit our website www.rhochistj.org or email us at rhochis@gmail.com.

Say Hello to JNC8: New Hypertension Guidelines

By: Frances Trosa, PharmD Candidate c/o 2015

After much anticipation, the report from the Eighth Joint National Committee (JNC 8) has arrived! Panel members appointed to the committee have created evidence – based recommendations to assist physicians in managing hypertensive patients.

A major difference between the JNC 7 report and the JNC 8 report is the recommendation on target blood pressure treatment goals in different patient populations. For example, JNC 7 determined that all adult patients with hypertension should have a systolic blood pressure (SBP) goal of less than 140 mmHg. Furthermore, patients with diabetes or renal disease should aim for a SBP of less than 130 mmHg.¹

However, there are some differences with the recommendations of the panel of the Eighth Joint National Committee. In JNC8, Adults years 60 and older should be treated for hypertension with pharmacologic agents when SBP is 150 mmHg or greater, or DBP is 90 mmHg or greater. The treatment goal for this population is to maintain a blood pressure less than 150/90. The panel further stated that any adult patient in this population that has been treated to achieve a SBP of less than 140 mmHg as per the previous guidelines should continue with his or her current medication regimen as long as the medication is being well tolerated and the patient is not experiencing any adverse effects.²

JNC 8 recommends initiating pharmacologic therapy in patients younger than 60 years old when the patient's SBP is 140 mmHg or greater or his or her DBP is 90 mmHg or greater, with a target goal of less than 140/90. It was also recommended that patients older than 18 with chronic kidney disease or diabetes receive pharmacologic treatment when their SBP is 140 mmHg or greater or their DBP is 90 mmHg or greater. Patients in this subset should also be treated to a goal of less than 140/90.²

The report from JNC8 goes on to recommend initial antihypertensive treatment for specific populations. In the general nonblack population, the committee recommends thiazide diuretics, calcium channel blockers (CCB), angiotensin – converting enzyme inhibitors (ACEI), or angiotensin receptor blockers

(ARB) for initial treatment of hypertension. This recommendation also applies to nonblack, diabetic patients.²

In the general black population, the panel concluded that initial treatment with antihypertensives should include a thiazide diuretic or CCB. This recommendation is also consistent with that for the black, diabetic population.²

Therapy for patients aged 18 years and older with chronic kidney disease and hypertension should include an ACEI or ARB either as initial or add – on therapy. This recommendation is for patients of all races with chronic kidney disease, with or without proteinuria. Although these medications are not recommended as initial therapy in the general black population, black patients with chronic kidney disease and proteinuria should be initiated on either an ACEI or ARB for their renal benefits. Initial pharmacologic treatment in black patients with chronic kidney disease and without proteinuria may include a thiazide diuretic, CCB, ACEI, or ARB. If a thiazide diuretic or CCB was used as initial treatment, an ACEI or ARB can be added as second – line therapy if the patient is not at his or her blood pressure goal with monotherapy.²

It is important to acknowledge that blood pressure will not always be achieved after initial therapy. If a patient's goal blood pressure is not reached within a month of treatment, a physician can either increase the dose of the current medication or add a second drug from the initial recommendation. Furthermore, if a patient cannot achieve a goal blood pressure with two medications, the physician may add on a third medication and titrate if needed, and so on. The panel also stated that an ACEI and ARB should not be used in the same patient.²

The report from JNC 8 offers clinicians guidance regarding blood pressure thresholds, goals, and drug therapy plans based on evidence from randomized clinical trials. These guidelines, when combined with clinical judgment, should assist clinicians in managing their hypertensive patients.

SOURCES:

1. Peterson ED, Gaziano J, Greenland P. Recommendations for Treating Hypertension: What Are the Right Goals and Purposes?. *JAMA Online*. December 18, 2013.

<http://jama.jamanetwork.com/article.aspx?articleid=1791422>. Accessed January 17, 2013

2. James PA, Oparil S, Carter BL, et al. 2014 Evidence-Based Guideline for the Management of High Blood Pressure in Adults: Report From the Panel Members Appointed to the Eighth Joint National Committee (JNC 8). *JAMA Online*. December 18, 2013. <http://jama.jamanetwork.com/article.aspx?articleid=1791497>. Accessed January 17, 2013.

The Blunt Truth

By: Katharine Cimmino, Editor-in-Chief

Marijuana, also known as “grass,” “pot,” “joint,” “weed,” “reefer,” “hashish,” and “Mary Jane,” is a very popular illicit drug.¹ According to the National Survey on Drug Use and Health, “In 2012, 5.4 million persons aged 12 or older used marijuana on a daily or almost daily basis in the past 12 months (i.e., on 300 or more days in that period), which was an increase from the 3.1 million daily or almost daily marijuana users in 2006.”² In addition, Colorado and Washington have both legalized recreational marijuana, although currently Colorado is the only state to sell it.³ Although marijuana is an illicit drug, it has been shown to offer many therapeutic benefits. If scientists can determine how to harness the desirable effects and eliminate the harmful addictive ones, then marijuana can be a viable and safe treatment alternative.

U.S. Federal and New York Law

The federal government regulates drugs through the Controlled Substance Act. They classify marijuana as a Schedule I drug, or a drug that is highly addictive and has no medical value. The federal government has the constitutional authority to prohibit marijuana for any and all purposes. This power was affirmed by the Supreme Court case *Gonzales v. Raich* (2005). Therefore, even if a citizen resides in a state that allows for the use of marijuana, he or she can still be prosecuted under federal law for growing, selling, or using this drug. However, the Supreme Court ruling and the law still reside in a grey area. Currently, there are statutory mandatory minimum sentences, which say that there is a 5-year minimum jail sentence for growing 100 plants or for possession of 100 kilograms of marijuana. The jail time

dramatically increases if someone grows more plants, or if they have prior convictions. In states that allow patients to grow their own plants, citizens are often restricted to growing far below the statutory mandatory minimum amount. The laws and ruling passed by the Supreme Court say nothing about prosecuting patients using medicinal marijuana. Also, the current rulings do not say that any of the state laws are unconstitutional.⁴ Because of this fact, many states are beginning to pass laws allowing for the use of medical marijuana.

Currently, there are 21 states that have passed laws legalizing medical marijuana: Alaska, Arizona, California, Colorado, Connecticut, Delaware, Hawaii, Illinois, Maine, Maryland, Massachusetts, Michigan, Montana, Nevada, New Hampshire, New Jersey, New Mexico, Oregon, Rhode Island, Vermont, Washington, and the District of Colombia.⁵ On January 9th, 2014, Governor Andrew Cuomo of New York took administrative action that allowed for the medical use of marijuana.⁶⁻⁸ The Governor is able to pass this by relying on a provision of the Public Health Law, the Antonio G. Olivieri Controlled Substance Therapeutic Research Program, which allows for controlled substances to be used for “cancer patients, glaucoma patients and patients afflicted with other diseases as such diseases are approved by the commissioner.”⁹

In his 2014 State of the State Address, Governor Cuomo talked about the medical marijuana pilot program in which 20 hospitals can provide medical marijuana to patients being treated for serious illnesses. According to the policy, “This program will allow qualified eligible participants to seek relief for their symptoms in a safe and legal manner, while also evaluating the effectiveness and feasibility of a

medical marijuana system.”⁷ The plan calls for the State Department of Health to set the standards for using marijuana. The Department would decide which hospitals would be able to dispense the drug, how it could be used, and what procedure needs to be followed to dispense it.⁶ The findings from this program will help to create future policy.⁷

It is important to note that this is an administrative action. There is no actual legislation as of yet to legalize medical or recreational marijuana in New York.⁶ In the past, New York has tried to enact legislation to authorize the sale of medical marijuana, but the state’s Senate has blocked it. However, administrative officials do believe that the marijuana policy in New York would be more restrictive than in other states, such as Colorado and California.⁸ While Governor Cuomo’s action will allow an infrastructure to be set up to use marijuana in hospitals, there is no telling when the drug will be available for patients. Officials still need to select which hospitals can dispense marijuana to allow for regional diversity. Finally, the program states nothing about growing marijuana, which means that New York will have to turn elsewhere for its source.⁶ This begs a bigger issue; if New York receives its medical marijuana from an out-of-state source, it could possibly open itself up to federal intervention.

