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RHO Px CHI post

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An award-winning, monthly, electronic, student-operated newsletter publication by the St. John's University College of Pharmacy and Health Sciences Rho Chi Beta Delta chapter

THE RHO CHI SOCIETY

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

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

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

RHO Rx CHI post

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RHO CHI POST: TEAM MEMBERS

@ Davidta Brown

5th Year, STJ; Editor-in-Chief

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.

@ Katharine Cimmino, PharmD

Graduate Copy Editor [Content-Focused]

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

@ Bharat Kirthivasan, PhD

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.

@ Tasnima Nabi

6th Year, STJ; Copy Editor [Content-Focused]

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

@ Tamara Yunusova

5th Year, STJ; Copy Editor [Content-Focused]

I enjoy articulating information in a captivating and insightful way. I hope to make this publication more informative, student-friendly, and innovative.

@ Fatema Elias

6th Year, STJ; Copy Editor [Content-Focused]

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

@ Sang Hyo Kim

4th Year, STJ; Section Editor: Puzzles

Advancing technology and medicine, as well as prolonging the lifespan and improving quality of life, have 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.

@ Svetlana Akbasheva

6th Year, STJ; Section Editor: Clinical

I am very excited and honored to be part of the Rho Chi Post! In a profession that is constantly evolving with new developments, it is so important to remain informed and current. The Rho Chi Post helps do just that, and I look forward to contributing to this unique publication.

@ Nicollette Pacheco

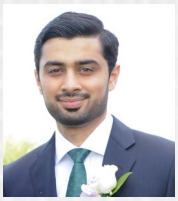
5th Year, STJ; Staff Editor [Graphics-Focused]

As a new member of the Rho Chi Post team, I have a vast appreciation of what it means to be a future pharmacist in the rapidly evolving world of healthcare. I am looking forward to being on the team as a graphics-focused staff editor, and I hope to bring my passion for science and creativity to the Rho Chi Post.

@ Andrew Leong

6th Year, STJ; Staff Writer

Students have to do more than what is required of us in classes to truly learn about our profession. That's why I joined the Rho Chi Post. This publication represents a channel by which our team members, faculty, and readership can share information - something I believe is important in this ever-changing pharmacy world.



@ Fawad Piracha

6th Year, STJ; Finance and Outreach Manager

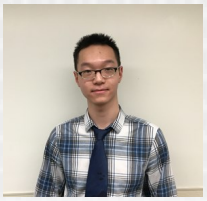
I am delighted to join the editorial team. I have the firm intention of broadening readership and facilitating growth of the Rho Chi Post.

@ Joshua Bliss

6th Year, STJ; Social Media Manager

By providing student-organized, reliable healthcare information, the Rho Chi Post helps us all in fulfilling our education both in and out of the classroom. Education is the tool we use to set paths for our futures, and every chance to expand our education is a chance at building a better future. I am honored to be a part of the Rho Chi Post & look forward to the future!

RHO CHI POST: TEAM MEMBERS



@ Alex Chu

3rd 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.

@ Jack (Hongkai) Bao

4th Year, STJ; Staff 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.

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

If you are interested in becoming a Rho Chi Post editorial team member, visit:

rhochistj.org/RhoChiPost/Application

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By: Tasnima Nabi, Co-Copy Editor [Content-focused]

Dear Readers,

When I received Volume 1, Issue 1 of the Rho Chi Post in my inbox during my sophomore year, I knew that I wanted to contribute in every way possible. The Rho Chi Post has been the best experience throughout my education at St. John's University.

I would like to take this opportunity to thank our faculty advisor, Dr. S. William Zito. His enthusiasm and dedication to the newsletter since day one has always inspired each editor to be innovative, which has led us to accomplish many milestones. His genuine care and continued support is what makes the Rho Chi Post an even greater success.

I would like to thank Dr. Mohammad Rattu, one of the founders of the Rho Chi Post, and our website administrator. Dr. Rattu is always working closely with us on making sure the website is running smoothly 24/7, and his unfaltering commitment to the team has ensured that the Rho Chi Post succeeds on a national level.

I thank our faculty editors and the St. John's University College of Pharmacy and Health Sciences administration for their continued support and encouragement. I thank our authors, who range from students at pharmacy programs across the nation, to pharmacy residents at prestigious programs, and to renowned practicing pharmacists. It is your willingness to contribute to the growing minds in pharmacy that allows the Rho Chi Post to be relatable and resourceful.

