

RHO_{Px}CHI POST

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A student-operated newsletter by the St. John's University College of Pharmacy and Health Sciences Beta Delta chapter

SINGLE-LINE STORIES

- NYCSHP Industry Relations CE Meeting at The New York Academy of Medicine on 9/27
- Interested in joining the Rho Chi Post Editorial Team? Email us to learn more!
- 2012 ASHP Midyear Meeting & Exhibition will be in Las Vegas, NV. Are you coming?
- A warm welcome to the Classes of 2016 and 2018!

WE ARE.....



FALL 2012



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

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COLLEGE OF PHARMACY AND HEALTH SCIENCES - NAME CHANGE ANNOUNCEMENT

The College of Pharmacy and Allied Health Professions has officially changed its name to the College of Pharmacy and Health Sciences. This is the college's second name change since it was established in 1929.

In order to truly encompass the current and future educational goals of the College of Pharmacy and Allied Health Professions, the college submitted a request to the University Board of Trustees to officially change its name. On May 15, 2012 an internal notification was released to the University community announcing that the request had been approved, and that the college would henceforth be known as the College of Pharmacy and Health Sciences.

"We are delighted and grateful that the University's Board of Trustees approved of our request to change the name of the college," said Robert A. Mangione, Ed.D., Interim Provost for St. John's University, and former Dean of the College of Pharmacy and Health Sciences. "We believe that the change in the school's name from the College of Pharmacy and Allied Health Professions to the College of Pharmacy and Health Sciences captures many of the exciting new developments at the college and is a better description of not only where the college is today, but also helps identify where it will be heading in the future."

"With the Master of Public Health program currently wrapping up its final approval stages, and the development of a new

baccalaureate degree in Biomedical Sciences, the new name serves as an umbrella to the numerous areas in Health Sciences the college can pursue," said Sawanee Khongsawatwaja, Associate Dean, Administration and Fiscal Affairs for the College of Pharmacy and Health Sciences.

Since the announcement of the name change came towards the close of the Spring 2012 semester, the college plans to host an outdoor luncheon on September 6, 2012 on the Great Lawn for the students, faculty, administrators, and staff of the college.

"It will be great opportunity for the college community, to gather together in a casual environment, and celebrate this momentous occasion," said Khongsawatwaja. He continued: "The college is about to embark on its next milestone, and it's truly something to be excited about and a part of."

The college has also experienced a change in its leadership. In early July, the University announced that Robert A. Mangione, Ed.D., agreed to serve as the Interim Provost for the University. In his place, as the Dean for College of Pharmacy Health Sciences, S. William Zito '66P, Ph.D., was appointed to serve as the acting dean for college.

In this time of great changes, we here at the *Rho Chi Post* are excited for the future of our college.

The announcement above was approved by St. John's University College of Pharmacy and Health Sciences

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Share your organization's announcements

Spread the word through Rho Chi Post

Email us at rhochis@gmail.com and

we will feature your announcement in our next issue!



Top: Acting Dean of College of Pharmacy and Health Sciences, Dr. S. William Zito (left) and Interim Provost of St. John's University, Dr. Robert Mangione at the Name Change Ceremony and Luncheon event on the Great Lawn at Queens Campus.



Top: The new Interim Provost Dr. Mangione having a discussion with Dr. Schanne and Dr. Barletta, faculty members at St. John's University College of Pharmacy and Health Sciences.



Top: Dr. Joseph Brocavich, Associate Dean and Associate Clinical Professor with Acting Dean of College of Pharmacy and Health Sciences, Dr. S. William Zito.



Top: Dr. Frank A. Nania, Clinical Coordinator of the Professional Experiential Program, talking with Associate Dean Sawanee Khongsawatwaja and Health Education Resource Center Director Jaclyn Viallet.



Top: Assistants to the Dean come out in force to show their support for the school



Top: Clinical professors and faculty members posing with Johnny Thunderbird.

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Top: Graduate students promoting American Association of Pharmaceutical Scientists (AAPS) chapter at our campus.



Top: Rho Chi Beta Delta Chapter Executive Board members show their school spirit with our very own Johnny Thunderbird!



Top: Phi Delta Chi (PDC) brothers promoting their professional pharmacy fraternity at the Name Change Ceremony.



Top: Lambda Kappa Sigma (LKS) sisters with Johnny Thunderbird at the Name Change Ceremony.



Top Pictures: Students enjoying the lunch and having a great time at the Name Change Ceremony.



Top: Graduate students and our Teaching Fellows promoting American Association of Pharmaceutical Scientists (AAPS) chapter.



Top: Johnny Thunderbird reading the Rho Chi Post issue announcing the appointment of Dr. Zito as the Acting Dean and Dr. Mangione as the Interim Provost.



Top: Special thanks and recognition to our Teaching Assistants (TAs) and Teaching Fellows (TFs) who teach us so much, often at 7:30 AM. Their hard work and dedication to teach us have resulted in our success in many aspects of our careers.



Top: Rho Chi President, Yining Shao, promoting the Beta Delta Chapter and the Rho Chi Post to students that stopped at his booth.

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ANTIPLATELET USE FOLLOWING ACUTE CORONARY SYNDROMES BY: ADDOLORATA CICCONE, CO-COPY EDITOR

Acute coronary syndrome (ACS) is a myocardial ischemia caused by obstruction of coronary arteries. ACS is stratified into three types, based on electrocardiogram (EKG) changes and the presence of cardiac biomarkers (e.g. troponin, creatinine phosphokinase, and myoglobin). To guide treatment plans, it is important to identify the exact type of ACS the patient is experiencing. An EKG with ST-segment elevation and positive cardiac biomarkers characterizes ST-segment elevation myocardial infarction (STEMI), the most severe type of ACS. Non-ST-segment elevation myocardial infarction (NSTEMI) has no EKG changes but positive cardiac biomarkers. Unstable angina (UA) has neither EKG changes nor cardiac biomarkers present. Principles in therapy for all types of ACS include maximizing oxygen saturation; managing pain; decreasing workload of the heart; increasing coronary blood flow; decreasing further clot formation; and, decreasing cardiac remodeling. In the management of STEMI, early (≤ 24 hours) invasive catheterization and revascularization with percutaneous coronary intervention (PCI) or coronary artery bypass graft

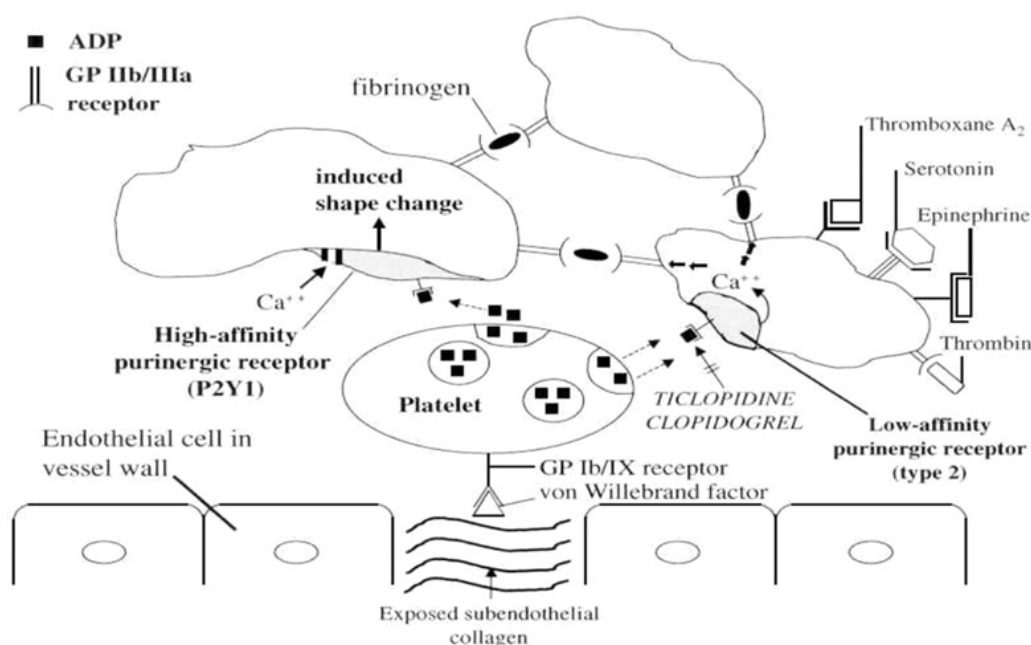
(CABG) is recommended.¹ Pharmacological agents utilized in the treatment of ACS include fibrinolytics, anti-ischemic agents (e.g. nitroglycerin, morphine, beta-blockers, and angiotensin-converting enzyme inhibitors), lipid-lowering agents (e.g. statins), antiplatelets (e.g. aspirin, P2Y₁₂ inhibitors, and GP IIb/IIIa inhibitors), and anticoagulants (e.g. unfractionated heparin, low-molecular-weight heparins, direct thrombin inhibitors, and factor Xa inhibitors).¹⁻²

Thienopyridines

Ticlopidine (Ticlid®), clopidogrel (Plavix®), prasugrel (Effient®), and ticagrelor (Brilinta®) are the four thienopyridines providing cardiologists with treatment options for stroke prevention in ACS patients after PCI.²⁻⁶ The thienopyridines, better known as P2Y₁₂ inhibitors, inhibit P2Y₁₂ receptors on the surface of platelets, decreasing platelet activation and aggregation, increasing bleeding time, and reducing blood viscosity.²

Ticlopidine

The pilot drug ticlopidine carries labeled ACS



Mechanism of Action of Thienopyridines

Source: <http://www.annals.org/content/129/5/394/F2.large.jpg>

indications for UA or NSTEMI undergoing PCI. It is a prodrug requiring activation via the hepatic CYP 3A4 enzyme. A loading dose of 500mg should be administered once six hours prior to PCI; maintenance doses are 250mg twice daily. The drug has a black box warning (BBW) against life-threatening hematologic disorders (e.g. neutropenia, agranulocytosis, thrombotic thrombocytopenic purpura [TTP], aplastic anemia). Potential adverse effects include diarrhea, nausea, and dyspepsia. It is recommended that white blood cells (WBC), neutrophils, and platelets be monitored in patients on ticlopidine.^{2,3} Use of this thienopyridine is unfavorable due to its life-threatening side effects, gastrointestinal (GI) upset, and twice daily dosing; these characteristics spurred the development of newer P2Y₁₂ inhibitors.