Pharmacology of Marijuana

Marijuana generally refers to the unpurified plant extracts. The active component, tetrahydrocannabinol (THC), is found in the flowering shoots and leaves of the plant. The effects of THC occur when it binds to a cannabinoid receptor, a G protein-coupled receptor, which causes the release of GABA, an inhibitory neurotransmitter. There are two subtypes of cannabinoid receptors: CB1, found mainly in the brain, and CB2, found in immune cells.^{10 (p.195-196)}

Generally, people either ingest or inhale marijuana. Ingestion results in a slower onset of action, approximately 0.5-1 hour, while inhalation is rapid and occurs in a matter of minutes. The drug is highly lipophilic, which results in a large volume of distribution and long half-life of approximately 7 days. This property explains why chronic users can test positive after 8 weeks.¹⁰

The psychological effects of THC are due to the high abundance of CB1 receptors in the brain, and

the effects include euphoria, increased sensory perception, and relaxation.^{10 (p.196)} Some people may also experience depersonalization, changes in body image, disorientation, panic reactions, and severe paranoia.^{10 (p.197)} THC also decreases memory function^{10 (p. 197) -11 (p.53)} and concentration.¹ Smoking marijuana impairs motor skills, which can make driving dangerous.^{10 (p. 197)}

Other effects may include blood-shot eyes, dry mouth, increased heart rate and blood pressure, bronchodilation, and bronchial irritation or bronchospasm.¹ THC also increases conjunctival injection, which decreases intraocular pressure.^{10 (p.196)} This explains why marijuana is helpful in alleviating symptoms of glaucoma. Long term use of cannabinoids, especially THC, can change the function of immune cells, either by the activation or deactivation of the immune system. It is important to note that this finding was only based on extrapolated studies done on acute exposure in animals, and is likely attributed to the CB2 receptors found on numerous immune cells.^{11 (p.53)}

In addition, chronic long-term use of marijuana can cause people to exhibit withdrawal symptoms and the drug can be addictive.^{10 (p.197)} These people can develop tolerance to the drug and physical dependence.^{11 (p.56)}

Therapeutic Uses of Marijuana

Currently, there is a cannabinoid derivative in clinical use. Dronabinol (Marinol®), a synthetic form of THC, is FDA approved for the treatment of nausea and vomiting associated with cancer chemotherapy. It is also approved as an appetite stimulant for patients with acquired immunodeficiency syndrome (AIDS). However, the nontherapeutic effects, or unwanted side effects, are still the same as marijuana. Patients still run the risk of experiencing anxiety, delusions, depersonalization, euphoria, and more.¹⁰

According to the Institute of Medicine, conditions where patients used marijuana for relief included: HIV (to control nausea, increase appetite, combat wasting, and relieve GI distress caused by antiretroviral therapy), cancer, chronic pain (including back pain), musculoskeletal diseases (including MS and arthritis), glaucoma, seizures, migraines and cluster headaches, terminal cancer, gastrointestinal disorder.

ders, neurological disorders (epilepsy, Tourette's syndrome, brain trauma), and mood disorders.^{11 (p.22)}

Cannabinoids can be used as analgesics and are often used in patients with chronic pain. A randomized, controlled crossover trial was conducted where 23 adults with post-traumatic or postsurgical neuropathic pain were assigned into four different potency groups. Of these, 21 patients completed the trial and average daily pain scores were measured for the four doses of 0%, 2.5%, 6% and 9.4% THC. The study found that the higher inhalation dose of 9.4% THC helped with the intensity of pain, improved sleep, and was overall well tolerated. However, long-term efficacy and safety could not be measured so further investigation would have to be conducted.¹²

Medical marijuana can also be used to treat multiple sclerosis, specifically the symptom of spasticity. In a placebo-controlled, crossover trial involving adult patients with multiple sclerosis, 37 patients were either given a cigarette which contained cannabis or a control cigarette which contained a placebo. After a washout period of 11 days, participants were crossed over to the opposite group. Both change in spasticity and pain scale was measured in the 30 patients that completed the trial. The trial found that smoking cannabis was superior to placebo in both reducing spasticity and pain; however, the patients who smoked cannabis experienced cognitive impairment.¹³

Migraines are another serious health problem and although there are several treatment options, many patients still suffer from painful and sometimes chronic headaches. Depending on the severity of the migraine, patients can often miss work or school, causing a huge economic loss. Another problem with chronic migraines is rebound headaches, which can be triggered by medication overuse. Although the 5-HT_{1D} or "triptan" drugs are good abortive drugs for migraines, some patients cannot tolerate the side effects such as chest or throat tightness, tingling, and anxiety. In addition, these drugs have variable oral absorption and if not taken quickly enough, will not prevent a migraine. Therefore, patients often look for alternative therapies for migraine relief.¹⁴ Many different drugs have been used for migraine relief and doctors will often create regimens that are patient specific. A review article examined five case

studies of patients who experimented with cannabis to relieve migraines. Three patients with chronic headaches found that smoking cannabis was comparable and even superior to aspirin and ergotamine tartrate therapy.¹⁴ It is important to note that with most of these case studies, patients have exhausted all other measures and found little relief with conventional agents.

Safety and Efficacy Concerns

Although marijuana has been used as an herbal remedy prior to the 20th century, experts are skeptical of its use as a drug because of safety and efficacy concerns.^{11 (p.19)} According to the report published by the Institute of Medicine in 1999, "...cannabinoid drugs might offer broad-spectrum relief not found in any other single medication."^{11 (p.88)} Although the report discusses benefits of this drug, it also cautions against the harmful substances that marijuana smoke can deliver. The report concludes that the answer is not necessarily medical marijuana, but harnessing the effects of the chemical THC to help these patients. Overall, the Institute of Medicine asks that more research be conducted so that the effects of marijuana and THC can be understood, safer and more reliable delivery systems can be found, and that the negative psychological adverse effects be weighed against the medical benefit when using this drug.^{11 (p.1-4)}

Since this report, numerous studies on the use of medical marijuana have been conducted, yet professionals remain skeptical about the risks vs. benefits of the drug. Perhaps the best solution is to not use a current drug available, but to look for other biochemical and biopharmaceutical options. Most of these patients have debilitating chronic conditions, and the last thing we, as professionals, should do is add to the patient's disease burden by giving drugs with unwanted side effects.

A Hope For A Safer "High"

A study published in *Science* showed how a natural chemical, pregnenolone, can stop the "high" effect of marijuana. In the study, the French scientific team gave rats and mice enough active ingredients of cocaine, morphine, nicotine, alcohol, and marijuana so that the drugs intoxicated the animals. According to Dr. Pier Vincenzo Piazza, neurobiologist

and principle author of the study, "We have this built-in negative feedback mechanism, a brake," on THC intoxication.¹⁵ The study found that THC increased pregnenolone levels in the brain by 1500%, which was 50 times greater than any other drug used in the study.¹⁵

After this was discovered, the scientists decided to experiment further. They used two groups of rodents, one sober and one under the influence of marijuana. They injected the rodents with stimulators and inhibitors of the CB1 receptor and found that pregnenolone levels rose and fell, respectively, in both groups. Next, scientists injected the intoxicated rodents with an inhibitor of pregnenolone only to discover that they became more inebriated. The sober rodents showed no effect. The scientists therefore discovered that pregnenolone, a substance that was once thought to only be a precursor for other steroid hormones, could actually suppress THC intoxication.¹⁵

At normal levels, when someone smokes cannabis, THC binds to the CB1 receptor and induces intoxication. The study also discovered that when abnormally high levels of cannabis were consumed, much higher than what the average smoker consumes, the body began to produce pregnenolone. Pregnenolone binds to the CB1 receptor, but at a different point of the receptor.¹⁶ Essentially, pregnenolone is an allosteric modulator of the CB1 receptor. This study found that at a cellular level, pregnenolone only partially reverses or prevents the binding of THC.¹⁷

By pregnenolone binding to the receptor, THC binds less effectively and the effects of cannabis intoxication are blocked.¹⁶ High rodents injected with pregnenolone appeared to have decreased memory loss. In addition, pregnenolone also counteracted the increased appetite caused by marijuana. However, this is not beneficial for patients taking the drug hoping to increase their weight (e.g. HIV and cancer patients). Lastly, pregnenolone was also shown to reduce the addictive behavior of rodents taking marijuana.^{15, 17}

While the study did aid in identifying the cellular pathway of pregnenolone and its binding site on CB1 receptors, its clinical role is still unclear. Pregnenolone is orally unstable and only remains in the brain for a short time.¹⁵ It is quickly metabolized into other steroids.¹⁷ Dr. Piazza states, "Pregnenolone

cannot be used as a drug by itself."¹⁵ So instead, other pregnenolone derivatives need to be synthesized that stay attached to the CB1 receptor and are not metabolized to other products. These are the drugs that should be tested in humans and on which more studies must be done.¹⁷

What This All Could Mean

Further research must be conducted, but if a suitable drug can be found to stop the negative effects of a high, medical marijuana can be a safe alternative to patients with many of these chronic and debilitating conditions. Until then, healthcare professionals can give marijuana to those who have no other option while weeding out ones who are just addicted to a high.

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Direct Association of HIV and Early Kidney Damage in Women

By: Elizabeth Kopec, PharmD Candidate c/o 2014, South University School of Pharmacy at Columbia, SC

Human immunodeficiency virus (HIV) is a global pandemic, with approximately 35.3 million people infected in 2012. The United States currently has 1.3 million people living with HIV, with 20,000 deaths occurring every year due to acquired immune deficiency syndrome (AIDS).¹ In 2012, 1.7 million people died worldwide of AIDS-related illnesses.²

HIV destroys CD4 cells, which secrete cytokines to activate immune responses as part of the body's immune system. A normal CD4 count in a healthy person ranges from 500 cells/mm³ to 1,000 cells/mm³. However, as the HIV spreads, CD4 counts decrease to levels low enough to prevent the body from effectively fighting off infections, which eventually leads to AIDS. A CD4 count of 200 cells/mm³ or

less is diagnostic of AIDS, but a CD4 count of 350 cells/mm³ is when opportunistic infections become communicable and antiretroviral therapy is initiated. Currently, the World Health Organization recommends beginning antiretroviral therapy when the CD4 count falls to 500 cells/mm³ to help those with HIV live longer and stay healthier by acting earlier in the progression and lowering the amount of virus in the blood.³

AIDS-related illnesses remain a problem among those with uncontrolled or untreated AIDS, and are linked to increasing rates of morbidity and mortality.⁴ There are multiple AIDS-related illnesses, but some of the most common opportunistic infections include pneumocystis jirovecii pneumonia, toxoplasma

gondii, candidiasis, cytomegalovirus, and mycobacterium avium complex. Other complications include cancers, anemia, high cholesterol, depression, and lactic acidosis. HIV-associated nephropathy and chronic kidney disease are significant complications of HIV infection due to the high mortality rate (50%) in the first year of dialysis in this population, and are becoming a major concern due to the growing prevalence (30%) of abnormal renal function in HIV-infected patients.^{5,6}