I would like to thank the editorial team for being some of the brightest and passionate students I have had the opportunity of working with. Our outreach has grown exponentially, and it is collaborative hard work that allows us to publish high-quality content on a monthly basis.

Last, and certainly not least, I would like to thank you, our readers. It is the pursuit of knowledge, and an appreciation for your peers and profession that has paved the path for the Rho Chi Post. Thank you for supporting us, for reaching out to us, and for being engaged. I hope you will continue to read, become involved, and spread the word!

Yours truly,

Tasnima Nabi
Co-Copy Editor [Content-focused]

Appropriate Use of Antiepileptic Drugs for Prophylaxis in the Neurosurgical Care Unit

By: Anthony Vecchione, PharmD Candidate c/o 2016

Seizures are a well-described complication of acute brain injury and neurosurgery. Antiepileptic drugs (AEDs) are frequently utilized for seizure prophylaxis in neurocritical care patients, but this practice is controversial because of the possible adverse effects of these drugs (which can affect patient outcomes). Practitioners have prescribed AEDs for seizure prophylaxis in a variety of disease states, including intracerebral tumors, traumatic brain injury (TBI), aneurysmal subarachnoid hemorrhage (SAH), intracerebral hemorrhage (ICH), ischemic stroke, and for patients undergoing craniotomy.[1] The incidence of seizures and the type of AEDs used in these disease states varies greatly with the extent of neurologic injury, lesion location, and interventions performed. There has been growing interest in newer AEDs for seizure prophylaxis in the intensive care setting because of safety and monitoring issues associated with conventional AEDs (e.g. phenytoin).[1] The purpose of this article is to review the primary literature and current guidelines, in order to outline the appropriate use of AEDs for seizure prophylaxis in the neurosurgical care setting.

Current treatment guidelines and literature do not support the use of routine seizure prophylaxis in patients with primary brain tumors or metastatic lesions. The use of AEDs is complicated in these patients because of the potential for significant drug interactions with commonly administered chemotherapeutic agents (e.g. erlotinib, gefitinib, irinotecan, temsirolimus). Enzyme-inducing AEDs (e.g. carbamazepine, phenytoin, oxcarbazepine) should be avoided in patients receiving regimens that include these chemotherapeutic agents. There is also the potential for serious and possibly life-threatening cutaneous adverse events (e.g. Steven Johnson Syndrome [SJS], toxic epidermal necrolysis [TEN]) in patients undergoing cranial radiation therapy. It remains unclear if newer AEDs (which do not require therapeutic drug monitoring, have fewer drug-drug interactions, and have a superior adverse effect profile) have a role in managing this patient population.[2,3] The brain metastases guidelines state that the need for AEDs is clear in patients who have experienced a seizure by the time their brain tumor is diagnosed. However, the evidence does not support primary prophylaxis with AEDs in patients with brain tumors who have not experienced a prior seizure, even with metastases (Class I).[4]

Posttraumatic seizures (PTS) in TBI patients are classified as either early PTS (i.e. within the first 7 days of injury) or late PTS (i.e. more than 7 days after injury). The incidence of early PTS in TBI patients has been correlated with the severity of the injury. Penetrating injuries have the highest incidence of PTS in about 50% of patients, while other high risk patients (e.g. those with depressed skull fractures, subdural hematomas, intracerebral hematomas, a cortical contusion) have a PTS incidence of 20% to 25%.[5] Current guidelines from the Brain Trauma Foundation state that most studies do not support AEDs evaluated thus far for the prevention of late PTS. Therefore, initiating seizure prophylaxis more than one week following TBI is not recommended.

For the prophylaxis of early PTS, phenytoin has been shown to reduce the incidence of seizures.[6] The American Academy of Neurology (AAN) guidelines had an analysis using pooled evidence from two "class I" studies that evaluated phenytoin. The analysis demonstrated a significantly lower rate of early PTS in patients given AED prophylaxis compared to controls. It was concluded that prophylaxis with phenytoin in patients with severe TBI was effective in decreasing the risk of early PTS.[7]