Clopidogrel

Clopidogrel was the next thienopyridine discovered. This agent is indicated for all three types of ACS with or without PCI. As a prodrug, clopidogrel requires activation via CYP 2C19 (rather than 3A4), which prompts us to screen for further potential drug-drug interactions (DDI). The administered loading dose is 300–600mg once, with a maintenance dose of 75mg once daily. There is a BBW stating that heterogeneity of CYP 2C19 genes may reduce conversion of clopidogrel into its active metabolite, which may result in reduced platelet inhibition and a higher rate of cardiovascular events following myocardial infarction (MI) or stent thrombosis following PCI. Adverse effects seen include bleeding, bruising, and rash, thus signs of bleeding should be closely monitored for in patients on clopidogrel.^{2,4}

A landmark prospective, multicenter, international, double-blinded, parallel group, placebo-controlled, randomized clinical trial compared combination aspirin and clopidogrel versus aspirin alone in 12,562 UA/NSTEMI patients.⁷ The primary endpoint of cardiovascular death, MI, or stroke was lower in the combination group than in the group taking aspirin alone (9.3% vs. 11.4%; $P<0.001$). A secondary safety endpoint looking at fatal bleeding revealed that rates were significantly

higher in the combination group ($P<0.001$). This increase in bleeding particularly occurred in CABG patients within five days of initiating clopidogrel. This CURE trial thus concluded that the addition of clopidogrel to aspirin was beneficial in UA/NSTEMI in reducing mortality, MI, and stroke; however, there was an increase in major and minor bleeding rates with the combination.⁷

Another landmark trial comparing the use of clopidogrel with and without aspirin was the CLARITY TIMI-28 trial.⁸ This prospective, multicenter, international, double-blinded, parallel group, placebo-controlled, randomized clinical trial was conducted with 3,491 STEMI patients, providing data on the same clinical endpoints in an ACS patient population excluded in the CURE trial.^{7,8} Cardiovascular death, MI, or stroke was lower in the combination group than in the group taking aspirin alone (15% vs. 21.7%; $P<0.001$). Major and minor bleeding rates were similar in both groups through PCI (1.3% vs. 1.1%) and at 30 days (1.9% vs. 1.7%). It was concluded from this study that the addition of clopidogrel to aspirin is beneficial in patients with ACS, PCI, and acute MI; yet, for primary prevention of cardiovascular disease, there is no evidence that the combination offers an advantage over aspirin alone, and for secondary prevention, while substitution of clopidogrel for aspirin may provide a marginal benefit at a higher cost; the benefit of adding clopidogrel to aspirin is undetermined.⁸

Drawbacks to using clopidogrel include genetic polymorphism, a DDI with proton-pump inhibitors (PPIs), its slow onset and long duration, increased bleeding risk, and low degree of platelet inhibition ($<50\%$).^{2,4} Also, a high rate of recurrent atherothrombotic events post-ACS was seen despite the administration of dual-antiplatelet therapy (DAPT) with aspirin and clopidogrel.⁹ These reasons sparked a great interest in finding newer, more potent inhibitors of the P2Y₁₂ ADP receptor.

Prasugrel

Prasugrel is a newer thienopyridine indicated for use in UA/NSTEMI, or in STEMI with PCI.

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This prodrug requires activation via the CYP 3A4 and CYP 2B6 enzymes. The loading dose is 60mg once; subsequently, 5–10mg daily is the maintenance dose. Interestingly, although the 5mg daily dose is for patients at high risk for bleeding, there is currently no real data to support this. A BBW warns against significant, sometimes fatal, bleeding; fatal intracranial bleeding and uncertain benefit in patients aged ≥ 75 years old; and increased risk of bleeding with surgery. Adverse effects to watch out for are unique in comparison to the other thienopyridines and include bleeding, hypertension, hyperlipidemia, headache, back pain, and epistaxis (nosebleeds). As with the previous thienopyridines, patients need monitoring for signs of bleeding.^{2, 5}

The TRITON TIMI-38 trial compared prasugrel head-to-head with clopidogrel. It was the phase 3 prospective, multicenter, international, double-blinded, parallel group, randomized clinical trial performed for prasugrel to enter the market. Among 13,608 ACS patients scheduled for PCI, endpoints looked at were cardiovascular death, MI, or stroke; incidence of stent thrombosis; and fatal bleeding. Cardiovascular death, MI, or stroke was lower with prasugrel than clopidogrel (9.9% vs. 12.1%; $P < 0.001$).¹⁰ Incidence of stent thrombosis was also lower with prasugrel (1.1% vs. 2.4%; $P < 0.001$), which was a clinically important finding as high incidence of stent thrombosis is a concern with clopidogrel.^{9–10} Incidence of fatal bleeding, however, was higher with prasugrel than with clopidogrel (2.4% vs. 1.8%; $P = 0.03$). In regards to differences in type of ACS, there were no statistically significant differences in bleeding. In conclusion, from this study, prasugrel is associated with significantly reduced rates of ischemic events and stent thrombosis, but an increased risk of fatal bleeding. Subgroup analyses show decreased clinical benefit and increased bleeding risk in patients < 60 kg; ≥ 75 years old; and with a past medical history of stroke or transient ischemic attack (TIA). Mortality did not differ significantly between clopidogrel and prasugrel.¹⁰

Ticagrelor

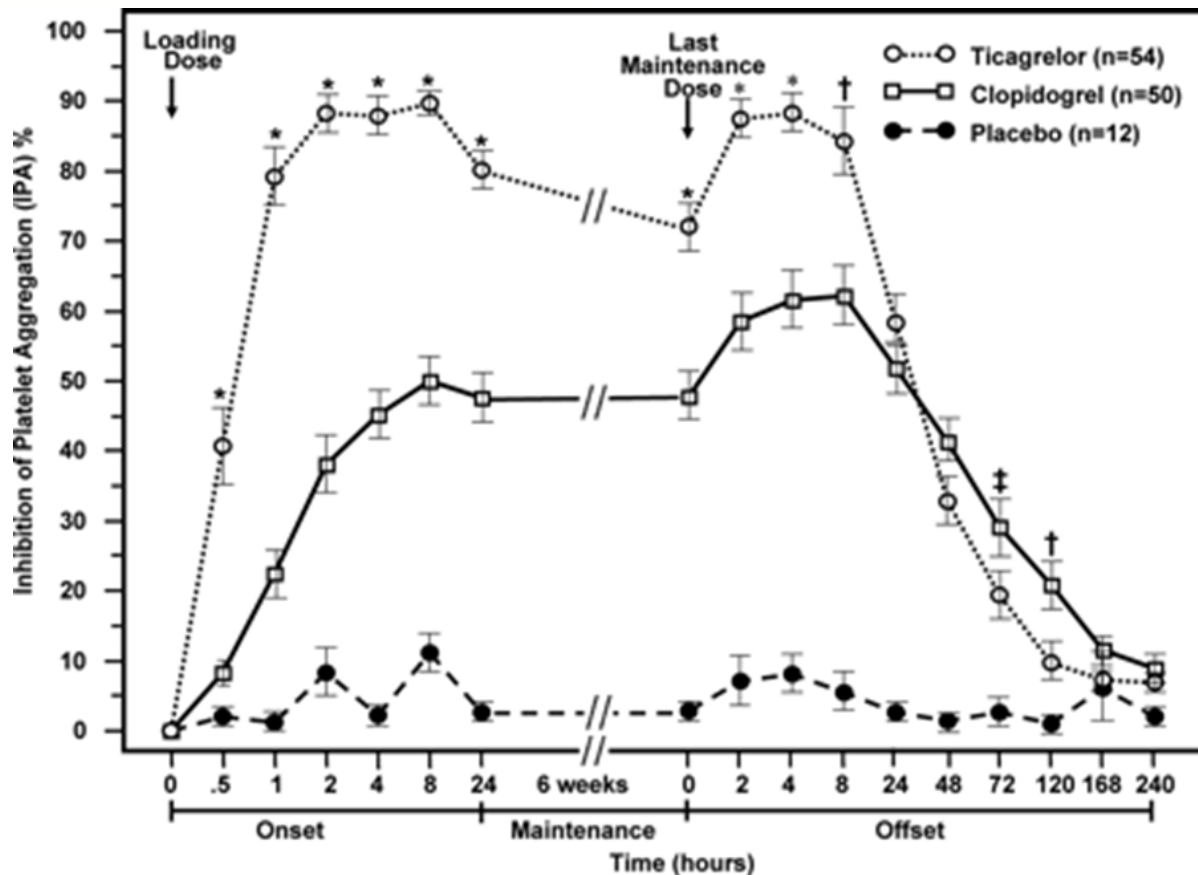
The newest thienopyridine on the market is ticagrelor. It is the first reversible P2Y₁₂ inhibitor. Like clopidogrel, it is for all three types of ACS with or without PCI. This prodrug, like prasugrel, is not affected by CYP 2C19; it is rather activated by the CYP 3A4 enzyme like ticlopidine. The loading dose for this agent is 180mg once; the maintenance dose is 90mg twice daily. The BBWs for ticagrelor are its significant (sometimes fatal) bleeding and concomitant use with maintenance doses of aspirin > 100 mg daily reducing its effectiveness (and should be avoided). Unique adverse effects include dyspnea, headache, cough, dizziness, nausea, atrial fibrillation, bradycardia, gynecomastia, and ventricular pauses. Besides signs of bleeding, difficulty breathing should also be monitored for.^{2, 6}

