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QUOTE OF THE MONTH

"Just having medicine isn't equivalent to medical care. You need the health systems, the social framework so that people feel safe."

- Annie Lennox



Drug Information Questions: Vaccines are Drugs Too

By: Aisa Mrkulic, Maria Michael and Svetlana Bachayev, PharmD Candidates c/o 2022

With the surge of Coronavirus Disease 2019 (COVID-19) vaccines sweeping the nation, there have been many concerns surrounding their safety and impact on everyday life as we adjust to the new normal. During our Introductory Pharmacy Practice Experience (IPPE) at Long Island Jewish Medical Center (LIJ), our pharmacy resident preceptor, Dr. Barbara Barsoum, Pharm.D., invited us to tackle the inquiry of one attending anesthesiologist tasked with the care of a COVID -19-conscious patient. We were asked to research whether any interactions between dermal fillers and the available COVID-19 vaccines exist. At our disposal were the Food and Drug Administration's (FDA's) Vaccine and Related Biological Products Advisory Committee's data, as well as any information tertiary databases such as Lexicomp© and Micromedex© had to offer.

Based on our findings, we reported the following: Moderna's COVID-19 vaccine has been linked to adverse effects in patients with FDA-approved "medical device implants," known as dermal fillers (also referred to as soft tissue fillers or wrinkle fillers). ¹ These injectable implants are intended to create a "smoother and/or fuller appearance" in the lips, cheeks, and other areas of the body. ² Moderna's Study 301 enlisted 30,351 participants, among which facial swelling was observed in two patients, with one patient experiencing this adverse effect in as little as one day after administration of the second dose. These patients received facial fillers anywhere between 2 weeks and 6 months prior to receiving the vaccine.¹ According to the FDA, it is possible that localized swelling occurred due to an inflammatory reaction to the foreign substance. There were no systemic symptoms, instead, subjects only experienced localized inflammation that is easily treated with antihistamines and steroids, like prednisone. Notably, facial swelling in subjects with dermal fillers was not observed following administration of the Pfizer vaccine. There were no reported reactions to either vaccine in patients who had previously received Botox injections.¹ At this time, no data exists regarding a possible interaction between dermal fillers and Janssen's COVID-19 vaccine.

Although this question may seem trivial, great value should be placed on all patient inquiries, especially those for which members of the healthcare team seek our guidance and expertise. It is these questions that are often symbolic of the duty we have as pharmacists to improve quality of care. Much of our education and training focuses on proper navigation of the tools available to us. While it is impossible to always have the answers, pharmacists should make every effort to utilize their extensive drug information skills to identify the best resources to search in order to adequately respond to drug information questions. With the potential to shed light on health-related problems that may have otherwise gone unnoticed, pharmacists are truly indispensable.

References:

- Vaccines and Related Biological Products Advisory Committee: FDA Review of Efficacy and Safety of Moderna COVID-19 Vaccine Emergency Use Authorization Request. Food and Drug Administration (FDA) website. https://www.fda.gov/ media/144585/download. Published December 17, 2020. Accessed January 10, 2021.
- Dermal Fillers (Soft Tissue Fillers). Food and Drug Administration (FDA) website. https://www.fda.gov/medical-devices/aesthetic-cosmetic-devices/dermal-fillerssoft-tissue-fillers.Accessed October 3, 2021.

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Antiepileptics in Migraine Prophylaxis

By: Krishna Tamakuwala, PharmD candidate c/o 2023

Migraines are characterized by episodes of head pain that are often throbbing and frequently unilateral. Migraines are divided into two categories: migraines without aura, known as common migraine, and migraines with aura, known as classical migraine. Migraines without aura are oftentimes associated with typical symptoms like nausea, vomiting, or sensitivity to light, sound, or movement. Migraines with aura, in addition to these typical symptoms, are accompanied by transient focal neurological symptoms, which are usually visual, including the illusion of bright stars or geometric patterns. Migraines affect nearly 36 million Americans which is approximately 12% of the population with global estimates being higher.¹

One might wonder, what does epilepsy and antiepileptics have to do with migraines? Epilepsy, also known as a seizure disorder, is a disorder of the brain. A person is diagnosed with epilepsy when they have had two or more seizures. ⁷ Both migraine and epilepsy are included in the broad category of neurological chronic disorders and are both characterized by episodic events. A recent hypothesis has been postulated suggesting a clinical connection between epilepsy and migraine. ⁸ Both of these disorders are described as entities resulting from altered neuronal excitability with a similar genetic basis.² Epilepsy oftentimes is a comorbid condition of migraine, and it occurs more commonly in patients with migraine than in the general population. Evidence has shown that the prevalence of migraine in patients with epilepsy is higher than in those without epilepsy.² Therefore, it is evident that a possible connection between the two disease states exists and because of their similarities, the use of antiepileptic drugs (AEDs) in migraine prophylaxis is a plausible approach.

The rationale behind the use of AEDs in migraine prevention is based on the hypothesis that migraine and epilepsy share several similar pathogenic mechanisms. Shared pathophysiological mechanisms include abnormalities in the function of voltage-gated sodium (Na+) and calcium (Ca2+) channels, reduced gamma-amino butyric acid (GABA)-mediated inhibition, and increased glutamate-mediated excitation at the presynaptic or postsynaptic level. Additionally, both disease states lower the threshold for the induction of cortical spreading depression (SD), and lower the threshold for induction of longterm changes in neuronal excitability (sensitization and kindling). 2 Some of the common AEDs used in migraine prophylaxis include valproic acid, divalproex sodium (Depakote®), and topiramate (Topamax®).

Valproic acid is arguably the most popular agent of the three mentioned above. It was approved by the FDA in 1996 as a treatment option for migraine prophylaxis. Valproic acid exerts its mechanism of action by increasing the availability of GABA, an inhibitory neurotransmitter, and enhancing its action at postsynaptic receptor sites. Valproic acid modulates the biochemical phenomenon of aura and affects nociception by modulating GABA and glutamate-mediated neurotransmission.² Numerous double-blind, placebo-controlled trials have documented that valproic acid is an effective preventative treatment for migraines. To summarize, randomized, placebocontrolled trials showed that response rates among patients treated with valproic acid, 800 to 1500 mg/day, ranged from 43% to 86% compared with 14% to 21% in those receiving placebo. Valproic acid reduced the number, severity, and duration of migraine attacks with a modest dose-response effect. Adverse effects, mostly gastrointestinal, occurred in 19% to 86% of cases (7% to 79% with placebo). Data from the two multicenter studies indicated that valproic acid was equally as effective in migraine with aura as in migraine without aura. Upon completion of the open trial, recommendations have been proposed for the optimal use of valproic acid in migraines. ⁵

Before initiating treatment with valproic Acid, a physical examination and a thorough medical history, with special attention to hepatic, hematological and bleeding abnormalities, should be performed. Baseline liver function tests (LFTs) must be ordered and evaluated within the first 6 months of initiating treatment, with frequent monitoring throughout therapy. The rationale behind LFT monitoring is that valproic acid can cause liver issues and use of this medication is contraindicated in liver disease. Valproic acid is also contraindicated in pregnancy. Exposure of valproic acid in pregnancy is associated with approximately a three-fold increase in the rate of major anomalies, specifically spina bifida which is when a developing baby's spinal cord fails to develop properly.⁴ Furthermore, valproic acid has a black box warning for hepatotoxicity, patients with mitochondrial disease, fetal risk, and pancreatitis. Patients with a history of pancreatitis should consider an alternative AED.