The AAN and brain trauma guidelines were published before recent trials that evaluated levetiracetam for seizure prophylaxis in TBI patients. Levetiracetam offers some advantages over other AEDs as it does not require serum concentration monitoring, has favorable pharmacokinetic properties (e.g. excellent bioavailability), and has no known drug interactions.[8] A study published in *Neurosurgical Focus* compared levetiracetam and phenytoin for seizure prophylaxis in severe TBI. There were 15 of 32 patients (46.9%) in the levetiracetam group compared to 12 of 41 patients (29.3%) in the phenytoin group, who warranted electroencephalogram (EEG) monitoring for seizure activity. In 7 of 15 (46.7%) levetiracetam cases, the results were normal (and in 8

cases, the results were abnormal); 1 patient had seizure activity, whereas 7 had seizure tendency. All the EEG results in the phenytoin group were normal. The higher incidence of abnormal EEG findings in the levetiracetam group was statistically significant ($p = 0.03$). However, despite this finding, patients treated with levetiracetam and phenytoin had no statistical difference in seizure activity incidence ($p = 0.556$). The conclusion of this study was that levetiracetam was as effective as phenytoin in preventing early PTS, but levetiracetam is associated with an increased seizure tendency on an EEG analysis.[8] Based on this study, levetiracetam may be effective for early PTS prophylaxis, but we need more studies to make a solid judgment.

The incidence of seizures after subarachnoid hemorrhage (SAH) may be as high as 20% due to the occurrence of seizures and seizure-like phenomena at the time of aneurysm rupture and their association with early complications (e.g. re-bleeding). Following aneurysm treatment and discharge, seizure incidence appears low and may be related to the method used to secure the aneurysm, thickness of the subarachnoid clot, location of the aneurysm, and presence of a subdural hematoma. The use of prophylactic AEDs in the perioperative setting is common but controversial. The incidence of seizures appears low, the influence of seizures on outcomes is unclear, and various risk factors for seizures have been identified with little consistency. Randomized controlled trials demonstrating the safety and efficacy of prophylactic AEDs in patients with SAH are also lacking.

Additionally, some studies have demonstrated worse neurologic outcomes with the use of prophylactic AEDs. Studies (comparing phenytoin to placebo and phenytoin to levetiracetam) have associated poor outcome scores with patients receiving phenytoin prophylaxis. In these studies, levetiracetam was given for a short duration and some patients experienced seizures after medication discountinuation.[9-14] The American Heart Association / American Stroke Association (AHA/ASA) guidelines state that the administration of prophylactic AEDs may be considered in the immediate post-hemorrhagic period or the first 7 days after aneurysm rupture (Class IIb, Level of Evidence B).[15] However, they do not recommend specific AEDs that can be used for prophylaxis. Neurocritical Care guidelines state that routine use of AED prophylaxis with phenytoin is not recommended after SAH (strong recommendation), but routine use of other AEDs for prophylaxis may be considered (very low quality evidence; weak recommendation). If AED prophylaxis is used, a short course (3 to 7 days) is recommended (low quality evidence; weak recommendation).[16] The Neurocritical Care guidelines also do not recommend specific AEDs for prophylaxis. Further studies are warranted to determine AEDs to use for SAH seizure prophylaxis.

The reported incidence of seizures following arterial ischemic stroke (AIS) ranges from 4% to 23%. Early or acute-onset seizures occur between 24 hours and 4 weeks after AIS, while and late-onset seizures occur greater than 4 weeks after AIS. Although the exact underlying pathophysiology of post-AIS seizures is unclear, it is thought that edema and cytotoxicity induced by an ischemic insult are responsible for early-onset seizures, whereas scar tissue formed after anoxia and deformation of dendrites is responsible for late-onset seizures. Due to a lack of data on the prophylactic administration of AEDs in this patient population, the AHA/ASA guidelines for the early management of adults with ischemic stroke do not recommend prophylactic AEDs. Recurrent seizures should be treated in accordance with the previously mentioned standard. There is also poor data on the newer, less toxic AEDs in patients with post-AIS seizures.[17]

Intracerebral hemorrhage (ICH) is a frequent cause for admission to the neurocritical care unit. Patients with ICH are at the greatest risk of seizure within the first few days after ictus, with over half of the seizures occurring in the first 24 hours. The incidence of early seizures has been reported in 7.4% to 17% of patients with ICH, while late seizures are reported in 2.6% to 10.2% of these patients. Seizure prophylaxis in patients with ICH is controversial. There are currently no randomized placebo-controlled trials evaluating the efficacy and safety of prophylactic AED therapy in patients with ICH. The current available evidence is observational, and it represents a heterogeneous group of patient comorbidities and severity of illness. It is critical to investigate the use of newer AEDs for seizure prophylaxis in ICH patients.[18-19] The AHA / ASA guidelines recommend that prophylactic AEDs not be used (Class III; Level of Evidence: B).[20]

In conclusion, after reviewing the primary literature and current guidelines on the major disease states seen in the Neurosurgical Care Unit, further studies are needed to assess the utility of newer AEDs (e.g. levetiracetam, lamotrigine, lacosamide) for these patients. Conventional AEDs are associated with poorer outcomes because of drug interactions, need for drug level monitoring, and adverse drug reactions. With further studies of newer AEDs for seizure prophylaxis, we can potentially improve patient outcomes in the Neurosurgical Care Unit.

