

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

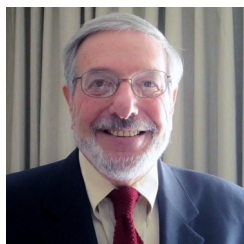
## SINGLE-LINE STORIES

- Dr. Robert A. Mangione appointed Interim Provost effective August 1st 2012
- Dr. S. William Zito appointed Acting Dean effective August 1st 2012
- The Research Council of Norway awards \$900,000 to Dr. Simon Moller
- Dr. Jeffrey C. Kinkley, to serve on selection committee for Fulbright Scholarships
- Assistant Clinical Professor Dr. John Conry featured on APhA's Pharmacy Today magazine

## CONGRATULATIONS TO DEAN MANGIONE AND DR. ZITO



Dean Mangione, the new Interim Provost of St. John's University



Dr. S. William Zito the Acting Dean of the College of Pharmacy and Health Sciences

Dear Readers,

The Rho Chi Post Editorial Board wishes Dr. Robert A. Mangione and Dr. S. William Zito our warmest congratulations on their recent appointments as Interim Provost and Acting Dean of St. John's University's College of Pharmacy and Health Sciences, respectively.

Dr. Mangione, affectionately known as Dean Mangione by students, is a well-respected and beloved faculty member who will now be the face of St. John's University. Dr. Zito, the driving force behind the *Rho Chi Post*, is both an advocate and mentor for numerous students through the Rho Chi Beta Delta Chapter and his research laboratory. Their new roles speak volumes of their character and it is a great credit to the College of Pharmacy and Health Sciences to have such dedicated faculty members.

These promotions follow the decision of St. John's University's current Provost, Dr. Julia Upton, to step down as provost to continue her role as a well-distinguished Professor of Theology. Dr. Upton will also hold the title of Special Assistant to the President, Rev. Harrington. Dr. Mangione and Dr. Zito are expected to hold their new positions until such a time when the Provost Search Committee, headed by Dr. Michael A. Simons (Dean of the School of Law), completes their search for a new candidate for the office of Provost.

It is our pleasure, as editors of the *Rho Chi Post*, to recognize the continuing outstanding achievements of Dr. Mangione and Dr. Zito to the university community. We thank them for their continued support of our newsletter and wish them the best in their new positions.

Sincerely,

*The Editorial Board*

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## ARTIFICIAL SALIVA AGENTS IN XEROSTOMIA BY: NEAL SHAH, CO EDITOR-IN-CHIEF

Xerostomia, commonly known as dry mouth, is an anti-muscarinic side effect of numerous medications. Antidepressants, analgesics, diuretics, and antihistamines have a high propensity to cause xerostomia.<sup>1</sup> Xerostomia may also result from Sjogren's syndrome, Parkinson's disease, and various chemotherapy agents.<sup>2</sup> Traditionally, muscarinic agonists like pilocarpine have been used to reverse xerostomia. Interestingly, angiotensin-converting enzyme-inhibitors (ACEi) are also reported to increase salivary production.<sup>3</sup> There are salivary replacements available via prescription commonly referred to as artificial saliva (i.e. Caphosol®, NeutraSal®, Aquoral®, and Numoisyn®). Over the counter artificial saliva products include Biotene®, which also has antimicrobial properties, and SalivaSure®, which is a xylitol salivary stimulant.

Caphosol® and NeutraSal® are supersaturated calcium phosphate rinses that are indicated for xerostomia caused by chemotherapy. Patients are instructed to mix the different colored Caphosol® vials together and rinse with half the liquid for one minute, then repeat. If swallowed, the manufacturer states there are no adverse effects, nor are there any interactions with other medications.<sup>4</sup> NeutraSal® is a powder-packet dissolved in a glass of water with similar rinsing directions as Caphosol®.<sup>5</sup> Aquoral® is an oral spray consisting of oxidized glycerol triesters that coats the mouth and provides extended lubrication; since it coats the lining of the mouth, this product may also help heal ulcerations. Like Caphosol®, it does not have any side effects if swallowed nor any drug interactions reported by the manufacturer. It is dosed as two sprays three or four times a day.<sup>6</sup>

Numoisyn® is a prescription salivary inducing agent, available in both tablet and liquid dosage forms. Numoisyn® tablets primarily consist of mannitol and malic acid designed to stimulate the salivary glands to produce saliva, while the liquid resembles salivary consistency. Both preparations

are contraindicated in fructose-intolerant patients and can be used up to 16 times per day. Like Aquoral® and Caphosol®, no drug interactions or adverse effects if swallowed are reported by the manufacturer.<sup>7</sup>

These salivary replacements provide a benefit compared to pilocarpine. Pilocarpine (Salagen®) tablets taken orally produce systemic muscarinic agonist effects, including sweating, diarrhea, tearing, blurred vision, and excessive urination.<sup>8</sup> These side effects are minimized with the introduction of pilocarpine spray, but this medication is unavailable in the United States. For patients who wish to resolve their xerostomia without systemic effects, Caphosol®, Aquoral® or Numoisyn® are attractive, but expensive alternatives. One month's supply of Caphosol® through a discount program and Medicare costs about \$128, which may be too costly for some patients.<sup>9</sup> Aquoral®, if not covered by insurance, can cost \$110 for a 40mL bottle. A 100-count of Numoisyn® lozenges can cost up to \$40; and a 300 mL bottle of Numoisyn® can cost up to \$65. Artificial saliva agents thus have significant advantages and disadvantages to consider when choosing a treatment regimen for xerostomia.