The PLATO trial was a prospective, multicenter, international, double-blinded, parallel group, randomized clinical trial performed on 18,624 ACS patients comparing ticagrelor head-to-head with clopidogrel. The primary endpoint of cardiovascular death, MI, or stroke resulted lower with ticagrelor than clopidogrel (9.8% vs. 11.7%; $P < 0.001$). As far as the safety endpoint of fatal bleeding, no statistically significant difference was seen between the two groups (11.6% vs. 11.2%; $P = 0.43$); except for non-CABG-related bleeding, which was greater in the ticagrelor group (4.5% vs. 3.8%; $P = 0.03$). In conclusion, in patients with ACS (regardless of ST-segment elevation, PCI status, or clopidogrel loading beforehand) ticagrelor is associated with significantly reduced rates of ischemic events and a significant decrease in mortality; there is also no significant difference in overall risk of fatal bleeding, but increased risk of non-procedure-related fatal bleeding.¹¹

Based partly on the methods used in the PLATO trial, ticagrelor and clopidogrel were further compared in the ONSET/OFFSET study.^{11, 12} As can be seen in the data provided, ticagrelor has a faster, greater onset; a greater degree of platelet inhibition maintained throughout therapy;

and a faster offset as compared to clopidogrel.¹² Perhaps clopidogrel has a slower offset than ticagrelor due to its irreversible P2Y₁₂ binding as compared to the reversible nature of ticagrelor's P2Y₁₂ binding. In view of the results from this

study, ticagrelor is therefore preferable in ACS patients for immediate platelet inhibition or if patients require a CABG or another unanticipated surgical procedure.¹²



ONSET/OFFSET Results¹²

The newer P2Y₁₂ inhibitors prasugrel and ticagrelor produce stronger platelet inhibition than clopidogrel.^{2, 5, 6, 12} Previous studies compared these new agents head-to-head with clopidogrel, the standing agent of choice in comparison to ticlopidine, but never to one another. In July 2012, the first direct pharmacodynamic comparison between prasugrel and ticagrelor was published in the *Journal of the American College of Cardiology*.¹³ This prospective, single-center, single-blind crossover study was performed on 44/139 screened ACS patients who did not respond to clopidogrel treatment 24 hours post-PCI. Patients with high platelet reactivity on clopidogrel received either ticagrelor 90mg twice daily or pra-

sugrel 10mg once daily for 15 days and then directly crossed over to the alternate treatment for another 15 days. Platelet reactivity was lower for ticagrelor (32.9 vs. 101.3, $P < 0.001$). High on-treatment platelet reactivity was seen in 0% of patients taking ticagrelor in comparison to 2.4% of patients taking prasugrel ($P = 0.5$). Furthermore, no patients in either treatment group experienced a major bleeding event, but ticagrelor had more mild side effects (e.g. dyspepsia, dyspnea). In conclusion, in patients with persistently high platelet reactivity after initiating clopidogrel, ticagrelor produces a statistically significant higher degree of platelet inhibition in comparison to prasugrel.¹³ It would be interesting to see the results

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of a well-designed, large, randomized, prospective, placebo-controlled clinical trial comparing prasugrel and ticagrelor to compare them to the results

of this smaller study and observe if these pharmacodynamic differences translate into significant differences in efficacy or safety.

	Clopidogrel	Prasugrel	Ticagrelor
Onset	2 hours	30 minutes	30 minutes
Time to Peak Effect	6–8 hours	4 hours	2 hours
Duration	5–9 days	5–9 days	3 days
Platelet Inhibition	50–60% at 5–7 days	84% at 4 hours	88% at 2 hours
Reversibility of Platelet Inhibition	No	No	Yes
DDI with PPI	Yes	No	No
Issue with Genetic Polymorphism	Yes	No	No
Optimal Choice if:	Prior MI or stroke; prior fibrinolytic	On PPI; high risk of stent thrombosis; diabetic patient	On PPI; CABG
Do Not Use if:	No ACS, MI, or PCI; genetic resistance	< 60 kg; 75+ years; Hx of stroke or TIA	Heart failure; COPD; noncompliant

Thienopyridine Comparison²⁻¹²

Summary

Antiplatelet agents improve clinical outcomes for patients with ACS.^{1,7,8} Evidence supports early initiation of DAPT with a thienopyridine and aspirin.^{1,7-9,14} The thienopyridines decrease morbidity and mortality, with some increased bleeding.^{1,7,8,10-13} Overall mortality is not statistically different between the agents.¹⁰⁻¹² ACS guidelines do not specifically endorse any one thienopyridine over the others.¹ The comparison of these four agents is only based upon a handful of trials; and more are needed to make a definitive guideline stating that one is best. While the evidence on these medications continues expand, we must utilize clinical guidelines and evidence-based medicine to formulate individual patients' antiplatelet regimens. A thienopyridine should be chosen depending on the given patient's risks, concomitant disease states, and current drug regimens. The information in the comparative chart compiled

above may be of assistance.

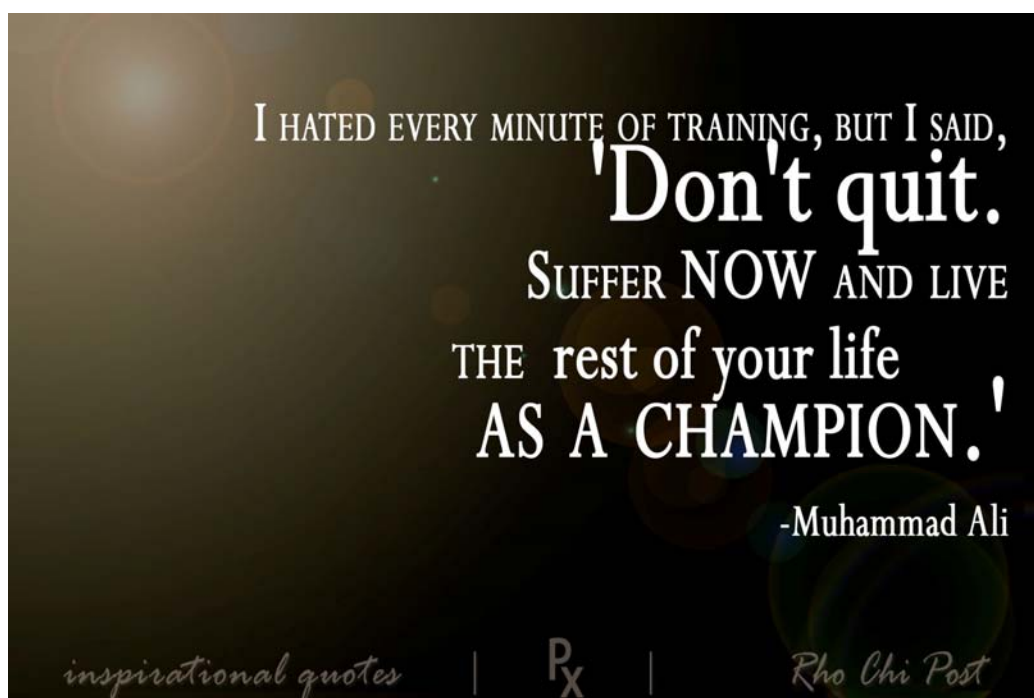
In choosing among these agents, benefits of antiplatelet therapy must be weighed against risks of bleeding and stent thrombosis. Although it does appear that newer thienopyridines overcome several issues associated with earlier ticlopidine and clopidogrel, further trials would be useful in generalizing evidence for broad clinical use.¹⁰⁻¹³

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QUOTE OF THE MONTH BY: ALEENA CHERIAN, STUDENT CO-COPY-EDITOR



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STUDENT SPOTLIGHT: FELIPE CAMACHO BY: NANDINI PURANPRASHAD, PHARM.D. CANDIDATE C/O 2013



Felipe Camacho is a 6th year student at the University of Florida College of Pharmacy. He received his Bachelors of Arts in Music Composition from Rollins College, Winter Park, FL. After graduation, Mr. Camacho plans to pursue a

residency at the Veterans Affairs (V.A.), Lee Memorial Health system, or the Indian Health services. As part of his 2-month ambulatory care rotation, Mr. Camacho participated in a health outreach trip to clinics in Ayuda Nicaragua, where he was directly involved in patient care.

Q: What are some of the best moments from your trip?

A: The trip was an amazing experience. I enjoyed all of the doctors and students that came along on the trip. The doctors and pharmacists were very informative and taught without being condescending in any way; it was very stress free and I learned so much. I thoroughly enjoyed going into town and actually seeing how the more modern people of Nicaragua interacted. I loved our hotel and all of the food that was prepared for us. The fresh juice for dinner that was like a little “leit motif” to the morning’s breakfast fruit was also a wonderful surprise and very thoughtful of the hotel hosts.

Q: Tell me about one person you met.

A: I remember seeing this pretty little girl, “JB,” at the triage station, when we were in Los Mangos. She was about six years old and had a bright pink sundress on with black shoes. She looked like she had just walked 5 miles with her mother and seven siblings. I remember telling her how pretty she was and seeing her face light up as she smiled. Her eyes had pierced my soul. Her cheeks had risen and her lips parted. My heart sank into my chest when I had noticed that all of her teeth had rotted down to brown-black stumps. The translator helped me write down JB’s chief complaints: upset tummy after meals, can’t sleep, and general-

ized pain which triggered the question, “How many cups of coffee does she drink in a day?” I remember my jaw had dropped when the mother confessed to giving JB 9 cups of coffee per day.

My first shift had ended when I finished with the triage of JB and her family. I was able to walk them over to the next station to see the physicians. I wasn’t able to listen in on their diagnosis, but I was able to see it at my next station at the central pharmacy. JB’s mother was told to significantly limit the amount of coffee that JB could have and well as given 10 mg of famotidine, twice daily for GERD. JB was also given children’s vitamins and was counseled on taking the famotidine 30 minutes before meals that makes her symptoms worse and to take the children vitamins once per day to make her strong and healthy. I got to watch her smile one last time as she and her family walked away into the tall banana plant forest. She stole and broke my heart...

Q: What was the hardest or most frustrating part of the trip?