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

[Author(s)]. [Article Title]. *Rho Chi Post.* [Year and Month Published]. [Volume]([Issue]):[Pages].

To view some examples, please visit our Citation Guidelines.

2016 Rho Chi Induction

By: Jack (Hongkai) Bao, Staff Editor & Sang Hyo Kim, Section Editor (Puzzles)

In an atmosphere populated with restless pharmacy students, bright pink undertones illuminated and calmed the room. Students and faculty of great scholastic achievement filled tables throughout the venue and sat chatting away. As more attendees arrived to join their anxious colleagues, the Executive Board of Rho Chi congregated and began to make preparations.

This was the Rho Chi Society Induction Ceremony of January 20, 2016 held, at Verdi's of Whitestone. This year, 53 students were inducted, including forty-two 4th year students, six 5th year students, one 6th year student, and five Ph.D students. The special night began with an address by Michael Bosco, the current president of the Rho Chi Society. He recalled a younger time as a freshman, when Dr. Robert Mangione introduced the idea of a pharmacy honor society. "There's no way I'll be a part of this," he thought. But less than four years later, Michael would go on to be inducted as a member and become the president of the St. John's chapter. "Life has a way of surprising you," he said. For many, joining the Rho Chi Society was a goal sought after since the first day of pharmacy school, but for others, this induction may have been an unexpected celebration, rewarding their dedication and resolve. In similar ways, all 53 inductees were gathered together as a result of their unparalleled curiosity about the profession of pharmacy. Michael encouraged us to become leaders and use the knowledge and skills we have gained to inspire others.

The following speaker was Dean Digate of the St. John's University College of Pharmacy and Health Sciences. Dr. Digate told us to work hard and reminded us that with pharmacy as a profession, there are many diverse paths students can pursue. Short and sweet, Dr. Digate passed along the keynote address to Dr. John A Pieper, who is the president of St. Louis College of Pharmacy. Honored by having Dr. Pieper, who travelled all the way to New York for the induction, everyone listened attentively. Dr. Pieper's speech emphasized the global expansion of the pharmacy profession. There are many international students across the world who are studying pharmacy, and he mentioned that the United States is implementing and facilitating ways to allow international students to pursue their careers in the States. Dr. Pieper proudly stated that pharmacy is most advanced in America, and pharmacists can truly extend their knowledge to improve patients' quality of life. As future pharmacists, we must find more ways to expand our profession and elevate it to the highest level.

With many inspiring words and smiles, the Rho Chi induction was a success. The new Rho Chi members will work hard for the 2016 year. Members will continue to implement the values of Rho Chi and will await the next inductee class for next year. Much work remains to be done, but with such bright characters, a positive future for Rho Chi lies ahead.

Messages from the Incoming Eboard

Ajla Dupljak, President:

I would like to congratulate all the new members on their induction into the distinguished Rho Chi Society. I am both honored and grateful for this opportunity to serve as president and look forward to collaborating with my fellow executive board members in an effort to make this upcoming year full of great opportunities and experiences for all of our Rho Chi members.

Karen Lin, Vice President:

There are no words to express the great honor I received as a Rho Chi inductee. I would like to thank all my professors, friends and family for their unwavering support. Moving forward as the Vice President, I plan to bring awareness to the countless opportunities we can pursue in pharmacy. I believe this is a field that is constantly changing and overflowing with new discoveries. I will continue to uphold the mission and the vision of The Rho

Chi Society by promoting the importance of pharmacists in healthcare and the impact our knowledge provides. It is my goal to advocate for events and opportunities within St. John's University that can cultivate and shape us to become the best professionals we can all be. Let's move forward together to make this an amazing year!

Rafi Reyasat, Treasurer:
Ever since I heard about the Rho Chi Honor Society back in freshmen year, it was always a goal of mine to become a part of it one day. I am now honored to be a part of what is arguably the most prestigious society in pharmacy. As treasurer, it is my goal to not only utilize our current budget to its fullest but also, to increase it to help the future E-Boards to come. As a collective E-Board, we want to inspire pharmacy students, especially those who are younger to strive for academic excellence in pharmacy. By doing so, they too can one day be part of an amazing induction ceremony into Rho Chi like we just were.