Antiepileptics in Migraine Prophylaxis

By: Krishna Tamakuwala, PharmD candidate c/o 2023

Topiramate is another promising AED in migraine prophylaxis being studied, however, only two, relatively small, placebo-controlled trials have been evaluated thus far. Some adverse effects observed during the study included paresthesia, weight loss, altered taste, anorexia, and memory impairment. In the first trial, 30 patients who had migraine with or without aura were randomized to topiramate prophylaxis (n = 15) or placebo (n = 15). After 18 weeks of treatment, the mean 28day migraine frequency was reduced by 29% in patients receiving topiramate and by 7% in those receiving placebo. The second study lasted 20 weeks and included 40 patients who were randomly assigned to receive topiramate (n = 19), dose ranging from 25 to 200 mg/day, or placebo (n = 21). The mean 28-day migraine frequency was reduced by 36% in topiramate-treated patients as compared with 14% in placebo recipients. However, further evaluation in randomized, doubleblind, placebo-controlled trials with larger populations is needed to confirm these preliminary findings. ⁵ Despite the limited data available, topiramate is FDA approved for migraine prophylaxis in patients 12 years and older.

According to a Cochrane review comparing valproic acid and topiramate, mean headache frequency for topiramate and valproic acid is significantly lower than placebo. Similarly, a comparison between topiramate and divalproex demonstrated favorable results for the proportion of subjects randomized to an AED with results showing $\geq 50\%$ reduction of migraine attacks. For topiramate, 100 mg and 200 mg dosing out-performed the 50 mg dosing, but this came with a disadvantage of a higher adverse event rate. For the valproic acid and divalproex comparison, a dose-effect correlation could not be established. ³ Upon analysis and comparison of the three major antiepileptic agents, the Cochrane review came to the conclusion that valproic acid, topiramate, and divalproex are all effective prophylactic treatments for episodic migraines in adults.

Gabapentin, FDA approved for focal partial seizures in adults and pediatric patients 3 years and older, is another possible AED to be considered in migraine prophylaxis. In a recent 12-week prophylaxis trial of 143 patients with migraine, each randomized to receive either gabapentin (n = 98) or placebo (n = 45), the median four-week migraine rate was 2.7 for patients treated with gabapentin, maintained on a stable

dosage of 2400 mg/day, and 3.5 for those treated with placebo (P = 0.006), compared with a median four-week migraine rate of 4.2 and 4.1, respectively, during the baseline period. Additionally, the proportion of patients showing at least 50% reduction in the migraine rate was 46.4% with gabapentin and 16.1% with placebo (P = 0.008). Some of the commonly reported side effects in the gabapentin group included dizziness, somnolence, and asthenia (abnormal physical weakness or lack of energy). At the end of the study, the authors concluded that gabapentin was an effective and well-tolerated prophylactic agent for migraine but more evidence is needed to further support the use of gabapentin at this time. ⁵ Unlike topiramate, divalproex sodium, and valproic acid, gabapentin is not FDA approved for migraine prophylaxis and is not indicated for offlabel use.

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Upon analysis of the various AEDs used in migraine prophylaxis, whether new or traditional, evidence for their safety and efficacy, although promising, is still inadequate. There is still a need for a more extensive evaluation of the ongoing controlled studies with a larger number of patients and greater homogeneity of diagnosis in order to establish the efficacy of AEDs in management of clinical conditions other than epilepsy.⁵ In addition to analyzing the ongoing controlled studies, it is crucial to weigh the safety profile of each AED against its reported efficacy. Not only is the efficacy profile important when choosing an AED; additional characteristics such as tolerability, adverse events profile, comorbid conditions, concomitant drug interactions, and cost must be considered.² Although doubts and concerns still exist, at present valproic acid and topiramate are the two agents with the more promising evidence in migraine prophylaxis, with both agents having FDA approval for this indication.

References:

1. Burch, R., Buse, D. and Lipton, R., 2019. Migraine. Neurologic Clinics, 37(4), pp.631-649. Accessed 27 August, 2021

2. Calabresi, P., Galletti, F., Rossi, C., Sarchielli, P. and Cupini, L., 2021. Antiepileptic drugs in migraine: from clinical aspects to cellular mechanisms. ScienceDirect. Accessed 27 August, 2021

3. Mulleners, W., McCrory, D. and Linde, M., 2014. Antiepileptics in migraine prophylaxis: An updated Cochrane review. Cephalalgia, 35(1), pp.51-62. Accessed 27 August, 2021

Antiepileptics in Migraine Prophylaxis

By: Krishna Tamakuwala, PharmD candidate c/o 2023

References:

4. Ornoy, A., 2009. Valproic acid in pregnancy: How much are we endangering the embryo and fetus?. Reproductive Toxicology, 28(1), pp.1-10. Accessed August 29, 2021.

5. Spina, E., 2021. Antiepileptic drugs: indications other than epilepsy. https:// w w w . j l e . c o m / e n / r e v u e s / e p d / e - d o c s / antiepileptic_drugs_indications_other_than_epilepsy__263021/article.phtml?tab=texte. Accessed 27 August, 2021

6. Valproic Acid and Derivatives. Lexi-Drugs. Hudson, OH: Lexicomp, 2021. http://online.lexi.com/. Last Updated 08/11/2021. Accessed 27 August, 2021.

7. Centers for Disease Control and Prevention. Frequently Asked Questions About Epilepsy. https://www.cdc.gov/epilepsy/about/faq.htm. Accessed 26 August 2021.

8. Haut S, Bigal M, Lipton R. Chronic disorders with episodic manifestations: focus on epilepsy and migraine. The Lancet Neurology. 2006;5(2):148-157. doi:10.1016/s1474 -4422(06)70348-9. Accessed 27 August, 2021.

9. Peterlin B, Gupta S, Ward T, MacGregor A. Sex Matters: Evaluating Sex and Gender in Migraine and Headache Research. Headache: The Journal of Head and Face Pain. 2011;51(6):839-842. doi:10.1111/j.1526-4610.2011.01900.x. Accessed 27 August, 2021.

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CAR T-cell therapy for Multiple Myeloma

By: Lyana Sayilar, PharmD Candidate c/o 2022

Multiple myeloma is characterized by an accumulation of abnormal plasma cells in the bone marrow and the formation of tumors in bones. An insufficient quantity of healthy blood cells are produced in the bone marrow leading to a weakened immune system.¹ The exact cause of multiple myeloma is unknown, but abnormalities of chromosomes and oncogenes; genes which can transform a normal cell into a tumor cell under certain conditions, may play a role. Idecabtagene vicleucel (Abecma®) is the first Food and Drug Administration (FDA)approved chimeric antigen receptor (CAR) T-cell therapy for patients who have not responded to treatment or who experienced a relapse in multiple myeloma after four different treatment lines including an immunomodulatory agent, proteasome inhibitor, and an anti-CD38 monoclonal antibody.⁵ In order for patients to receive idecabtagene vicleucel, the benefits must outweigh the risks as outlined in the Risk Evaluation and Mitigation Strategy (REMS), a drug safety program who's purpose is to ensure benefits outweigh risks in high-risk medications. 1

Idecabtagene vicleucel is a B-cell maturation antigen (BCMA)-directed genetically modified CAR T-cell therapy.¹ BCMA is expressed at high levels on malignant plasma cells. Bcell activation factor (BAFF) and a proliferation-inducing ligand (APRIL) are present and circulate at higher levels in patients with multiple myeloma, so they may induce downstream signaling cascades in multiple myeloma cells. APRIL and BAFF bind to BCMA on malignant plasma cells and induce the proliferation of multiple myeloma cells via activation of NF-kappa B and MAPK/JNK signaling pathway. ^{2,3} In addition, serum BCMA is present in greater quantities in patients with multiple myeloma and can be used to monitor disease status in these patients. Therefore, targeting BCMA can be beneficial in treating multiple myeloma.² CAR T-cell therapy involves using a patient's native, genetically modified T-cells, which are able to detect and kill specific cells. After T-cell modification, the patient's T-cells are infused back into the patient.¹