Patients with HIV are at a higher risk of kidney damage due to the nephrotoxic side effects associated with antiretroviral drugs, such as indinavir and tenofovir.⁷ Because nephrotoxicity is such a common and severe adverse event, renal function tests are performed at the time of diagnosis and are repeated annually.⁸ Risk factors for renal disease in HIV-infected patients include old age, female gender, diabetes, hypertension, and hepatitis B and C infections.⁹

It has been postulated that HIV infection is associated with an increased risk of early kidney injury in females, and several studies have been conducted to research early renal damage in HIV-infected women.¹⁰ A study performed between 1999 and 2000 compared urine injury markers between HIV-infected and HIV-uninfected women. A total of 908 women were infected with HIV, whereas 289 women were not infected. Tubular injury markers were determined to be the best factor to research the decline and progression of kidney structure and function over time. Particularly, interleukin-18 (IL-18) and kidney injury molecule-1 (KIM-1) were measured due to their specificity to the proximal tubule of the nephron.¹¹ Both biomarkers were found in very low concentrations in healthy individuals and in high concentrations in critically ill patients. It was found that the HIV-infected women had more extensive tubulointerstitial and glomerular injury than uninfected women, proving that KIM-1 and IL-18 are good predictors of ensuing decline in renal function.¹²

Predictors of Proteinuria and Renal Failure Among Women with HIV Infection is another clinically relevant study that researched the variables associated with renal failure in HIV-infected women. A total of 2,057 women were evaluated twice a year for four to five years by urine analysis, CD4 lymphocyte count, HIV RNA level, and serum creatinine level.

The study found that proteinuria is associated with elevated HIV RNA level, CD4 lymphocyte counts of less than 200 cells/mm³, African American race, and the presence of the hepatitis C antibody. There is currently no information, however, to suggest differences in the clinical course of HIV-associated renal disease based on gender.¹³

The Microalbuminuria in HIV Infection study is another relevant clinical trial conducted to research if HIV infection is an independent risk factor for microalbuminuria. Albumin and creatinine concentrations and the albumin to creatinine ratio in patients were measured. Of the 967 subjects evaluated, 760 were infected with HIV. Researchers found that HIV infection was associated with a five-fold risk of microalbuminuria, and is a strong predictor of microalbuminuria. They also suggested that the severity of HIV might not be as important as other risk factors such as high systolic blood pressure and insulin resistance in predicting the presence of microalbuminuria.¹⁴

There are numerous HIV complications that patients need to be aware of and take precautions against. Some of these complications that may have more severe consequences include opportunistic infections, tuberculosis, and lymphomas. Other complications are becoming more prevalent among the HIV-infected population, with renal injury being the main complication due to its association with mortality. HIV-infected women are being recognized more as at risk population and early recognition and screening are crucial in detecting and deterring renal damage. Although crucial, it is not sufficient to be able to receive anti-viral therapy without as much social stigma as patients did years ago. Patients and healthcare professionals, as patient advocates, must be vigilant about preventing and treating other complications of the disease and anti-viral therapy that are now being recognized.

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New Alternative First Line Therapy for EGFR NSCLC

By: Jenny Park, PharmD Candidate c/o 2015

On July 12, 2013, the FDA approved afatinib (GilotrifTM) as a new first-line treatment for patients with late-stage non-small cell lung cancer (NSCLC), a type of carcinoma where specific types of epidermal growth factor receptor (EGFR) gene mutations are expressed.¹ The drug afatinib irreversibly blocks EGFR, also known as ErbB-1, as well as other members of the ErbB family that play a role in the growth and proliferation of pervasive cancers with a high mortality rate. These are cell surface receptors that are involved in cellular functions such as mitosis. In some patients, mutations cause the constant activation of the EGFR protein; therefore, the binding of afatinib will provide a sustained and selective method of blockage.²

Afatinib was an orphan drug that originated in the United States and was provided an expedited

review. The drug approval was based upon the LUX-Lung 3 trial, which compared afatinib to chemotherapy with a combination of pemetrexed (Almita[®]) and cisplatin (Patlinol[®]) in a randomized, phase III study. Being a multi-national trial in 25 countries across Asia, Australia, Europe, North America, and South America, this was the largest global trial in EGFR mutation lung cancer treatment.³

There are several subtypes of lung cancer, with NSCLC being the most common subtype. Approximately 85% to 90% of lung cancers are NSCLC, which is also further broken down into three categories: squamous cell (epidermoid) carcinoma, adenocarcinoma, and large cell (undifferentiated) carcinoma.⁴ EGFR gene mutations are present in about 10% of NSCLC, with the majority of these gene mutations expressing EGFR exon 19 deletions or exon

21 L858R substitutions.² The pathogenesis of EGFR depends highly on cell surface receptors that control intracellular transduction pathways.⁵ When EGFR is activated, it increases cellular tumor growth and proliferation. It is also the target of tyrosine kinase inhibitors.⁶ It has been shown in clinical studies that 20% of NSCLC tumors are EGFR based and that about 85% of patients respond to tyrosine kinase inhibitor treatment.⁷

The LUX-Lung 3 trial was a two-armed, randomized, parallel comparison with 229 patients in the afatinib arm and 111 patients in the chemotherapy arm with the majority of patients (89.3%) having stage IV NSCLC.³ The patients that were chosen for the trial underwent a biomarker testing for the presence of the common EGFR mutation. Patients were given either 40 mg of afatinib once daily or a combination of pemetrexed (Almita® powder) and cisplatin (Platinol® solution) infusion over two hours. The primary endpoint of the study highlighted a progression free survival (PFS) according to the evaluation criteria for tumors. Other key secondary endpoints were overall survival and disease control. For afatinib, patients received continuous daily dosing as long as they did not develop disease progression. For pemetrexed/ cisplatin, patients received a maximum of 6 treatment courses unless they developed disease progression.³ Results showed that a course of treatment with afatinib showed a significantly higher PFS than chemotherapy treatment. The median progression free survival was 11.14 months for afatinib versus 6.90 months for the chemotherapy (95% CI 0.425, 0.784; $p = 0.0004$).³ After a full year, 46.5% of the control patients in the afatinib arm and 22.0% in that of the chemotherapy arm were still alive and progression free (95% CI 0.367, 0.649; $p < 0.0001$). The proportion of patients that were alive and progression free on afatinib more than doubled at month 12 and month 18 compared to those on a standard chemotherapy treatment regimen. Not only was there significant PFS, there was also a higher tumor response rate, higher disease control rate, and greater disease-related symptom relief as well. There was a significant delay in disease progression, which resulted in a 4.24 month gain in a median PFS for all patients and a 6.70 month gain in patients with EGFR mutations such as deletions in exon 19 and L858R mutation in exon 21

which are the most common.⁸ The results of the testing were very encouraging, demonstrating a potentially viable alternative to standard chemotherapy treatments of today. As Prof. Klaus Dugi, Corporate SVP of Medicine, Boehringer Ingelheim states, "We are delighted to announce the first approval of Afatinib, offering a new personalized treatment approach for patients with EGFR mutation positive NSCLC."⁸

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Quote of the Month

By Melissa Roy Co-Copy Editor (Graphics Focused)

*“Start by doing what’s necessary;
then do what’s possible; and
suddenly you are doing the
impossible.”*

Saint Francis of Assisi

Asperger Syndrome: Temple Grandin's Insight and Contribution

By: Sang Hyo Kim, Staff Editor

During the Fall 2013 semester, activist and best-selling author Temple Grandin, Ph.D, came to St. John's University to talk to students, faculty, and administrators about the need to embrace children and young adults who have autism spectrum disorders (ASDs). While many people may think of autism as a single disorder in which individuals have an intellectual disability and unusual behaviors, autism is rather a spectrum of closely related disorders with a shared core set of symptoms. There are three different types of ASD's: Autistic Disorder (what most people think of), Asperger Syndrome, and Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS).¹

Grandin was diagnosed with autism in 1950, when the term "autism spectrum disorder" was not yet coined. Although she looked like a normal child, Grandin had trouble interacting and socializing with others. With her strong affinity for rockets, electronic lab, and especially, animals, Grandin viewed the world differently from her non-autistic peers.² It wasn't until later that Grandin realized that she has Asperger's Syndrome (AS). AS is a developmental disorder marked by a difficulty in the ability to communicate and socialize with others. It is known as the less severe form of autism. While those with Asperger's Syndrome do not exhibit learning disabilities, which is common in patients with Autistic Disorder, they have problems with socializing and developing relationships.² They may have a lack of rhythm, odd inflection, or monotone pitch in speech, and are isolated because of poor social skills and narrow interests.³ Symptoms of AS, such as uncoordinated motor skills, are exhibited during the first year of life. However, experts at the Great Ormond Street Hospital for Children in London state that AS in children is not formally recognized until the demands of their environment increase, as may be the case when they leave primary and start secondary school.³

During her speech to the 1,250 guests at Carne-secca Arena, Grandin said, "Autism should not define us... but it can be used to our advantage."⁴ She explained how visionaries from our world, such as Albert Einstein and Steve Jobs, could have been on the autism spectrum.⁴ When we examine people with AS

symptoms, they show obsessive interests toward a single object or topic. Though there is no definite proof that Einstein and Jobs had Asperger's Syndrome, we see what Grandin is trying to say since these men, who have revolutionized our world, spent their life devoted to the field they were passionate about. Grandin, who was always fond of animals, went on to become a designer for livestock handling, a field not pursued in depth. Upon visiting her aunt's ranch each summer, she was daunted by the brutal treatment of cattle, and was inspired to create new facilities for the proper treatment. She has earned her Masters degree in animal science. Grandin currently teaches Animal Science at the Colorado State University and is the author of a best-selling book on autism, *The Way I See It: A Personal Look at Autism and Asperger's*.⁴

Grandin's visit to our school during Founder's week, which is dedicated to deepening the University community's knowledge and understanding of St. John's University's Vincentian heritage, truly touched upon our school's goals of compassion and empathy. Grandin has now become an inspiration to the world. She raises awareness of children and adults who have autistic spectrum disorders and teaches ways to respond to these individuals. As a society, we should not push away individuals who may be clumsy or may appear different, but give them the chance to seek their full potential. By doing so, we will provide AS individuals with an environment to flourish and their work might have an ever-lasting impact like that of activist Temple Grandin.

