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QUOTE OF THE MONTH

By: Matthew Kahn, Graphics Editor



White coat ceremony: a rite of passage

By: Katharine Russo, PharmD Candidate c/o 2021

A traditional rite of passage, the 18th Annual Pharmacy White Coat Ceremony on October 21st, 2017 marked a student's progression into the rigorous academic and professional years of pharmacy school at St John's University College of Pharmacy and Health Sciences. As Senior Associate Dean for Pharmacy Dr. Joseph Brocavich, Pharm.D. relayed to students, "The white coat serves as a link to all who practice the healing arts and serve and care for their patients." It is a sign of all the effort and hard work they've put into their education since freshman year and the continuing effort they will need to put forth to be shaped into extraordinary pharmacists. To people on the outside it might seem trivial, but to those students who received it, it means so much more.



Third Year Pharmacy Students

Front: Marissa Bowdler, Alexandra Maglaras Back: Aiša Mrkulić, Katharine Russo, Carolyn Webber, Adriana Hudson, James Gorman

The white coat is a symbol of the role they will play as one of the nation's most trusted healthcare professionals and the tremendous responsibility they will have for their patients.¹ Upon receiving the coats, students recited together as a class the Oath of Commitment, an oath taken to remind them all of what they have left to do, both inside and outside of the classroom. Keynote speaker Dr. Victoria Roche, Special Assistant to the Dean at Creighton University School of Pharmacy and Health Sciences, reminded students of the lasting commitment the jackets represent, "It is a public testimonial to your lifelong commitment to the tenets of professionalism. Tenets that must become a core component of who you are as a human being both inside and outside of any practice setting."

Within the next four years at St. John's University, pharmacy students will engage respectfully with faculty who will challenge them academically to gain the knowledge, skills, and attitudes of a competent pharmacist. In addition, students will strive to be their best selves and the best pharmacists in order to fully engage with patients, pharmacists, and other healthcare professionals in the field.

SOURCES:

1. National Association of Chain Drug Stores. Pharmacists rank second again among Gallup's most trusted professionals. <https://www.nacds.org/news/pharmacists-rank-second-again-among-gallups-most-trusted-professionals/>. Published 12/21/2016. Accessed 11/03/2017.

The future of pharmacy at our fingertips

By: Gabrielle Flavoni, PharmD Candidate c/o 2018

Pharmacists have always been deemed one of the most accessible health care providers in the community, especially to those who cannot often travel long distances. Over the years, many retail pharmacies began offering delivery services for prescription medications, specifically for the elderly and disabled. However, delivery services are not always openly available for everyone and the services are sometimes limited. CaryRx, on the other hand, streamlines this pharmaceutical service to best fit the needs of every individual consumer.

CaryRx is a new and innovative company based out of Washington DC that is completely re-inventing the pharmacy world. The new company recently partnered with Postmates to act as a same-day delivery service to patients in the District area. Unlike many existing pharmacies, CaryRx is primarily technology-based. With the help of a phone application, patients and providers are able to streamline their pharmacy needs in the palm of their hand. Providers can send electronic prescriptions to CaryRx, who then provides same-day delivery. Similarly, if a patient has a paper prescription, they can snap a photo of the prescription and upload it to the app, also qualifying for the same-day service. Patients have the ability to upload their insurance information and payment methods onto the application as well, thereby

allowing for clear communication of copays. There is also a built-in delivery tracker available for every order, with a map showing the route taken for delivery.

One of the first questions you may have is: how much does this cost? CaryRx prides itself in providing its service at no additional cost to the consumer, and no delivery fees added. Pharmacists are available 24/7 to answer any questions or address any concerns both over the phone as well as via the app. CaryRx also has a store that patients can visit and fill prescriptions in-person, if they wish. They have contracted McKesson to serve as the primary wholesaler.

The one drawback that CaryRx currently faces is that it does not dispense any opioid medications. According to the founder, Areo Nazari, the logistics involved are too difficult to implement. However, all other controlled medications are eligible to be filled and dispensed with same-day delivery. Although this new era of pharmacy has a long way to go in terms of development, it already proves itself as the next big step in the pharmacy world.

SOURCES:

1. "Pharmacy Delivered." CaryRx, 2017, caryrx.com.

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FDA approves tisagenlecleucel (Kymriah TM): first gene therapy available in the United States

By: Anna Diyamandoglu, PharmD Candidate c/o 2020

The specificity of individuals' genetic makeup has been one of the primary obstacles facing healthcare professionals in their attempt to treat cancer patients. Cancer is at the forefront of disease states which have proved difficult to understand and treat due to each patient's unique genetic makeup and how the same type of cancer can develop differently in different patients. Individualized treatment of certain cancers, such as leukemia, using gene therapy – insertion of genes into an individual's cells and tissues to treat a disease – has long been considered as a potential way to overcome the obstacle of genetic specificity in patients.¹

This past August 2017, the FDA approved the first gene therapy tisagenlecleucel (Kymriah TM). Manufactured by Novartis, tisagenlecleucel is the first approved CAR-T cell therapy for patients up to 25 years old with second or later relapse or refractory B-cell Acute Lymphoblastic Leukemia (ALL).² ALL is a cancer in which the bone marrow produces too many immature lymphocytes; it is the most common childhood cancer in the United States and progresses very quickly.³ Traditional treatment involves chemotherapy, radiation, and if necessary, a bone marrow transplant from a related or unrelated donor.