Idecabtagene vicleucel is available as an IV suspension containing 460 million cells.⁷ Before administering idecabtagene vicleucel, thaw the infusion bag and administer within one hour of the start of thawing. If more than one IV bag is needed, complete the infusion of the first IV bag before thawing the second IV bag. Prior to its infusion, cyclophosphamide 300 mg/ m² IV and fludarabine 30 mg/m² IV should be administered for three days. Cyclophosphamide and fludarabine should be given to decrease the number of T cells to make room for the new CAR T-cells, a process referred to as lymphodepletion.⁸ After two days of completing the chemotherapy, idecabtagene vicleucel infusion can be initiated. Approximately 30 to 60 minutes before infusion, acetaminophen 650 mg orally and diphenhydramine (12.5 mg IV or 25 to 50 mg orally) or another H1-antihistamine can be given to minimize the risk of infusion reactions. Once infused, rinse the tubing with 30-60 mL of 0.9% NaCl at the same rate as the infusion rate.⁴

Idecabtagene vicleucel does come with some limitations. It should not be administered to patients with an active infection or inflammatory disorder because life-threatening infections have occurred after the infusion. Its multiple black-boxed warnings include cytokine release syndrome (CRS), hemophagocytic lymphohistiocytosis/macrophage activation syndrome (HLH/MAS) (which results in decreased blood cell counts and an inflammatory reaction that attacks organs, such as the spleen and liver), neurologic toxicity, and prolonged cytopenia. CRS and HLH are a result of the activation and proliferation of T-cells, resulting in high fever and flu-like symptoms. Prior to idecabtagene vicleucel administration, at least two doses of 8 mg/kg tocilizumab IV should be prepared in case a CRS reaction occurs, as stated in the package insert which can be found on the FDA website.⁵ The most common side effects include cytokine release syndrome, infections, a weakened immune system, fatigue, and musculoskeletal pain. Side effects may be observed within one to two weeks after treatment or later. ¹ Patients must be monitored at least daily for seven days. For four weeks following the infusion, patients should stay close to the healthcare facility in case side effects occur. For at least 8 weeks following the infusion, patients should be cautioned to avoid driving.⁵

In conclusion, CAR T-cell therapy has been shown to be a useful approach in achieving a therapeutic response in patients with multiple myeloma and is being studied in other conditions, such as Human Immunodeficiency Virus (HIV). ⁶ Pharmacists should become familiar with CAR T-cell therapy and recognize the impact it can have on patients with refractory cancer, such as those with multiple myeloma. Staying informed about the many advancements in medicine such as this will allow for more efficient care for our patients.

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CAR T-cell therapy for Multiple Myeloma

By: Lyana Sayilar, PharmD Candidate c/o 2022

References:

- U.S. Food and Drug Administration. 2021. FDA Approves First Cell-Based Gene Therapy for Adult Patients with Multiple Myeloma. https://www.fda.gov/newsevents/press-announcements/fda-approves-first-cell-based-gene-therapy-adultpatients-multiple-myeloma Accessed 1 October 2021.
- Tai, Y. and Anderson, K., 2015. Targeting B-cell maturation antigen in multiple myeloma. Immunotherapy, 7(11), pp.1187-1199. Accessed 1 October 2021
- Feng, D. and Sun, J., 2020. Overview of anti-BCMA CAR-T immunotherapy for multiple myeloma and relapsed/refractory multiple myeloma. Scandinavian Journal of Immunology, 92(2). Accessed 1 October 2021
- Medscape. 2021. Abecma (Idecabtagene vicleucel) dosing, indications, interactions, adverse effects, and more. https://reference.medscape.com/drug/ abecma-idecabtagene-vicleucel-4000133#11. Accessed 1 October 2021.
- U.S. Food and Drug Administration. 2021. ABECMA. https://www.fda.gov/ vaccines-blood-biologics/abecma-idecabtagene-vicleucel. Accessed 1 October 2021.
- Qi, J., Ding, C., Jiang, X. and Gao, Y., 2020. Advances in Developing CAR T-Cell Therapy for HIV Cure. Frontiers in Immunology, 11. Accessed 1 October 2021
- Idecabtagene Vicleucel. Lexi-Drugs. Hudson, OH: Lexicomp, 2021. http:// online.lexi.com/. Updated August 27, 2021. Accessed October 1, 2021.
- Hoparx.org. https://www.hoparx.org/images/hopa/resource-library/patienteducation/What-is_CAR-T-cell-therapy-CT-part1a.pdf. Accessed 9 October 2021.

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A New Approach with an Old Drug: Colchicine and Heart Disease

By: Mathew Fontanez, PharmD Candidate c/o 2022

What place does the familiar gout medication colchicine have in the fight against heart disease? Colchicine and its natural source, the autumn crocus plant, have been used to treat the "disease of kings", or gout, for well over 2000 years. As a result of hyperuricemia, gout often occurs in those with a diet high in purine-containing foods and drinks such as alcohol, organ meats, spinach, lentils, and oatmeal to name a few. ⁶ These purines are broken down by the body and produce high levels of uric acid.⁵ As this build-up increases, uric acid may concentrate in certain areas of the body, namely various joints, and uric acid crystal formation occurs. Colchicine alleviates this by downregulating several inflammatory pathways that are triggered in response to the crystals building up in and around the joint space.⁵ It is here that we find a great deal of promise in the age-old gout therapy as a new avenue for heart disease treatment.

Cardiologist Dr. Mark Nidorf from Genesis Care, Australia, one of the largest providers of cancer and cardiac care services in Australia, postulates that low dose colchicine has a means of preventing cardiovascular events in patients with coronary artery disease. In his study, 5522 patients with stable chronic coronary disease were pre-treated with colchicine 0.5 mg daily in a 30-day open-label run-in phase to ensure tolerance. The patients were followed for a median 30-month period. ¹ The standard regimen for acute gout flares is 1.2 mg orally on Day 1 and 0.6 mg once or twice daily on Day 2 until the flare resolves. Some experts continue for 2-3 days after the flare resolves.² As one might guess from the name, Dr. Nidorf's "LoDoCo" trials 1 and 2 utilized a low dose of colchicine at 0.5 mg once daily. The primary endpoint was a composite of cardiovascular death which included myocardial infarction, ischemic stroke, or ischemia-driven coronary revascularization. Colchicine's downregulation of various inflammatory pathways includes those that are known to contribute heavily to atherosclerosis. ³ The LoDoCo 2 trial provided credibility to the possibility of colchicine use as a means for secondary prevention for heart disease as the primary endpoint occurred in 187 (6.8%) patients in the colchicine group and 264 (9.6%) patients in the placebo group with a calculated hazard ratio of 0.69, a 95% confidence interval 0.57-0.83 and a p-value <0.001. This represents a statistically significant reduction in cardiovascular death, myocardial infarction, ischemic stroke, and ischemic

With over 90% of the initial test population being able to tolerate colchicine during the open-label phase, this initial screening speaks to this medication's potential as a viable option to a large number of those affected with heart disease. When considering the sample population used in the study, the variation in disease states strengthens the argument that the medication may have a wider use in clinical practice. That said, the clinics involved in the study were based in only two countries, with the Netherlands clinics (N = 3618) providing almost twice the number of patients as the Australian clinics (N = 1904), which may skew results when compared to practice across other countries. ⁴ Beyond a tolerance for the medication, key among the findings was the low incidence of adverse effects, with serious effects such as neutropenia occurring at comparable rates between the test group and control group. No issues were reported when administered with high dose statin therapy, a vital result to have as colchicine would be used in patients already on preventative therapies. Finally, most encouraging was the statistically significant primary endpoint revealing that composite death occurred less frequently in the colchicine group than the placebo group.⁴

This study and its findings do not immediately cement colchicine's place amongst other heart disease therapies. It does however provide more proof of its promise as a new option to be explored when considering how best to provide long-term preventative coronary disease care. It is these attempts at unconventional approaches to care that may open even more doors for utilizing previously marketed drugs for new indications.