Bianca Chiu, Secretary:
It is a huge honor to be inducted as a member of Rho Chi. It is with great privilege that I am given the opportunity to push forth and expand upon Rho Chi's mission of academic excellence, leadership, and service within the beta delta chapter. As the new secretary, I hope to be a resource not only to our new class of inductees but also to new pharmacy students who do not yet know about Rho Chi. Our current executive board looks forward to bringing together students, faculty, and the community to continue to recognize intellectual achievement and advance pharmacy.

Guang Mei Fung, Historian:
I am excited and honored to be part of the executive board for Rho Chi. I look forward to working with my accomplished colleagues to continue the success of the Beta Delta chapter here at St. John's. I am confident that we will uphold this reputation and will be able to promote academic excellence, leadership, and service of the pharmacy profession. Congratulations to all the inductees.

Sang Hyo Kim, Media Coordinator Relations
I'm really happy to join the executive board this year! By writing for the Rho Chi Post since my freshman year, I hope I can be helpful in bringing more updates in pharmacy to Rho Chi. As media coordinator, I promise to work hard with my fellow E-Board members and inductees, and to make a great 2016 year.

Imlygic™, the First Oncolytic Viral Therapy in the US

By: Gabrielle Plaia, PharmD Candidate Class of 2016

On Oct. 27 2015, the Food and Drug Administration announced the approval of talimogene laherparepvec, referred to by its brand name Imlygic™, with an indication for local treatment of melanoma lesions that cannot be removed completely by initial surgery. The drug was created by Amgen.[1] This drug is the first of its kind - a genetically modified, live oncolytic herpes simplex virus type 1 (HSV-1) therapy.[2] The drug is injected directly into the lesions and then proceeds to work by replicating inside tumors. It then causes the lysis of individual cells causing a rupture of tumors, which may in turn cause an anti-tumor response, though the exact mechanism of action is not known.[3]

The trial that paved the way for the approval of Imlygic™ is referred to as OPTiM, a phase 3 multicenter, open-label, randomized clinical trial. This trial set out to compare Imlygic™ to an immunostimulatory protein called granulocyte-macrophage colony-stimulating factor (GM-CSF) in 436 individuals with advanced melanoma with lesions unable to be removed by surgery.[4] Due to the modification of HSV-1, Imlygic™ can replicate within tumors and to produce GM-CSF. The released GM-CSF combined with Imlygic's™ tumor-lysing ability and release of tumor-derived antigens, may promote an anti-tumor immune response. This is only a proposed mechanism of action, since, as previously stated, the true mechanism of action is not known.[2]

The melanoma lesions of these patients were treated with Imlygic™ (295 patients) or GM-CSF (141 patients) for six months or until injectable lesions ceased to exist. The primary endpoint of this study was a durable response rate (DRR), which is defined as complete or partial response for at least six months, and beginning at any point within twelve months of initiating therapy. OPTiM found that 16.3% of patients treated with Imlygic™ reached a durable response rate, as opposed to 2.1% of patients treated with GM-CSF, which was statistically significant.[4] Additionally, in the primary survival analysis of OPTiM, the median overall survival was calculated as 23.3 months in patients with Imlygic™ as opposed to 18.9 months in those treated with GM-CSF, although this did not achieve statistical significance. There was no improvement in overall survival or effect on melanoma spreading to other regions with the use of Imlygic.[4]

In April of 2015, the FDA's Oncologic Drugs Advisory Committee (ODAC) and Cellular, Tissue and Gene Therapies Advisory Committee (CTGTAC) voted 22-1 in favor of approval of Imlygic™, then known as oncolytic immunotherapy T-VEC.[5] A final approval decision was scheduled for October 27th, 2015 - and on that date the drug was then set to be marketed, a few days after approval by the European Medicines Agency.[6]

Risks associated with Imlygic™ include common side effects observed in the OPTiM trial - fatigue, chills, pyrexia, flu-like symptoms and injection site pain.[1,2] A more serious possible adverse event of Imlygic™ therapy is cellulitis at the injection site. Due to the nature of its mechanism as a modification of herpes simplex virus 1, infection with herpes may occur.[1] Imlygic™ should therefore not be used as treatment in certain patient populations, such as those on immunosuppressants, pregnant women, and otherwise immunocompromised individuals. Additional risks include impaired wound healing. Overall, in the OPTiM trial, there was a marginally higher percentage of patients treated with Imlygic™ (99.3%) as opposed to GM-CSF (95.3%) who had treatment-emergent adverse effects.[4]