A: Not a big fan of the toileting practices here: we can’t, under any circumstances, flush the used toilet paper. We have to place them in plastic bags to be picked up the next day because they will clog up their delicate drainage system... I am so going to be constipated.

Q: What are some interesting things about Nicaragua that the average person may not know?

A: The minimum wage salary here, if the even choose to enforce it, is \$112.00 US dollars per month, that is \$28.00 per week, \$4.00 per day, \$0.50 cents per hour and that is not really accounting for their week hours being way more than 40hours/week.

The gas here cost roughly 33 cordobas per liter, which is about \$5.50 per gallon! It cost us over \$100.00 to fill up Brenda’s Jeep... a whole months salary! You would think that stuff would

be super cheap here. It's not!

I get sad thinking about it - seeing mothers walk, carrying their children miles and miles on ankle-twisting, rocky roads, seeing a family of four creatively riding a tiny motor bike, one-hundred people squeeze in and burst out of a yellow school bus, and finally, how my annual salary as a pharmacist would mean I'd make \$2,530,000 per year here...literally a millionaire!

Q: Describe a day at the clinic.

A: My first clinic day was in El Chile. As we set up our makeshift pharmacy, triage, and operating room, more people started to show up at the clinic and the line grew exponentially. They were happy to see us, they never complained about waiting, and even after miles of walking and hours of waiting, they always came in and left with a smile and with not one complaint. My first shift was in the OR with our makeshift operating table. Our first and only operation was on a man that could not stand the sight of the lipoma on his forehead. After I watched and helped with the bloody excision of the lipoma, I took on patients to diagnose and treat. Triage seemed scary at first but once I got the hang of it, it was pretty awesome! Brenda, our trip hostess, took in the chief complaints and age, and we took vital signs and weight. After 8 hours of treating ~218 patients, I still had the energy to play soccer (with a

beach ball) with the kids. They are cute kids. It was hard to leave them and it sucked seeing their faces as we left on the bus...no more smiles.

Q: What did you learn about yourself on this trip?

A: I learned a lot about myself here. I am perceived to be a millionaire to these people. I thought we (insert minority race here) were born to fail in the US—the people here really have no choice but to fail it seems. I often think now how I used to stare at rich people in the states and wonder what it would be like if we swapped. It is also weird to see all of this poverty and then drive a few minutes and then see majestic mountains and you can't help but wonder: how did things get to be this way? Maybe I am overthinking it. Maybe they are fine the way things are and I shouldn't compare the US to Nicaragua. I love this country now and am going to miss the people and my new friends who translated for us. I do hope to go back and visit someday.

On behalf of the Rho Chi Post Editorial we thank Felipe Camacho and Ms. Nandini Puranprashad for this interview. If you have any questions or comments, feel free to contact us at RhoChis@gmail.com or email Ms. Nandini Puranprashad directly at: nandini.puranprashad07@my.stjohns.edu

If you want to read more about Health Outreach Trip to Ayuda Nicaragua, then please read articles by Chivas Owle and Jennifer Raquipo on The Student Doctor Network titled "Global Health Outreach: Nicaragua" available at: <http://studentdoctor.net/2012/02/global-health-outreach-nicaragua/>

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RX AND THE CITY



OCTOBER 19 TO 21, 2012
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LETTER FROM THE EDITORS: WE NEED YOU!

Dear Reader,

We are always looking to engage with each of you. If you are a talented cartoonist or have a passion for art, feel free to contact one of the editors. It is a great way to express yourself and earn a spotlight for your artistic skills while drawing attention to an aspect of the pharmacy profession.

Can't draw? No problem, take pictures instead! We need photographers who can attend campus events and seminars that are related to healthcare or the pharmacy profession. Please feel free to send us the pictures with one or two paragraphs explaining the event. Perhaps you have a passion for writing; if so, feel free to write to us in response to an article you read. Even if it is just a question or a few comments on an article, email us!

Don't like what you see in the newsletter? Then let us know! Tell us what you would like to see in the newsletter, what topics you are interested in, and/or if you wish to read more about a specific topic. The newsletter is for you; so, your feedback is very important to us.

Think you have some clinical knowledge to share? Feel free to send us interesting drug information questions you have answered or share what you have learned through your rotation experiences.

This is a commitment-free way to stay involved with the pharmacy profession. Contributing to our newsletter does not obligate you to contribute to every issue. We are more than happy to have guest authors and talented students work with us whenever they are available or free to do so.

If you have any questions, comments, and/or concerns, please do not hesitate to email us at: rhochis@gmail.com.

It has been our pleasure to serve you through the Rho Chi Post during the past year and look forward to the upcoming Volume 2 issues starting in October 2012.

With much thanks,

The Editorial Team

BISPHOSPHONATES AND ATYPICAL FRACTURE RISK BY: STEVE SOMAN, CO-EDITOR-IN-CHIEF

Bisphosphonates are proven to enhance bone density and reduce fracture incidence in postmenopausal women but recent data suggests they may have adverse effects with regards to bone quality. The drugs in this class can be differentiated as non-nitrogen containing (older generation) and nitrogen containing (newer generation) medications. These non-nitrogen containing drugs include etidronate (Didronel®), clodronate (Bonefos®, Loron®) and tiludronate (Skelid®).¹ The nitrogen containing drugs are pamidronate (Aredia®), alendronate (Fosamax®), ibandronate (Boniva®), risedronate (Actonel®) and zoledronate (Zometa®, Reclast®).¹

There are recent reports of atypical fractures of the femoral shaft with bisphosphonate use which begs the question: how long should a patient be treated with bisphosphonates before their risk for such atypical fractures increases significantly? Data from multiple studies show that long-term treatment with bisphosphonates results in increased risk for atypical fractures. According to the American Academy of Orthopaedic Surgeons (AAOS) 2012 Annual Meeting, patients are at an increased risk for atypical fractures when they have been treated with bisphosphonates for four or more years.² The FDA defines long-term usage as three to five years.³

"... how long should a patient be treated with bisphosphonates before their risk for atypical fractures increases significantly?"

How exactly the mechanism of action of bisphosphonates leads to increased fracture risk remains unknown. One theory is that bisphosphonates suppress bone turnover, which leads to reduced bone maintenance and accumulation of microfractures over a long period of time.⁴ These microfractures reduce bone quality and continue to propagate, eventually leading to atypical fractures or a rare break, typically without trauma.⁴ These breaks can occur in the diaphysis or the

subtrochanteric region of the femur.⁵

There is also data on the increased risk of patients with a previous fracture having a subsequent or second fracture on the opposite femur or what is known as contralateral atypical femur. According to the AAOS, "the incidence of a subsequent atypical femur fracture occurring in the other thigh was 53.9 percent in patients who continued bisphosphonates for three or more years after their first fracture, compared to 19.3 percent in patients who discontinued bisphosphonate use."⁶ These studies and new data prompted the FDA in October of 2010 to revise the labeling for bisphosphonates indicated for osteoporosis to carry the warning for atypical fractures.⁷

"...the incidence of a subsequent atypical femur fracture occurring in the other thigh was 53.9 percent in patients who continued bisphosphonates for three or more years after their first fracture..."

Of the multiple trials that evaluate the risk of atypical fracture, one interesting study of note is a trial of 52,595 patients treated with bisphosphonates ≥ 5 yrs, in which 71 (0.13%) had a femoral shaft fracture during the subsequent year, and 117 (0.22%) had a femoral shaft fracture within 2 years.⁸ *The New England Journal of Medicine (NEJM)* published multiple large studies showing that atypical fractures are rare with up to 10 years of bisphosphonate use.³ Another study of 50,000 patients showed that the rate of atypical fractures was 1 in 1,000 for each additional year of treatment beyond 5 yrs.⁹ Out of 83,311 Swedish women, 59 women had atypical femur fractures, of which 46 (78%) had used bisphosphonates in a study based on the Swedish Prescribed Drug Register.¹⁰ In a case control study from Canada, over 200,000 women ≥ 68 years were evaluated and researchers found that among the women with at least five years of bisphosphonate

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use, the estimated absolute risk of having an atypical femur fracture within one to two years was low (0.13 to 0.22 percent).¹¹ These studies show that the long term usage of bisphosphonates is linked to atypical fractures; however, the absolute risk of a atypical fracture is extremely low.

The data from various large multicentered international studies seem to support the theory of a “drug holiday” that may help lower the risk of atypical fractures.^{12,13} A patient may be treated for up to five years; then the bisphosphonate may be discontinued for one to two years before restarting therapy. Studies also show that the risk of developing an atypical fracture is extremely low so providers must take into account benefit vs. risk on an individual patient case by case before making treatment decisions.¹³ “The clinical implications are that for people at high risk of fracture, particularly those with bone density in the osteoporotic range or with an existing spine fracture, any potential risks are outweighed by the benefits of fracture reduction.”¹²

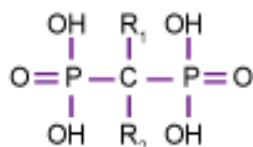
“A patient may be treated for up to five years; then the bisphosphonate may be discontinued for one to two years before restarting therapy.”