A New Approach with an Old Drug: Colchicine and Heart Disease

By: Mathew Fontanez, PharmD Candidate c/o 2022

References:

- Antipolis S. Gout drug repurposed to fight heart disease. Escardio.org. https://www.escardio.org/The-ESC/Press-Office/Press-releases/Goutdrug-repurposed-to-fight-heart-disease. Published 08/31/2020. Accessed October 14, 2020.
- Colchicine. Lexi-Drugs. Hudson, OH: Lexi-Comp, Inc. Updated October 1, 2020. Accessed October 14, 2020.
- Leung YY, Yao Hui LL, Kraus VB. Colchicine--Update on mechanisms of action and therapeutic uses. Semin Arthritis Rheum.2015;45(3):341-50. doi: 10.1016/j.semarthrit.2015.06.013. Accessed October, 2020.
- Nidorf SM, Fiolet ATL, Eikelboom JW, et al. The effect of low-dose colchicine inpatients with stable coronary artery disease: The LoDoCo2 trial rationale, design, and baseline characteristics. Am Heart J.2019;218:46-56. doi: 10.1016/j.ahj.2019.09.011. Accessed October,2020
- Nuki, G., Simkin, P.A. A concise history of gout and hyperuricemia and their treatment. Arthritis Res Ther 8,S1 (2006). https://doi.org/10.1186/ ar1906. Accessed October, 2020.
- Zhang Y, Chen C, Choi H, et al. Purine-rich foods intake and recurrent gout attacks. Ann RheumDis. 2012;71(9):1448-1453.doi:10.1136/ annrheumdis-2011-201215. Accessed October,2020

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Potentially Life-Threatening Interactions Between Newer Smartphones and ICDs

By: Richa Tamakuwala, PharmD Candidate c/o 2022

pacemakers and permanent patient's characteristics. In this article, the topic of focus will be the to an in vivo study of 679 patients.⁴ potentially life-threatening interactions between ICDs and smartphones due to the latter's ubiquitous role in everyday life.

cause interference with these ICDs.

In the mid-1990s, several investigators conducted in vitro and in vivo tests, and reported several effects of EMI on CIEDs including temporary inhibition of output from oversensing emitted electrical signals from the cell phone, noise reversion or asynchronous pacing, and unwanted ventricular tracking from cellphone signals detected by the atrial lead.² The highest incidence of this interference was when the cellphone was placed

There has been a dramatic rise in the number of patients directly over the pacemaker itself, whereas the lowest incidence of with cardiovascular implantable electronic devices (CIEDs), such as interference came with use of the cellphone at the ear without any implantable cardioverter- clinically significant events. Early on, more EMI interference was defibrillators (ICDs), due to an increasing aging population and observed in cell phones with Global System for Mobiles (GSM) clinical trials showing benefits in mortality and morbidity. Multiple technology, because of its high-power usage and continuous pulsing studies investigating the use of ICDs concluded that the use of associated with digital signals. In response to GSM – which now these devices has been associated with decreased incidence of entails more than 80% of the mobile communications market – and deaths from arrythmias, thus prolonging life span.¹ Combatting the increased possibility of EMI interactions with cell phones, CIED these proposed benefits is the proliferation of technology that manufacturers have developed special filters to isolate cell phone emits electromagnetic signals, whose electromagnetic interference frequencies in the feedthroughs (which are conductors used to carry (EMI) potentially interferes with CIED function.² While most a signal through an enclosure or printed circuit board). Since this manufacturers attempt to create devices that are "EMI-proof", change was implemented, bipolar leads were used in pacing systems clinical consequences still occur. These consequences will differ programmed to nominal sensitivity values, reducing the prevalence depending on the type of interaction, type of device, and the of interactions between cellphones and ICDs to only 0.3%, according

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Another study analyzed various CIEDs, including 51 pacemakers, 5 cardiac resynchronization therapy pacemakers, 46 Implantable cardioverter-defibrillators are small, battery- implantable cardioverter-defibrillators, 43 cardiac resynchronization powered devices that are placed in the chest to detect and stop therapy defibrillators, and 3 implantable loop recorders, to abnormal heartbeats, or arrhythmias. An ICD continuously monitors determine a possible correlation of certain distances between the heartbeat and delivers electric shocks, when needed, to restore a smartphone (iPhone 6) and the smartwatch (Apple Watch A1553) normal heart rhythm. These devices are often used in patients and the CIED. The Apple products were placed in close proximity to who have ventricular tachycardia or fibrillation, which are the implanted devices, directly above for the phone, and at the conditions that result in a dangerously fast heartbeat, because this right for the watch. All possible activations of the iPhone and the prevents the heart from supplying sufficient blood to the rest of Apple Watch, including the standby, dialing, and connecting modes, the body. There are two basic types of ICDs: (1) a traditional were tested. The incidence and characteristics of interferences were ICD, which requires invasive surgery to implant the device in the also tested with interrogation telemetry.⁵ Interrogation telemetry is chest and attach the leads to the heart, and (2) a subcutaneous a more selective, automatic measurement and wireless transmission of ICD (s-ICD) which is implanted under the skin at the side of the data from remote sources. There was only one case of cell phonechest, below the armpit, and is attached to an electrode that runs induced electromagnetic interference observed. Utilization of along the breastbone.³ Because these devices work to regulate wanded telemetry - a method that utilizes low-frequency heart rate via transmission of electric signals to the heart, there is radiowaves and simple digital modulation techniques at relatively a possibility that devices that also use electric signals, such as slow rates for sequential data transmission - indicated 14% of mobile devices, security systems, medical equipment, etc., can patients experienced iPhone-induced magnetic interferences. There were no interferences observed with the Apple Watch. Based on these results, the overall risk of electromagnetic interferences of the iPhone 6 and the Apple Watch with CIEDs is low, but close proximity of the iPhone to implanted devices can cause telemetry interferences.5

Potentially Life-Threatening Interactions Between Newer Smartphones and ICDs

By: Richa Tamakuwala, PharmD Candidate c/o 2022

The most recent publication about implanted devices and **References** cell phones focused specifically on the newer generation iPhone 12, because it contains a circular array of magnets around a central charging coil that makes the phone compatible with MagSafe accessories. While these magnets make the phones more efficient at aligning with wireless chargers and peripheral accessories, and increasing wireless charging speeds, there were 2. some concerns regarding possible device-device interactions, due to the presence of a strong magnetic array in the iPhone and MagSafe compatible cases. To test these concerns, a study was conducted on a patient with a Medtronic Inc. ICD, and the results 3 were shocking. Once the iPhone was brought close to the ICD over the left chest area, immediate suspension of ICD therapies was noted and persisted for the duration of the test. This result was reproduced multiple times with different positions of the phone over the left chest pocket.⁶ In response to these results, the authors reported an important public health issue concerning the iPhone 12: it can potentially inhibit lifesaving therapy in a patient, particularly when the phone is carried in an upper chest pocket. Apple also updated its website to include warnings about avoiding any potential interactions with sensor-based medical devices, recommending a safe distance of more than 6 inches / 15 cm apart or more than 12 inches / 30 cm apart if wirelessly charging.⁷ Ultimately, Apple claims that despite the fact that the iPhone 12 model does contain more magnets than prior models, 7. the risk of magnetic interference to medical devices is not inherently greater than in previous iPhone models.

Despite the lack of overwhelming evidence contraindicating the use of newer cellphone models in patients with ICDs, physicians should recommend positioning the CIED contralateral to the ear and avoiding close physical proximity between the CIED and the cell phone, such as when keeping the phone in a breast pocket near the CIED.

