

RHO_{Rx}CHI post

VOLUME 3, ISSUE 1

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

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Meet the Dean: Interview with Dean DiGate

By: Katharine Cimmino, Editor-in-Chief and Erica Dimitropoulos, Senior Staff Editor

Just last month, St. John's University College of Pharmacy and Health Sciences kindly welcomed a new Dean into our family, Dean Russell J. DiGate. Dean DiGate is a highly experienced educator and academic leader. He attended the University of Rochester, where he earned a B.A., M.A., and Ph.D. in Biology. He was formally the Provost of the University of the Sciences in Philadelphia, the Dean of the Philadelphia College of Pharmacy, and a Professor and Chairman of the Department of Pharmaceutical Sciences at the University of Maryland School of Pharmacy. Dean DiGate is also a researcher, an internationally recognized expert in the field of topoisomerases and DNA replication. Now, he is back to his hometown of New York to serve as our Dean in Queens, with a new set of objectives. Dean DiGate was particularly attracted to our school for two main reasons- its Vincentian mission, and the fact that we are a college that encompasses all health sciences, not just pharmacy. Therefore, he aims to lead a college that embodies altruistic values and promotes top of the line healthcare. Our interview with him further elucidated his goals and plans to carry out the mission of both our College and University.



[Read the Full Interview on Page 24](#)

Single Line Stories

- Rho Chi Post Informational Session On October 21st -
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Hope For Children with Acute Lymphoblastic Leukemia

By: Ada Seldin, Staff Editor

Emily Whitehead, a 7-year-old girl who fought off relapsing acute lymphoblastic leukemia (ALL), has captured the hearts and prayers of the masses. Her story is an inspiration to those battling any disease with a poor prognosis and particularly holds promise for the 15% of children with ALL resistant to intensive chemotherapy. Emily was one of two children who enrolled in an experimental T-cell therapy involving CTL019, a chimeric antigen receptor with specificity for CD19 on B-cells. Within a month of therapy, she demonstrated an astounding recovery and has been in remission since.¹

In acute lymphoblastic leukemia, immature lymphocytes in the bone marrow, known as lymphoblasts, remain in their immature state. T-cells normally recognize these mutated cells and kill them before they are able to multiply exponentially, but in the case of this disease, the abnormal cells remain undetected. The disease progresses quickly as the cancerous blast cells spread to the blood, liver, spleen, and lymph nodes.² The premise of the experimental treatment was to reengineer the patient's T-cells to express anti-CD19 receptors that would target and destroy the invading B-cells. This procedure had already been successfully carried out in three adult patients with chronic lymphoblastic leukemia, but the effects on children with ALL were still uncertain.³

Emily had been diagnosed with acute lymphoblastic leukemia two years before initiating the experimental therapy. Prior to her participation in the study, her disease had relapsed, and several rounds of high-dose chemotherapy were performed with little avail.¹ For the study, a sample of Emily's and the other patient's T-cells were extracted and engineered to express the chimeric antigen receptor using lentiviral-vector technology. The cells were subsequently infused into the patients' blood stream over a period of three days.³

One month after the CTL019 infusion, both patients experienced morphologic remission which is defined by less than 0.01% of residual disease. As hoped, the chimeric T-cells multiplied in the blood and bone marrow to levels more than 1000 times that of the original levels introduced into the body.

Much to the researchers' surprise, the CTL019 colony also spread to the cerebral spinal fluid, a phenomenon that had not been observed in previous studies with adults. Furthermore, researchers had not predicted CTL019 migration into the CSF because neither child had detectable central nervous system leukemia. Such findings identify chimeric antigen receptor-modified T-cells as a means of preventing lymphomas from spreading to the CNS and as potential treatment modalities against primary CNS cancers.³

Emily's recovery was nothing short of a miracle. The other child's cancer, however, proved to be more resilient. The cancerous blast cells reappeared in the circulatory system two months after CTL019 infusion. They had mutated to no longer express CD19, thereby evading the T-cells that depend on this antigen for recognition. According to evidence uncovered by IGH sequencing, the CD19- clone was present in the peripheral blood and bone marrow as early as day 23. The probability of this event occurring in future patients can be reduced by the addition of chimeric T-cells with different antigen receptors, such as CD22. In addition, because this event has not yet occurred in adults with CLL, researchers have reason to believe that it is specific to a certain subset of acute leukemias.³

Although CTL019 therapy clearly demonstrates anti-leukemic effects, it is not devoid of safety issues. Both children experienced acute toxicity secondary to the cytokine-release syndrome, including high fevers. Emily was transferred to the pediatric intensive care unit on day 5 as her condition necessitated ventilation and blood-pressure support. The new population of T-cells had released a surge of cytokines, which in turn, caused systemic inflammation. Glucocorticoids were not successful, but the anticytokine monoclonal antibodies etanercept and tocilizumab brought Emily back to normal within hours. Both patients also displayed laboratory evidence of the macrophage activation syndrome, namely elevated levels of ferritin, aminotransferase, triglycerides, and serum D-dimer.³

The use of T-cells to treat leukemia is still under investigation and much remains to be learned. As such, it is not employed first-line in children newly

diagnosed with acute lymphoblastic leukemia, because many of them will benefit from standard chemotherapy. It is, however, a viable option for patients with relapsing disease. In the last decade, scientists have turned to immunotherapy, which involves manipulating the host's immune cells to eradicate cancerous cells. An unprecedented advantage of CTL019 is that the reengineered T-cells are able to thrive in the body, reaching adequate numbers to induce remission of disease.⁴ With further data and improvements, T-cell therapy may just prove to be the perfect cure.

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Ketoconazole No More

By: Hayeon Na, Co-Copy Editor [Content-Focused]

Ketoconazole (Nizoral®) is an antifungal medicine once used to treat infections caused by dermatophytes and yeasts.¹ Dermatophytes are the most common fungal infections in humans, invading the keratinized areas of the body (hair, nails, and skin).² Ketoconazole prevents the growth of several types of fungi by disrupting the production of fungal cell membranes. The FDA approved Ketoconazole in June 1981,³ after the EU authorized it in 1980.¹ Later, topical formulations such as creams, ointments, and shampoos became available.³

On July 26th the Food and Drug Administration (FDA) announced that oral dosage forms of ketoconazole (Nizoral®) should no longer be prescribed as first-line therapy for any fungal infections.⁴ The label and indication for oral ketoconazole were updated, and a new medication guide was added. However, because of their limited systemic absorption, other dosage forms of the drug (creams, ointments, and shampoos) were not included in this change.⁴

These recent changes were fairly drastic. The FDA withdrew the indication for *Candida* and dermatophyte infections. Oral ketoconazole is now only indicated as second-line therapy for life-threatening fungal infections called endemic mycoses

(blastomycosis, coccidioidomycosis, histoplasmosis, chromomycosis, and paracoccidioidomycosis), when first-line treatments have failed, alternatives cannot be found, or the patient cannot tolerate others.⁵ The FDA also revised the Black Box Warning, added a contraindication for patients with liver disease, and included new recommendations for assessing and monitoring patients for liver toxicity while taking oral ketoconazole.⁵ These seemingly abrupt changes were triggered by the recent recommendation for the withdrawal of ketoconazole from the EU national markets by the European Union (EU) drug regulators.¹

In a news release on July 25, 2013, the European Medicine Agency (EMA) stated that the "benefit of oral ketoconazole does not outweigh risk of liver injury in fungal infections" in early stages of treatment at recommended doses (200mg – 400mg/day in a single dose),⁶ and that other antifungals have a lower incidence of liver injury. The reported cases of hepatotoxicity in ketoconazole use include hepatitis, cirrhosis, and liver failure that may require transplantation or may even result in death.¹

In July of 2011, the French National Agency of Medicine and Health Products Safety (ANSM) suspended the marketing authorization of ketoconazole

due to the unfavorable risk-to-benefit ratio. All oral dosage forms were withdrawn from the market except for those in hospitals. In cases such as Cushing's syndrome in an in-patient setting, individual patients needed to be granted temporary authorization for use (ATU) by the French Drug regulatory body (AFSSAPS) after assessments of risk-to-benefit ratios.⁵ ANSM requested that an EU-wide review be conducted according to the European legislation, which requires that "there is a coordinated European approach when a Member State takes a regulatory action in relation to a medicine authorized in more than one country."¹ While the EU conducted a review of the medication, ANSM noted that alternatives should be used in lieu of the high-risk medication.⁷

At the end of the review, the Committee on Medicinal Products for Human Use (CHMP) of EMA stated that data on the efficacy of Ketoconazole is "limited and does not meet current standards."¹ This conclusion was made by consulting available data from preclinical, clinical, and post-marketing studies, as well as case reports, epidemiological studies, expert opinions, and current scientific literature. According to the recommendation by CHMP, patients currently on the medication should make appointments with doctors who will review the patients' state and either stop therapy or find alternatives, because other measures to reduce the risks associated with Ketoconazole cannot be identified.¹ The EMA website states that the CHMP opinion will now be sent to the European Commission for a legally binding decision.