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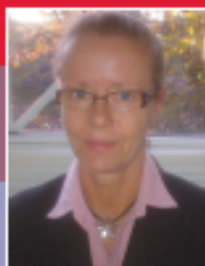


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New Hepatitis C Drug Receives FDA Approval

By: Ada Seldin, Staff Editor

On November 22, 2013, simeprevir (Olysio®), a new agent to treat chronic hepatitis C, received approval under the FDA's priority review program. Simeprevir is an NS3/4A protease inhibitor that blocks the replication of the hepatitis C virus. Two other drugs from the same class, boceprevir and telaprevir, which were approved in 2011, drastically improved treatment outcomes for patients with chronic hepatitis C virus infection.¹ All three of these protease inhibitors are indicated as a part of an antiviral regimen in combination with pegylated interferon and ribavirin in adults infected with genotype 1 hepatitis C virus with compensated liver disease, including cirrhosis. They have been shown to be effective in both treatment naïve and treatment-experienced patients who have either relapsed, failed prior therapy, or had only partial response to prior therapy.² Genotype 1 is the most treatment-resistant of the hepatitis C viruses and is, unfortunately, also the most common type in the U.S. Thus, simeprevir will play an integral role in the treatment of hepatitis C.

Hepatitis is an inflammatory disease of the liver that results in liver cell death. Although it is most commonly caused by a viral infection, drugs or toxins can also precipitate hepatitis C. The five main hepatitis viruses that are responsible for significant human disease are: A, B, C, D, and E. Hepatitis C is particularly devastating for many reasons. Newly infected patients are often asymptomatic or present with mild, nonspecific symptoms and are thus unaware of their condition, thereby increasing the risk of transmission. Furthermore, 70-85% of HCV-infected patients will develop chronic disease, which can lead to cirrhosis and liver cancer. Unfortunately, there is no vaccine to date for the prevention of hepatitis C infection. Because HCV is a blood-borne pathogen, prevention consists of behavioral precautions, such as barrier contraception as well as avoiding the sharing of syringes. Thanks to effective screening protocols, blood transfusions are no longer a major source of infec-

tion. Nonetheless, 3.2 million Americans are living with chronic hepatitis C. Injection drug use is by far the leading risk factor for infection. Perinatal and sexual transmission is also possible, but occurs less frequently. Finally, hepatitis C virus has at least six genotypes, which complicates treatment and exposes the patient to reinfection with different strains.³

The goal of drug therapy is to achieve undetectable viral load 12 to 24 weeks after completion of therapy. This is known as SVR, sustained virologic response. Combination therapy with simeprevir, pegylated interferon, and ribavirin exhibits marked superiority over pegylated interferon, ribavirin, and placebo according to the results of three Phase 3 studies known as QUEST-1, QUEST-2, and PROMISE. The QUEST trials studied treatment-naïve patients and PROMISE studied patients who relapsed after prior interferon-based treatment. Based upon the data from the QUEST studies, 80% of treatment-naïve patients achieved sustained virologic response 12 weeks after combination treatment with simeprevir, while only 50% of the placebo controlled group had SVR. Similarly, 79% of patients randomized to

the simeprevir group in the PROMISE study had SVR at 12 weeks, while 37% of patients in the placebo group achieved such results.⁵ ASPIRE, a Phase 2b study, demonstrated that the addition of simeprevir to the peg-

ylated interferon/ribavirin regimen led to a sustained virologic response after 24 weeks in 65% of prior partial responders and 53% of prior non-responders versus 9% and 19% of the respective placebo groups.⁶ Interestingly, simeprevir was not compared in head-to-head trials with the other protease inhibitors on the market.

Simeprevir offers the unique advantage of once daily dosing.^{7,8} This will reduce pill burden and may improve compliance. The most common side effects seen in clinical trials include rash, pruritus, photosensitivity, and nausea. Patients should be instructed to avoid extensive sun exposure and to protect themselves with sunscreen, hats, and clothing. Telaprevir

"Simeprevir is an NS3/4A protease inhibitor that blocks the replication of the hepatitis C virus."

CLINICAL

shares a similar side effect profile. Like its protease inhibitor predecessors, simeprevir is metabolized primarily by CYP P450 3A4, and is therefore susceptible to drug interactions with potent inhibitors or inducers of this enzyme. Since ribavirin is pregnancy category X and simeprevir is only indicated for combination therapy, all males and females taking this drug must use two forms of birth control. It is unknown whether simeprevir passes into breast milk. Patients with decompensated liver disease should not take simeprevir. In addition, it is recommended to screen patients for NS3 Q80K polymorphism in genotype 1a virus, as a reduction in efficacy is observed in this population.⁹

Evidence suggests that simeprevir is safe and effective for its intended use. It has the potential to substantially reduce morbidity and mortality in millions of Americans. However, its place in therapy among other protease inhibitors used in combination with pegylated interferon and ribavirin remains to be seen.

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The Use of Methadone in Neuropathic Pain

By: Neal Shah, PharmD, MD/PhD Student c/o 2021, West Virginia University School of Medicine

Methadone is a powerful long-acting mu-opioid agonist that has been traditionally used in the management of chronic pain, treatment of pain refractory to certain opioid agents, and maintenance of opioid addiction.¹⁻⁵ While neuropathic pain is not traditionally linked to mu-opioid receptors, spontaneous neuropathic pain has been successfully treated

with opioids. However, no improvements in emotional or physical functioning were seen.⁶

Neuropathic pain is classically linked to N-methyl-D-aspartate (NMDA), serotonin (5HT), and norepinephrine (NE) receptors. NMDA receptors are antagonized by agents such as ketamine, and 5HT and NE reuptake into neurons are inhibited by agents such as duloxetine and amitriptyline.⁷ Some

mu-opioid agonists, like tramadol, have dual 5HT/NE reuptake inhibition; methadone possesses these characteristics as well as additional NMDA antagonism.^{8,9} Agonism of NMDA receptors causes a down-regulation of mu-opioid receptors. Therefore, by antagonizing NMDA receptors, mu-opioid agonists are able to exert analgesic effects.⁸ The combination of these effects makes methadone an excellent and efficacious option in managing neuropathic pain in both cancerous and noncancer settings, such as in diabetic neuropathy.^{9,10}

A retrospective chart review compared the visual analog scale (VAS) scores of pain from 18 patients (15 with various cancers, 3 with diabetes mellitus) before and after methadone treatment. Doses ranging from 15 mg to 60 mg of methadone daily lowered the VAS from an average of 7.5 to 1.5.¹¹ Another retrospective assessment of 50 noncancer patients with various intractable neuropathies (nerve root fibrosis, peripheral neuropathy, post-herpetic neuralgia, etc.) showed that out of the 26 patients that completed therapy and questionnaires, 15 had "moderate" pain relief, and 6 had "marked" pain relief.⁹ Two drawbacks of using mu-opioid agonists are their addictiveness and their overdose potential. In 2007, West Virginia ranked first for deaths involving overdoses on methadone.⁴

Additionally, since methadone involves the inhibition of 5HT reuptake, serotonin syndrome is possible. A woman taking concomitant methadone, olanzapine, and venlafaxine developed symptoms consistent with serotonin syndrome, which resolved when venlafaxine and olanzapine were discontinued.¹² Furthermore, selective serotonin reuptake inhibitors such as fluvoxamine and fluoxetine inhibit one pathway of the metabolism of methadone by CYP2D6, which may elevate the risk of developing serotonin syndrome.¹³

Methadone remains a valid choice to use in refractory neuropathic pain in many patient conditions; however, it must be administered with caution in patients at a high risk for drug abuse or overdose, and when concomitantly given with drugs affecting serotonin pathways.