- Smith T, Jordaens L, Theuns DA, van Dessel PF, Wilde AA, Hunink MG. The cost-effectiveness of primary prophylactic implantable defibrillator therapy in patients with ischaemic or non-ischaemic heart disease: A European analysis. European Heart Journal. 2012;34(3):211-219. doi:10.1093/eurheartj/ehs090. Accessed October 1, 2021.
- Misiri J, Kusumoto F, Goldschlager N. Electromagnetic interference and implanted cardiac devices: the nonmedical environment (part I). Clin Cardiol. 2012;35(5):276-280. doi:10.1002/clc.21998. Accessed August 1, 2021
- Implantable cardioverter-defibrillators (ICDs), https:// www.mayoclinic.org/tests-procedures/implantable-cardioverterdefibrillators/about/pac-20384692. Accessed October 1, 2021.
- Tandogan I, Temizhan A, Yetkin E, et al. The effects of mobile phones on pacemaker function. Int J Cardiol. 2005;103(1):51-58. doi:10.1016/j.ijcard.2004.08.031. Accessed October 1, 2021
- Lacour P, Parwani AS, Schuessler F, et al. Are Contemporary Smart-5. watches and Mobile Phones Safe for Patients with Cardiovascular Implantable Electronic Devices? JACC Clin Electrophysiol. 2020;6(9):1158 -1166. doi:10.1016/j.jacep.2020.04.033. Accessed October 1, 2021.
 - Greenberg JC et al. Life-saving therapy inhibition by phones containing magnets. Heart Rhythm 2021 Jan 4; [e-pub]. doi.org:10.1016/ j.hrthm.2020.12.032. Accessed October 1, 2021
- About the magnets inside iPhone 12, iPhone 12 mini, iPhone 12 Pro, iPhone 12 Pro Max, and MagSafe accessories, https:// support.apple.com/en-us/HT211900. Accessed October 1, 2021
- Burri H, Mondouagne Engkolo LP, Dayal N, et al. Low risk of electro-8. magnetic interference between smartphones and contemporary implantable cardioverter defibrillators. Europace. 2016;18(5):726-731. doi:10.1093/europace/euv374. Accessed October 1, 2021
- Link M. New Smart Phone Can Temporarily Inactivate ICDs. NEJM Journal Watch. https://www.jwatch.org/na53134/2021/01/29/newsmart-phone-can-temporarily-inactivate-icds. Published 01/29/2021.
- 10. Tzeis S, Asvestas D, Moraitis N, et al. Safety of smartwatches and their chargers in patients with cardiac implantable electronic devices. Europace. 2021;23(1):99-103. doi:10.1093/europace/ euaa220. Accessed October 1, 2021.

Dravet's Syndrome and a Novel Antiepileptic Drug: Cannabidiol (Epidiolex®)

By: Jason Ifeanyi, PharmD Candidate c/o 2022

by recurrent seizures, which are brief episodes of involuntary movement that may involve a part of the body (partial) or the entire part of the body (generalized) and are sometimes accompanied by loss of consciousness and control of bowel or bladder function."² When thinking of antiepileptic drugs (AEDs), we oftentimes think of valproic acid (Depakote®), phenytoin (Dilantin®), carbamazepine (Tegretol ®), topiramate (Topamax ®), and levetiracetam (Keppra®), to name a few. This is for good reason, as these are AEDs that have been around for many years and have shown efficacy in numerous seizure types. One AED that Cannabidiol is a novel AED used in the treatment of multiple seizure types, one of which is Dravet's syndrome, a rare form of drug-resistant epilepsy that affects a significant percentage of the United States (US) population. Currently, three medications have an Food and Drug Administration (FDA)-approved indication for DS, one of which is cannabidiol. As aspiring healthcare clinicians, it is our duty to optimize patient health-related outcomes. In order to achieve this goal in patients struggling with Dravet's syndrome, we must have a sound understanding of this disease state along with the medications used in their treatment.

epilepsy in infancy (PMEI) or severe myoclonic epilepsy in infancy (SMEI), is a rare form of drug-resistant epilepsy that affects an estimated 1 in 15,700 individuals in the US. DS oftentimes begins in the first year of life in an otherwise healthy infant.³ The first seizure experienced by patients with this syndrome will oftentimes be febrile and may be a tonic-clonic seizure or a seizure involving clonic movements on one side of the body.³ For reference, a tonicclonic seizure is a type of seizure also known as a convulsion, that involves both stiffening (tonic) and rhythmical jerking (clonic) of the muscles.⁴ There are other seizure types that may be seen in DS as well, such as myoclonic, atypical absence, tonic, focal aware or impaired awareness seizures (partial). Regardless of the type, seizures seen in DS are often long (more than 5 minutes) and can result in a life-threatening emergency seizure known as status

Epilepsy is a highly prevalent neurological disorder epilepticus.³ Status epilepticus is defined as having a seizure that caused by unusual nerve cell activity, and is among one of the lasts longer than 5 minutes, or having more than 1 seizure within a 5 most common disease states encountered today in clinical practice. minute period, without returning to a normal level of consciousness Each year around 150,000 Americans are diagnosed with between episodes.⁵ After the first febrile seizure, seizures can hapepilepsy.¹ Epilepsy is defined by the World Health Organization pen without a fever, but patients may be more sensitive to infections (WHO) as a "chronic noncommunicable disease...characterized and frequently have seizures when they are sick or have a fever. 3,6,7

Most cases of DS are due to severe mutations in the gene coding for the sodium voltage-gated channel alpha 1 subunit (SCN1A). In fact, 80% of patients with DS have an SCN1A mutation. This mutation causes problems with the way sodium ion channels in the brain work, which can affect the electrical activity in the brain and can ultimately lead to a seizure.8 Genetic testing is recommended for patients who display any of the following: two or more prolonged (more than 10 minutes) seizures by age 1, one prolonged seizure and a hemi-clonic seizure (seizure causing rhythmic jerking in one side of the body) by age 1, two seizures that affect alternating sides of the body, or a seizure onset before 18 months of age, followed by myoclonic seizures, absence seizures, or both type of seizures (myoclonic and absence). With that being said, not all SCN1A mutations are associated with DS, and some mutations are associated with other forms of epilepsy that are not as severe as DS.7 This means that genetic blood tests are not 100% conclusive, since they do not screen for all mutations that cause DS. Complicating matters even further, diagnosis depends on the child's history of seizures and other symptoms that emerge as seizures progress. The usual tests used to evaluate epilepsy such as magnetic resonance imaging (MRI) and electroencephalogram (EEG) can sometimes appear normal at Dravets syndrome (DS), also known as polymorphic first in babies with DS, which has many experts believing that some children are never correctly diagnosed.⁷

> Between the ages of 1-5 years old, many children begin to show signs of developmental delay as well as other health issues including poor coordination, ataxic (unsteady) gait, impaired speech development, frequent infections, slowed growth and poor weight gain, and behavioral issues like hyperactivity and irritability.⁷ While medications certainly play a role in the management of DS, as aspiring healthcare clinicians one should always be looking for nonpharmacologic approaches to optimize patient outcomes. One such approach involves counseling patients to avoid common seizure triggers including overheating (e.g., hot baths, strenuous exercise), sudden temperature changes in the environment whether hot or cold, fevers (can be treated with antipyretics), flashing lights and stress, to name a few.^{3,7}

Dravet's Syndrome and a Novel Antiepileptic Drug: Cannabidiol (Epidiolex®)

By: Jason Ifeanyi, PharmD Candidate c/o 2022

generate brain, which may interrupt a seizure or prevent a seizure from group.^{11,12} happening to begin with.⁷ Despite the clear utility of nonpharmacologic approaches, many patients will ultimately need to use AEDs to obtain maximum seizure control and live a healthier quality of life.

cannabinoid receptors.11

Efficacy of cannabidiol in the treatment of DS was established with one randomized, double-blind, placebocontrolled trial which studied 120 patients 2-18 years of age. The intervention (cohort of 61 patients) was cannabidiol at a dose of 20 mg/kg/day, and the comparator (cohort of 59 patients) was a placebo. Participation in the study included patients with a documented history of diagnosed DS that was not completely controlled by current AEDs, with or without VNS or a ketogenic diet. Participants took one or more AEDs at a dose that had been stable for at least 4 weeks. During a 4-week baseline period,