Clinicians should not prescribe oral Ketoconazole to anyone who has an underlying liver disease.⁸ The FDA recommends that health care professionals assess liver status with values for alanine aminotransferase (ALT), aspartate aminotransferase (AST), total bilirubin, alkaline phosphatase, prothrombin time (PTT), and international normalized ratio (INR), in patients with and without liver problems before starting the medication. Patients who are on Ketoconazole should be monitored weekly for ALT values to detect liver damage. If the patient develops symptoms of abnormal liver function, if the ALT level increases more than 30% from baseline, or if the ALT level reaches above the upper limit of normal level, the treatment should be discontinued and a full set of liver tests should be performed and repeated to en-

sure normalization.⁵

Although keeping up with the FDA updates on medications can be difficult and time-consuming, it is necessary for practitioners to be aware of changes. Because various professionals work together in patient care, there are numerous opportunities for error prevention. Pharmacists who encounter prescriptions for oral Ketoconazole should consult the prescriber about the new recommendations before dispensing the medication to make sure that the patient is receiving optimal care.

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BRAIN Initiative: Mapping the Human Brain

By Erica Dimitropoulos, Senior Staff Editor

If you were in charge of government spending, how would you allocate our funds? Would you put more money into public schools? Restructure the healthcare system? How about a multi-billion dollar project to remap the brain? A few months ago, President Obama announced his plans to invest in the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) initiative. The project is expected to cost billions of dollars over the course of a decade, and it will be led by the National Institutes of Health (NIH), the Defense Advanced Research Projects Agency (DARPA), and the National Science Foundation (NSF).^{1,2}

But what exactly does “mapping the brain” entail? We currently have the capacity to record the activity of up to hundreds of neurons in action using technol-

ogy such as magnetic resonance imaging (MRI), electroencephalography (EEG), positron emission tomography (PET), and many more. However, these machines are considered low-resolution and too slow to depict detailed neuronal activity. Therefore, the goal of the BRAIN initiative is to trace the function of hundreds of thousands of neurons as they interact,

and to understand how each neuronal circuit behaves in time and space to allow us to process information at extraordinary speeds.³ In other words, we want to understand how the brain engages in conversation with itself, or “thinks,” and changes over time.

John Donaghue, professor at Brown University, described our currently technology as “looking at a page of TIME from six feet away...you can get a general idea of what’s going on and maybe read

“As humans we can identify galaxies light-years away, we can study particles smaller than an atom,” President Barack Obama said. “But we still haven’t unlocked the mystery of the three pounds of matter that sits between our ears.”

BACK TO COVER

the headline but you can't [understand] the text."² In line with this analogy, he explained how our current intention should not be to take a microscope and look at every ink imperfection of each letter on the page either; "What's missing is that middle level of analysis" or, in other words, how the brain makes everything come together.² It is therefore time to create a completely new technology using knowledge from medicine, engineering, computational science, and other disciplines.

It appears that members of the BRAIN team are still debating exactly how the money and time devoted to this project should be spent. Careful planning is certainly important, and direction for such a large task can be hard to find. In fact, mapping the brain is thought to be much more difficult than mapping the genome, for there is no clear endpoint to our knowledge.⁴ However, although the BRAIN initiative may seem a little far-fetched and underdeveloped, a few years from now we will be closer to understanding the core of our humanity. The benefits of this project are tremendous, as it will help us gain insight into treatments for various neurological conditions, such as Alzheimer's disease, schizophrenia, epilepsy, and the consequences of strokes and traumatic brain injury. Furthermore, perhaps we could even learn how the mind creates and erases memories and apply that information to psychological ailments such as obsessive-compulsive disorder (OCD) and post-traumatic stress disorder (PTSD). Regardless of these opportunities, many scientists and philosophers argue

that the brain is not the mind, and there is a long journey ahead of us in truly understanding how matter can become conscious of itself, or, what exactly makes us human.

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Canagliflozin (Invokana®): New Type 2 Diabetes Drug

By: Sang Hyo Kim, Staff Editor

On March 29th 2013, the U.S Food and Drug Administration approved canagliflozin (Invokana®), a new form of a diabetic drug for patients with type 2 diabetes mellitus.¹ Canagliflozin is in a new class of medications called sodium glucose co-transporter 2 (SGLT2) inhibitors and is the only oral, once-daily medication that has demonstrated to improve glycemic control, and reduce body weight, and reduce systolic blood pressure in clinical trials.¹ Invokana®, manufactured by Johnson & Johnson, is different from existing drugs in that it causes excess blood sugar to be excreted in the urine rather than affecting the supply or use of insulin in the pancreas.²

Type 2 diabetes mellitus is a chronic condition that affects the body's ability to metabolize glucose and is characterized by impaired pancreatic beta cell function that cannot keep up with the body's demand for insulin.¹ Approximately 26 million Americans have diabetes, of which 90 to 95 percent is type 2.¹ According to the U.S national data, from 2007 to 2010 nearly half of the adults with type 2 diabetes did not achieve recommended levels of glucose control.¹

Canagliflozin works by inhibiting sodium glucose co-transporter 2 (SGLT2), an important carrier responsible for the re-absorption of glucose from the kidneys back into the bloodstream. As canagliflozin inhibits SGLT2, it promotes the loss of glucose in the urine, thus lowering blood glucose levels.¹

The safety and efficacy of canagliflozin were tested in nine clinical trials, involving over 10,285 patients with type 2 diabetes. The trials showed that canagliflozin improved hemoglobin A1C levels, a measure of blood sugar control.³ Results further showed that 100 mg and 300 mg doses of Invokana® improved the patient's glycemic control and, at some prespecified secondary endpoints, patients

had significant reduction in body weight and systolic blood pressure.¹ When comparing canagliflozin to current standard treatments such as sitagliptin (Januvia®) and glimepiride (Amaryl®), Invokana® dosed at 300 mg had a greater reduction in A1C levels and body weight than either competitor.¹

Despite positive outcomes, canagliflozin showed some disadvantages during the trials. Although canagliflozin raised levels of HDL, or "good cholesterol", it also raised levels of LDL, also known as "bad cholesterol." The clinical trials also revealed signs of stroke risk and experiences of small heart attacks in patients taking the medication during the first 30 days. According to an F.D.A spokesman, however, warnings of increased stroke/heart attack risk do not appear on the label because the significance of the findings are unclear. To further evaluate these adverse effects, the F.D.A is requiring Johnson & Johnson to implement five post-marketing studies.²

Canagliflozin is not for patients with type 1 diabetes or diabetic ketoacidosis.⁴ It is also not known yet if canagliflozin is effective in patients that are eighteen years of age and younger.⁴ People with moderate to severe kidney disease should not take canagliflozin since there is a higher risk for negative side effects compared

to people with normal kidney function.² The major side effects of canagliflozin include vaginal infections, penis yeast infections, urinary tract infections, and increased frequency of urination.^{2,4} Because of canagliflozin's diuretic effect, it can cause reduction in intravascular volume, which may lead to orthostatic or postural hypotension and/or sudden drops in blood pressure when standing up during the first three months of therapy.³ Canagliflozin is a prescription medicine designed to be used in adjunct to diet and exercise to lower blood sugar.