Tisagenlecleucel is customized to match each patient's own T-cells. T-cells are removed from the patient's bloodstream, frozen, and sent to Novartis' manufacturing center where they are genetically modified to in-

clude a new gene that contains a specific chimeric antigen receptor (CAR).⁴ These receptors allow the patient's T-cells to target and destroy leukemia cells that contain the surface antigen CD19. Once the modification has been made, the cells are frozen and shipped back to the institution where the patient is treated for administration. The FDA is requiring that all institutions that prescribe and dispense tisagenlecleucel be specially certified.⁵

Throughout its experimental and clinical trial phases of development, tisagenlecleucel showed great potential in terms of the prognoses of pediatric ALL patients. The first patient to be administered this treatment, Emily Whitehead, was six years old and near death when her physicians at the Children's Hospital in Philadelphia decided to try the therapy as a last resort in 2012. She is now 11 and has been cancer free for five years.⁴ Additionally, in a clinical trial involving multiple health care institutions which included 63 pediatric ALL patients, the overall remission rate within three months of treatment was 83% - an astoundingly successful rate.⁵

While the approval of tisagenlecleucel has the potential to help many young leukemia patients, it has several side effects: hypotension, high risk of infection, hypoxia, acute kidney injury, and a black boxed warning for cytokine release syndrome (CRS) which causes fever and flu-like symptoms that can be life threatening if left untreated.⁵

With the approval of tisagenlecleucel, the option for gene therapy treatment has gone from being simply an idea to an implementable option for patients. Regarding the ground-breaking approval, FDA Commissioner Scott Gottlieb, M.D, stated, “We’re entering a new frontier in medical innovation with the ability to reprogram a patient’s own cells to attack a deadly cancer.”⁵ Indeed, approval of tisagenlecleucel (KymriahTM) is a leap forward for cancer research and opens a door to the limitless potential gene therapy has in making historically incurable diseases now curable.

SOURCES:

1. Tontonoz, Matthew. “Model Ts: FDA Approves First CAR T Cells for Cancer.” Memorial Sloan Kettering, Memorial Sloan Kettering Cancer Center, 30 Aug. 2017.
2. “KYMRIAHTM (Tisagenlecleucel).” KYMRIAH[®] (Tisagenlecleucel) | NOW FDA APPROVED, Novartis Pharmaceuticals, 30 Aug. 2017.
3. “Childhood Acute Lymphoblastic Leukemia Treatment.” National Cancer Institute, National Cancer Institute, 17 Aug. 2017.
4. Grady, Denise. “F.D.A. Approves First Gene-Altering Leukemia Treatment, Costing \$475,000.” The New York Times, The New York Times, 30 Aug. 2017.
5. “Press Announcements - FDA Approval Brings First Gene Therapy to the United States.” U S Food and Drug Administration Home Page, Office of the Commissioner, 30 Aug. 2017.

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Safety and efficacy of a new drug: sofosbuvir/velpatasvir/voxilaprevir (Vosevi®)

By: Shireen Farzadeh, PharmD Candidate c/o 2019

Sofosbuvir/velpatasvir/voxilaprevir (Vosevi®) is the first pangenotypic fixed-dose combination tablet that includes 400 mg of sofosbuvir, a Hepatitis C virus (HCV) nucleotide analog, 100 mg of velpatasvir, an HCV NS5A inhibitor, and 100 mg of voxilaprevir, an HCV NS3/4A protease inhibitors.^{1,2} In the interest of brevity, sofosbuvir/velpatasvir/voxilaprevir will be referred to by its brand name throughout the article. Vosevi® is indicated to treat adults with chronic HCV genotype 1, 2, 3, 4, 5, or 6 infection with or without cirrhosis (compensated), who were treated with an NS5A inhibitor-containing therapy, but were not cured.³ Cure meaning the HCV is not detected in the blood when its measured three months after treatment is completed.³ Unfortunately, Vosevi® is not a treatment option for patients with severe renal impairment and end stage renal disease or moderate to severe liver disease, due to the presence of sofosbuvir and voxilaprevir.²