Bisphosphonates for women with high risk for osteoporotic fractures should not be stopped for the sole basis of atypical fracture risk as the benefits of these medications far outweigh this low risk. For a low risk patient who has stable bone mineral density (BMD), no previous vertebral fractures, and absence of glucocorticoid therapy, stopping bisphosphonates after five years may be the more reasonable decision. During this time, the patient’s bone density should be monitored; their risk factors evaluated; and, if they become high risk for normal fractures, restarting the bisphosphonate therapy may then be warranted.¹³

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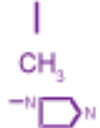
	R ₁	R ₂	Relative Potency
Etidronate	OH	-CH ₃	1
Clodronate	Cl	-Cl	10
Tiludronate	H	-S-  -Cl	10
Pamidronate	OH	-(CH ₂) ₂ -NH ₂	100
Alendronate	OH	-(CH ₂) ₃ -NH ₂	1000
Risedronate	H	-CH ₂ - 	5000
Ibandronate	OH	(CH ₂) ₂ -N(CH ₂) ₄ -CH ₃	10,000
Zoledronic acid	OH		100,000

Image Source: [http://www.clinicaloptions.com/~media/Oncology/Programs/Bone Health Oncology](http://www.clinicaloptions.com/~media/Oncology/Programs/Bone%20Health%20Oncology)

INFLUENZA VACCINES: PROJECTED STRAINS FOR THE 2012-2013 SEASON BY: JOO HEE KWON, PHARM.D. CANDIDATE C/O 2013

There are 3 antigenic types of influenza: A, B, and C. Influenza C causes mild illness and therefore does not cause epidemics. In contrast, influenza A and B are capable of causing mild to severe flu and in some cases death. An epidemic can occur depending on the number of people who are vaccinated, the predominant viruses of the season, and how the vaccines correlate with circulating strains during any given season.¹ The most recent surveillance shows that the percentage of mortality due to pneumonia and influenza (6.1%) is below the epidemic threshold (7.5%).²

Influenza A can be classified based on two different types of surface proteins, hemagglutinin (H) and neuraminidase (N), and can be further divided into different strains. Influenza B does not have these subtypes, but just different strains. To differentiate among circulating viruses, influenza virus is named with the following details: antigenic type, host of origin, place of origin, strain number, and year of discovery, and if type A, the H and N numbers.³

Unlike other viruses, influenza virus strains change often as they mutate to adapt to the human immune response.⁴ When choosing the strains for each influenza season, the following are considered: what viruses exist, how prevalent they are, and the degree of virulence in causing clinical illness. After this process is completed by the World Health Organization's (WHO) surveillance system, U.S. FDA Vaccines and Related Biological Products Advisory Committee (VRBPAC) will decide in February (prior to the next influenza season) whether to follow or change their recommendations⁵, and as soon as the decision is announced, the manufacturers will start developing the vaccines, which usually takes at least 6 months.⁶

According to human serology tests performed by WHO Global Influenza Surveillance and Response System (GISRS), the strains for 2012-2013 season in northern hemisphere are A/

California/7/2009 (H1N1) pdm09-like virus; an A/Victoria/361/2011 (H3N2)-like virus; and a B/Wisconsin/1/2010-like virus (B/Yamagata lineage). Only the first of these strains is the same as last season. The other 2 strains from previous season that changed are A/Perth/16/2009(H3N2)-like virus and B/Brisbane/60/2008-like virus (B/Victoria lineage).⁷

According to the recent meeting minutes from VRBPAC, vaccines will include all of the above strains as well as B/Brisbane/60/2008-like virus, following the WHO recommendation to include this specific strain if the country is considering two influenza B viruses in vaccines.^{5,8} The reason for inclusion of 2 influenza B viruses is that both B/Yamagata and B/Victoria lineages circulated in different parts of the world at the same time. B/Victoria was the strain of choice over the past two seasons due to its higher prevalence; however, infections from B/Yamagata strain were also witnessed during the 2011-12 season and both strains are different enough to offer cross-protection. Hence, the B/Yamagata was also chosen for the upcoming season.⁹ Among the B/Yamagata viruses, B/Wisconsin/1/2010-like virus was selected since most of the viruses of this lineage were similar to this specific virus both genetically and antigenically. Similarly, A/Victoria/361/2011 (H3N2)-like virus was chosen for the next season based on human serology study results, which showed more antibody titer against this strain in comparison to the previously chosen strain A/Perth/16/2009.⁷

Vaccines render protection by causing the formation of antibodies against the specific virus strains included in the vaccine. This process takes about two weeks from the time of vaccination. There are generally two types of vaccines: the flu shot and the Live Attenuated Influenza Vaccine (LAIV) nasal spray. The flu shot contains inactivated or killed vaccine. There are intramuscular flu shots, which are indicated for people aged 6 months and older, the Fluzone High-Dose

shot for patients 65 years and older, and the Fluzone Intradermal shot for patients 18—64 years old.¹⁰ Fluzone High-Dose contains four times the amount of antigen as that in the regular flu shot, making this vaccine suitable for the elderly as their immunity is weakened with age and higher doses of the vaccine are needed to build adequate immunity to the flu.¹¹ The nasal spray flu vaccine that contains weakened live virus is only indicated for healthy people aged 2-49 years.¹⁰

Everyone over 6 months of age can be vaccinated against the flu; however, vaccination is contraindicated in people who are allergic to chicken eggs or any other component of the vaccines, people with moderate to severe illness with fever, and those with history of Guillain-Barré Syndrome that occurred after vaccination and without risk factors for flu complications.¹⁰ In addition, the nasal spray flu vaccine cannot be given to pregnant women, those with a weakened immune system or asthma, children younger than 5 years old who had at least one wheezing episode within previous year, people with severe nasal condition that makes breathing difficult, and children or adolescents on long-term aspirin treatment.¹²

Most of the vaccines available for the 2012-13 flu season are trivalent. This February, the FDA approved FluMist Quadrivalent, the first LAIV to include the 2 influenza B viruses, one of which was chosen for the upcoming season. It is a nasal spray formulation that is made the same way as the trivalent FluMist vaccine by the same manufacturer MedImmune LLC.⁹ FluMist Quadrivalent gives added protection as it protects against one more strain of influenza B virus.

When a virus of a non-human origin affects humans, that virus is called a variant virus. The variant virus results from a combination of genes from human, swine, and avian as well as other influenza viruses. In 2011, a variant of the influenza A H3N2 virus or “swine flu” that normally infects pigs began to cause influenza illness in humans. The number of H3N2 variant cases has increased partly due to enhanced surveillance programs and

quite possibly an increased incidence of cases. There were several case reports of H3N2 variant virus infections since last October. Twelve people from August through December of 2011 were infected with A(H3N2)v in Indiana, Iowa, Maine, Pennsylvania, and West Virginia. Six of these people did not have swine exposure and 11 were children. All patients recovered without complications.¹³ In April 2012, one child in Utah was reported to be infected with the same type of virus that has the M gene from A(H1N1)2009 virus; the child recovered fully after treatment with oseltamivir.¹⁴

“When a virus of a non-human origin affects humans, that virus is called a variant virus.”

The virus can become a pandemic if a major change occurs in the genetic design of H3N2, which can happen if the human virus transmits across multiple, different species. People at high risk of acquiring such infection are those living or working in close proximity to pigs. The virus can be spread among humans the same way other viruses do: through contacting air droplets from an infected person when coughing or sneezing. Medications to treat the variant influenza virus are similar to the treatment for other types of influenza: amantadine, rimantadine, oseltamivir and zanamivir; but, amantadine and rimantadine are not suggested for use due to the concern for resistance.¹⁵ Currently, a vaccine that will give protection against this variant virus is being studied.⁷

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A CHEROKEE EXPERIENCE: THE STORY OF MY ROTATION

BY: NANDINI PURANPRASHAD, PHARM.D. CANDIDATE C/O 2013



I'm sitting in a quaint coffee shop in Cherokee, North Carolina, sipping a dirty chai tea with some of my roommates with 1970s music chiming in the background as I write this article and words cannot describe

my experiences at this rotation. The most surprising aspect of my ambulatory care rotation at the Cherokee Indian Hospital was how differently pharmacy is practiced in North Carolina. Cherokee Indian Hospital is part of the Indian Health services, a federal health program for American Indians and Alaska natives throughout the country. Cherokee Indian Hospital is a family practice based hospital and clinic located on the Cherokee Indian Reservation in western North Carolina. It serves approximately 14,000 Native Americans across a five county area through a variety of programs funded and operated through both the Indian Health Service and the Tribal Health Delivery System.

The goal of the Cherokee Indian Hospital rotation is to enable students to gain an understanding of clinical, administrative, and technical aspects of Indian Health Service pharmacy and to provide a unique cultural experience. You will be able to experience one week of inpatient pharmacy and three weeks of outpatient pharmacy which consists of four clinics: anticoagulation, medication therapy management, refill by mail, and counseling. You can also request to see the diabetes care clinic and the pain Suboxone® clinic. Students are assigned one project by a pharmacist, most of whom are commissioned officers. Students are there Monday through Friday and alternate between shifts that start at 8:00 am and end at 5:00 pm or start at 9:00 am and end at 6:00 pm, with an hour allocated for a lunch break. On Wednesdays, everyone starts at 10:00 am and the day ends at 6:00 pm. For inpatient pharmacy, students attend rounds at 8:30 am. The hospital is

very small and carries only 22 beds, so you cover a maximum of about 10—12 patients a day. Most patients are admitted for substance abuse or alcohol/opioid withdrawal. Students perform medication reconciliation when a patient is admitted and discharged, which consists of counseling the patient on any and all changes made to their medication regimen. Students also make all the patients' intravenous (IV) medications and answer any drug information questions the pharmacy receives.

The outpatients clinics are all primarily managed by students, so be prepared to work as if you are a pharmacist because you have a lot of direct patient contact and there is a lot of independent work. In the anticoagulation clinic, students routinely monitor INRs for patients on warfarin. You see patients one-on-one in a private room, take the patients' vitals (i.e. blood pressure, pulse, and respiratory rate), go through a list of questions including any changes in diet and exercise, bleeding and bruising, swelling, difficulty breathing, changes in medications, and tobacco and alcohol use. You take note of the patient's INR for that clinic visit and their previous INRs and use that information to determine how the patient's warfarin dose should be adjusted if they are not within their goal range; identify the cause of their INR change; make a recommendation to the pharmacist; adjust the patient's warfarin dose; and schedule their next appointment in one, two, or four weeks. You also counsel the patient on foods that affect warfarin. After all this is done, you document everything that happened during the visit in the electronic health record system (EHR).

For the medication therapy management (MTM) clinic, patients bring in all their medications, students review their medications with them, and align their medications so that they can receive all their medications at the same time. The same process is done for refill by mail where

patient's medications are partialled so they can finish all their medications at the same time, and then the refill by mail kicks in. Every patient interaction is documented in the EHR system. For the counseling clinic, any changes made to a patient's medication or refills requires counseling. Here is where you have a lot of patient interaction and will get to know the local Cherokee people. You learn of the poverty these people live in and the drug addiction and substance abuse that plague this small nation of people.