Due to its infancy on the market, we cannot say with certainty what doses of Invokana® will be com-

"Canagliflozin is in a new class of medications called sodium glucose co-transporter 2 (SGLT2) inhibitors and is the only oral, once-daily medication that has demonstrated to improve glycemic control, and reduce body weight, and reduce systolic blood pressure in clinical trials"

monly prescribed to diabetic patients. Last year, the FDA rejected another drug in the class of SGLT2 inhibitors called dapagliflozin because of its adverse effects, including increased risk for breast and bladder cancers.² However, dapagliflozin was approved in Europe in November under the trade name of Forxiga®.² Johnson & Johnson is also seeking approval in Europe for Invokana®, which was first licensed by Mitsubishi Tanabe Pharma Corporation in Japan.²

Wall Street predicts that canagliflozin can increase profits for Johnson & Johnson. According to Lawrence Biegelsen from Wells Fargo, an American multinational banking and financial services holding company with operations around the world, the drug can bring in an estimate of \$111 million in 2013 and up to \$667 million by 2016.² These statistics show that canagliflozin will compete with the rest of the diabetic treatments in the pharmaceutical industry. However, healthcare providers must see beyond the profits and carefully observe for adverse reactions and whether canagliflozin will improve a patients' quality of life.

New Treatment for a Deficiency in Iron-Supplement Therapies

By: Davidta Brown, Staff Editor

For the estimated 7.5 million individuals in the United States living with iron deficiency anemia (IDA), there is now a new alternative to iron supplements or time-consuming, repetitive infusions. On July 25, 2013, the FDA approved ferric carboxymaltose injection (Injectafer®) for the treatment of IDA, especially in patients who cannot tolerate or have poor responses to oral iron.^{1,2} The iron injection is produced by American Regent Inc., a division of the Swiss company Luitpold Pharmaceuticals Inc., and is the first high-dose, non-dextran, intravenous iron treatment offered for a wide variety of patient profiles.¹

Ferric carboxymaltose injection (Injectafer®) is an iron replacement product intended for individuals with iron deficiency caused by, or concurrent with, cancer, various gastrointestinal disorders, abnormal

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uterine bleeding, or chronic kidney disease.³ The most unique benefit that this treatment provides over traditional IDA management methods is the significant decrease in administration time. While most non-dextran iron infusions must be given as multiple doses, spread out over the course of several weeks, a full treatment with Injectafer® can be administered in one 15-minute dose.^{1,4}

The success of the new IDA treatment in patients with diverse causes of iron-deficiency was confirmed through two major, randomized clinical trials. The first trial, in which 94% of the patients were female and the primary etiologies were heavy uterine bleeding and disorders of the GI tract, intended to observe the efficacy of ferric carboxymaltose injection in patients who were intolerant to or had previously displayed an unsatisfactory response to oral

iron supplements.² In the second trial, most of the patients had chronic kidney disease, specifically of the type in which patients were not dependent on dialysis.² In both trials, Injectafer® was administered either at a dosage of 15mg/kg of body weight, up to a maximum single dose of 750mg, or as two separate doses separated by at least a week, up to a maximum cumulative dose of 1500mg.¹

The results of each trial indicated a greater improvement in hemoglobin levels when Injectafer® was administered rather than an alternative source of iron, though the benefits were greater among patients in the first clinical trial. For example, the maximum change in hemoglobin levels on average was 1.6g/dL for trial 1 participants, who received ferric carboxymaltose injections, as opposed to 0.8g/dL for those who received oral iron.² Individuals in the kidney disease trial who received Injectafer® were compared to those receiving another common iron injection for people with kidney disease, iron sucrose injection (Venofer®).² The increase in hemoglobin was less significant here, with levels of 1.1g/dL on the new treatment in comparison to 0.9g/dL on the old.²

Since the creators of Injectafer® intended for the drug to serve a wide variety of patients, it was important that any side effects that appeared during the clinical trial period be minimal. Fortunately, the results of both trials were positive in this regard. The most common reaction was dizziness or nausea immediately after the administration of ferric carboxymaltose injection, and this occurred in only 6% of the

tested subjects.³ In addition, hypertension was noted in 3.8% percent of the patients involved in the clinical trial.³ The most serious reactions were anaphylactic in nature, and side effects of this sort were displayed in 0.1% of the subjects.³

Luitpold Pharmaceuticals Inc. intends to manufacture and market Injectafer® internationally, under the name Ferrinject®.¹ At present, the Swiss pharmaceutical company is the only one producing ferric carboxymaltose injections for IDA. However, if the alternative treatment stands the test of time and continues to meet the unique needs of individuals with iron-deficiency anemia, there is no doubt that other companies will join Luitpold Pharmaceuticals in this newly created facet of the iron-supplement market.

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New Drug to Treat HIV-1 Hits the Market

By: Ada Seldin, Staff Editor

On August 12, 2013, a new weapon against HIV-1 infection was added to the existing armada. Dolutegravir, the third integrase strand transfer inhibitor to attain FDA approval, targets a protein essential to HIV replication. HIV-1 is the predominant type of HIV virus, the other being HIV-2, which is endogenous to West Africa. Although both types of the virus cause clinically indistinguishable AIDs, HIV-1 is more easily transmitted and has a shorter incubation period.¹ Because HIV therapy is so patient-specific and often involves a combination of agents, dolutegravir has the potential to enhance drug regimens. It is approved for use in treatment-naïve as well as treatment-experienced adults and children over 12 years of age who weigh at least 40 kg. The only distinction between the populations is that children who have previously taken raltegravir, another integrase strand transfer inhibitor, are not eligible for dolutegravir while adults can take the drug.² HIV integrase processes and transports viral DNA into the nucleus, where integration into the host genome occurs. Integration allows the viral DNA to be transcribed into mRNA, which is subsequently translated into viral proteins. Dolutegravir works by binding to integrase and blocking the incorporation of viral DNA into the host genome.³

Dolutegravir's safety and effectiveness were established by four clinical trials involving 2,539 subjects. The randomized, multicenter, double-blind, active-controlled studies, SPRING-2 and SINGLE, provided evidence of the efficacy of dolutegravir in treatment-naïve adults. In SPRING-2, dolutegravir was compared with raltegravir, and the results showed no significant difference in efficacy between the two. In SINGLE, dolutegravir in combination with Epzicom® was shown to be superior to just Atripla®. Treatment-experienced patients who had never received another integrase strand transfer inhibitor were tested in the trial SAILING, during which they were randomized to take either dolutegravir or raltegravir along with a background regimen. This time, dolutegravir actually outperformed raltegravir by 9.7% (95% CI: 3.4 – 15.9%). The multicenter, open-label, single-arm VIKING-3 trial studied the

effects of dolutegravir on patients who had inadequate responses to other antiretroviral therapy and had evidence of raltegravir and/or elvitegravir resistance. These patients were given dolutegravir twice daily with the current failing background regimen for 7 days and were then switched to an optimized background therapy. The primary endpoint, the mean reduction from baseline in HIV-1 RNA at Day 8, was 1.4 log₁₀ (95% CI: 1.3 log₁₀-1.5 log₁₀). Data on pediatric patients were obtained from a fifth trial called IMPAACT. At week 24, 70% of the 23 subjects ages 12 to 17 who had received a once daily dose of dolutegravir in combination with background therapy achieved a viral load <50 copies/ml.⁴

Based on information gathered during the aforementioned clinical trials, in addition to Phase I and II studies, the recommended dosage of dolutegravir is 50 mg once daily for integrase strand transfer inhibitor-naïve patients and 50 mg twice daily for INSTI-experienced patients with suspected resistance. Certain drugs, such as rifampin, efavirenz, fosamprenavir/ritonavir, and tipranavir/ritonavir, are potent inducers of UGT1A1/CYP3A, and thus coadministration with these agents necessitates a dosage adjustment to 50 mg twice daily. Coadministration with dofetilide is contraindicated due to potentially life-threatening events. Cation-containing products, such as antacids, laxatives, oral iron or calcium supplements, or buffered medications, should be taken two hours before or six hours after drug administration.