POLARIS-1 is a phase 3 placebo-controlled trial, in which Vosevi® was administered to patients with chronic HCV genotype 1-6, who were previously treated with a regimen containing a NS5A inhibitor. Patients with genotype 1 infection who were previously treated with an NS5A-containing regimen, were randomized in a 1:1 ratio to receive either the active drug (150 patients) or a matching placebo (150 patients) once daily for 12 weeks. Patients with HCV infections of other genotypes were all enrolled into the active group (114 patients). POLARIS-1 showed sustained virologic response (SVR) of 96% with the experimental drugs, versus 0% with placebo. POLARIS-4 is a phase 3, active-comparator, open-

labeled trial, in which 314 patients with HCV genotype 1-3 who were previously treated without a NS5A inhibitor were randomized in a 1:1 ratio to be administered with either the experimental drug (163 patients) or sofosbuvir/velpatasvir (151 patients) for 12 weeks. Nineteen additional patients with HCV genotype 4 were also assigned to the experimental drugs. In POLARIS-4 an SVR of 98% was observed in the experimental group compared to 90% with sofosbuvir/velpatasvir. POLARIS-1 and POLARIS-4 data concluded that 12 weeks of Vosevi® showed high efficacy and SVR in patients of all HCV genotypes and whose direct antiviral treatment (DAA) previously failed.⁴

POLARIS-2 and POLARIS-3 are phase 3 open-labeled trials. In POLARIS-2, HCV patients of genotypes 1-4 and naïve to DAA with or without cirrhosis were randomized to groups given either 8 weeks of Vosevi® or 12 weeks of sofosbuvir/velpatasvir. Patients with HCV of genotypes 5-6 were assigned to the experimental group. POLARIS-2 showed SVR in 95% of patients with experimental drugs, but did not establish noninferiority. Hence, the 8-week treatment was not worse than the SVR of 98% in patients with 12 weeks of sofosbuvir/velpatasvir. In POLARIS-3, HCV patients of genotype 3 and naïve to DAA with compensated cirrhosis were randomly assigned to either 8 weeks of experimental drug or 12 weeks of sofosbuvir/velpatasvir. POLARIS-3 had an SVR of 96% in both treatments groups. POLARIS-2 and POLARIS-3 concluded that although 8 weeks of Vosevi® was not established to be noninferior to 12 weeks of sofosbuvir/velpatasvir, both treatment groups had a high SVR in

HCV genotype 3 and compensated cirrhosis.⁵

Clinical trials have shown efficacy of Vosevi®, but as with any other medication, it is imperative that pharmacists counsel patients on side effects, monitoring parameters, and drug interactions. POLARIS-1 and POLARIS-4 demonstrated common side effects such as headache, fatigue, diarrhea, nausea, asthenia, and insomnia. Less common side effects (<5%) include, rash and depression. Patients' lipase, creatine kinase, and bilirubin should be monitored, as Vosevi® may cause an increase their levels. Since the medication was released on the market, serious side effects observed include, hepatitis B reactivation in patients co-infected with HCV and HBV and symptomatic bradycardia when taken with amiodarone. It is imperative to counsel patients that therapeutic concentrations of Vosevi® may be affected if it is coadministered with p-glycoprotein inducers, CYP enzyme inducers, or rifampin, and that the medication may affect concentrations of P-gp, BCRP, OATP1B1, and OATP1B3 substrates. Whether or not Vosevi® poses a risk to geriatric, pediatric, or pregnant populations is unknown.¹ Pharmacists should urge patients to speak to a gastroenterologist to determine if the regimen is an appropriate treatment option.³

Overall, Vosevi® is a well-tolerated medication. Advantages of the medication over some of the other HCV regimens include its once-a-day administration, 12-week duration treatment, and cost of \$74,760 for a 12-week supply, which is less than that of sofosbuvir (Solvadi®) and ledipasvir/sofosbuvir (Harvoni®).¹ The HCV guidance of the American Association for the Study of Liver Diseases and the Infectious Diseases Society of America states that options are very limited for patients who have failed on NS5A inhibitors. For genotype 1, for example, deferred treatment or increased treatment

duration of 24 weeks with weight-based ribavirin are the only options. Hence, Vosevi® is likely to provide value in treating adults with HCV genotypes 1, 2, 3, 4, 5, or 6 previously treated with an HCV regimen and failed on an NS5A inhibitor or HCV genotypes 1a or 3 previously treated with an HCV regimen containing sofosbuvir without an NS5A inhibitor. Currently, the HCV guidance has not updated to add Vosevi® as a recommended regimen, but it will likely be indicated in the near future.⁶

SOURCES:

1. University of Washington. Sofosbuvir/Velpatasvir/Voxilaprevir (Vosevi®). Hepatitis C Online. <https://www.hepatitisc.uw.edu/page/treatment/drugs/sofosbuvir-velpatasvir-voxilaprevir/drug-summary>. Accessed November 17, 2017.
2. Vosevi® (sofosbuvir/velpatasvir/voxilaprevir) [package insert]. Foster City, CA; Gilead Sciences, Inc.; Revised 07/18/2017.
3. Gilead Sciences, Inc. EVERY ONE MATTERS. VOSEVI® (sofosbuvir 400 mg/velpatasvir 100 mg/voxilaprevir 100 mg) tablets. <http://www.vosevi.com/>. Accessed November 17, 2017.
4. Bourlière M, Gordon SC, Flamm SL, et al. Sofosbuvir, Velpatasvir, and Voxilaprevir for Previously Treated HCV Infection. *N Engl J Med*. 2017;376(22):2134-2146. Doi: 10.1056/NEJMoa1613512.
5. Jacobson IM, Lawitz E, Gane EJ, et al. Efficacy of 8 Weeks of Sofosbuvir, Velpatasvir, and Voxilaprevir in Patients With Chronic HCV Infection: 2 Phase 3 Randomized Trials. *Gastroenterology*. 2017;153(1):113-122. doi: 10.1053/j.gastro.2017.03.047. Epub 2017 Apr 5.
6. AASLD/IDSA/IAS–USA. Recommendations for testing, managing, and treating hepatitis C. <http://www.hcvguidelines.org>. Accessed November 17, 2017.

The opioid epidemic: a national crisis

By: Katharine Russo, PharmD Candidate c/o 2021

The DEA announced in August 2017 that 2018 would bring strict manufacturing reductions to commonly prescribed schedule II opioid painkillers. As the opioid epidemic continues to take countless lives, the government, including President Donald Trump are cracking down on regulations. Under this directive, there will be a 20 percent decrease in the manufacturing of controlled substances as compared to 2017 for the following medications: oxycodone, hydrocodone, oxymorphone, hydro-morphone, morphine, codeine, meperidine, and fentanyl.

Each year, the epidemic plaguing our nation continues to worsen. Every 24 hours, 91 lives are lost to an accidental opioid overdose.¹ In 2015, 52,404² deaths were attributed to lethal drug overdoses stemming from addiction.² Of those 52,404 deaths, 33,091 overdose deaths were related to schedule II narcotics.² In 2015 alone, New York State witnessed a 135.7 percent increase in synthetic opioid death rates vs 2014.² The FDA states that since 1999, the number of opioid related overdoses resulting in death, including those by heroin, has quadrupled.¹ However, the number of opioid related deaths involving prescription opioids has more than quadrupled.¹ With the urgent need to curb this epidemic, various public health and governmental responses have been put into place. Such public health responses include the more accessible lifesaving antidote, naloxone, and an increase in State Prescription Drug Monitoring Programs.

Naloxone (Narcan®) is a highly effective emergency medicine for opioid overdoses. Due to the escalating

epidemic, it is suggested that family members, friends of opioid users, and all healthcare professionals be trained to administer this life-saving medication. Administering this drug to patients experiencing an overdose, or those assumed of having an overdose, reverses the effects of the opioid. Naloxone attaches to the same receptors in the brain that bind opioids and blocks the effects of opioids for 30 to 90 minutes to reverse the respiratory depression that ultimately leads to death. Naloxone will only work against opioids such as heroin and opioid painkillers, but it will not hurt the patient if any of these opioids are not involved but an overdose is still suspected.³

Another initiative to help curb the opioid epidemic is the implementation of Prescription Drug Monitoring Programs (PDMP). PDMPs are tools utilized by the government for reducing prescription drug abuse and diversion of medication to the streets. This program is utilized by collecting, monitoring, and analyzing electronically transmitted prescribing and dispensing data submitted by pharmacies and approved dispensing physicians. The purpose is to monitor the distribution of controlled substances to safeguard the public while supporting the legitimate use of controlled substances for medical conditions. There are currently 49 states, the District of Columbia, and Guam that have PDMPs. New York State collects information for Schedule II-V whereas some states that only collect for Schedules II-IV.⁴

Within the past few weeks, President Donald Trump has called this crisis a national emergency. In an official

White House statement, the President has authorized his administration to use any and all appropriate emergency measures to respond to the opioid crisis.⁵ The Drug Enforcement Administration, a government entity, has proposed to reduce the amount of manufactured Schedule II drugs in 2018 to help regulate the amount of Schedule II narcotics available in the system. This is being done by limiting the quantities of the basic ingredients needed to meet the countries' legitimate research, medical, scientific, industrial, and export needs of these products.⁶

Pharmacists will play a big role in helping to decrease the number of opioid abuse related deaths. The Virginia State Board of Pharmacy has required all active pharmacists in their state to complete one hour of continuing education courses based on opioid abuse prevention.⁷ Making healthcare professionals more aware of the situation is the first step to ending this issue. As part of the profession, pharmacists play a big role in the management and counseling of pain medications. Encouraging patients, family and friends of users, or patients' caretakers to carry naloxone is also being encouraged by the Board of Pharmacy. Pharmacists have the capability of controlling this crisis by informing patients of the dangers of opioid use, instructing them on handling suspected overdoses, and advocating for safe medication storage and disposal as to not fall into the wrong hands.⁸

SOURCES:

1. Understanding the epidemic. Centers for Disease Control and Prevention. <https://www.cdc.gov/drugoverdose/epidemic/index.html>. Published 08/30/2017. Accessed 09/12/2017.
2. New data show continuing opioid epidemic in the United States. Centers for Disease Control and Prevention. <https://www.cdc.gov/media/releases/2016/p1216-continuing-opioid-epidemic.html>. Published 12/16/2016. Accessed 09/06/2017.
3. Why use naloxone? Naloxoneinfo.org. <http://naloxoneinfo.org/get-started/about-naloxone>. Published 09/01/2013. Accessed 09/12/2017.
4. Prescription drug monitoring frequently asked questions (FAQ). Prescription Drug Monitoring Program Training and Technical Assistance Center. <http://www.pdmpassist.org/content/prescription-drug-monitoring-frequently-asked-questions-faq>. Accessed 09/12/2017.
5. Achenbach J, Wagner J, Bernstein L. Trump says opioid crisis is national emergency, pledges more money and attention. The Washington Post. https://www.washingtonpost.com/politics/trump-declares-opioid-crisis-is-a-national-emergency-pledges-more-money-and-attention/2017/08/10/5aaaae32-7dfe-11e7-83c7-5bd5460f0d7e_story.html?utm_term=.c5cfa3f93a86. Published 08/11/2017. Accessed 09/06/2017.
6. DEA proposes reduction to amount of controlled substances to be manufactured in 2018. United States Drug Enforcement Administration. <https://www.dea.gov/divisions/hq/2017/hq080417.shtml>. Published 08/04/2017. Accessed 09/06/2017.
7. Barlas S. Pharmacists step up efforts to combat opioid abuse: the CDC and Congress are trying to pitch in. *P T*. 2015;40(6):369-401.
8. Reynolds V, Causey H, McKee J, et al. The role of pharmacists in the opioid epidemic: an examination of pharmacist-focused initiatives across the United States and North Carolina. *N C Med J*. 2017;78(3):202-205.

The role of evolocumab (Repatha[®]) in the treatment of patients with cardiovascular disease

By: Katie Lee, PharmD Candidate c/o 2019

In 2015, FDA approved evolocumab (Repatha[®]), a human monoclonal antibody of the PCSK9 (proprotein convertase subtilisin kexin type 9) inhibitor class.¹ Evolocumab is used to treat adult patients with heterozygous familial hypercholesterolemia (HeFH) or clinical atherosclerotic cardiovascular disease who need further lowering of their LDL-C levels, while being on maximum tolerated statin therapy.¹ Evolocumab is also further approved for adult patients with homozygous familial hypercholesterolemia (HoHF), who are not controlled on other LDL-lowering therapies, such as Ezetimibe (Zetia[®]). PCSK9 is a protein that binds to LDL receptors and is responsible for its degradation². Since evolocumab is a PCSK9 inhibitor, it blocks the effects of PCSK9 and prevents the degradation of LDL receptors¹. This allows for an increase in the availability of LDL receptors to bind to circulating cholesterol, reducing the amount of free cholesterol in the blood.

The route of administration of evolocumab is injection administered subcutaneously; however, there are different dosage directions depending on whether the patient has HeFH and clinical atherosclerotic disease or HoFH¹. Up to July 2016, the recommended direction was to administer a dose of 420mg and give three injections consecutively within thirty minutes. The new direction is to administer a dose of 420mg over nine minutes using a

single-use-on-body infusor with a prefilled cartridge, or by giving three injections consecutively within thirty minutes using the single-use prefilled autoinjector or single-use prefilled syringe.¹

The common adverse effects of evolocumab include nasopharyngitis, upper respiratory tract infection, influenza, back pain, and injection site reactions that result in redness and itching at where the injection was administered¹. If the patient develops signs of an allergic reaction, such as rash and hives, the patient should discontinue the medication and seek medical help immediately¹.

Although evolocumab is effective at reducing of LDL-C levels in the blood, its effects on reducing morbidity and mortality are still in question¹. Unlike statins, there is no proven benefit with evolocumab in preventing cardiovascular events such as strokes or heart attacks². Evolocumab still needs to be monitored for its efficacy in patients and their quality of life.

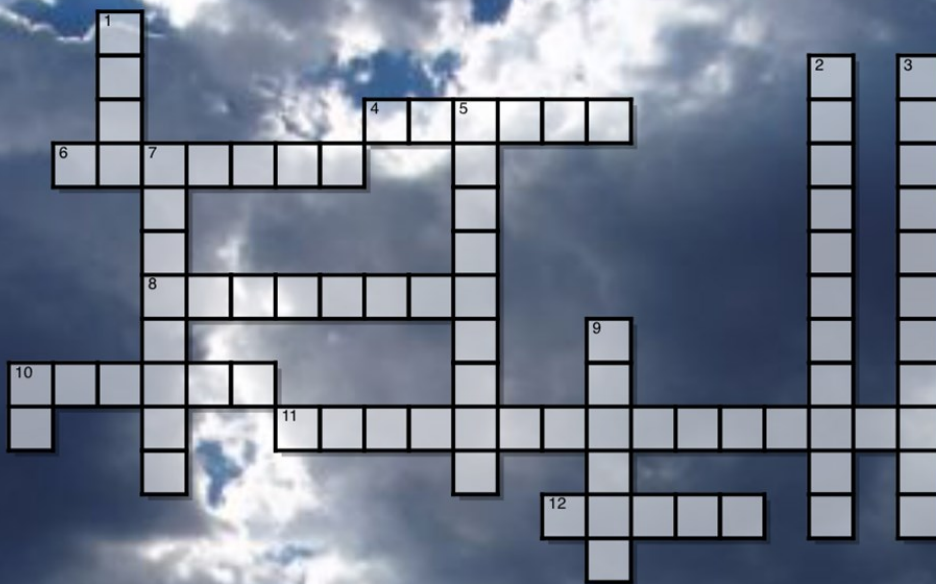
SOURCES:

1. REPATHA (EVOLOCUMAB) [package insert]. Thousand Oaks, CA; Amgen Inc.; Revised 07/2016.
2. Pahon E. FDA approves Repatha to treat certain patients with high cholesterol. FDA. <https://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm460082.htm>. Published 08/27/2015.

Puzzle: Pharmaceutical Companies Crossword

By Matthew Kahn, Graphics Editor

Pharmaceutical Companies



ACROSS

- 4 After being purchased by Martin Shkreli, was involved in the infamous 'Daraprim Price Hike'
- 6 Subsidiary of Johnson & Johnson; Founded by the man who discovered Haloperidol
- 8 Formerly Actavis; Produces a wide ranges of drugs including many glaucoma treatments, as well as Bystolic, Botox, and Viibryd
- 10 Produces IV bags and premixed drugs among other products; This company's factories in Puerto Rico were decimated by the recent hurricane, causing widespread shortages of its products
- 11 Britain-based producer of Flovent, Advair, and Augmentin, as well as the controversial drug Avandia
- 12 Originally founded in Germany 350 years ago, its US subsidiary was nationalized by the U.S. government in 1917, after which it became its own independant company, while keeping the original name

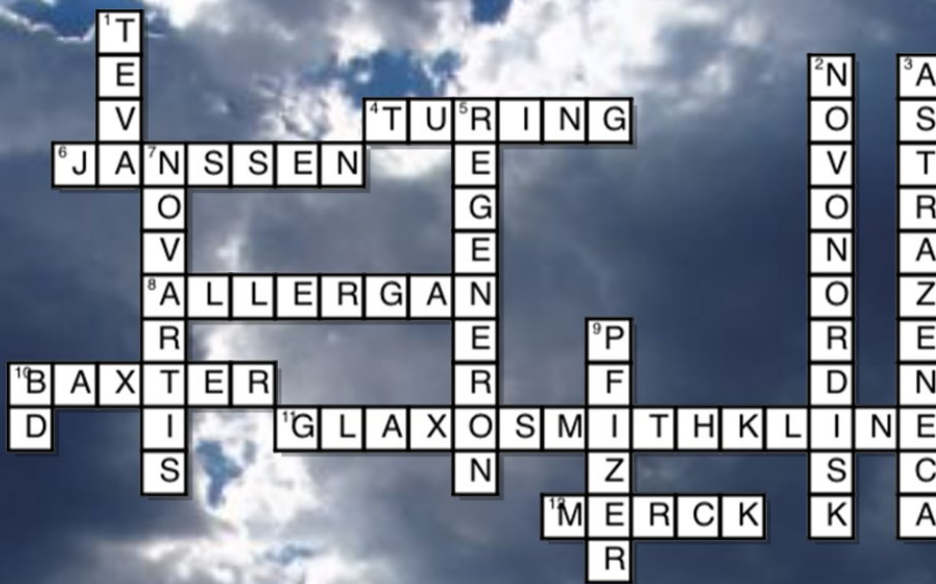
DOWN

- 1 Headquartered in Israel; World's largest generic drug manufacturer
- 2 Has a strong focus on diabetes medications, including Victoza, Tresiba, Levemir, and NovoLog
- 3 Has a portfolio of products in the disease states of cancer, cardiovascular, gastrointestinal, infection, neuroscience, respiratory and inflammation; one of its best-selling drugs was Crestor
- 5 Founded in Tarrytown, New York; produces only five drugs: aflibercept, rilonacept, dupilumab, sarilumab, and alirocumab
- 7 Headquartered in Switzerland; Produces many drugs, including Gleevec, Voltaren, and Ritalin
- 9 Headquartered in New York City; produces Lipitor, Lyrica, and Viagra
- 10 One of the largest producers of needles, syringes, and related diabetes supplies