Potential benefits with this agent are reflected in the results in the OPTiM study. In comparison to GM-CSF, there was a 4.4 month increase in median survival rate with Imlygic therapy, although this was not statistically signficant.[4] A greater percent of patients had reached a complete or partial response rate as well. The results of OPTiM are a representation of what will hopefully be exemplified in a broader patient population of individuals with advanced melanoma, which is incredibly difficult to treat. This genetically modified oncolytic viral therapy not only provides an additional treatment modality in those with unresectable melanoma, but it paves the way for what could become a pivotal class of drugs in the constantly-advancing landscape of cancer immunotherapy.

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The Effect of Acetaminophen on Emotional Pain

By: Nicollette Pacheco, Staff Editor (Graphics-focused)

Acetaminophen, an analgesic and antipyretic, has been widely used to relieve minor aches and pains since the 1950s. The drug exhibits these effects by inhibiting the enzymes COX-1 and COX-2, and acts in both the central and peripheral nervous systems.[1] While acetaminophen is currently indicated for the relief of mild fever and pain, recent studies reveal that it may relieve more than just a physical ache.[2] In vivo studies have shown that acetaminophen protects dopaminergic neurons against glutamate excitotoxicity and may protect hippocampal neurons in the brain from oxidative stress.[3] In animal models, acetaminophen altered monoamines and synaptic plasticity in the hippocampus by acting on presynaptic serotonin receptors.[3] While these studies are limited in their application to human models, they indicate possible psychological activity and serve as a solid foundation for further research on the use of acetaminophen in emotional pain.

In order to understand the basis of this developing theory, it is important to recognize the areas of the brain that are responsible for processing both physical and emotional pain. The experience of physical pain consists of two components: the sensory and the affective. The affective component relays information regarding the unpleasantness of a painful experience, such as the distress that follows after placing one's hand on a hot stove.[4] The brain regions associated with this component are known as the dorsal anterior cingulate (dACC) and the anterior insula (AI).[4] It has been found that these two regions of the brain are not only associated with physical pain, but also with the emotional pain caused by social rejection, loss, and exclusion. In humans, the dACC and AI show increased activity while experiencing social rejection.[5,6] The phenomena of physical and emotional pain show an overlap of activity in these regions of the brain, suggesting that the dACC and AI respond to the overall sensation of distress.[4,6] Based on the finding that physical and emotional distress are represented by common somatosensory brain systems, researchers began to question the applicability of acetaminophen for emotional distress.

In a randomized, double-blind trial, 121 participants were studied to determine the effect of acetaminophen in emotionally painful situations. Each participant received either 1,000mg of acetaminophen or 1,000mg of sugar. The basis of the study corresponded to the Meaning-Maintenance Model, which theorizes that any violation of expectation leads to an affective response. In the test activity, subjects were prompted to write about death – an activity that is said to cause the affective response to pain. The control activity asked subjects to write about dental pain, which elicits thoughts of discomfort, but does not create the same experience of violated expectations as the test activity. Subjects were then asked to fill out the Positive and Negative Affect Schedule, a survey that identifies the state of affect an individual experiences. The control activity (dental pain) was implemented to rule out negative mood as an explanation to the reported state of affect. Reports of increased affirmation in the Affect Schedule test indicate an emotional response to the assigned activity.

The results of the study were consistent with the hypothesis that the only subjects to demonstrate increased affective response were exposed to the test activity and were given placebo. Subjects in the test group who were given acetaminophen demonstrated similar responses to those in the control group who did not experience an increased affective response at all.[5]

In another study, conducted by DeWall et al., participants were observed over a period of three weeks to measure their level of social pain. Patients were blinded and randomized to a daily dose of 1,000mg acetaminophen or placebo. Every evening, patients were instructed to use the Hurt Feelings Scale to report the amount of social pain experienced each day. This scale was chosen to quantify the experience of hurt feelings and to isolate the sensation of social exclusion from other negative emotions. Results demonstrated that the participants who

were randomized to acetaminophen experienced less hurt feelings over time than those who were given the placebo.[6]

A third randomized, blinded study revealed that patients exposed to 1,000mg of acetaminophen reported less negativity and social discomfort towards decision-making, a thought process that typically causes significant psychological discomfort.[7]