Dolutegravir's safety profile appears favorable. The most common adverse reactions associated with the drug are insomnia and headache. Patients with underlying hepatitis B or C are at increased risk for worsening transaminase elevations.⁴

Dolutegravir is marketed by ViiV Healthcare and manufactured by GlaxoSmithKline under the trade name, Tivicay®.² Since its ravaging emergence in the 1980s, HIV has gone from a deadly killer to a manageable disease state. Our knowledge of the viral machinery used to invade and replicate within our cells has led to the discovery of numerous drug enti-

BACK TO COVER

ties. Thanks to HAART (highly active antiretroviral therapy), a combination regimen of several antiretroviral drugs, people with AIDs can live longer, healthier lives. Dolutegravir represents the continued effort of scientists to expand treatment options for people afflicted with HIV and improve their prognoses.

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Nattokinase use in DVT Prophylaxis

By: Samad Tirmizi, PharmD Candidate c/o 2014

Deep vein thrombosis (DVT) is a clot formation that occurs within deep veins, generally in the legs. This can cause swelling and pain due to the engorged vessels, and can eventually result in further complications such as a pulmonary embolism. Patients at high risk for DVT are given prophylactic treatment to prevent such an occurrence. Some people at high risk include long term hospitalized patients, post-surgical patients, pregnant women, and people who fly for extended periods of time.¹ Prophylactic treatment generally involves use of anticoagulants such as heparin, warfarin, or thrombolytic medications, but there is a fairly high risk of bleeding associated with these drugs. Currently, there are very few known homeopathic options available for patients who would fit the need for DVT prophylaxis.¹

It is theorized that a product called Nattokinase can be used for prevention of deep vein thrombosis. Nattokinase is a serine protease found in soybeans that contains fibrinolytic properties. It is known to be stable in a pH range from 6 to 12, but inactive in acidic environments.^{2,3,4} Studies have demonstrated that Nattokinase is absorbed across the intestinal tract of rats.⁵

Nattokinase lacks clinical studies to show safe and effective dosing. There is neither pregnancy information, nor any interaction information currently available.⁶ Additionally, no reports of adverse reac-

tions have been documented in the trials evaluating nattokinase. However, an acute cerebellar hemorrhage case report in a patient with history of ischemic stroke results in a theoretical risk of bleeding.⁶ Nattokinase should also be avoided in patients with peptic ulcer disease or coagulation disorder, pre- or post- surgery patients, and in patients on concomitant anticoagulation therapy.⁶

A study published in *Nutrition* in 2009 by Dr. Hsia showed that Nattokinase was shown to decrease factors VII, VIII, and plasma fibrinogen levels.⁷ The study was an open-label, self-controlled clinical trial on 15 healthy volunteers, 15 dialysis patients, and 15 cardiovascular risk factor patients. The patients took two capsules of Nattokinase by mouth for two months. The primary outcome was decreased clotting factors. Compared to baseline, the healthy patients were shown to have decreased factor VIII by 17%, factor VII by 14%, and fibrinogen by 9%; dialysis patients were shown to have decreased factor VIII by 19%, factor VII by 7%, and fibrinogen by 10%; cardiovascular risk factor patients were shown to have decreased factor VIII by 19%, factor VII by 13%, and fibrinogen by 7%.⁷ Although the study sounds assuring, it was performed on a small sample of the population. The study design is also a weakness to note, as it was not randomized and had no placebo-control group.

The LONFLIT-FLITE study in 2003 is the only randomized, parallel placebo-controlled trial that has been published, consisting of 186 subjects: 92 subjects in the control group and 94 subjects in the treatment group. Patients at high risk for DVT were given Flite Tabs® during long 7-8 hour flights.⁸ Flite Tabs® contain nattokinase for its fibrinolytic function, and pycnogenol, a natural plant-based product which may help reduce edema.⁹ Inclusion criteria were patients at high risk for episodes of DVT, including previous superficial vein thrombosis or DVT episode, coagulation disorders, severe obesity or limitation of mobility due to bone or joint problems, neoplastic disease within 2 years, clinical cardiovascular disease, and large varicose. Exclusion criteria were patients who used anticoagulants, had any recent treatments done (time range not defined), and possible low compliance (compliance risk assessment not defined). Of the 92 control group subjects, 5 had a DVT, and 2 had superficial thrombosis. In the treatment group of 94, there was no thrombotic event observed.⁸

This study shows the potential of nattokinase. However, since a combination product was used, it is difficult to assess whether DVT prevention was caused by the nattokinase or the pycnogenol. The study sets a course for potential research on nattokinase alone, or even in the combination Flite Tabs® formulation for its fibrinolytic activities.

Though studies show that this natural medicine may work, there have been no comparative studies of Nattokinase to Warfarin or other anticoagulants in humans. Thus, a specific dose for a patient cannot be recommended. Currently there are no reports of adverse effects and potential drug interactions, however this is another limitation due to limited data on this natural product. Additionally, the general efficacy studies done had very small populations and most concluded that there is potential for this product. However, further studies need to be conducted.

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First New Recombinant Coagulation Factor IX (Rixubis) Gains Orphan Drug Approval

By: Tamara Yunusova, Senior Staff Editor

After a lengthy fifteen-year hiatus in recombinant drug approvals, FDA-approved Recombinant Coagulation Factor IX (Rixubis) has mounted to the forefront of Hemophilia B drug therapy. The recombinant coagulation factor gained orphan drug approval on June 26, 2013 for routine prophylaxis, control of bleeding episodes, and perioperative management in adults with Hemophilia B.¹

Hemophilia B is characterized by a deficiency of clotting factor IX, a naturally occurring protein in the blood that controls bleeding.² Rixubis, developed by Baxter International, is a purified protein produced by recombinant DNA technology. It is administered by an intravenous injection twice weekly for six months in order to prevent bleeding episodes.² According to Baxter Int., it is the only recombinant factor IX product in the U.S. market for both prophylaxis and control.³

Based upon a Phase I/III study, a twice-weekly prophylactic treatment with Rixubis for six months achieved a median annualized bleed rate (ABR)* of 2.0, with 43% patients experiencing no bleeding at all over the period. According to the FDA, in comparison to patients receiving on-demand treatment, patients in the prophylaxis study had a 75% lower annual bleeding rate.²

Karan Midthun, M.D., director of the FDA's Center for Biologics Evaluation and Research, says, "As the first recombinant coagulation factor IX indicated specifically for routine prophylaxis to prevent bleeding, Rixubis becomes a new weapon in our arsenal to protect Hemophilia B patients... This approval provides patients and physicians with an alternative treatment option to prevent or reduce the frequency

of bleeding episodes."¹

Current drug therapy for Hemophilia B requires dosing 2-3 injections per week for prophylaxis.¹ With the development of factor IX products on the horizon, the search for a longer-acting recombinant factor continues. Biogen Idec has developed a fusion protein product that will require dosing once every one to two weeks. The product was submitted for approval in the U.S. earlier this year. In addition are two other long-acting factor IX products from Novo Nordisk and CSL Behring, both of which are undergoing phase III testing.¹

*Annualized Bleed Rate (ABR) refers to the number of bleeding episodes per year.