In addition to an excellent clinical experience, a rotation at Cherokee Indian Hospital offers a wide variety of outdoor and recreational activities. Being bored is impossible; Cherokee is located next to the Great Smoky Mountains National Park. There are many activities to do throughout the day in Cherokee such as running, hiking trails, the Indian village, enjoying the beautiful Oconaluftee Island Park, tubing, visiting other towns, the Indian museum, exploring waterfalls around the area, storytelling at the bonfire, and gem mining. You are also able to meet and live in free housing with students from other health professions such as medical students, physician assistant, public health, and dentistry. There is truly a southern hospitality present in Cherokee; the people are

very welcoming to visitors and willing to share their culture.

By the end of this rotation, I gained tremendous growth in my professional maturity as a pharmacy student and expanded my knowledge base of ambulatory care and patient interaction. One of the nostalgic memories I have of this rotation is the picturesque drive to the hospital, surrounded by a myriad of smokey mountain peaks with the sunshine sparkling through the hazy clouds and illuminating the magnificence of the surrounding mountains. I enjoyed going to the beautiful Oconaluftee Island Park, sitting on a rock by the stream, my feet wading in the water, watching the laughing children playing in the shallow water and smiling parents taking pictures and just admiring the serenity of the park. They say a picture is worth a thousand words; but, the pictures that I took of Cherokee do not do justice to the natural beauty of this land and its rich culture and history. I only hope to return here someday.

If you have any questions or comments, you may write to us at rhochis@gmail.com or contact Ms. Nandini Puranprashad directly at: nandini.puranprashad07@my.stjohns.edu

Image Source: <http://saftinet.net/wp-content/uploads/2011/11/CHS-Logo-High-Res.jpg>



One unique aspect of the Cherokee model is that the specialty mental health and the primary care behavioral health team work closely together to coordinate patient care as a interdisciplinary team.

Read more at: <http://integrationacademy.ahrq.gov/content/Integration%20at%20Cherokee%20Health%20Systems>

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Top: The Eastern Band of the Cherokee Nation is the only tribe in North Carolina that is recognized by the federal government, is located in western North Carolina near their traditional homelands. The Tribe consists of approximately 14,000 enrolled members and holds 56,000 acres for our Qualla Boundary.

Learn More at: <http://nc-chokeee.com/>



Top: Cherokee Indian Hospital is a family practice based hospital and clinic located on the Cherokee Indian Reservation in western North Carolina.

Learn more about this site at: <http://www.ihs.gov/medicalprograms/pharmacy/resident/cherokee.asp>



Top Pictures: Mrs. Nandini Puranprashad participating in patient care activities at the clinic. You may contact her at nandini.puranprashad07@my.stjohns.edu for more information about this rotation site.

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NEW STUDENT CONVOCATION ADDRESS BY: MOHAMED DUNGERSI, ASSOCIATE STUDENT EDITOR

The following address was delivered by one of our student editors on behalf of the students at the College of Pharmacy and Health Sciences as a welcome to St. John's University to students of the classes of 2016 and 2018.

Dean Zito, Administrators, Faculty Members, and students of the classes of 2016 and 2018, Good Afternoon! On behalf of the students at the College of Pharmacy and Health Sciences, I would like to take this opportunity to welcome each one of you to our esteemed college.

As I stand here today, I fondly remember my very own student convocation ceremony from August of 2007—it was indeed a significant moment in my life. Simply, making the transition from a high school to a university student was a daunting, yet very exciting, experience. I had left the safe haven of home and traveled across the world with the hopes of living out a dream. The next 5 years that followed have been life changing for me. With every passing year, I found myself challenged to a greater degree and this has contributed to positive and invaluable growth in me. I can safely say that the next years of your life will become the vital foundation to enable you to grow into exemplary healthcare providers.

As it has been famously put: “Even the longest journey starts with the first step.” Today, I congratulate you, as you have taken that very first step. The destination and length of your journey is now in your control. Of course, twists and turns will come and go, and depending on how you navigate through them, they will define you! The next couple of years in college will surely be a challenging journey. You will hit roadblocks, but never lose sight of the destination of your journey. It will not be easy, but I encourage you to never look down and to persevere in your interests.

I can assure you that the College of Pharmacy and Health Sciences is committed to making your experience as worthwhile as it can be and

that you will receive nothing but the best. You will learn in state-of-the-art facilities and receive great, quality education from enthusiastic faculty - some of whom will serve as lifelong mentors. At certain points during your time here, you will have the unique opportunity to be a part of our exciting study abroad programs. And when it is time for you to venture out of the classroom into the healthcare setting, you will have an incredible diversity of top institutions to choose from for your clinical rotations.

Along with all of these, your education here will encompass the humble teachings of the Vincentian spirit and the importance of service to humanity. Do keep in mind that these elements are necessary to develop one's self before becoming a healthcare professional.

As you begin your journey, I urge you to make the most of each opportunity you receive. It is indeed an opportunity in itself just to be able to begin college. You have a clean slate to start from with no presumptions about you—make the most of it. If you didn't study as hard in high school, study harder. If you were not as involved in extra-curricular activities, then college offers you more chances. With a plethora of student organizations, you can be sure to find your place in a variety of professional, academic, cultural, or religious organizations. If you were not as involved in community service, venture through one of a multitude of service programs, and find the solace that comes with giving back to the community.

As I alluded earlier, keep in mind that you define your college experience! So, explore the unknown: step out of your comfort zone and challenge yourself to greater heights.

Many have claimed that the time you spend in college is the best time of your life. I cannot verify this, but what I can guarantee you is that your years in college will go by very quickly. And once they're over, you will not be able to have them

back. So, do not hesitate or let opportunities leave your sight.

I will leave you with the wise words of Mark Twain. He once said: "Twenty years from now you will be more disappointed by the things you didn't do than by the ones you did do. So throw

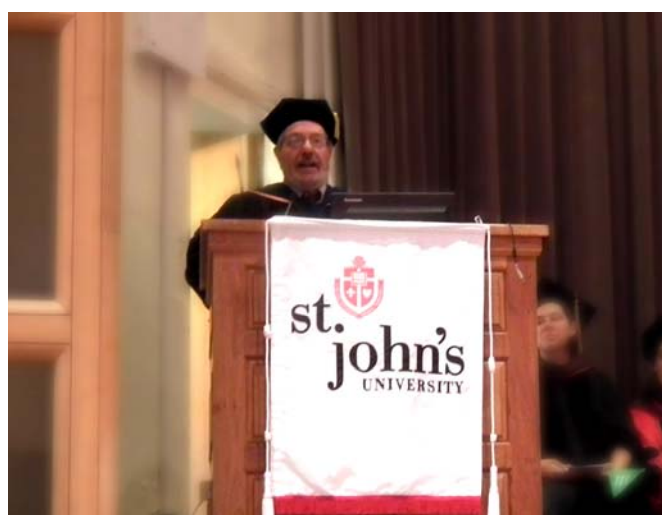
off the bowlines. Sail away from the safe harbor. Catch the trade winds in your sails. Explore. Dream. Discover."

I wish each one of you the best of luck as you begin your journey! Thank you for your time!

PICTURES FROM NEW STUDENT CONVOCATION BY: ALEENA CHERIAN, STUDENT CO-COPY-EDITOR



Top: The new incoming students assembled in Marillac Hall for the New Student Convocation Ceremony



Top: Acting Dean Dr. Zito addressed the students and welcomed them into the St. John's University family.



Top and Right: Of course, the Rho Chi Post was there to welcome our new students and to dedicate ourselves to be their platform for excellence in student publishing.



RHO CHI POST (RHOCHISTJ.ORG)



Top: Rho Chi Post Student Editor, Mr. Mohamed Jameel Dungersi, was chosen to deliver the student address at the New Student Convocation.



Top: The Rho Chi Post was given an extraordinary recognition by Dr. Zito, the Acting Dean of the College of Pharmacy and Health Sciences, for which we are extremely grateful.



Top: The administrators, faculty members, guest speakers and distinguished friends of St. John's University were in attendance at the New Student Convocation.



Top: Dr. Joseph Brocavich, Associate Dean and Associate Clinical Professor, delivered an encouraging message to the students to pursue their dreams with determination and the Vincentian values we uphold at St. John's University College of Pharmacy and Health Sciences.

**Name Change Recognizes Research and Programs
at College of Pharmacy and Health Sciences**

[More ►](#)

Read More at: <http://www.stjohns.edu/academics/undergraduate/pharmacy/about/name.stj>



Top: Future Pharm.D. Candidates enjoyed a meal with various clinical and faculty members in Marillac Hall



Top: Assistant Clinical Professors, Dr. William M. Maidhof and Dr. Regina Ginzburg, sharing a moment of school pride.



Top: The event was a great opportunity for students to meet fellow classmates, the clinical faculty and start their professional education with a smile.

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Below: We want to hear from you! Tell us about your experiences at St. John's College of Pharmacy and Health Sciences.



**submit
your story**

Image Source: <http://www.achievmagazine.com/submit>

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RHO CHI EXECUTIVE BOARD MEMBER INSIGHT: ALBANA ALILI BY: MOHAMMAD A. RATTU, PHARM.D. [PGY-I RESIDENT AT VA NYHHS]

We sometimes need to step back and look at our foundations for success. Without the support of past and present Rho Chi executive boards, there would be no Rho Chi Post newsletter. From our May to September issues, we will learn about each of our local chapter's board members on a more personal level. Our insight will predominantly include their nicknames, hobbies, favorite quotes, reasons for accepting the Rho Chi invitation, and motivations for becoming part of the executive board.

Our fifth (and final) executive board member insight is with Albana Alili, current fifth year student pharmacist and Vice President of Rho Chi at St. John's University's College of Pharmacy and Health Sciences.

Q: We all have nicknames, for one reason or another. What have people called you, either in the past or right now in college?