A popular form of nonpharmacologic treatment in patients who patients were required to have at least 4 convulsive seizures while are not obtaining adequate control of seizures despite the on stable AED therapy. The baseline period was followed by a 2appropriate use of AED's is a ketogenic diet, which is high in fat week titration and a 12-week maintenance period. The primary outand low in carbohydrates.^{9,10} Although the exact mechanism is come measured was the percentage change from baseline in the poorly understood, clinical experience with the ketogenic diet has frequency (per 28 days) of convulsive seizures (including atonic, shown that both the low sugar and high fat component uniquely tonic, clonic and tonic-clonic seizures). Baseline period median seizure alters the excitability of the brain, which reduces the tendency to frequency was 15 in the placebo group and 12 in the cannabidiol seizures.⁹ Another nonpharmacologic treatment group. Results from this study showed that the median percent reducapproach that may be employed is the use of vagal nerve tion from baseline in the frequency of convulsive seizures was signifistimulation (VNS). This form of treatment is usually considered cantly greater (p < 0.01) for cannabidiol 20 mg/kg/day (39%) when medications are not working. VNS involves implanting a compared to placebo (13%). Furthermore, 4 of the 60 patients small device in the patients neck, around the vagus nerve. The treated with cannabidiol reported no convulsive seizures during the device sends regular electric signals from the vagus nerve to the maintenance period, compared to 0 patients in the placebo

Cannabidiol is currently available as a 100mg/ml oral solution. Patients and careaivers will need to utilize either a calibrated 1ml or 5ml oral syringe provided by the manufacturer to withdraw and administer the correct dose from the bottle. The recommended Cannabidiol (Epidiolex®) is currently one of three novel starting dose in patients with DS is 2.5 mg/kg/day by mouth twice AED's with an FDA indication for treatment in DS, with the other daily which yields a total daily dose of 5 mg/kg/day. After 1 week, two being fenfluramine (Fintepla®) and stiripentol (Diacomit®). the dose can be further increased to a maintenance dose of 5 mg/ Cannabidiol, the active ingredient in Epidiolex, is a cannabinoid kg by mouth twice daily (10 mg/kg/day). Based on individual clinithat naturally occurs in the Cannabis sativa L. plant. Receiving FDA cal response and tolerability, cannabidiol can be increased to a approval on June 25th of 2018, FDA on-label indications include maximum recommended maintenance dose of 10mg/kg by mouth the treatment of seizures associated with Lennox-Gastaut twice daily (total daily dose 20 mg/kg/day). Patients with hepatic syndrome (LGS), tuberous sclerosis complex (TCS), and Dravets impairment should have their dosage adjusted accordingly based on syndrome (DS) in patients at least 1 year of age, with the latter recommendations which can be found in the Epidiolex product inforbeing the major focus of this discussion. At present, not much is mation.¹¹ The most common adverse effects are those that occurred known about the precise mechanism by which cannabidiol exerts in greater than 10% of patients on cannabidiol during trials and had its anticonvulsant effects in humans. Cannabidiol does not appear higher occurrence rates than in placebo. These include somnolence to exert its anticonvulsant effects through interaction with (feeling sleepy or drowsy)¹³, decreased appetite, diarrhea, transaminase elevations, rash, fatigue, malaise, asthenia (abnormal physical weakness or lack of energy)¹⁴, insomnia and infections.¹¹ Although cannabidiol poses significant health benefits for patients struggling with DS, there are precautions that need to be taken into consideration, one of which is hepatotoxicity. Dose-related elevations of liver transaminases have been reported, some resulting in hospitalization.¹¹ Transaminases include alanine transaminase (ALT) and aspartate aminotransferase (AST). These are both enzymes produced by the liver. Elevation in any of these enzymes could be a marker for potentially serious liver damage.¹⁵

Prior to initiating treatment with cannabidiol, clinicians should

Dravet's Syndrome and a novel antiepileptic drug: Cannabidiol (Epidiolex®)

By: Jason Ifeanyi, PharmD Candidate c/o 2022

valproic acid.¹¹ Besides obtaining labs, clinicians should also so we can better optimize patient health-related outcomes. counsel patients on the clinical signs of liver toxicity that should prompt medical referral. These clinical signs include unexplained nausea, vomiting, right upper quadrant abdominal pain, fatigue, anorexia, jaundice and/or dark urine. Other warnings for cannabidiol include the risk of somnolence and sedation, suicidal behavior and ideation, hypersensitivity reactions, and withdrawal of AEDs.¹¹ Patients should be advised to avoid driving or operating heavy machinery until they have gained sufficient experience with cannabidiol and can gauge whether their ability to safely drive or operate machinery will be adversely impaired or not. Patients initiated on cannabidiol should be monitored for the emergence of or worsening of depression, suicidal thoughts or behavior, or any other changes in mood or behavior that may be unusual. There have been reports of hypersensitivity reactions with cannabidiol including itching, redness and angioedema that required treatment with corticosteroids and antihistamines. Patients should be counseled on signs and symptoms of hypersensitivity reactions, and advised to seek medical attention immediately o should such a reaction occur. Use of cannabidiol is contraindicated in patients with a prior hypersensitivity reaction to cannabidiol or any of the ingredients in the product formulation, one of which 10. includes sesame seed oil. As with most AEDs, patients and clinicians alike should avoid abrupt discontinuation of cannabidiol, as this may result in an increased seizure frequency and risk for status epilepticus. 11

In conclusion, Dravets syndrome is a rare form of drugresistant epilepsy affecting a significant percentage of the US population. Patients with this syndrome will oftentimes need to be on multiple AEDs to control their seizures and obtain a better quality of life. Every attempt should be made to employ nonpharmacological approaches, such as avoiding common triggers for seizures, as well as the use of VNS and/or a ketogenic diet in patients who are not deriving adequate control from their current seizure medications. Currently 3 medications are FDA-approved for the treatment of patients struggling with DS,

obtain serum AST, ALT, and total bilirubin levels. These labs should with cannabidiol being FDA-approved for treatment in patients 1 also be obtained at 1 month, 3 months and 6 months when year of age and older. Caution must be exercised in patients with initiating treatment, and periodically thereafter as clinically hepatic impairment, and strict monitoring of liver function tests must indicated. Clinicians should obtain these labs within 1 month of be employed to prevent hepatotoxicity. As aspiring healthcare clinichanging the dose, or if there is an addition or change in cians, it is imperative that we stay well-informed on rarer disease medications that are also known to affect the liver, such as states such as DS, as well as medications used in their management

References

- 1. Epilepsy: Facts, Statistics, and You. Healthline. https://www.healthline.com/health/ epilepsy/facts-statistics-infographic. Published 2021. Accessed August 5, 2021
- Epilepsy. Who.int. https://www.who.int/news-room/fact-sheets/detail/epilepsy. Published June 20, 2019. Accessed August 5, 2021
- Types of Epilepsy Syndromes. Epilepsy Foundation. https://www.epilepsy.com/ learn/types-epilepsy-syndromes/dravet-syndrome. Accessed August 6, 2021.
- Types of Seizures. Epilepsy Foundation. https://www.epilepsy.com/learn/typesseizures/tonic-clonic-seizures. Accessed August 1, 2021.
- Status Epilepticus. Hopkinsmedicine.org. https://www.hopkinsmedicine.org/health/ conditions-and-diseases/status-epilepticus. Accessed August 2, 2021.
- What is Dravet Syndrome?. Dravet Syndrome Foundation. https:// www.dravetfoundation.org/what-is-dravet-syndrome/. Accessed August 1, 2021.
- 7. Dravet Syndrome. ucsfbenioffchildrens.org. https://www.ucsfbenioffchildrens.org/ conditions/dravet-syndrome. Accessed August 1, 2021.
 - SCN1A gene: MedlinePlus Genetics. Medlineplus.gov. https://medlineplus.gov/ genetics/gene/scn1a/#conditions. Accessed August 1, 2021.
 - Ketogenic Diet For Epilepsy / Seizures. Cleveland Clinic. https:// my.clevelandclinic.org/health/treatments/7156-ketogenic-diet-keto-diet-forepilepsy. Accessed August 1, 2021.
 - Epilepsy Society. https://epilepsysociety.org.uk/about-epilepsy/treatment/ ketogenic-diet. Accessed August 2, 2021.
- 11. EPIDIOLEX® (cannabidiol). EPIDIOLEX.com. https://www.epidiolex.com/. Accessed August 9, 2021.
- 12. Antiepileptic Efficacy Study of GWP42003-P in Children and Young Adults With Dravet Syndrome (GWPCARE1) - Full Text View - ClinicalTrials.gov. Clinicaltrials.gov. https://clinicaltrials.gov/ct2/show/NCT02091375. Accessed August 1, 2021.
- 13. Medical Definition of Somnolence. Rxlist.com. https://www.rxlist.com/somnolence/ definition.htm. Accessed August 1, 2021.
- 14. Medical Definition of Asthenia. Rxlist.com. https://www.rxlist.com/asthenia/ definition.htm. Accessed August 1, 2021.
- 15. Overview of ALT and AST Liver Enzymes. Verywell Health. https:// www.verywellhealth.com/liver-enzymes-1759916. Accessed August 1, 2021.