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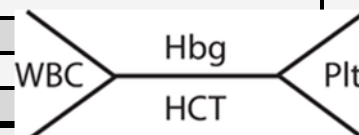
Review of Useful Labs & Tests in Infectious Disease Management

By: Beatrisa Popovitz, Staff Editor

Essential Equations		Source: Pharmacology Weekly	
Ideal Body Weight Males (Devine formula) Females (Robinson formula)		$IBW(men) = 50 \text{ kg} + 2.3 \text{ kg/in (every inch over 60")}$ $IBW(women) = 45.5 \text{ kg} + 2.3 \text{ kg/in (every inch over 60")}$ <i>(e.g. a woman who is 5'5" (65"): $IBW = 45.5 + 2.3 (65-60) = 57 \text{ kg} = 125.4 \text{ lb}$)</i>	
Adjusted Body Weight		$Adjusted \text{ Body Weight} = IBW + 0.4 (Actual \text{ Body Weight} - IBW)$	
Body Mass Index (BMI)		$BMI = \frac{Weight \text{ in kg}}{(Height \text{ in cm})^2}$	
		WHO Ranges for Adults	WHO Ranges for adults of Asian or Pacific Islander Descent
		Underweight: $<18.5 \text{ kg/m}^2$ Normal Range: $18.5-24.9 \text{ kg/m}^2$ Overweight: $25-29.9 \text{ kg/m}^2$ Obese: $\geq 30 \text{ kg/m}^2$	Underweight: $<18.5 \text{ kg/m}^2$ Normal Range: $18.5-22.9 \text{ kg/m}^2$ Overweight: $23-24.9 \text{ kg/m}^2$ Obese: $\geq 25 \text{ kg/m}^2$
		Creatinine Clearance (Cockcroft- Gault Equation)	
		$Adult \text{ Males} = [(140 - \text{age in years}) \times (\text{weight in kg})] \div 72 \times \text{serum Cr}$ $Adult \text{ Females} = 0.85 \times [(140 - \text{age in years}) \times (\text{weight in kg})] \div 72 \times \text{serum Cr}$ <u>Consideration for Cockcroft-Gault</u> * patient is >18 years of age * renal function is stable In patients who are older than 65 and/or underweight with a $SCr < 0.8 \text{ mg/dL}$, some clinicians adjust the SCr up to $0.7-1.0 \text{ mg/dL}$	
Normal Values for Basic Metabolic Panel		Source: Medline Plus Medical Encyclopedia	
Na	136-144mEq/L		
K	3.7-5.2mEq/L		
Cl	101-111mmol/L		
HCO ₃	20-29mmol/L		
BUN	7-20mg/dL		
Cr	0.8-1.4mg/dL		
Glucose	64-128mg/dL		

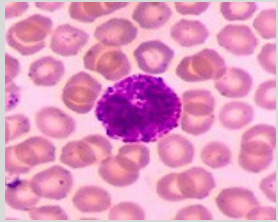
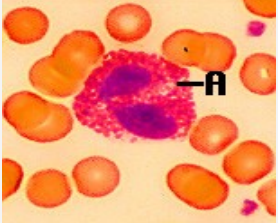

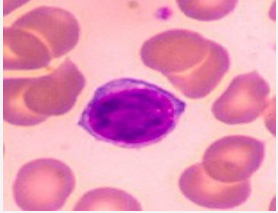
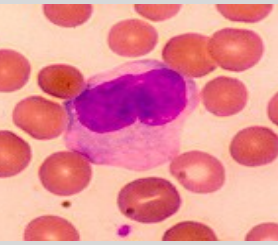
Complete Blood Count
Measures the total numbers of Red Blood Cells (RBCs), White Blood Cells (WBCs or leukocytes), the total amount of hemoglobin, and hematocrit
Provides information on average RBC size (MCV), the amount of hemoglobin per RBC (MCH), and the amount of hemoglobin relative to the size of the cell (MCHC), as well as the platelet count

Normal Complete Blood Count (CBC) Values in Adults			Source: Global RPh, Medline Plus Medical Encyclopedia
	Male	Female	
Hemoglobin (g/dL)	13.5-16.5	12.0-15.0	
Hematocrit (%)	41-50	36-44	
RBCs ($\times 10^6/\text{ml}$)	4.5-5.5	4.0-4.0	
RDW (RBC distribution width)	<14.5		
MCV	80-100		
MCH	26-34		
MCHC%	31-37		
Platelet Count	150,000-450,000		



Reviewed by: Dr. Jodlowski and Dr. Zito, Clinical Pharmacy Practice Department

Leukocytes

<p>Basophils (granulocytes)</p> <p>Normal range: 0-200</p>	<p>A type of granular leukocyte</p> <p>Not phagocytic, motile</p> <p>Least numerous leukocyte (account for <1% of all WBCs in body)</p> <p>Release inflammatory chemicals known as histamines</p> <p>Provide an allergic response</p> <p>Release anticoagulant (heparin)</p> <p>Have surface protein receptors which bind IgE (immunoglobulin involved in allergic response and mediation of hypersensitivity reactions)</p>	
<p>Eosinophils (granulocytes)</p> <p>Normal range: 0-450</p>	<p>A type of granular leukocyte (second most abundant)</p> <p>Usually has a bi-lobed nucleus and heavily granulated cytoplasm</p> <p>Stain with acid dye eosin Y</p> <p>Involved in allergic response</p> <p>Involved in defense against parasitic infection (eosinophilic basic proteins are toxic to many parasites)</p> <p>Localize near parasites , bind to IgG or IgE on the surface of larvae or worms, and degranulate by fusing their intracellular granules with the plasma membrane, and release the toxic major basic protein (MBP) into the inter-cellular space</p>	
<p>Neutrophils (granulocytes)</p> <p>Normal Range: 1,800-7,700</p>	<p>A type of granular leukocyte (most abundant)</p> <p>Specialize in the phagocytosis and killing of extracellular parasites through both oxygen-dependent and oxygen-independent mechanisms.</p> <p>Effector cells of innate immunity</p> <p>Rapidly mobilized to sites of infection and can work in anaerobic conditions</p>	
<p>Lymphocytes (mononuclear cells)</p> <p>Normal Range: 1,000-4,800</p>	<p>Part of adaptive immune response</p> <p>Use cell-surface receptors to recognize pathogens</p> <p>Some lymphocytes selected during adaptive immune response provide long-term adaptive immunological memory of the pathogen (acquired immunity/protective immunity)</p> <p>Subdivided into B and T lymphocytes /cells</p> <p><u>B cells:</u></p> <p>cell surface receptors for pathogens are immunoglobulins</p> <p>can become plasma cells, which secrete antibodies that bind to pathogens and their toxic products</p> <p><u>T cells:</u></p> <p>cell surface receptors are known as T-cell receptors</p> <p>further subdivided into cytotoxic T cells and helper T cells</p> <p>Cytotoxic T cells: kill cells that are infected with either viruses or bacteria</p> <p>Helper T cells: secrete cytokines that help other cells of immune system to become fully activated effector cells</p>	
<p>Monocytes (mononuclear cells)</p> <p>Normal Range: 0-800</p>	<p>Leukocytes that circulate in the blood</p> <p>Larger than granulocytes, have a distinctive indented nucleus, and all similar looking</p> <p>Different cytokines or tissue environments promote monocytes to differentiate into various macrophages and dendritic cells</p> <p>Mobile progenitors of macrophages (travel in blood to tissues where they mature into macrophages)</p> <p>Macrophage: large irregularly shaped phagocytic cell bearing an extensive cytoplasm with numerous vacuoles</p>	

Reviewed by: Dr. Jodlowski and Dr. Zito, Clinical Pharmacy Practice Department

Urinalysis

- Evaluation of a sample of urine, examining the appearance (color, odor, turbidity), content (blood cells, crystals, casts) and other chemical features
- Components include:
Macroscopic urine analysis – color, odor, volume, turbidity
Urine dipstick-
Chemical analysis – pH, specific gravity, protein, glucose, ketones, nitrites
Microscopic urinalysis - crystals, casts, RBC's & WBC's & epithelial cells.
- An excellent method by which diseases without striking signs or symptoms may otherwise be left unrecognized may present themselves, including urinary tract infections, renal disorders and diabetes
- When urine cultures reveal bacterial growth, urinalysis can confirm a bacterial infection of the urinary tract, as opposed to

Chemical and Microscopic Analysis of Urine (Findings pertinent to infectious conditions)