Although current research on the use of acetaminophen for emotional conditions remains limited, there is a possibility that negative emotional experiences may contribute to physical pain disorders, such as fibromyalgia and somatoform disorders.[4] Hyperactivity in the somatosensory cortex may also predispose certain individuals to a higher pain sensitivity.[4] While more extensive research is necessary, the use of acetaminophen for emotional pain may be on the horizon for treatment of both physical and emotional distress. Recent publications in TIME magazine and on NPR radio have discussed these new findings and their application in medicine, increasing patient awareness of acetaminophen's possible use for emotional pain. However, along with the emotional benefits seen in recent reports comes the hepatic toxicity that frequently limits the use of acetaminophen in clinical practice. As pharmacists, it is important to emphasize that the take home message of these news segments is not a definitive recommendation, but rather a hint at what is to come.

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Do you attend events on campus, but prefer not to write?

SUBMIT YOUR PHOTOGRAPHS

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and we will feature your pictures in our next issue!

Letter from the President

By: Ajla Dupljak, President-Elect, Rho Chi Beta Delta Chapter

Greetings! My name is Ajla Dupljak and it is with great honor and privilege that I write to you all as your new President-elect for the 2016-2017 Rho Chi Society Beta Delta Chapter. First and foremost I would like to congratulate all those who were inducted into the society on January 20th 2016. Membership in the Rho Chi Society is a privilege accorded to the very few who distinguish themselves by their academic and professional achievements. My fellow members truly exemplify what it means to be a part of such a collaborative and honorable society. In addition to congratulating the new inductees, I would also like to thank all of the past members whose work and advances have paved the way for us all to have a role in the Rho Chi Society, in particular the 2014-2015 Eboard: Michael Bosco, Lina Lin, Julia Kamuda, Jessica Langton, Davidta Brown, and Zachary Piracha. They have all worked hard this past year to plan and execute countless events, including the induction ceremony, and they have also made this transition into the new Eboard effortless, for which I am beyond grateful.

In my experience thus far as a Pharm. D. candidate at St. John's University I have worked with some of the most inspiring professors and some of the most intelligent students. While I think I speak for all of my colleagues when I say that the workload we have received can be a bit overwhelming at times, at the end of the day I don't mind because I know that we are all getting the best pharmacy education there is to offer. With every passing class, exam, and homework assignment, we all become more and more equipped to take on the future of medicine. It is our goal as members of the Rho Chi Society to stimulate the development and advancement of pharmacy as future intellectual leaders.

The current and new executive boards are working side by side to ensure that your time here at St. John's is embellished with great events and opportunities that can further the advancements made in the field of pharmacy. From networking events like Coffee House Chats and Mock interviews to events with a great purpose like S4Gift, we are all working tirelessly to ensure that all of our Rho Chi members get the most out of their educational experience.

In addition to the marvelous events hosted by Rho Chi, the Rho Chi Post is a publication that offers all students an outlet to get involved and educate their fellow classmates. The Rho Chi Post was founded by a group of hardworking students in 2011 and after over 415 unique articles, 40 published issues and 4 volumes, they have gained the respect and recognition of all of us here at St. John's. The Post offers a unique platform for integrating ideas and opinions in a professional and scientific manner. I would encourage all of our present and future members to get involved in such a unique and rewarding outlet.

The success of the Rho Chi Society and all of its members is impressive and inspirational to say the least. I know without a doubt that we all will continue in these footsteps of success. There is a quote by the historical figure commonly referred to as the Father of Western medicine, Hippocrates, and it states: "Wherever the art of Medicine is loved, there is also a love of Humanity". So despite the fact that we are often burdened by countless exams and endless hours of studying that have increasingly consumed a majority of our time, I encourage you all to love the art of medicine. This love is what's going to follow us all into our future careers as medical professionals and allow us to make a real difference in the lives of all of our future patients. After all we are the future of pharmacy, and the future looks bright!

Sincerely,

Ajla Dupljak

President-Elect for the 2016-2017 Rho Chi Society Beta Delta Chapter

PUZZLES

MATCHING COLUMNS

By: Sang Hyo Kim, Section Editor

How well do **YOU** know your psych drugs?

Match the drugs on the left with the characteristics on the right.