Puzzle: Pharmaceutical Companies Crossword

Answers

Pharmaceutical Companies



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- 2 Has a strong focus on diabetes medications, including Victoza, Tresiba, Levemir, and NovoLog
- 3 Has a portfolio of products in the disease states of cancer, cardiovascular, gastrointestinal, infection, neuroscience, respiratory and inflammation; one of its best-selling drugs was Crestor
- 5 Founded in Tarrytown, New York; produces only five drugs: aflibercept, rilonacept, dupilumab, sarilumab, and alirocumab
- 7 Headquartered in Switzerland; Produces many drugs, including Gleevec, Voltaren, and Ritalin
- 9 Headquartered in New York City; produces Lipitor, Lyrica, and Viagra
- 10 One of the largest producers of needles, syringes, and related diabetes supplies

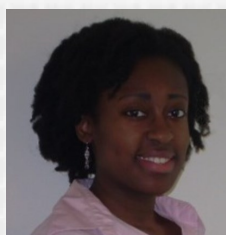
RHO CHI POST: TEAM MEMBERS



@ Karen Lin

6th Year, STJ; Editor-in-Chief

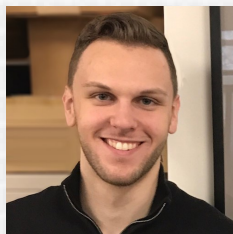
The Rho Chi Post allows me to have an appreciation for interactive pharmacy learning as well as the art of writing. With each newsletter, my goal is to provide current information to readers who come across the Post. As an editor, I hope to make the newsletter one-of-a-kind and motivate and influence writers to explore science with their creative talents.



@ Davidta Brown, PharmD

Graduate Copy Editor [Content-Focused]

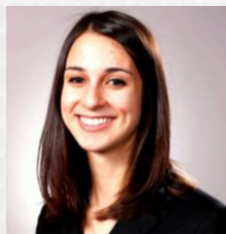
My two great loves are innovative science and quality writing; the Rho Chi Post is an insightful combination of both. As an editor, I look forward to bringing relevant information and fresh perspectives to the student and faculty of St. John's University, as well as to making the Rho Chi Post a newsletter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



@ Matthew Kahn

5th Year, STJ; Graphics Editor

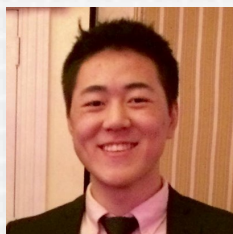
I've always loved graphic design, so I was thrilled at the opportunity to be a part of the Rho Chi Post team and contribute to future publications. I'm excited to explore new ways to make the Post even better, and also to be continuously exposed to new ideas in the pharmaceutical field.



@ Nicollette Pacheco, PharmD

Graduate Editor [Graphics-Focused]

As a member of the Rho Chi Post team, I have a vast appreciation of what it means to be a pharmacist in the rapidly evolving world of healthcare. As a graduate editor, I will continue to bring my passion for science and creativity to the Rho Chi Post.



@ Jack (Hongkai) Bao

6th Year, STJ; Copy Editor

In my 3rd year of pharmacy school, I was introduced to the Rho Chi Post, an award-winning newsletter run by students. My involvement began by simply reading monthly articles, but as time passed, my passion for writing grew. Coupled with my interest in pharmacy, I made the initiative to apply for a position. Now, as a team member, I believe that the Post is a great way for students and faculty to stay up to date concerning pharmacy news.



@ Bharat Kirthivasan, PhD

Graduate Copy Editor [Content-Focused]

I received my doctorate 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.

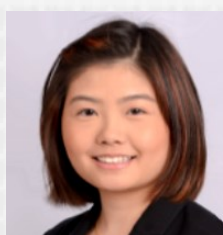
RHO CHI POST: TEAM MEMBERS



@ Sang Hyo Kim

6th Year, STJ; Section Editor: Puzzles

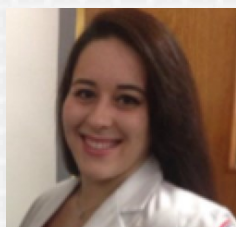
Advances in technology and medicine, as well as improved quality of life, have prolonged lifespans and increased the geriatric population. Pharmaceutical industries and healthcare systems persistently work to find solutions to changing demands and new problems of the society. I wish to learn, educate, and prepare myself and others for the future.



@ Mei Fung

6th Year, STJ; Staff Editor & RCP Website Liaison

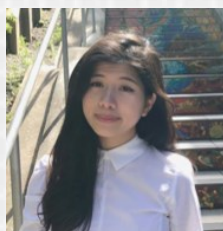
It's always interesting to see how the healthcare field evolves and all the advancements in pharmacy come to fruition. I joined the Rho Chi Post because it brings together a variety of these topics with distinguishing perspectives from our peers in pharmacy practice. I am ecstatic to join the team in continuing Rho Chi Post's endeavors in promoting the profession.



@ Gabrielle Flavoni

6th Year, STJ; Staff Editor

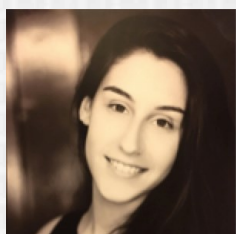
Writing has always been an enormous passion of mine, and I'm blessed to join such an amazing team that encourages me to explore it. As a new Staff Writer for the Post, my goal is to aid others in staying up-to-date about the pharmacy world, while also utilizing a creative outlet to make an impact on those around me.