A: Although I have had a variety of nicknames through the years, ranging from banana to Coco, my nickname to my family and friends has always been Bana.

Q: All right, Bana, what are some of the things that you like doing outside of pharmacy?

A: I really enjoy reading and playing basketball in my spare time. Traveling has always been one of my favorite things to do; since my parents are from Europe, I have been able to travel overseas quite often.

Q: Traveling truly is exciting – some upperclassmen are in Europe now for one of their electives! So, what is your favorite quote?

A: "Many eyes go through the meadow, but few see the flowers in it," by Ralph Waldo Emerson, has been my favorite quote for many years now. I remember selecting it as my senior quote for my high school yearbook. It has come to mean much more to me through the years. Initially, the flowers just signified the beautiful things in life that are often overlooked. I now also see them as opportunities that may be missed, people that may not

be appreciated, and significant moments that may pass by unnoticed, particularly if we do not pay attention or value each minute of our lives. I believe that it is a very powerful quote.

Q: Very profound – I agree that we need to be grateful for what we have! Now, when you received an invitation to join the Rho Chi Academic Honor Society, why did you accept it?

A: Achieving membership in Rho Chi was one of my main goals in college. It not only signified the highest honor, in terms of academic excellence, but also leadership in the profession of pharmacy and advancement of students as future leaders and professionals. When I received my invitation, I saw my hard work rewarded and I felt accomplished. Since I wanted to become a part of the organization for what it represented, I really did not have to think twice about my decision to accept the invitation.

Q: Leadership is definitely at the core of Rho Chi. Finally, what were your impetuses for applying to an executive board position?

A: In most organizations that I have been a part of, from Key Club back in high school to APhA and Rho Chi in college, I have been fortunate enough to serve on a number of E-Boards. For me, attaining leadership positions allows me to make differences and get the most out of my experiences. I feel that I have more opportunities to share ideas, and could contribute to the organization through student/community event planning and implementation. I wished to become active in Rho Chi; so, I applied for (and thankfully received) a position on the executive board.

We thank Albana for taking the time to provide us with this insight, and hope that you enjoyed learning more about your Rho Chi executive board members over the last couple of issues.

If you have any additional questions for Albana, please email her at albana.alili08@stjohns.edu

MATCHING CHALLENGE: LOOK-ALIKES, SOUND-ALIKES

BY: ADDOLORATA CICCONE, STUDENT COPY EDITOR

The following medications are easily confused.
Try to match each one with its corresponding fun fact.
If you need help, please view the answers on page 35.

1. This dihydropyridine calcium channel blocker is a suitable first-line agent over beta-blockers or angiotensin-converting enzyme (ACE) inhibitors in African Americans as their hypertension tends to be less renin-driven than that of Whites.
 2. This antiarrhythmic agent is used in the prevention and treatment of both ventricular and supraventricular tachyarrhythmias, including cardioversion of recurrent atrial fibrillation. Its use is limited, however, by many adverse effects associated with its long-term use, including: photosensitivity, skin discoloration, thyroid dysfunction, QT interval prolongation, bradycardia, liver injury, and pulmonary toxicity.
 3. This antibiotic has good gram-negative coverage and is used in urinary tract infections (UTIs), lower respiratory tract infections, skin and skin structure infections, and especially against *P. aeruginosa*. It is important to adjust the dosage in patients with renal dysfunction.
 4. This aminopenicillin antibiotic is used to treat infections of the digestive, genitourinary, and respiratory systems. It should be taken with an 8 ounce glass of water one hour before or two hours after meals on an empty stomach.
 5. This aminopenicillin antibiotic is used to treat infections of the lower respiratory tract, skin and skin structure infections, gonorrhea, *Helicobacter pylori* gastrointestinal infection, streptococcal pharyngitis, and acute otitis media. Regular-release formulations may be taken with or without food; extended-release formulations should be taken within one hour of a meal.
 6. This agent is indicated for use against glaucoma, drug-induced edema, and edema due to congestive heart failure, and is contraindicated in patients with sulfonamide allergy.
 7. This potassium-sparing diuretic is indicated for congestive heart failure and hypertension. It carries a black-box warning against hyperkalemia, which occurs most often in patients with diabetes mellitus, renal impairment, and the elderly; thus, potassium levels must be carefully monitored and patients on this medication should avoid potassium-containing dietary supplements and salt substitutes.
 8. This antimetabolite is used for rheumatoid arthritis and as an adjunct in renal transplant rejection prophylaxis. It carries a black-box warning against risk of malignancy with long-term use of this agent due to chronic immunosuppression.
 9. This anticholinergic agent is indicated for Parkinson's disease and medication-induced extrapyramidal disease. It may cause numerous side effects, including: anticholinergic (dry) symptoms, orthostatic hypotension, peripheral edema, loss of appetite, nausea, confusion, headache, insomnia, agitation, anxiety, depression, hallucinations, vivid dreams, irritability, or worsened mental disorders.
 10. This agent is indicated as an antidote to acetaminophen overdose and a mucolytic agent to break down excess mucous in bronchopulmonary diseases such as cystic fibrosis.
- A. Acetazolamide
 - B. Acetylcysteine
 - C. Amantadine
 - D. Amiloride
 - E. Amiodarone
 - F. Amlodipine
 - G. Amoxicillin
 - H. Ampicillin
 - I. Azathioprine
 - J. Aztreonam

BRAND VS. GENERIC: WHAT EVERY PRESCRIBER SHOULD KNOW BY: MARINA YERMOLAYEVA, PHARM.D. CANDIDATE C/O 2013

"I'm allergic to the generic; I need the brand name medication," is a common claim heard by many health care providers. Managed care organizations get numerous calls from doctors and patients requesting prior authorizations to approve brand name medications whilst there are generic alternatives available on formulary. Much-needed healthcare resources, time, and money can be saved by investing some effort to educate people about the differences (or lack thereof) between brand and generic drugs.

Each medication available on the United States market today has been reviewed and approved by the U.S. Food and Drug Administration (FDA). A company that has invented and synthesized a unique drug may designate this product with a "brand" name, which is usually catchy and easier to pronounce than the official, chemical name for the active ingredient. The company then may legally claim exclusive rights to manufacture this product for up to 17 years from the time of discovery, which is known as a patent.¹ Once this patent expires, other companies are allowed to manufacture the product using the same active ingredient but different fillers, coloring, and packaging; these multi-source products are known as "generics" and go by their chemical names. To differentiate between the two, brand names are usually capitalized and generic names are not.

Generic products must meet stringent requirements set by the FDA. The word "generic" is an adjective that refers to an entire class and is synonymous with "general." It just means that the

generic is not unique and has the same characteristics as another item, in this case, the brand name medication. Under the 1984 Drug Price Competition and Patent Term Restoration Act, generic medications must show the same active ingredient, strength, quality, purity, and potency as the brand name dosage form for entry into the U.S. market.^{2,3}

"...generic medications must show the same active ingredient, strength, quality, purity, and potency as the brand name dosage form for entry into the U.S. market."

Therapeutic equivalence must be proven via several tests. If the generic and brand products show the same concentration profiles in the blood after administration, they are considered to be bioequivalent, and therefore therapeutically equivalent. Bioequivalence studies typically involve studying the pharmacokinetics of the brand and generic formulations in healthy adults (in-vivo) in a randomized, crossover study design.⁴ While bioequivalence studies typically call for only 18—25 healthy volunteers, brand-name clinical trials are required to test hundreds to thousands of people to demonstrate safety and efficacy because virtually nothing is known about the pioneer drug.³ Once safety and efficacy is established for a brand medication, bioequivalence studies are considered sufficient evidence to validate a generic drug. Two different formulations of the same drug are considered to be bioequivalent when the total extent of absorption (AUC, area under the curve), maximum serum concentrations (C_{max}), and the times to C_{max} (t_{max}) are neither statistically nor clinically significantly different. The serum-concentration-versus-time curves for the two dosage forms should be identical.⁴ This data is published in the Orange Book. There are some exceptions to the in-vivo bioequivalence requirements. Bioequivalence of intra-



From fda.gov⁷

venous (IV) or oral solution dosage forms are inferred; and, some older drug formulations for which no bioequivalence issues are anticipated are only required to submit in-vitro dissolution tests to the FDA.³

According to the official FDA website, all generic manufacturing, packaging, and testing sites must pass the same quality standards as those of brand name drugs. In fact, many generic drugs are made in the same manufacturing plants as brand name drug products.² FDA inspectors evaluate each site to ascertain that Good Manufacturing Practice regulations are followed; samples of all drug products are randomly collected and sent to FDA laboratories for evaluation.³ Furthermore, the FDA imposes the same post-marketing surveillance tactics on generic products as it does on brands. Programs such as MedWatch are in place for health care workers and patients to report adverse reactions. These reports are investigated when necessary, and appropriate action is taken to ensure that only safe products are available on the U.S. market. The FDA also encourages more extensive research to investigate which inactive ingredients are problematic among generics.²

“.. all generic manufacturing, packaging, and testing sites must pass the same quality standards as those of brand name drugs.”