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RHO CHI POST CLINICAL CORNER

By: Aleena Cherian, Co-Copy Editor [Graphics-focused] & Beatrisa Popovitz, Staff Editor

Review of Biostatistics & Statistical Tests

Hypothesis Testing

- H_0 : Null hypothesis (negative statement i.e. that no difference exists between the two groups)
- H_1 : Research hypothesis (positive statement i.e. that a difference exists between the groups)

Errors in Hypothesis Testing

Possible Outcomes

Decision from Statistical Test	Actual Reality		Definitions
	Null is False	Null is True	
	Reject Null	No Error	Type I Error
			Type I Error: to falsely conclude that a significant difference exists between study groups To reject H_0 when it is true
	Fail to Reject Null	Type II Error	No Error
			Type II Error: to falsely conclude that no difference exists between the two study groups To fail to reject H_0 when it is false

Probability of Error

- Alpha (α): the probability of making a type I error
 - Statistically significant if α (p-value) < 0.05 or the probability of falsely concluding a difference exists is <5%
 - P value does not provide the size of the difference between groups and is of limited value
 - Huge sample sizes can result in statistically significant p values even though there is a small clinically insignificant differences between groups
- Beta (β): the probability of making a type II error
 - β should be <0.2 (ideally <0.1)
 - small sample size increase beta

Statistical Power and sample size

- Power ($1-\beta$): sensitivity
 - Ability of an experiment to find a difference between study groups when in fact the difference truly exists
 - As sample size increases, power increases

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Reviewed by: Dr. T Jodlowski and Dr. L Augusto

Choosing Statistical Tests

Purpose of statistical analysis: to collect sufficient evidence to reject the null hypothesis (H_0) in favor of accepting the research hypothesis

The test and the level of significance must be specified in the study protocol before the study is performed

Criteria for selection of statistical test

Scale of measurement of the test variable

- Continuous
 - Interval
 - Ratio (absolute zero exists)

If continuous, selection of statistical test also depends on normal (use parametric tests) vs. non-normal distribution (use non-parametric tests)
- Categorical (use non-parametric tests)
 - Nominal (mutually exclusive i.e. race, age)
 - Ordinal (ranking, intrinsic order)

Type of study design

- **Paired:** results can be obtained for each patient under all experimental conditions and the groups are paired with respect to other characteristics (dependent study design, i.e. comparisons before and after treatment on same individual)
- **Unpaired:** results for each patient are only available under a single set of conditions and the results for two or more groups are compared (independent study design)

Methods of testing

<i>parametric</i> continuous, normal distribution, each observation is independent of the other ordinal, interval or ratio data	2 groups: Student's T test, Paired t-test 3 or more groups: ANOVA/ANCOVA, repeated measures of ANOVA
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Categorical

	Unpaired	Paired
Ordinal & Nominal Data	Fisher's Exact variant when individual cells of matrix <5 Chi Square (X^2) Test larger sample size	McNemar

Continuous

	Unpaired		Paired	
	2 groups	3 or more groups	2 groups	3 or more groups
Normal Distribution (ratio, interval)	Student's T test comparison is made between two study groups	ANOVA, ANCOVA variances of populations from which the samples are drawn are equal <ul style="list-style-type: none"> • ANOVA: continuous dependent + more than 1 nominal independent variable • ANCOVA: continuous dependent and a mixture of nominal and continuous independent variables 	Paired T-test dependent variable is measured twice on same individual	Repeated measures of ANOVA assesses several measurements of the same participants under different conditions or at different points of time
Non-Normal Distribution (ordinal, ratio, interval)	Mann-Whitney U calculation based on rank order of data points, when the distribution of ranked responses between samples are different	Kruskal Wallis subjects not allowed to participate in more than one group	Wilcoxon Rank Sum groups compared are equal, all individuals represented in both groups	Friedman subjects are part of >1 group

Reviewed by: Dr. T Jodlowski and Dr. L Augusto

Surviving APPE Rotations

By: Aleena Cherian, Co-Copy Editor [Graphics-Focused] and Jenny Prakash, PharmD Candidate c/o 2014

Starting your rotations in 5th year usually brings mixed emotions. On one hand, it's a relief to finally be finished with labs and D&Ds...imagine, a whole year without any exams! But on the other hand, now you have to test how well your book knowledge stands up to real world application. Here are a few tips to help you navigate the world of rotations and to make the most of your experience.

Be prepared!

We can't stress enough how important it is to prepare yourself for **each** rotation- whether it's paperwork, travel and parking arrangements, or reviewing drugs and disease states prior to starting. Nothing kills adjusting to a new site like having to make up for lost time, especially since you only have 4 weeks.

First, always *contact your preceptors* using their preferred method of contact one to two weeks before the start of each rotation to introduce yourself, and to let them know you are coming and when you are coming. Don't forget to ask them if they need any site-specific documents or clearance, and always ask if there is anything you can do to prepare for the rotation. Some preceptors may require readings or assignments to help you prepare for the specific duties of that site.

Complete and bring all required paperwork and documentation, especially your health clearance. Keep track of when it expires, and make sure to complete all requirements prior to the expiration date. Starting this year, this also includes getting your flu shot each season!

If the specific site has provided any documents or information on *RxPreceptor*, make sure to read up on the rules, expectations, dress code, and anything else available to you, so you know what to expect when you start. If you're starting a specific clinical elective, take some time to brush up on things like clinical guidelines and drug classes so you'll be much more prepared to handle the work.

Learn the travel directions to your site ahead of time, and if it's completely unfamiliar to you, consider visiting the site before the rotation begins to avoid any surprises. In hospitals or specialty centers,

you may also need to find out where the pharmacy is located in the building if your preceptor hasn't arranged to meet you. If you are driving, note that not all sites have parking lots available, so be prepared to find street parking or make other travel arrangements. Always give 15-20 minutes of extra time for lost or empty MetroCards, accidents and road closures (especially in the winter!), subway or LIRR delays, getting lost, finding a parking spot, and any other complications that could come up on the first day.

Get to know your References and Guidelines

You will be asked many drug information questions by your preceptors, by patients, or by other medical staff. It's ok to not know every answer at first, but you should always know where to look it up!

Some useful apps for your smartphone or tablet include Micromedex for drug reference and Epocrates for drugs, interactions, and tablet identifiers. Also, if you are in a diverse area, consider apps such as MediBabble to translate basic medical phrases to other languages, especially Spanish, in order to accommodate the Spanish speaking patients whom you'll encounter frequently in the NYC area.

For clinical information, always refer to reputable and up to date sources and clinical journals (no textbooks or class notes!), such as *Pharmacists/Prescriber's Letter* or *New England Journal of Medicine*. Familiarize yourself with clinical guidelines for the most common disease states (e.g. JNC 8 for hypertension, the ADA Guidelines for diabetes, and various CHEST guidelines for cardiac and thrombotic conditions), and always keep track of when they are updated so you refer to the most recent edition.

Stay Updated

Now that you're no longer in class, you won't have your professors to tell you when there is a new guideline, a new drug on the market, drug shortages, or drug recalls. During rotations and in your future, it is essential to take the initiative to stay updated for the changes and new developments in the profession.

Some useful resources to keep up with newly approved drugs and indications include the FDA web-

site and the “Product Showcase” section of APhA’s Pharmacy Today, which is available online. Medpage Today (medpagetoday.com) is also a great website for recent news and events in the medical and healthcare field, and you can sign up to receive free daily updates via e-mail.

Make the most of your time

It sounds cliché to say that rotations are “what you make of them,” but in the end, it is up to you to use the time you spend at the site to your advantage. If no one is watching over your shoulder, it’s tempting to sit back and let the hours pass, killing time on your phone, “Instagram-ming” your lunch or updating Twitter. However, being proactive will make all the difference - ask if there’s anything you can do to help the site, take on new projects, or in your downtime, read up on new developments or drugs.

Think Ahead!

Even though graduation still seems a long way ahead, it’s never too early to begin thinking about your postgraduate plans. As you consider staff positions, residency, research, fellowships and more, tailor your rotation experience to meet your long term goals: ask preceptors if you can work on projects in your area of interest, speak with pharmacists about their own education and the career paths which brought them to where they are today, and ask if there are any research opportunities you can get involved with, especially a long term project on which you can present a poster or abstract. Build good relationships with your preceptors and consider

asking them to review your CV or even write a letter of recommendation before you finish at the site.

Be Professional & Confident

While this may go without saying, remember that you are representing yourself as well as the University, so conduct yourself with the highest standard of professionalism, whether you are dealing with pharmacists, other healthcare providers, or patients. Dress professionally but comfortably (business casual) and adhere to any site-specific dress codes. Also remember to wear your (clean) white coat, name tag, and if applicable, ID badge for the site.

Don’t be afraid to say that you don’t know the answer to something, but always know where to look it up (see above), and simply say you will “get back to them with more information.” When you provide recommendations to patients or physicians, be able to back up your information with reputable sources and studies and always present the information in a clear, informed manner.

When you speak to others, especially to preceptors and other medical staff, being confident with a pleasant demeanor will make a tremendous difference. While knowing your clinical information and being prepared is a large part of speaking with confidence, your tone of voice, body language and other nonverbal communication (remember from speech class and CPP) also speak volumes.

The idea of leaving the familiarity of classes may be daunting, but remember that you’ve been preparing four and half years for this and it will be one of the most rewarding times of your pharmacy career. Take initiative and be prepared, and you’ll be able to make the most of this experience!

Has your article been published in an issue of the Rho Chi Post?

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Here is a suggested format for citing / referencing your work:

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Dr. Robert Mangione Interview Continued

By: Katharine Cimmino, Editor-in-Chief and Melissa Roy, Co-Copy Editor [Graphics-Focused]

Many of our students know that you hold the position of Provost, but what exactly does that entail?

I am still learning every day about what being Provost entails. The Provost is the Chief Academic Officer.

I sometimes describe it as being the dean of the deans. So when I was the Dean of the College of Pharmacy and Health Sciences, I had associate deans and department heads reporting to me. Now as the Provost, I have the deans of each individual school reporting to me. If there is an issue with an academic policy or if there is an academic fiscal issue, my office is where it is addressed and it's a great place to be.

Was becoming Provost ever one of your goals?

Honestly, I did not apply for the position as Provost when the position first became available in 2011. I was honored when the search committee contacted me in February 2012 to ask if I was interested in applying for the position, but my wife had just been diagnosed with ovarian cancer at that time and I did not think I should pursue the position because of her illness. Fr. Harrington later contacted me in August 2012 and asked if I would serve as Interim Provost as the search remained open at that time. Although I was hesitant because my wife's illness, Janet was doing better at that time and was extremely supportive-- in fact, she told me that if I didn't take the position then I shouldn't come home. A few months later I applied for the position of Provost and was fortunate to be selected. If it wasn't for all of my wife's support, I never would have pursued this position, or would have been worthy of selection, and I am truly grateful to her because I do enjoy being your Provost.