Factor	Normal Value	Significance of Abnormal Values
Appearance	clear, from pale to dark yellow	Cloudiness and/or turbidity as well as unusual odor may be indicative of infection. Red/brown urine may be indicative of hematuria (blood in the urine)
Acidity (pH)	4.6-8	Out of range pH may indicate infection High urine pH: may be indicative of kidney failure, a UTI, gastric suction low urine pH: may be indicative of diabetic ketoacidosis, diarrhea, starvation
Concentration (Specific Gravity)	1.002-1.035 (for normal kidney)	Higher than normal range specific gravity may be indicative of dehydration, and can also be indicative of a renal disorder.
Protein	0-8mg/dL	May be indicative of renal problems, including early signs of diabetic kidney damage (diabetic nephropathy). Other causes of proteinuria include: dehydration, glomerulonephritis, polycystic
Glucose	0-0.8 mmol/L (0-15 mg/dL)	May be indicative of diabetes or pregnancy (gestational diabetes)
Ketones	Negative	May be indicative of diabetes (further testing warranted) Abnormal ketone levels (>20 mg/dL) may indicate abnormal food/nutrition intake (anorexia, a diet low in carbohydrates, starvation, or prolonged vomiting, etc). Large amounts of ketones (>80 mg/dL) in the urine may be a sign of diabetic ketoacidosis.
Blood	Negative	Hematuria may require further testing for kidney damage, kidney infection, kidney/bladder stones or neoplastic disorders
Nitrites	Negative	Positive result suggests presence of nitrate-reducing microorganisms in the urine (such as E.coli)
Leukocyte esterase	Negative	Positive result suggests white blood cells in the urine, usually indicative of urinary tract infection

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Reviewed by: Dr. Jodlowski and Dr. Zito, Clinical Pharmacy Practice Department

What You Should Know About Selecting APPE Rotations

By: Aleena Cherian, Co-Copy Editor, Graphics Focused

Selecting APPE Rotations

You've made it past the progression interviews at the end of 2nd year, the White Coat Ceremony, and the mind-boggling compounding and kinetics equations. You're almost done with those labs and late night D&D study sessions. Now, halfway through the first semester of your fifth year in the pharmacy program, you face the daunting task of selecting and ranking advanced rotations for your spring semester, something quite unlike anything in the program so far. For the first time since second semester of second year, you won't be looking at block schedules with your classmates. And while the entire process seems intimidating at first, it helps to have a little guidance and reassurance before you begin.

First, you can breathe a sigh of relief that you won't be going into the process blindly. The faculty of the College will set up an orientation that explains all of the details prior to the deadline for submission. Expect to hear about an orientation sometime in early-to-mid October and submit your rankings a few weeks after that.

Do your research!

After the orientation, the RxPreceptor website will allow you to look at potential sites for your five required rotations (An introductory "Key Concepts" rotation, one general inpatient setting, one focused inpatient setting, ambulatory care, and community practice) and four elective rotations. Make the most of the time allotted to look at the different sites offered to you, and *do not wait until the night before the deadline to start looking*. The last thing you want to do is submit your choices blindly at the last minute without giving it any thought.

Attend the rotations fair and speak to different preceptors- you may learn of a new rotation that interests you! There's no required number of sites that you should rank for each rotation, although you will be provided with a suggested number at orientation. Don't rank sites just to meet this number without looking into them, since there is always a chance you may end up with your 6th or 7th choice.

Take chances and be flexible!

It's very tempting to limit your selection only to sites that you've heard of or to sites closest to where you live. As you research sites, however, keep an open mind to the different rotation possibilities, even if it means an unfamiliar setting or a longer commute, and you may someday find that the learning experience was worth the possible inconvenience.

There are also a number of non-traditional rotations that may be offered to you such as "bundled" rotations at one site (like NewYork-Presbyterian Hospital's five month program) or out-of-state sites, including Pharmacy Affairs/Public Policy rotations in the Washington DC area and the ambulatory care rotation at Cherokee Indian Hospital in North Carolina. Students in the past have provided extremely positive feedback about these rotations*, and if they become available to you, take a chance on the unique offers!

Vary your choices

You may be starting rotations without the slightest idea of where your future in pharmacy is headed, and if so, take heart! Selecting a variety of rotations in diverse settings is the perfect opportunity to see what areas interest you the most.

On the other hand, you may already know that you prefer a certain area of pharmacy practice over another, but you still have the option of choosing different sites, different patient populations or different settings. If you know you prefer an acute care setting, try distinctive specialties at several institutions. If the community setting is where you see yourself, compare your experiences in a managerial rotation to one at an independent site to one that focuses on MTM. Varying your rotations not only provides you with options to see where your preferences lie, but presents you as a well-rounded student to future employers.

Even if you are absolutely certain of your preferences, I would still suggest trying one elective in an unfamiliar or different area in the field of pharmacy. With so many opportunities out there, this is a great chance to gain exposure to something new in the

profession.

Rotations are one of the most rewarding experiences in your career as a student pharmacist, because it allows you to put into practice all of the theory you've spent years studying. Even if you don't get your first choices, keep an open mind and remember that you will be given a chance later in the semester to submit requests to change your sites, especially if you find other options that interest you more.

*Check out the following articles in previous issues of the [Rho Chi Post](#) for a more comprehensive review of some of these rotations:

Puranprashad, Nandini . A Cherokee Experience: The story of my rotation. *Rho Chi Post*. Sept 2012; 1 (12):22-23

Ciccione, Addolorata. My Experiences at NewYork-Presbyterian. *Rho Chi Post*. Oct 2012; 2(1):6-7

Quote of the Month

By: Melissa Roy, Co-Copy Editor, Graphics Focused



Dean DiGate Interview Continued

BY: Katharine Cimmino, Editor-in-Chief and Erica Dimitropoulos, Senior Staff Editor

You have had a tremendous amount of experience with higher education. What made you decide to take another position as a Dean of a pharmacy school?

My situation of acting as Provost was very similar to Dr. Mangione's experience here at St. John's University. I was asked to move from the position of Dean to the Provost of the University of the Sciences in Philadelphia. As provost, your goal is to implement the overall academic strategy of the university. Your job is to be the liaison between the faculty and the board of trustees. Yet what I missed the most during my tenure as Provost were the interactions with students, faculty, and alumni. I have always found the dean's position to be much more fun and diverse. Given the opportunity, I decided to go back to something that I greatly enjoyed.

As I learned more about St. John's University and the College of Pharmacy and Health Sciences, there were a couple of things that really attracted me to this school. Primarily, I was drawn to the Vincentian mission, with the desire to understand the roots and causes of poverty and the desire to help people out of that situation. From a moral and ethical standpoint, this is a very altruistic and wonderful mission. From a structural standpoint, I also liked that our school is not only a College of Pharmacy, but also of Health Sciences. In many institutions, programs such as Physician's Assistant, Radiologic Science, and Clinical Lab Sciences, are contained within a separate College of Allied Health or Health Sciences. Here at

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"There is no better feeling then teaching someone and seeing them get it. You can't really describe the feeling of satisfaction when this happens, and it's important to do what you love."

St. John's University, everything is placed under one roof. This allows for much better control of programs, interdisciplinary training, and enables us to reach our goals together as a team of healthcare professionals.

From a personal perspective, I was born and raised on the Eastern tip of Long Island and I love the fact that I am back in New York. I originally left because there wasn't much to do then in terms of science, since there were few science intensive universities. Therefore, I had to go to college elsewhere to study and perform molecular biology research.

Over the course of the last 20-25 years, the landscape has changed dramatically and all in all, from both a job and personal perspective, St. John's University seems like a perfect fit.

What brought you into academia? Throughout your life, you have worked in numerous labs. What made you decide to go towards the academic route?

Basically, everyone who goes to graduate school figures out during the course of their study if they're going to enter research or academia. It is a personal choice, and I was always on the academic path. **There is no better feeling then teaching someone and seeing them get it. You can't really describe the feeling of satisfaction when this happens, and it's important to do what you love.**

Do you still get to work in labs and research?

The explosion of knowledge is continually expanding. As I went through my education, my interest

in science became much more focused until I was only looking at topoisomerases in DNA replication. Much more attention has to be placed on an increasingly narrow field of study. The assignment of additional administrative duties, especially at the level of Dean and higher, makes it impossible to fit everything you want to do within the day. You can look at my schedule and see that I have meetings all day long. So when do you have time to do your research and teach your graduate students and post-doctoral fellows? When you do go home all you do have time to do is have dinner and maybe watch an episode of the "Big Bang Theory."