@ Anna Chen

4th Year, STJ; Staff Writer

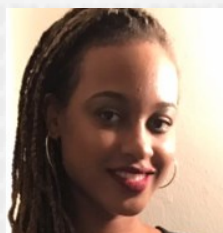
The Rho Chi Post is a fantastic opportunity for future health professionals to keep up with the vastly changing healthcare world. As the pharmaceutical landscape keeps changing, it is crucial that we join the conversation in voicing our opinions and clinical input into current healthcare debates. Healthcare is limitless in possibilities to better patient centered care and I aim to deliver content that is both invigorating and inspiring to both students and practicing professionals.



@ Anna Diyamandoglu

4th Year, STJ; Staff Editor

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 am looking forward to combining my interests in literary composition and pharmacy to write relevant pieces for Rho Chi Post which both pharmacy students and non-pharmacy students alike will find relatable and take an interest in.

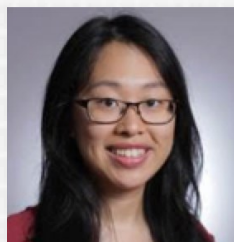


@ Thanesha Graham

5th Year, STJ; Staff Writer

As a writer for the Rho Chi Post, I have the unique opportunity to convey my knowledge, discoveries and interests to the general public. I will be able to enlighten individuals about issues that will not only impact them, but also their families, and communities. I look forward to supplying this newsletter with valuable and relevant information about the evolving field of pharmacy.

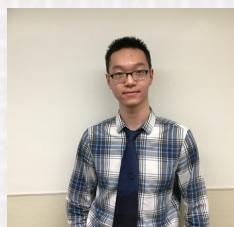
RHO CHI POST: TEAM MEMBERS



@ Vicky Liu

6th Year, STJ; Staff Writer

As a Staff Writer, researching and writing articles about current medicine gives me the opportunity to explore and understand more about pharmacy. I hope that my readers will also feel the same excitement as I do when I learn new things about medicine.



@ Alex Chu

5th Year, STJ; Staff Writer

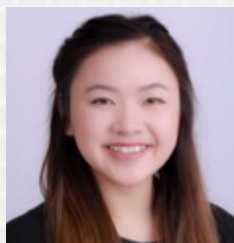
With a constantly evolving healthcare field, it is imperative that we keep ourselves up to date with the latest news. This is what led me to join the Rho Chi Post, which constantly comes out with interesting and informative topics. It is an honor to write for the Rho Chi Post, and I wish to contribute innovative and intriguing articles to this newsletter.



@ Katharine Russo

3rd Year, STJ; Staff Writer

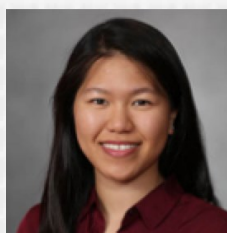
In my first two years as a pharmacy student, I was exposed to numerous opportunities to write medical based articles for classes and clubs. This is what first sparked my interest in health care literature and I look forward to being a Staff Writer for the Rho Chi Post in hopes of being able to share my passion and enthusiasm in writing health-care related publications.



@ Amy Nguyen

4th Year, STJ; Events and Social Media Manager

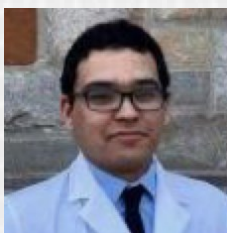
Because the pharmaceutical industries and healthcare systems are constantly changing and evolving, it's important to stay up to date on such topics. The student-run Rho Chi Post brings such relevant issues with a creative twist to the table. As the Events and Social Media Manager, I hope to create more outreach events geared towards showcasing the importance and benefits of the Post to students, alumni, and faculty of St. John's University and from other campuses.



@ Angela (Yan Yi) Chan

6th Year, STJ; Staff Writer

Being part of the Rho Chi Post would help me build experience with writing and reading research articles that would be helpful in my future to stay updated in the innovative world of health. I look forward to being a part of such a great team.



@ Jonathan Mercado

5th Year, STJ; Staff Writer

The Rho Chi Post breaks barriers for students that want a glimpse of their future and acts as an inspiration to work harder to achieve their goals. It is an embodiment of the motivation and intelligence that drives pharmacy students to be the most informed and capable professionals they can be. I am glad to a part of that mission and to channel my passion and interests through this newsletter.



@ Nicole Cheung

6th Year, STJ; Finance and Outreach Manager

As the Finance and Outreach Manager for the Rho Chi Post, I will act as the primary liaison and collaborate with the Graphics Editor to present information promoting our newsletter to other Rho Chi chapters. Using my experience of applying for NIH and Novo Nordisk Grants, I will assist with writing up proposal budgets as well as maintain accurate financial records. I am proud of our student-operated newsletter publication, and look forward to expanding our organization and network to create more educational workshops and further promote the pharmacy profession.

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