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RHO CHI POST: TEAM MEMBERS



@ Jason Ifeanyi6th Year, STJ; Editor-In-Chief

Last year I had the pleasure of serving as Social Media Manager and Staff Editor for the Rho Chi Post. It was amazing to see the growth we had as an organization, and the many students, faculty, and pharmacists we were able to connect our content with. I aim to continue and expand upon this growth as the new Editor-In-Chief this academic year. I look forward to working alongside this group of talented and driven students to effectively deliver newsletter publications that keep readers up to date on advancements made within the field of pharmacy.



@ Katharine Russo, PharmD

Graduate Copy Editor [Content-Focused]

The Rho Chi Post as been a forum for students, faculty, and staff to advance their knowledge in the field of pharmacy since 2011. The platform allows for students to practice their written communication skills while offering an innovative and creative workspace to bring together various aspects of the pharmacy profession. My involvement with the RCP during my years of study greatly impacted my education and I look forward to continuing my contributions as I start my career as a clinical pharmacist

@ Lexie Villariasa

6th Year, STJ; Copy Editor [Graphics-Focused] With the world of pharmacy changing day by day, it can be challenging to keep up with all the updates. The Rho Chi Post provides an excellent platform for students to share their insights and thoughts on the happenings within the field. I'm excited to join the Rho Chi Post and a team that is passionate about the profession. With a passion in graphic design, I hope to continue the vision the newsletter has and am grateful for the opportunity to do so!



@ Nancy Yousry

5th Year, STJ; Finance & Outreach Manager

Beyond grateful and excited to embark on carrying Rho Chi's Mission of providing an invaluable literature medium to the Student Community in an empowering and influential way. In these ever changing times, it is crucial now more than ever to take on the invaluable active role of listening, learning and understanding the change of dynamics within our communities and what that means towards the future of Healthcare and the Pharmaceutical Field in its constant interdisciplinary evolvement. As Finance and Outreach Manager of the Rho Chi Post, I aim to ensure inclusivity in sharing diverse perspectives and raise awareness of just how capable we are as future Pharmacists in being able to innovate revolutionary solutions while advocating for our Pasions, Profession and the sustainable wellbeing of our Patients.



@ Anna Diyamandoglu, PharmD Graduate Copy Editor [Content-Focused]

Throughout my time in the PharmD program, my understanding of pharmacy as a profession has evolved and deepened as much as my desire to create awareness, particularly to non-science students, about the diverse role pharmacy plays in various healthcare and non-healthcare settings. I have always had an affinity for writing and look forward to combining my interests in literary composition, editing and pharmacy to produce relevant issues which both pharmacy students and non-pharmacy students alike will find relatable and take an interest in.



@ Daniela Farzadfar, PharmD Graduate Staff Writer

Pharmacy is a constantly evolving profession. Writing for the Rho Chi Post gives me the opportunity to enlighten my peers and myself on changes occurring in the field that we are often not taught in the classroom. The Rho Chi Post serves as a creative outlet where students can express their opinions and share new information by combining their passion for writing and the pharmacy profession. I hope that my contribution to this newsletter inspires others to improve patient outcomes by staying up to date on recent changes.



@Mandy Zheng

4th Year, STJ; Copy Editor [Graphics-Focused]

I am excited to be a part of Rho Chi Post, a place for pharmacy students to share insights, opinions, and new discoveries. As future pharmacists, the issues that exist in the US healthcare system will have to be addressed and improved by us. Rho Chi Post informs students on all aspects of pharmacy and serves as an example and inspiration for others. Pharmacy is an ever-changing and dynamic field, and there are vast career opportunities and pathways for pharmacy students. I look forward to working, listening, and learning from my fellow students and future colleagues; and I hope to serve as a guidance to others as others have done for me.

@ Aiša Mrkulić

6th year, STJ; Social Media Manager & Staff Writer

"I am excited to have the honor of serving on the 2021-2022 Executive Board as Social Media Manager, eager to showcase the award-winning work of our editorial team, staff and contributing writers alike. Since joining the Rho Chi Post as a Staff Writer, I have been a frequent contributor to the newsletter—sought out by prospective staff writers interested in using cowriting as a springboard for their own involvement with the Post. If this tells us anything, it's that the potential for expansion over the coming year is promising! Those interested in applying for the Staff Writer position always have the option to collaborate with our published authors. Certainly, all are free to contribute independently at any point; however, those who may be hesitant to do so might benefit more from a firsthand account of newsletter writing, with the added bonus of guidance from one of our own—a polished writer familiar with the process.

ST. JOHN'S UNIVERSITY College of Pharmacy and Health Sciences

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RHO CHI POST: TEAM MEMBERS

@ Ashley Dao

4th Year, STJ; Website Liaison

The Rho Chi Post offers a place for students, alumni, and faculty to collaborate and share their experiences. Each bringing their own perspectives and opinions. I am very excited to be part of the Rho Chi Post team. As someone who has always had a love for writing, I am grateful for the voice that the Rho Chi Post has given me. I have also had the opportunity to learn from the articles published by my peers. I hope that I can encourage more students to contribute to the Rho Chi Post. After all, without conversations, there can be no change



@Rubab Hassan

6th Year, STJ; Staff Writer

The Rho Chi Post gives pharmacy students the opportunity to explore their interests, whether it be editing, writing, or graphics, while also enhancing their skills and knowledge as student pharmacists. I am excited to be a part of the Rho Chi Post because it is a great way to expand on what I have learned during my time in pharmacy school and also keep developing my writing skills. Being a writer gives me an outlet to raise awareness on the advancements that are constantly happening in the field of pharmacy and allows me to be part of an amazing team in hopes of providing other students with our best work.



@ Mah Noor Graduate, STJ; Staff Writer

Rho Chi Post is an amazing student-operated newsletter publication that is doing an astonishing job delivering updated news as well as giving students the opportunity to give back to the pharmacy community. As a staff writer, I hope to play a key role in educating students on the different aspects of pharmacy and how much growth takes place in this field. Reading the Post since freshman year has helped me gain a better understanding of what it means to be a pharmacist and I hope to achieve that same understanding in students who read my articles.



@ Bisma Sekhery, PharmD Graduate STJ: Staff Writer

There are two things I am passionate about one which is pharmacy and the second which is writing. The Rho Chi Post is a professional newsletter, which allows students to educate as well as learn more about the field of pharmacy as it evolves. I am beyond excited to contribute to this newsletter and provide my fellow classmates and peers interesting news about pharmacy. I have always enjoyed reading The Rho Chi Post articles throughout pharmacy school. The articles were interesting and educational. This allows me to make an important contribution to society and spread awareness not only of new drugs and advancements in the field, but current issues in the pharmacy world. Having a voice is very important and writing for this newsletter allows me to have one.



@ Zarnab Jillani 6th Year; STJ; Staff Writer

The Rho Chi Post is a great platform for students to not only apply what they have been learning in school, but to break norms and report on pharmacy related events that are not always addressed in an academic setting. I look forward to writing for the Rho Chi Post because it will give me a way to delve deeper into what I'm studying at the moment and give me a chance to share that with my peers. Moreover, with the constantly changing world of pharmacy it is important to stay up to date and present the information in a creative way.