When you choose an administrative route, you realize that you don't have the time to do your own research. You shift your focus and gain satisfaction by developing a support system so that others can be successful in their own research. I live vicariously through others. The joy that I get is not that I personally get these grants, but that the organization and the people within it are successful. My job is to promote the success of everyone that is in the program: faculty and students. Do I miss doing research? Absolutely. I still have what they call great "lab hands." There are people that can walk into a lab and perform the same exact experiment side by side with another person- it works for one and not the other. For whatever reason, and I don't know why, it works for me. There is nothing more fun than going into a lab and having something work. But you mature in your position and you change what you get satisfaction from.

You have published in several journals including *Nature*, *The Proceedings of the National Academy of Sciences*, and *Molecular Cell*. What advice can you give to people who want to go into research or publishing?

The sooner you can get into a lab and start doing things, the better off you will be- you need to find out early on if you have the bug. If you have the bug, then you can start planning on what you need to do to further your career. As an undergraduate, you just take in everything you can from your mentors. You have a built-in network from each person you get to know and as you get older, your network

expands because of your fellow graduate students. Now I have buddies who I went to graduate school with who are at the top of their game and their fields in science. When you meet someone new, you can't be shy. You have to go up and introduce yourself. Do your preliminary research and find other professors who are publishing in good journals. Later on in your education, use your mentor to figure out where the best labs with the best scientists are. You want to find who is the up-and-coming expert- the next Nobel Laureate or National Academy member- and work in those labs. More than anything, you need to be in a program with a high degree of sophistication that can provide these types of resources to you, and you need to make the best of these resources in every way possible.

Do you plan on expanding the amount of grants and contracts that St. John's University receives? If so, how?

I am going to try and expand our grants. It is not a difficult thing to do, but it requires perseverance. There are tried and true methods to increase grant productivity. It starts from the recruitment of competitive junior faculty. The pool of people who need and want jobs is huge. You need to recruit faculty that have been trained in good labs who know science and how to do it. You also have to understand what it means to be a St. John's faculty member- you need to be a scholar AND an excellent teacher. I always instruct the search committee to get me a person that does both. I don't want a person who does research but doesn't interact with anyone. They can put out a million papers, but if they don't teach and mentor the students that are here, it is unproductive. Alternatively, a person who is an excellent teacher but does no scholarly activity will not move the research agenda of the University forward either. I won't sign off on hiring anyone until they show me that they can do both.

When you do that, all of a sudden things start moving into place. The institution has to move forward. Do I want to increase the scholarship here? Absolutely. But my job is to make sure I have the resources to do that. If that means that we only bring in one person a year and do it right, then I would

BACK TO COVER

rather do that.

How do you plan on advancing the College of Pharmacy and Health Sciences?

I would like to broaden the number of health sciences that we have. Over the course of the next few years, I would like to see if it makes sense from a programmatic and fiscal sense to start something like Physical Therapy and/or Occupational Therapy. It would be nice to have a full array of healthcare professionals available to students. Also, it takes pressure off of some of the other programs, such as Physicians Assistant and Pharmacy, for enrollment. Before we do this, however, we need to make sure that all of our healthcare programs far exceed the standards of their respective accrediting bodies and ensure that they are both cutting edge and looking to the future.

Nowadays many people want to expand their certification. What do you think of joint PharmD/MBA or JD option?

Those programs are needed and should be done, but there is also a reality to it. Every pharmacy school that I have been affiliated with has offered combined degrees. From a professional point of view it is a smart move. PharmD/MBA is great for a community setting with the business access. A PharmD/MPH can be very attractive in terms of public policy. The PharmD/JD can allow you to implement policy and law related to drugs and therapies. Overall, they are well worth doing, but the enrollment in those programs tends to be low. Students in a PharmD or other healthcare program already have a large debt burden upon graduation. Most students therefore choose to go out and work, lower their debt, and consider obtaining another degree later. The reality is such that if you make that decision, the odds of you coming back are very slim. You get out and life happens. However, some people consider higher education while waiting for the job market to open. They are all great programs

and I think we should make them available. Most of the joint programs that I know of are structured so that some of the JD, MBA, or MPH courses are taken as electives while in a healthcare professional program, ultimately cutting down on the time it takes to finish the degrees. In our program here, there is virtually no room to do this. We are looking at ways to generate some room in the PharmD program to allow for a competitive degree. Right now, however, it is simply an add-on; there is no savings in terms of time. Unfortunately, I don't know if people are going to be willing to commit to the time with the way things are currently configured, but in the future these joint degrees may be very appealing to our student body.

What are your plans for the College of Pharmacy? Do you see making changes to allow for joint programs? Are their going to be any general changes to the PharmD program?

Every five years or so, you need to take a step back and reevaluate the curriculum. The profession and emphasis have changed, technology has changed, and what students have to master has shifted in different directions. It's time to do that with

"We need to make the curriculum cutting-edge and focus on designing a program that is capable of giving the students what they need to go out and practice."

our PharmD program here at St. John's University. There are courses in the curriculum trying to do more than one thing at a time. When that happens you get the worse of both. We need to make the curriculum cutting-edge and focus on designing a

program that is capable of giving the students what they need to go out and practice. Courses early in the curriculum should be teaching fundamentals, and that should lead into what they call translational-type of activities, where you integrate information. You still continue to learn, but now you take what you have learned and apply it to a higher order of learning, where you take principles and integrate them into critical thinking. Next is the actual practice of material. But when you have a confined and accelerated program, everything starts to get mixed. From a pedagogical point of view, it is not the best

way to learn. You need to know the fundamentals such as pharmacology, toxicology, and medicinal chemistry early on. Then in therapeutics, you need to know how those fundamentals relate to the therapeutic decision-making and how everything gets implemented into decision-making. You cannot make a decision and apply knowledge without truly learning the basics first.

You said you want to be "visible" to the student body. How do you plan on doing that? What's your vision for the student body?

In order to move our college forward, we have to be visible to many different constituents- the external world, the faculty, and the students. By far the most important part to me is visibility to the students. The students are the recipients of our healthcare curriculum and our educational philosophy. They are our

greatest ambassadors and advocates to the outside world and their influence increases exponentially each year. It is my job to make sure that I am not only visible to the students as the leader of the college, but that I make the college and its processes visible to them so that they can understand, participate, and advocate for the changes that will inevitably come in healthcare education. Functionally, this means that we must include students in the creation of their own curriculum. They must become active participants in their own education and take responsibility for it. In this way, teachers and students alike will be stakeholders in the process.

The Rho Chi Post wants to thank Dean DiGate for sharing his time and expertise with us. We want to welcome Dean DiGate into the St. John's family.

Join us on

Saturday, October 19th

for a Wonderful Service Opportunity and

Give Our Public Schools a Makeover



We'll create murals, paint classrooms, plant school gardens, and engage students in service.

*****The College of Pharmacy and Health Sciences will be providing transportation and lunch.**

Registering Is easy:

1. Go to www.newyorkcaresday.org
2. Select the Register tab
3. On the Toggle Box at the bottom of the screen, scroll down to highlight your team's name "SJU College of Pharmacy Health Sciences"
4. Discount Code: "NYCDF13STU"

If Interested Contact [Sawanee Khongsawatwaja](#)

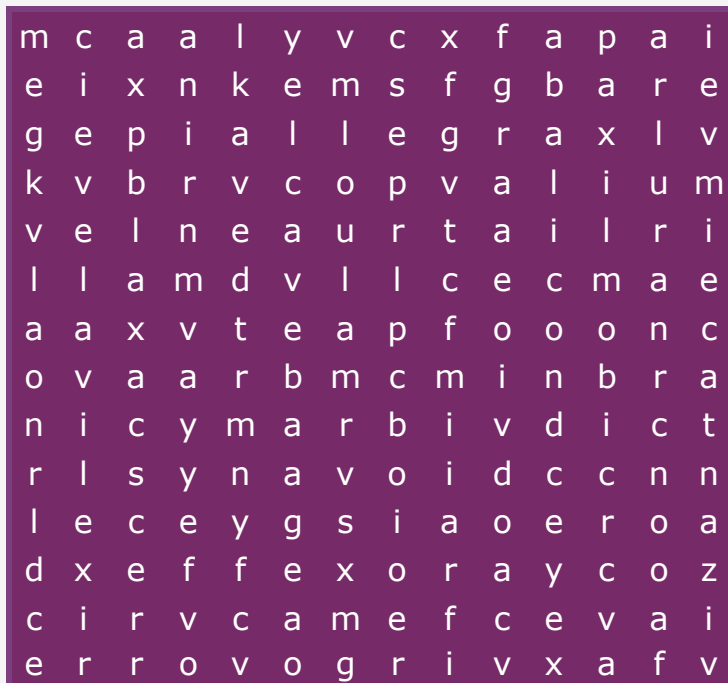
RHO CHI POST

Are You Smarter than a 6th Year?