If the regulations are not enough to convince health care professionals, there is published evidence of pharmacokinetic equivalence between brand and generic medications. The FDA recently reviewed 2,070 human studies conducted between 1996 and 2007 to compare absorption of brand name and generic drugs by the human body.² These studies were submitted to FDA to support approval of generics. The average difference in absorption between the generic and brand name was 3.5 %.⁵ This amount is considered negligible and not expected to have clinical impact. Even studies comparing batches of the same brand-name drug to itself, or to other brands, showed

slight variability in absorption. The difference for the generic-to-brand comparison was about the same as the brand-to-brand comparison in this analysis. The FDA permits very small variations in purity, size, strength, and other parameters for mass-produced brand and generic products.²

Clinical benefit was evaluated by a retrospective meta-analysis of cardiovascular brand and generic drug outcomes published in the Journal of American Medical association. The authors pooled articles from peer-reviewed health care-related journals between January 1984 and August 2008.⁶ In total, 47 articles [38 (81%) of which were randomized controlled trials (RCTs)], covering 9 subclasses of cardiovascular medications were identified and included in the analysis. Clinical equivalence was found in RCTs of β -blockers (7/7 RCTs), diuretics (10/11 RCTs), calcium channel blockers (5/7 RCTs), antiplatelet agents (3/3 RCTs), statins (2/2 RCTs), angiotensin-converting enzyme inhibitors (1/1 RCT), and α -blockers (1/1 RCT). Furthermore, clinical equivalence was also detected among narrow therapeutic index drugs [1/1 RCT of class I antiarrhythmic agents and 5/5 RCTs of warfarin].⁶ The overall data (n = 837) did not indicate a statistically significant difference between the effect of brand and generic drugs. Despite these findings, the same study found that more than half of published editorials [23 of 43 (53%)] published during the same time period recommended against generic drug substitution.⁶

In addition, allergies to medication warrant special attention and avoidance of the offending drug. However, identifying the causative agent as well as the type of allergy is key to determining how to manage each patient. If the main pharmaceutical ingredient is causing a life-threatening reaction (anaphylaxis, toxic skin reactions, ect.), all brand and generic products with that ingredient are contraindicated. If, however, the patient is found to be allergic to an inactive excipient, he or she may benefit from a different pharmaceutical formulation with different fillers and dyes. Each generic company will have their own combina-

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tions and ratios of excipients, so being allergic to one company's product does not warrant switching to a brand; instead, a different generic product from another manufacturer can be tried. Health care practitioners should also differentiate between true allergies (immunologically mediated) and intolerances, or adverse reactions, to a drug product. For example, if a patient has gastrointestinal upset or dyspepsia in response to a medication, these side effects can be managed (by taking the medication with food) rather than discontinuing or switching the medication.

As for patients that claim their generic medication is "not working" as well as the brand, there is no scientific evidence to support these claims based on the aforementioned FDA regulations and clinical studies. Patients may extrapolate these theories from unfounded preconceived notions that generic drugs are inferior to brands. If the patient is really not experiencing a clinical improvement, it is likely that the failure is due to the active ingredient and not the excipients. Perhaps a different agent from the same therapeutic class should be tried, or even one from another class. A patient may respond differently to certain drug characteristics unique to the active ingredient. If the patient and doctor feel that the generic version of the medication is the underlying cause of treatment failure, a different generic manufacturer can be requested before resorting to a brand.

"A patient may respond differently to certain drug characteristics unique to the active ingredient"

The lower price of generics only adds to the suspicion of their inferiority among patients, since a higher price is generally associated with greater benefit or safety. In fact, while the original brand-name manufacturer spent millions of dollars on research, discovery, synthesis, and approval of the medication, the generic manufacturer skips these costs and must only ascertain that their drug is bioequivalent and comparable to the brand-name product for market approval. This is the reason that generic companies are able to charge less for

the same active medication and still make up their cost and accrue profit. On average, the cost of a generic drug is 80—85 % lower than its brand counterpart.²

Finally, reluctance to use a generic product may result in therapy interruption. Patients are often left without any medication in the time it takes to acquire authorization from a third party payer for a non-formulary brand name drug. It is a time consuming process to get the prescription to the pharmacy, alert the doctor of an authorization block, have the doctor call the insurance plan and explain the situation, and ultimately allow the pharmacy to activate the authorization and dispense the drug. This may take up to a few days, and the patient may not receive any medication in the meantime, not wanting to pay for it out of pocket. If only the misconceptions about generic medications could be exposed and eradicated, this could be avoided.

In the majority of cases, substituting drugs within the same therapeutic class is reasonable and safe; the only exceptions are narrow therapeutic index drugs and antibiotics. For example, some of the most popular formulary-exception and prior authorization requests are for brand-name proton pump inhibitors (PPIs). There are currently six brand-name medications (Protonix® [pantoprazole], Nexium® [esomeprazole], Aciphex® [rabeprazole], Prevacid® [lansoprazole], Dexilant® [dexlansoprazole], Prilosec® [omeprazole]) and three generic medications (pantoprazole, omeprazole, lansoprazole) on the U.S. market. These agents have the same mechanism of action and similar pharmacokinetic properties and side effect profiles. Few head-to-head clinical trials have been executed comparing the effectiveness among these agents; therefore, it is difficult to judge which one will optimally benefit an individual patient. If the patient's formulary does not cover a drug prescribed by a clinician, it may be permissible to substitute not only with a generic product, but with any other PPI. Clinical outcomes are expected to be the same among these agents, as long as adequate dosing is

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achieved and the patient is not subjected to undue interruptions in treatment.

In some clinical cases, it is preferred to use brand-name products or be consistent with the generic manufacturer of one's medication. Drugs with narrow therapeutic indices, such as Dilantin® (phenytoin), Lanoxin® (digoxin), Synthroid® (levothyroxine), and Coumadin® (warfarin) should not be substituted.¹ Patients stabilized on one company's formulation should remain on it for adequate therapeutic control.

"In the majority of cases, substituting drugs within the same therapeutic class is reasonable and safe; the only exceptions are narrow therapeutic index drugs and antibiotics."

As healthcare costs continue to skyrocket, managed care organizations are scrambling to cut down costs. One cost-saving method is to substitute brand medications with their generic equivalents on formularies whenever possible. In 2010 alone, the use of FDA-approved generics saved \$158 billion, an average of \$3 billion every week.³ Patients still benefit from the active ingredients, with significant decreases in insurance and co-payment costs. Health care practitioners should take the time to educate patients on the concept of brand and generic medication to help develop an affordable, individualized, consistent therapy plan acceptable and beneficial to the patient.

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and we will feature your article in our next issue!**

MATCHING CHALLENGE: LOOK-ALIKES, SOUND-ALIKES (ANSWERS) BY: ADDOLORATA CICCONI, STUDENT COPY EDITOR

Go back to Page 30?

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

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Top: Always a popular destination, 2012 ASHP Midyear Meeting and Exhibition is heading to Las Vegas and is set to be a record breaking meeting! This year's meeting will be held at the Mandalay Bay Hotel with many affiliate events also taking place at the MGM Grand, the co-headquarter hotel. Not only does this new venue offer more to our attendees, but as the “entertainment capital of the world”, Vegas offers something for everyone and we are sure after sessions conclude there will be lots of thrilling activities.

The conference is for pharmacy students of all years to make connections and learn more about the unique opportunities within the pharmacy world. Discover the path for your future today, book now at: <http://connect.ashp.org/midyear2012/Home/>

Image Credit: Presbyterian College of Pharmacy - <http://pharmacy.presby.edu/organizations/the-midyear-meeting/>

RHO CHI POST: EDITORIAL TEAM

CO-EDITORS-IN-CHIEF



@ Steve P. Soman (6th Year, STJ)

Previously known as Ebey P. Soman, I really enjoy writing very opinionated articles. I strongly encourage all readers of our newsletter to respond with their own literary pieces. I look forward to hearing from you, and welcome your comments and constructive criticisms!

@ Neal Shah (6th Year, STJ)

I frequently assist several professors on campus with their research. My goal is to provide my fellow students with research-based information that correlates with clinical pharmacotherapy. If you have any topics of interest or comments on currently-published articles, please do not hesitate to email me!



STUDENT EDITORS



@ Mahdieh D. Yazdi (6th Year, STJ)

I like to stay current with all the changes in our profession, both legal and clinical. I hope to keep you informed with all that I learn. Please enjoy Rho Chi Post, and provide us detailed feedback so that we may improve our newsletter.

@ Mohamed J. Dungersi (6th Year, STJ)

I am enthusiastic about promoting the pharmacy profession, and what better way to do this than by being a part of the Rho Chi Post? Should you have any comments or concerns, feel free to contact me!



@ Marie Huang (6th Year, STJ)

I am in a continuous process of self-definition, and constantly testing the boundaries of this world. I enjoy channeling my inspiration through words and photographs. As a witness to an evolving profession, I look forward to keeping you updated! Who knows where we will be tomorrow?

@ Shannon Tellier (6th Year, STJ)

I believe it is important for students and everyone else in the profession to stay informed about current pharmacy events. Rho Chi Post is a great way to continue learning information about what is happening on our campus and in the nation.



@ Addolorata Ciccone (6th Year, STJ)

I am thrilled to serve as a Co-Copy Editor of Rho Chi Post. Whether you are brand new to the world of pharmacy, a seasoned veteran of this profession, or anywhere in between, I hope you find our work engaging, relatable, and informative. I look forward to reading your comments and feedback.



CO-COPY EDITORS



@ Aleena Cherian (5th Year, STJ)

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

RHO CHI

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

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

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

THE RHO CHI POST

MISSION

The Rho Chi Post 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 is the most exciting and creative student-operated newsletter within the St. John's University College of Pharmacy and Health Sciences. Our newsletter is known for its relatable and useful content. Our editorial team members are recognized for their excellence and professionalism. The Rho Chi Post sets the stage for the future of student-run publications in Pharmacy.

VALUES

Opportunity, Teamwork, Respect, Excellence

GOALS

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

CURRENT EXECUTIVE BOARD



Bethsy, Albana, Yining, Elizabeth, and Aleena at the 2012 Induction Ceremony

President: **Yining Shao**

Vice President: **Albana Alili**

Secretary: **Elizabeth Mo**

Treasurer: **Aleena Cherian**

Historian: **Bethsy Jacob**

Faculty Advisor: **S. William Zito, PhD**

UPCOMING EVENTS

Sep 5-7: International Conference on CNS
Drugs Effects & Novel Drug Development
DoubleTree by Hilton, Philadelphia, PA

Sept 6: College of Pharmacy and Health Sciences
Name Change Ceremony
St. John's University, Queens, NY

Sept 10-17: Pharmacology for Advanced
Practice Clinicians
Hyatt Regency, San Francisco, CA

Sept 18: Pharmaceutical & Biotech Patent
Litigation Training
Novotel Barcelona City, Barcelona, Spain

Sept 19-20: 3rd Annual Pharmacovigilance Asia
Amara Hotel, Singapore

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