@ Tiffany Dominic

6th Year, STJ; Staff Writer

My name is Tiffany Dominic and I am currently a sixth year pharmacy student. After being a dedicated reader of Rho Chi Post for years, I wanted to give back and be a part of this amazing community of writers and editors who work tirelessly to publish quality pieces of knowledge, news, and opinions. Being part of Rho Chi Post allows me to shed light on issues that aren't touched upon in our didactic courses and helps me connect students to real-world applications and approaches in pharmacy. I am beyond grateful that Rho Chi Post has given me the opportunity to continue my love for writing while also promoting patient advocacy and public health. I look forward towards writing about current events and essential healthcare issues while being part of this incredible team!



@ Holly Nguyen

4th Year, STJ; Staff Editor

I am actively involved with the IPhO and St. John's Wellness Peer Educators. Through the Rho Chi Post, I look forward to helping review and share the latest pharmaceutical news.

@ Richa Tamakuwala

6th Year, STJ; Staff Editor

Growing up, reading was always my favorite hobby. The way the authors were able to create such vivid images, the way they could make you feel what the characters were feeling, the way they captured their readers' attention so tightly that nothing else mattered in the moment all motivated me to start writing. Since starting pharmacy school, my writing has unfortunately been placed on hold, but after learning about Rho Chi Post, I'm excited to start writing again. Writing for Rho Chi Post will allow me, along with many other students, to do something I enjoy

while updating fellow future pharmacists on the ever-changing field of pharmacy.

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RHO CHI POST: TEAM MEMBERS



@ Jeremy Mesias 6th Year, STJ; Staff Editor

The field of pharmacy is constantly growing and improving with every coming day. Today's headlines become tomorrow's history. As healthcare leaders in a dynamic field, it is important to stay up to date. The Rho Chi Post serves as an excellent tool to help students become more informed about our profession, as well as providing them with the opportunity to contribute their own two cents to the conversation. I am excited to join the team and look forward to contributing to keeping students on top of



@ Anjali Rana

3rd Year, STJ; Staff Writer

My desire to learn about medicine and its effect on the human body began with a nebulizer. I had asthma as a young girl. At the age of ten, the vaporous gases from the pump never ceased to amaze me. My sickness, although unfortunate, fueled my interest in the functions, limitations, and exploitations of drugs. I have always had a passion for advocating for change and believe the Rho Chi Post adds great value to the community. As the world grows and develops each individual has an opportunity to express their thoughts on its development. Having the chance to become a Staff Writer provides me an opportunity to learn information about my peers to better assess the nature of their situation. When people begin discussing concepts at a younger age, they are able to influence people of their generation to care more about their own health. Combining concepts learned from pharmacy school with the mission to help those in need will create a stronger foundation for future healthcare professionals.



@Erica Tonti

6th Year, STJ; Staff Writer

The profession of pharmacy is constantly evolving and adapting to the ever-changing field of healthcare. The Rho Chi Post serves as an amazing outlet for students to be informed, as well as to inform others, on the most up to date and relevant information. I could not be more excited to join the Rho Chi Post. This opportunity allows myself and my peers to take initiative and raise awareness of the advancements in the field of pharmacy. As a staff writer, I look forward to contributing to the Rho Chi Post and am grateful for the opportunity to educate students on the growth within our profession.



@ Arya Firoozan 5th Year, STJ; Staff Writer

Joining the Rho Chi Post is an opportunity to remain updated with new advancements in the science of pharmacy. The Post provides students with a platform to present the rest of the student body with interesting articles regarding new medications and imporant changes in the field. Keeping up with new developments and innovations is key to becoming a capable pharmacist. I am quite excited to join a team that is a voice of research and knowledge and look forward to contributing in a way that will benefit the pharmacy community.



@ Tolulope Omisakin 6th Year, STJ; Staff Editor

As an avid reader, I have always taken an interest in how things were written. Whether it be novels, journal articles, or magazine columns, there is always a peculiar way in which a writer tells a story. The real story is only 50% of what is written and the rest is in how the writer decides to disseminate that information. The Rho Chi Post serves as an amazing outlet for student pharmacists, allowing us to delve into the intricacies of different perspectives and ideas in the world of pharmacy. It also gives us the opportunity to decide how we want to detail these new found perspectives and ideas to our audience. As an incoming editor for The Rho Chi Post, I hope to enhance and curate the way each writer tells their stories and help them reach their audience at new levels.



Graduate, STJ; Staff Writer

As future drug experts, we student pharmacists have a responsibility to take initiative and educate ourselves on advancements in healthcare, so as to improve the quality of patient care. The Rho Chi Post serves as a great platform for students to get information that is both accessible and accurate. To be a voice for my future, fellow pharmacists is to be heard and my patients cared for---as pharmacists are their best, sometimes their only, advocates. I hope that my contributions to the RCP spark readers' curiosity, and inspire conversations of how we may become better pharmacists.

@ Lyana Sayilar 6th Year, STJ; Staff Writer

I am thankful for the opportunity Rho Chi Post provides by engaging students, pharmacists, and faculty to learn from each other and spark new ideas, thoughts, and interests. The pharmacy profession is an ongoing and lifelong learning path and Rho Chi Post emphasizes and mirrors the importance of learning to provide pharmacists at our current jobs and patients in the future with recent information to improve patient care and outcomes. With the help of Rho Chi Post we can practice analyzing the literature that we read to improve our decision-making skills and communicate our findings with other members of the healthcare team.

@ Dana Weinstein 6th Year, STJ; Staff Writer

I am so excited to be a part of the Rho Chi Post team. This opportunity allows both myself and my peers to be well informed about the ever-changing profession of pharmacy and the vital developments in science and healthcare. Beyond the classroom setting, this newsletter fills in the gaps for the most up-to-date and current advancements for students and faculty. As a staff writer, I look forward to acting as an educator, a motivator, and an executor to further the mission and goals of the Rho Chi Post.



ST. JOHN'S UNIVERSITY College of Pharmacy and Health Sciences





RHO CHI POST: TEAM MEMBERS



@ Nishanth Viswanath 6th Year, STJ; Staff Writer

The profession of pharmacy is continuously expanding to meet new demands and offer novel platforms for innovation in healthcare. With an abundance of new information and guidance being published everyday, it can become difficult for students and professionals to stay updated with relevant information and find new outlets to learn. The Rho Chi Post not only allows us to be informed about the current state of our profession, but also allows students to voice their opinions and connect with each other through literature. I am excited to be part of its team, and hope to provide meaningful and resourceful contributions.



@ Edwin Gruda 6th Year, STJ; Staff Writer

My name is Edwin and I am a Doctor of Pharmacy student at St. John's University. My favorite aspect of pharmacy school is learning about the clinical and therapeutic components of drugs and diseases. As a kid, I was interested in both the math and sciences. The reason I chose pharmacy over other health care professions is because a lot of people rely on their medications to make them feel better. Pharmacists are the most accessible healthcare providers and are able to help patients optimize their drug therapy in order to improve their health. Throughout the beginning of pharmacy school, I volunteered at Columbia University Medical Center on the oncology department for one year. After that, I have been working as a pharmacy intern at Sandcastle Pharmacy, which is primarily an HIV specialty pharmacy. As a staff writer, I want to highlight the critical role of clinical pharmacists within an interdisciplinary team, in improving and enPage 22 VOLUME 10, ISSUE 6

BACK TO COVER

MISSION

The Rho Chi Post is an award-winning, 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

To provide the highest quality student-operated newsletter with accurate information

To maintain a healthy, respectful, challenging, and rewarding environment for student editors

To cultivate sound relationships with other organizations and individuals who are like-minded and involved in like pursuits

To have a strong, positive impact on fellow students, faculty, and administrators

To contribute ideas and innovations to the Pharmacy profession

St. JOHN'S UNIVERSITY College of Pharmacy and Health Sciences