When you are faced with a problem or a decision, who is the person or group in our University who makes the final decision?

In many instances the buck stops here, but I believe in working in a more collaborative way. We talk things through and I would hope that the decision taken is the one of majority consensus. There are some situations where I will be the outlier, but I get to make decisions so it's okay if my opinion differs. Overall though, I like to think that we work together.

We have a tremendous group here at St. John's University. I work very well with the deans and each one of my colleagues has their area of expertise and responsibility. We are a very complex organization and we seem to only be getting more complex, which is a good thing. There are many different people who report to me and help make St. John's University great. I report directly to the President. I work very closely with the Executive Vice President, who deals

with many of the non-academic and fiscal areas of the University, and all academic matters associated with the colleges, the faculty, and the students are ultimately my responsibility.

"The students and the faculty put their faith in me so I want to make sure that I do the right thing for them and I think, more than anything, this is what makes being provost most challenging and perhaps most rewarding."

As provost, what are some challenging decisions that you've had to make? Can you highlight some of the rewards?

I really like where I am and I am very happy in this position, however there are some situations that are more difficult and challenging than others. I think understanding the needs of the Staten Island campus was a challenge. For that we had just issued a strategic plan. Dr. Ross and the faculty did a tremendous job trying to facilitate the decision of what direction we should pursue. This project was difficult for me because I became involved late in the process and this particular project had been going on for a number of years.

There are also the issues of leadership and making sure we have the right leaders in the right place at the right time. Then the day-to-day challenges include allocation of funds. It is always hard to decide what initiatives get funding but I try to make a deci-

sion and then pray for the grace to be able to live with the consequences of my decisions. I do make hard decisions, but overall the rewards are worth it. The students and the faculty put their faith in me so I want to make sure that I do the right thing for them and I think, more than anything, this is what makes being provost most challenging and perhaps most rewarding. What drives me most is doing the right thing for the institution and to not disappoint the people who I am serving. I want to be here in this position right now and I am very grateful for this wonderful opportunity.

Do you miss being dean?

There are definitely things that I do miss about being dean, especially the student contact. When I was having a particularly challenging day, I would walk through the halls of St. Albert's. While the students probably thought that I was checking in on them, I was actually just recharging my battery. Seeing them hard at work would always give me a second wind to go back to whatever I was doing. I also miss the faculty. They are all my friends and I feel like I grew up in St. Albert's Hall. While I still talk to them, I don't get the everyday interactions that I used to have. I don't miss the difficulty of telling students that they could not continue in the program. That was always the hardest part of the job and it always broke my heart.

But with this new position, I have also made some great new friends. This is a wonderful environment, the office has a tremendous view of the Great Lawn, and it really is a great place to work. I never thought I would be here but I am truly happy that I was given the opportunity to serve as your Provost.

This position definitely comes with a different set of responsibilities, and with that I would like to share a story with you. I periodically have to sign checks for the University and I'm one of the few people authorized to do so. One day, I am brought a stack of checks. The first one crosses my desk and is for \$10,000. So I read the back up material justifying why the check is written and sign it. The next one

comes in and is for \$15,000. After a few checks, I come across one that is for \$1.7 million. I actually just stopped and took a moment. It was sitting right here on my desk, so I kneeled down and my associate who brought me the check to sign, Ms. Cacavallo, asked me why I was kneeling. I replied, 'Well honestly for two reasons: first, I am praying that this amount is correct and second, when I pass out after signing this check I will have a smaller distance to fall.' So you can see with this position there is a whole different set of responsibilities.

With this new position, do you still have the opportunity to teach or guest lecture?

I actually still do teach. Last year during my term as interim Provost, Father Harrington asked that I not teach during the transition. Right now though I am teaching Social Aspects of Pharmacy again, which is a fun course. I always love it when I am invited to give a lecture on celiac disease as it still is my interest and we

are currently finishing up a study that was funded by the FDA. Sometimes I am asked to lecture on leadership and things like that. I am always delighted if faculty or students invite me to give a talk and it is great to be with them. I no longer teach the pharmacy law course. Even though I still am a registered pharmacist and I keep up with the profession as best that I can, I feel that you have to keep much more up-to-date with the law component to teach the course and with my new responsibilities I just don't have the time.

With the position as provost, how can you shape or further expand a curriculum?

Faculty, by statute, drives the curriculum. This is a very good thing because faculty are the content experts and closest to the discipline. Where the Office of the Provost would become involved is the fiscal aspects. We answer questions like: Does it make good fiscal sense? Is it the kind of program we have adequate resources to support? If we don't have those resources, can we obtain them? Is the program consistent with the mission of the institution? Do we have enough demand for this program? etc... Overall, our influence of the curriculum is more from a

"Faculty, by statute, drives the curriculum. This is a very good thing because faculty are the content experts and closest to the discipline."

subsequent development level as opposed to creating the curriculum itself.

We can also influence a curriculum by directly asking the deans to consider going in a certain direction. Normally the Office of the Provost does not take such a forward role, but we can make suggestions.

What is your 5-year plan for the university?

This is the last year of the institutional repositioning document, which was an extension of the university's strategic plan, and we have just started talking about the next strategic plan. The academic strategic plan has to be integrated into the university strategic plan. Many people will say the university strategic plan should drive the academic strategic plan, whereas I think it should be the opposite. Right now, we are in the process of looking at the SWOT analysis and asking critical questions. I am also in the process of reaching out to the University Senate and talking to the Academic Planning Committee, which is a committee of faculty. I am interested in talking to the Academic Affairs Committee of Student Government to get a feel for their opinion on the appropriate criteria and markers to look at. Once all these things are done, I feel that you can get a good idea of where you want to go and then figuring out how to get there becomes much easier.

As of right now, we don't have a 5-year plan, but this year the idea is to develop that plan. We also have to keep in mind that we will have a new president and it might be presumptuous to establish a detailed plan before he or she is in place. We are, however, very fortunate to have a great leader in Father Levesque. For now though we are looking to get a general feel and build a foundation so we know where the gaps are, where the opportunities lie, and then create a plan from there.

So there are rumors that St. Albert's Hall is going to be expanded and renovated. Is there any truth to that?

I wish these rumors were true. I have been trying for years as Dean and I have a dream of filling in that parking lot that sits behind the building and putting

a wing there. My dream for the building would be to expand it to include many more of the College of Pharmacy and Health Science's programs, but we don't have the money to support it. This could include relocating the programs from the Bartilucci Center back to campus. I would also like to add in the speech and hearing center and psychological services to that building. Imagine if we had a structure where that parking lot was. On the first floor, we could have all clinical services including psychology, reading, hearing, speech, and maybe even a community pharmacy. On the next floor, we could have allied health sciences and also put in some research facilities. If we could make each floor its own discipline and really design the building like that, that would really be special, but it would be a multi-million dollar project. Today we don't have the funds, but there are many things that have happened

at St. John's University that I never thought were possible. Just because we don't have the means now doesn't mean we won't ever be able to do it. For now I just keep

dreaming it and envisioning it. I can clearly envision it and maybe during my time I will have the opportunity to truly see something like this come to pass. So that is Bob Mangione's plan but does anyone else agree, I don't know.

What inspired you to pursue a career in teaching instead of a community or hospital pharmacy?

I actually worked in both community and hospital settings. I pretty much always wanted to teach at the college level and as I stop to think about it, it was the pharmacists in my life who influenced me to become a teacher. One mentor was my junior high school science teacher who was a pharmacist, and my high school teacher, also a pharmacist, who taught anatomy and physiology. But if I had to name just one person, which is very difficult, it would have to be Sister Jane Durgin. Sister Jane is a pioneer in clinical pharmacy and she, more than anyone else, saw that this would be a good direction for me to go in. She taught and showed me by example that I could be a pharmacist and work in a way that I could convey information to others, so that was how it started.

"As of right now, we don't have a 5-year plan, but this year the idea is to develop that plan."

As medicine continues to rapidly evolve and expand, pharmacy schools have expanded their programs, while other schools have begun to offer joint pharmacy programs (PharmD/MBA, PharmD/PhD). In fact, recently, Rutgers has been the first to create the 10 year PharmD/MD program. What is your take on expansion of the pharmacy curriculum? Do you think there's a possibility that St. John's University will offer joint pharmacy degrees in the future?

This is definitely something that I want to see be done at St. John's University. When I was Dean of the College of Pharmacy and Health Sciences, this was one of my objectives. Now, of course as Provost, I respond to what the deans say so I will work closely with Dean DiGate and the faculty to discuss things, but I think we have extraordinary potential for PharmD/MBA, PharmD/JD, PharmD/MPH, and others. I think it's important for the institution.

How do you envision the pharmacy profession 10 years from now? With a growing dependence on biotechnology for new drug therapies, how do you think gene therapy will impact pharmacy as well as the responsibilities of pharmacists?

This is a great time to be in pharmacy. This is just my opinion, but I think the distribution function of medications will be provided more by technical support staff and we will see a difference in the technician to pharmacist ratio. I think the pharmacists will be called upon for more of their cognitive skills and be included more in management of care.

Genetics will have a significant impact. People can get tested and, in essence, genetic profiling can be conducted. This will definitely bring with it ethical questions, because we will know one's potential to develop certain diseases early on. We will also be able to understand how people respond to drug therapies and I think pharmacists will be in a great position to interpret and share data, and collaborate with prescribers to come up with the best individualized therapy.