Word Search: Drug Top 200 Challenge

By: Davidta Brown, Staff Editor

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



Clopidogrel
Fluticasone + Salmeterol
Trazodone
Alendronate
Fexofenadine
Lovastatin
Carvedilol
Paroxetine
Meloxicam
Diazepam
Valsartan
Duloxetine
Venlafaxine
Ranitidine
Fluconazole
Naproxen
Doxycycline
Potassium Chloride
Amitriptyline
Lansoprazole

PUZZLES

Trivia

By: Beatrisa Popovitz, Staff Editor

Answers

1) The three components of a urinalysis are:	A. Dipstick Test, Physical Exam, CrCl B. CrCl, GFR, Dipstick Test C. CBC, CrCl, Dipstick Test D. Physical exam, Dipstick Test, Microscopic Evaluation
2) Which of the following are granulocytes?	A. Monocytes, Neutrophils, Eosinophils B. Monocytes, Eosinophils, Lymphocytes C. Eosinophils, Neutrophils, Basophils D. Eosinophils, Basophils, Lymphocytes
3) Abnormal _____ levels in the urine may be indicative of prolonged vomiting.	A. Glucose B. Ketone C. Bilirubin D. Blood
4) The normal range of protein in the urine is	A. 0-8mg/dl B. 2-5mg/dl C. 10-30mg/dl D. 15-45mg/dl



By Frances Trosa
PharmD Candidate
Class of 2015

Many drugs
LOOK – ALIKE
OR
SOUND– ALIKE

causing them to be
easily mixed up in
practice.

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

Answers

Matching Column: Look-Alike Sound-Alikes

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. This drug is indicated only for the treatment of CMV retinitis in immunocompromised patients and for the prevention of CMV in transplant patients who are determined to be at risk for this disease 2. This drug is a competitive and reversible cholinesterase inhibitor 3. Black box warnings for this medication include concerns of ototoxicity and nephrotoxicity 4. This antilipidemic agent should be administered at least 30 minutes before meals 5. This antipsychotic has a higher risk of causing QTc prolongation than other agents in its class 6. This antidiabetic agent is a biguanide that should be administered with food to decrease gastrointestinal side effects 7. Patients should avoid ethanol when taking this sulfonylurea due to the risk of a rare disulfiram reaction 8. This drug is an anticholinergic agent that works by blocking the action of acetylcholine at parasympathetic sites 9. This drug is an alpha2 adrenergic agonist that can be used both for the treatment of hypertension and ADHD 10. This drug is an expectorant which may cause uric acid levels to be decreased by increasing uric acid excretion. | <ol style="list-style-type: none"> A. Guanfacine B. Gemfibrozil C. Ganciclovir D. Gentamicin E. Galantamine F. Guaifenesin G. Glucophage H. Glycopyrrolate I. Glucotrol J. Geodon |
|---|---|

How Did You Do???

Answers to Word search & Look Alike and Sound Alike

Trivia: 1.D 2.C 3.B 4. A

m c a a l y v c x f a p a i
 e i x n k e m s f g b a r e
 g e p i a l l e g r a x l v
 k v b r v c o p v a l i u m
 v e l n e a u r t a i l r i
 l l a n d v l l c e c m a e
 a a x v t e a p f o o n c
 o v a a r b m c m i n b r a
 n i c y m a r b i v d i c t
 r l s y n a v o i d c c n n
 l e c e y g s i a o e r o a
 d x e f f e x o r a y c o z
 c i r v c a m e f c e v a i
 e r r o v o g r i v x a f v

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

Do you enjoy our puzzles?**Send us a suggestion for a brainteaser at****rhochis@gmail.com****We will feature your work in our next issue!**

RHO CHI POST: EDITORIAL TEAM



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

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



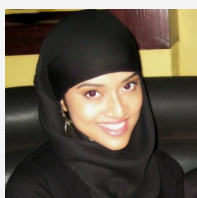
@ Bharat Kirthivasan (PhD Candidate, STJ; Co-Copy Editor [Content-Focused])

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



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

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



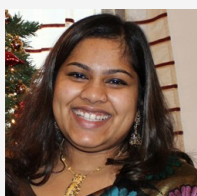
@ Tasnima Nabi (4th Year, STJ; Co-Copy Editor [Content-Focused])

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



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

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



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

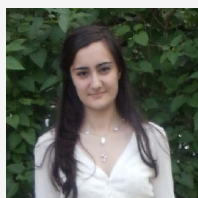
We as future healthcare professionals owe it to our patients and ourselves to become aware and current on the events affecting our profession. The Rho Chi Post is our way to learn new things and stay in touch with the pharmacy world, on- and off-campus. I have gained so much from reading previous publications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



@ Erica Dimitropoulos (5th Year, STJ; Senior Staff Editor)

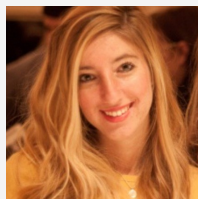
As busy student pharmacists, we often fail to keep current with healthcare developments. My aim is to sort through the news and provide quick updates that are important to our profession. Feel free to contact me if there are any topics you would like to see covered in the next issue!

RHO CHI POST: EDITORIAL TEAM



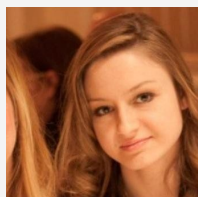
@ Tamara Yunusova (3rd Year, STJ; Senior Staff Editor)

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



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

I am eager to relay current information on interesting topics making waves in the world of healthcare pertinent to the advancement of our profession. As student pharmacists, we are molding the future of our profession, and the Rho Chi Post facilitates the cultivation of a relationship (between students, faculty, and other members of the healthcare community) to share ideas and spread awareness of various issues. Feel free to contact me if you would like to share your ideas with other members of the University community through this platform.



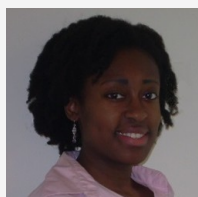
@ Ada Seldin (5th Year, STJ; Staff Editor)

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



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

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



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

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



@ You!

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

If you are interested in becoming an editor for the Rho Chi Post, please visit:
<http://rhochistj.org/RhoChiPost/EditorApplication>

RHO CHI

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

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

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

THE RHO CHI POST

MISSION

The Rho Chi Post is a monthly, electronic, student-operated, dean-approved publication that aims to promote the pharmacy profession through creativity and effective communication. Our publication is a profound platform for integrating ideas, opinions, and innovations from students, faculty, and administrators.

VISION

The Rho Chi Post aims to become the most exciting and creative student-operated newsletter within St. John's University College of Pharmacy and Health Sciences. Our newsletter continues to be known for its relatable and useful content. Our editorial team continues to be known for its excellence and professionalism. The Rho Chi Post essentially sets the stage for the future of student-operated publications in pharmacy.

VALUES

Opportunity, Teamwork, Respect, Excellence

GOALS

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

CURRENT EXECUTIVE BOARD



Zinnia, Majd, Moisey, Elissa, and Anh at the 2013 Induction Ceremony

President: **Moisey Rafailov**
 Vice President: **Majd Ahmad**
 Secretary: **Elissa Tam**
 Treasurer: **Anh Nguyen**
 Historian: **Zinnia L. Yu**

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

UPCOMING EVENTS

Oct 16-19: Drug Discovery Re-invented
 Scottsdale, Arizona

Oct 21: Rho Chi Post Info Session
 St. John's University

Oct 24: Pharmacy Organization Day
 St. John's University

Oct 30: Healthy Halloween
 St. John's University