Answers
on next page

Matching Column:

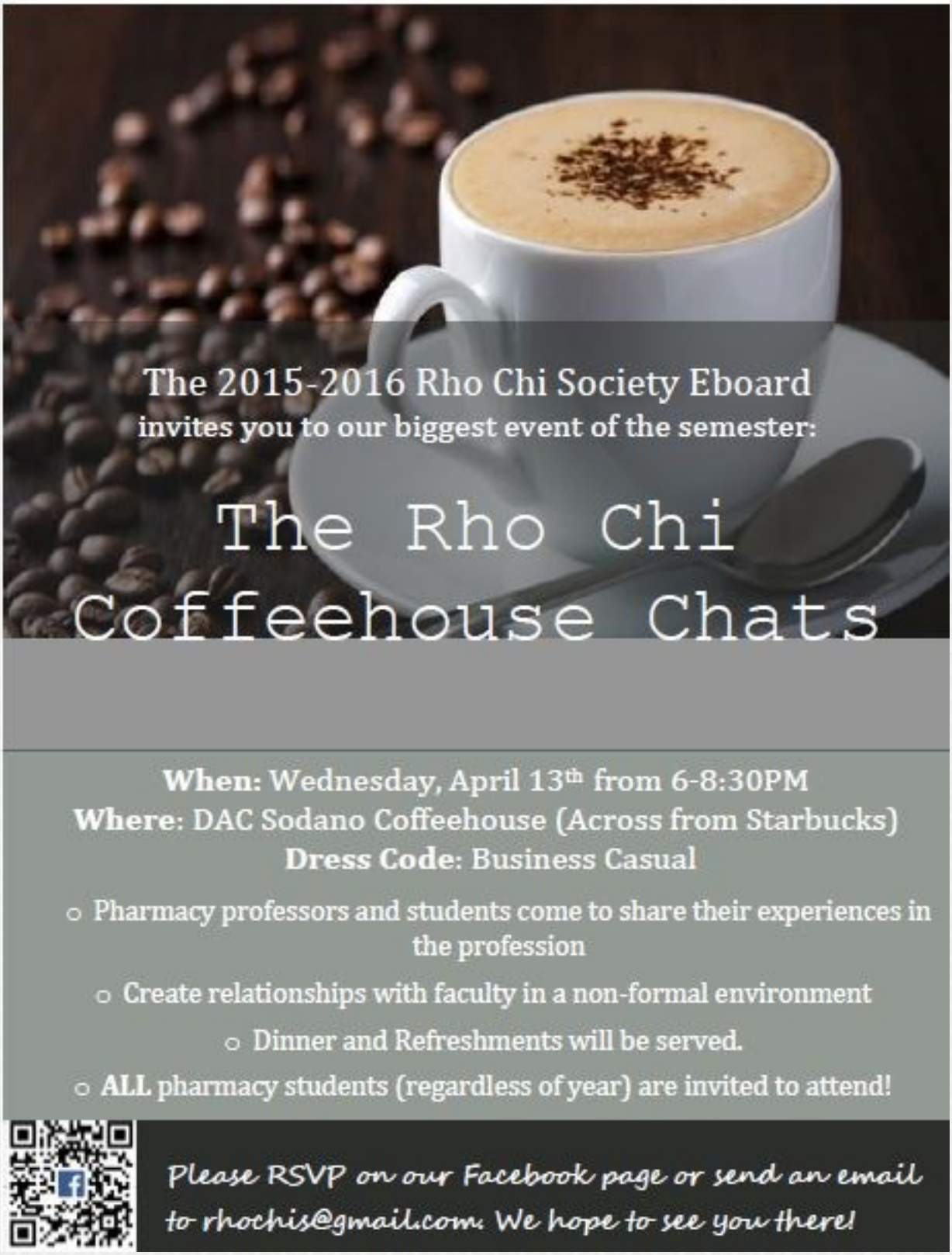
Psych Drugs

Alprazolam, Clonazepam, Diazepam, Lorazepam	A. Schedule IV Drugs
Adderall®, Focalin®, Vyvanse®, Concerta®	B. For the treatment of schizophrenia
Clozapine, Lurasidone, Paliperidone, Quetiapine, Risperidone, Ziprasidone	C. Schedule II Drugs
Doxepin	D. Tenex®, Intuniv®
Guanfacine, which is used for the treatment of ADHD, is known as these brand names	E. Comes in capsules and oral concentrate
Imipramine	F. Belongs to the fluorobutyrophenone class
Vilazodone	G. Trofanil PM®
Haloperidol	H. For the treatment of major depressive disorder
Milnacipran	I. Blocks the pre-synaptic α2 adrenergic receptor
Mirtazapine	J. For the management of fibromyalgia

Lexi-Comp Online™, Lexi-Drugs Online™, Hudson, Ohio: Lexi-Comp, Inc.

PUZZLES: ANSWERS

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



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