I also think you will find more primary public health

services being provided in pharmacy. The immunization program is such a success you can easily see this evolving into something bigger. I think things like compounding will become the job of more educated technical staff. Don't get me wrong, I was a pediatric pharmacist and I completely understand the importance of compounding medications. While I think that compounding is important and still a skill that a pharmacist needs to know, I think there will be a shift in responsibilities so the pharmacist can be used elsewhere. Already in hospitals, you see pharmacists up on the units working with a team to make decisions. There are still many questions and issues to be worked out but at the end of the day I feel like the profession will move in a direction towards what is best for the patient.

"I think the pharmacists will be called upon for more of their cognitive skills and be included more in management of care."

As someone who has held numerous extraordinary leadership positions in the pharmacy profession, what do you believe are important attributes of a good

leader?

I have been very blessed and very fortunate that I am surrounded by great people who support me, especially my wife and family. I have been fortunate that when I have been placed in leadership positions, I have been surrounded by great people who always made me look smarter and better than I really am. So I give a lot of credit to those who helped me but the standard that I try to live up to is to be a good servant leader according to Robert Greenleaf's tradition. This includes having qualities like listening, empathy, healing, awareness, persuasion, conceptualization, foresight, stewardship, commitment to the growth of people, and building community.

When you look at these qualities, I think many of these traditions are consistent with being both an academic leader and a member of a Vincentian institution. For me though, when all is said and done, I always ask myself if my family would be proud of what I did or embarrassed. If they would be embarrassed then I shouldn't do it. I always take responsibilities for my actions and I always take responsibility for anyone who reports to me. I am here to sup-

port them, but I also know that I make the final decision.

When people come to me and say that they made a mistake, the first thing I do is look at the carpet and say, 'Well I don't see any blood on the carpet; there is no chalk outline of a body; and as far as I can see no one is attached to life support measures; I think we can get through this.' But after calming the person down we have to take a good look at what has happened and come up with a better solution.

It is a privilege to serve as your provost and I don't want to ever disappoint you. Again, I have been very fortunate to have a lot of people whose shoulders I am standing on- I realize that and I don't want to disappoint them either. You have to have heroes in your life and you try to be as good as them and live up to their standards. Even if you don't come close, in your attempt you definitely become a better person and a better leader. That is the way I look at it.

What would you advise students who are thinking about becoming leaders of pharmacy clubs at St. John's University?

Always be honest with yourself. It is important to recognize your personal limitations but don't let them stop you. I know that sounds like a contradiction but when we are moved out of our comfort zone it can get a little scary, but unless you do that you are never going to grow. You also have to recognize your limitations and know when to ask for help. Take responsibilities for your decisions. Don't be afraid to say you are sorry if you make a mistake but more importantly, look for a solution. The most important thing is to be honest with yourself. Realize that in a

leadership position you have people counting on you so make sure you take responsibility and always work hard to avoid making the same mistake twice. If you do all these little things and try to work together with people, I think it will lead to success.

Is there any other advice that you can give to pharmacy students?

Enjoy the ride! I think that when all is said and done and you look back, the ordinary is truly the extraordinary and sometimes that's lost in the moment. You are never going to be this age again. I realize that being in school may not always be the best of times, especially when you guys stay up all night studying for your Drugs & Diseases tests. But for me, some of my fondest moments were those all-night study sessions with my friends and those are the experiences that I took with me. Just remember to enjoy your time

"It is important to recognize your personal limitations but don't let them stop you."

here and maximize your opportunities. Do everything you possibly can with the time that is given to you. Most importantly, cherish your friendships. I have

friends today who I met as undergrads and the relationship has been maintained and that's one of the greatest gifts I have received going through this profession.

The Rho Chi Post would like to thank Dr. Mangione for sharing his time and expertise with us. He is truly an inspiration for all students and faculty, and we congratulate him on his prestigious and well-deserved position as our Provost.

Went to an event on your campus?

Learned something interesting?

Write to our editors at RhoChiPost@gmail.com

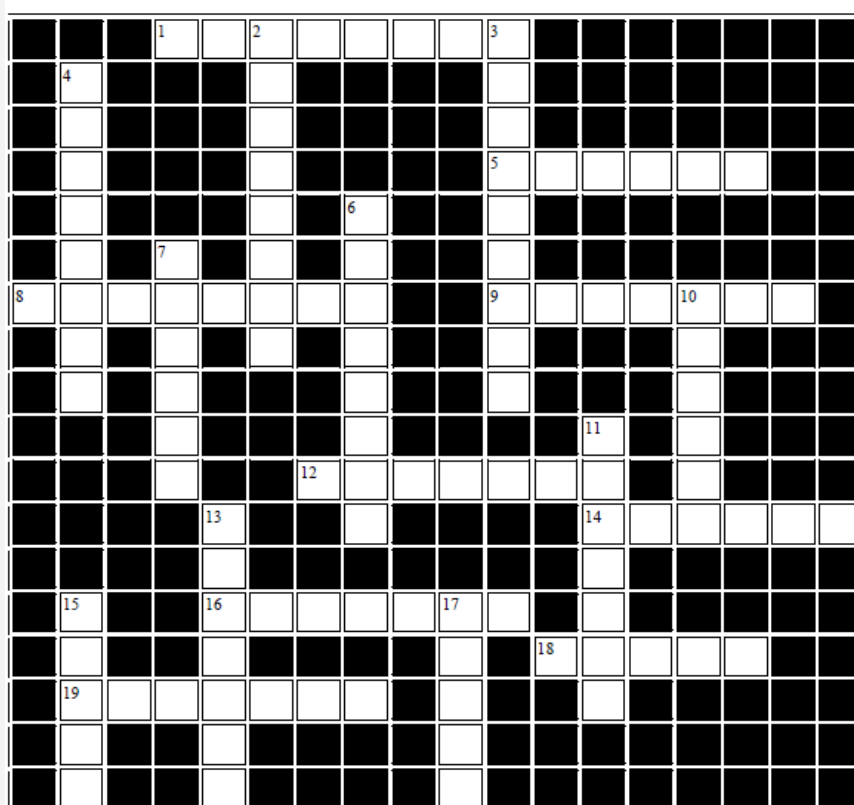
and we will feature your article in our next issue!

RHO CHI POST

Are You Smarter than a 6th Year?

Crossword Puzzle: Drug Top 200 Challenge

How well do you know the Top 200? For each generic name listed below, find the corresponding brand name in the puzzle. Note: This puzzle contains brand names only. Good luck!



Across

1. METHYLPHENIDATE
5. RAMIPRIL
8. CONJUGATED ESTROGEN
9. CEFDINIR
12. GLYBURIDE
14. PREGABALIN
16. DIGOXIN
18. PENICILLIN VK
19. OSELTAMIVIR

Down

2. TRIAMCINOLONE (NASAL)
3. SPIRONOLACTONE
4. TEMAZEPAM
6. ALBUTEROL
7. GLIMEPIRIDE
10. LOSARTAN
11. VALACYCLOVIR
13. FOLIC ACID
15. EZETIMIBE
17. ISOSORBIDE MONONITRATE

Answers



By Frances Trosa
PharmD Candidate
Class of 2015

Many drugs
LOOK – ALIKE
OR
SOUND– ALIKE

causing them to be
easily mixed up in
practice.

Can **YOU** match these
facts with the correct
medication?

Answers

Matching Column: Look-Alike Sound-Alikes

1. To be taken first thing in the morning on an empty stomach, at least 30 minutes before any food, beverages, or other medicine
2. Should avoid use in patients with a history of QT prolongation or in patients with concurrent use of other medications known to prolong the QT interval
3. A component of Sinemet that is able to cross the blood brain barrier and eventually be converted to its active form in the brain
4. A rescue agent used to counteract the effects of methotrexate
5. May prevent pregnancy when taken within 72 hours of intercourse
6. Patients should report any muscle symptoms or fatigue, as this is a sign of toxicity
7. A nuclear transcription factor peroxisome proliferator-activated receptor-alpha agonist
8. Increased risk of Stevens – Johnson Syndrome when taken with valproic acid or with rapid dose titration
9. Injection sites must be rotated to prevent lipohypertrophy
10. Must avoid taking with nitrates to avoid a drastic decrease in blood pressure

A. Levofloxacin

B. Levodopa

C. Levoleucovorin

D. Levitra

E. Lamotrigine

F. Levemir

G. Levonorgestrel

H. Levothyroxine

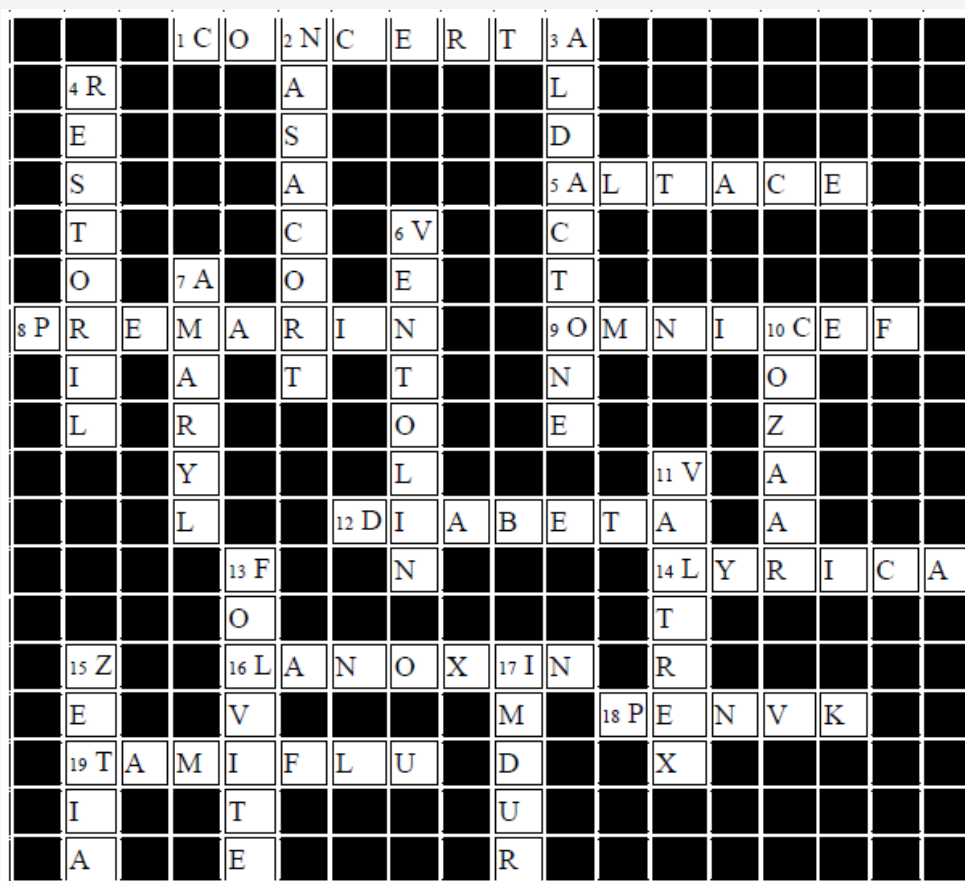
I. Lipitor

J. Lipofen

How Did You Do???

Answers to Word search & Look Alike and Sound Alike

1. H 2. A 3. B 4. C 5. G 6. I 7. J 8. E 9. F 10. D



Do you enjoy our puzzles?

Send us a suggestion for a brainteaser at

RhoChiPost@gmail.com

We will feature your work in our next issue!

RHO CHI POST: STAFF MEMBERS



@ Katharine Cimmino (5th Year, STJ; Editor-in-Chief)

I have always been an avid reader and writer. As a member of the Rho Chi Post I am able to merge my passions with the professionalism that comes with aspiring to be a healthcare provider. I am eager to be a part of a publication that promotes my interests and vocation.



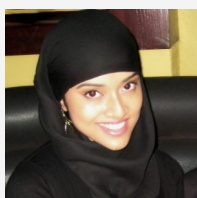
@ Bharat Kirthivasan (PhD Candidate, STJ; Co-Copy Editor [Content-Focused])

I am a doctoral candidate in Industrial Pharmacy researching nanoparticles for delivery to the brain. The only thing I enjoy more than reading a well-written piece of work is writing it. I am glad to work for the Rho Chi Post, and I encourage others to do the same.



@ Hayeon Na (5th Year, STJ; Co-Copy Editor [Content-Focused])

Hello! My name is Hayeon Na. I am a 2015 PharmD Candidate and one of the Copy Editors for the Rho Chi Post. I hope the information I present will be helpful, or at least interesting. If you have any comments regarding my contribution, feel free to contact me at any time!



@ Tasnima Nabi (4th Year, STJ; Co-Copy Editor [Content-Focused])

Writing has always been my greatest outlet for experience and knowledge, through which I hope to keep you engaged and informed. It is imperative to keep up with our changing profession and community, and I look forward to bringing pertinent information to the newsletter.



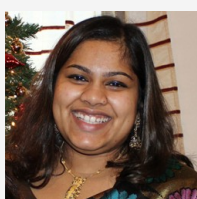
@ Erica Dimitropoulos (5th Year, STJ; Co-Copy Editor [Content-Focused])

As busy student pharmacists, we often fail to keep current with healthcare developments. My aim is to sort through the news and provide quick updates that are important to our profession. Feel free to contact me if there are any topics you would like to see covered in the next issue!



@ Aleena Cherian (6th Year, STJ; Co-Copy Editor [Graphics-Focused])

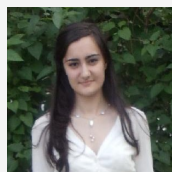
The Rho Chi Post has been a source of current information and great advice to students and professionals in this evolving profession. After years of experience in media and graphics-related work, it is now my privilege to be a part of this endeavor as a Co-Copy Editor. I hope you learn as much from future editions of the newsletter as I have, and I welcome your feedback!



@ Melissa Roy (5th Year, STJ; Co-Copy Editor [Graphics-Focused])

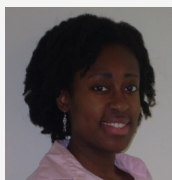
We as future healthcare professionals owe it to our patients and ourselves to become aware and current on the events affecting our profession. The Rho Chi Post is our way to learn new things and stay in touch with the pharmacy world, on- and off-campus. I have gained so much from reading previous publications and feel privileged to have the opportunity be a part of the team. Feel free to reach out to me with suggestions and comments.

RHO CHI POST: STAFF MEMBERS



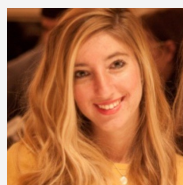
@ Tamara Yunusova (3rd Year, STJ; Senior Staff Editor)

My name is Tamara Yunusova, and I am a 3rd year Pharm D candidate at St. John's University. I enjoy articulating information in a captivating and insightful way. I hope to make this publication more informative, student-friendly, and innovative.



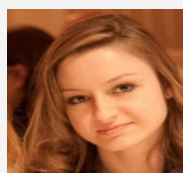
@Davidta Brown (3rd Year, STJ; Senior Staff Editor)

My two great loves are innovative science and quality writing, and the Rho Chi Post is an insightful combination of both. As an editor, I look forward to bringing relevant information and fresh perspectives to the student and faculty of St. John's University, as well as to making the Rho Chi Post a newsletter that offers something new to every reader.



@ Beatrisa Popovitz (5th Year, STJ; Staff Editor)

I am eager to relay current information on interesting topics making waves in the world of healthcare pertinent to the advancement of our profession. As student pharmacists, we are molding the future of our profession, and the Rho Chi Post facilitates the cultivation of a relationship (between students, faculty, and other members of the healthcare community) to share ideas and spread awareness of various issues.



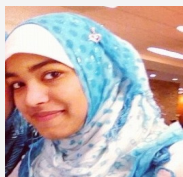
@ Ada Seldin (5th Year, STJ; Staff Editor)

I am thrilled to have become a new member of the Rho Chi Post team. I hope to further strengthen the goals of this newsletter and make a lasting contribution. It is important, as future pharmacists, to collaborate with our peers, as well as accomplished professionals in the field. Rho Chi Post provides a vehicle to voice our opinions and share relevant news.



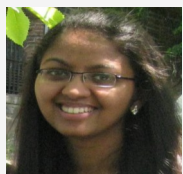
@ Sang Hyo Kim (2nd Year, STJ; Staff Editor)

Advancements of technology and developments of new medicines, prolonging the lifespan and improving the quality of life, have increased the geriatric population. In years to come, pharmaceutical industries and healthcare systems will persistently work to find solutions to changing demands and new problems of the society. Through the Rho Chi Post, I wish to learn, educate, and prepare myself and others for the future.



@ Fatema Elias (4th Year, STJ; Staff Writer)

I am honored to be a part of the Rho Chi Post team. In this age of technology and the continuously changing healthcare profession, I hope to engage like-minded students and professionals. Writing is something that I hold dear to my heart and I hope with this newsletter we can all stay well informed, interested, and educated.



@ Sherine Jaison (5th Year, STJ; Staff Writer)

I find the Rho Chi Post extremely informative and am eager to join the team. I hope my articles will enlighten you about the recent developments in the field of pharmacy and will help you to be a well-informed healthcare provider.



@ You!

We are always looking for creative and motivated students to join our team!

If you are interested in becoming an editor for the Rho Chi Post, please visit:

<http://rhochistj.org/RhoChiPost/EditorApplication>

RHO CHI

The Rho Chi Society encourages and recognizes excellence in intellectual achievement and advocates critical inquiry in all aspects of Pharmacy.

The Society further encourages high standards of conduct and character and fosters fellowship among its members.

The Society seeks universal recognition of its members as lifelong intellectual leaders in Pharmacy, and as a community of scholars, to instill the desire to pursue intellectual excellence and critical inquiry to advance the profession.

THE RHO CHI POST

MISSION

The Rho Chi Post is a monthly, 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, faculty, and administrators.

VISION

The Rho Chi Post aims to become the most exciting and creative 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 essentially sets the stage for the future of student-operated publications in pharmacy.

VALUES

Opportunity, Teamwork, Respect, Excellence

GOALS

1. To provide the highest quality student-operated newsletter with accurate information
2. To maintain a healthy, respectful, challenging, and rewarding environment for student editors
3. To cultivate sound relationships with other organizations and individuals who are like-minded and involved in like pursuits
4. To have a strong, positive impact on fellow students, faculty, and administrators
5. To contribute ideas and innovations to the Pharmacy profession

CURRENT EXECUTIVE BOARD



Anthony, Tyler, Sara, Tasnima, Joshua, Fawad at the 2014 Induction Ceremony

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UPCOMING EVENTS

Feb 24-26: 49th AAPS Arden Conference
 Rockville, Maryland

Mar 28-31: APhA Annual Meeting
 Orlando, Florida

Apr 2-4: AMCP Annual Meeting
 Tampa, Florida

May 17-20: NABP Annual Meeting
 Phoenix, Arizona