**SOURCES:**

1. Xerostomia (Dry Mouth). Available at: <http://www.uic.edu/classes/peri/peri343/xerost/xerost1.htm>. Accessed June 24, 2012.
2. Dry Mouth (Xerostomia). Available at: <http://www.nidcr.nih.gov/oralhealth/topics/drymouth/>. Accessed June 24, 2012.
3. Bossola M, Tazza L. Xerostomia in patients on chronic hemodialysis. *Nat Rev Nephrol*. 2012 Jan 17;8(3):176-82. doi: 10.1038/nrneph.2011.218.
4. Caphosol [package insert]. EUSA Pharma.
5. Neutrasal [package insert]. Available at: <http://www.neutrasal.com/>. Accessed June 24, 2012.
6. Aquoral [package insert]. Auriga Laboratories.

7. Numoisyn [package insert]. ALIGN Pharmaceuticals, LLC.
8. Pilocarpine. Available at: <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0000465/>. Accessed June 24, 2012.
9. Caphosol Exclusive Medicaid Offer. Available at: <http://live.caphosol.com/us/PAT/Medicare-Offer.aspx>. Accessed June 24, 2012.

## MATCHING CHALLENGE: OVER THE COUNTER PRODUCTS BY: MOHAMED DUNGERSI, ASSOCIATE STUDENT EDITOR

The following products are available over the counter.

Try to match each one with its corresponding fun fact.

*Please view the sources and answers on the next page*

- |   |   |
|---|---|
| <p>A. This product is a source of omega-3 fatty acids, primarily docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA). It is used to lower triglyceride levels, to lower high blood pressure, and for a variety of inflammatory conditions including rheumatoid arthritis.</p> <p>B. This product is native to the Balkans; it is a member of the Asteraceae family. It is used to prevent migraines as well as for dysmenorrhea, arthritis, and psoriasis.</p> <p>C. This product was originally extracted from bovine heart tissue, but is now manufactured using a beet and sugarcane fermentation process. It is used for several cardiovascular conditions as well as a general antioxidant. It is also used in Parkinson's disease and for migraine prevention.</p> <p>D. This product is a perennial from the Zingiberaceae family whose rhizomes and roots are used medicinally. It is used primarily as an antiemetic agent to relieve nausea and vomiting associated with pregnancy, motion sickness, chemotherapy, and surgery.</p> <p>E. This product is derived from the <i>Ginkgo biloba</i> tree. It is used for a multitude of conditions, including Alzheimer's disease, vascular dementia, tinnitus, and acute mountain sickness.</p> <p>F. This product is derived from dried or fresh bulbs of a plant commonly used in cooking, <i>Allium sativum</i>. It is used for hyperlipidemia, hypertension, and type 2 diabetes mellitus, as well as prevention of various cancers.</p> <p>G. This herb that is available in two forms: Roman/common and German/Hungarian. It is a member of the Asteraceae family. It is used for motion sickness, as well as many gastro-intestinal, inflammatory, and dermatologic diseases, including those in children. Additionally, it is used to decrease mucositis after certain types of chemotherapy. (Hint: It is also used as an herbal tea)</p> <p>H. This product is derived from the bark of <i>Prunus Africana</i>, a member of the Rosaceae family. It is used for Benign Prostatic Hyperplasia (BPH).</p> <p>I. This product is found in the marshy areas in Northern Asia, Europe, and parts of North America. It is a member of the Asteraceae family (formerly Compositae). It is used to prevent migraines as well as for allergic rhinitis and asthma.</p> <p>J. This product is derived from the flowers and leaves of <i>Hypericum perforatum</i>. It is used for depression, pain, anxiety, obsessive-compulsive disorder, and premenstrual syndrome.</p> | <ol style="list-style-type: none"> <li>1. Co-enzyme Q10</li> <li>2. Garlic</li> <li>3. Fish Oil</li> <li>4. St. John's Wort</li> <li>5. Butterbur</li> <li>6. Feverfew</li> <li>7. Ginkgo</li> <li>8. Chamomile</li> <li>9. Ginger</li> <li>10. African Plum</li> </ol> |
|---|---|

## MATCHING CHALLENGE: OVER THE COUNTER PRODUCTS (ANSWERS) BY: MOHAMED DUNGERSI, ASSOCIATE STUDENT EDITOR

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

*Go back to page 3?*

**SOURCES:**

1. McQueen CE, Orr KK. Natural Products. In: Berardi RR, Ferreri SP, Hume AL, et al. *Handbook of Nonprescription Drugs*. 16th ed. Washington, DC: American Pharmacists Association; 2009:973—1014.
2. McQueen CE, editor. *Sigler's Dietary Supplement Drug Cards*. 2nd ed. Lawrence, Kan: SFI Medical Publishing; 2009.
3. Charlson M, McFerren M. Garlic: what we know and what we don't know. *Arch Int Med* 2007; 167:325—6.
4. *Garlic Effects on Cardiovascular Risks and Disease, Protective Effects against Cancer, and Clinical Adverse Effects. Summary, Evidence Report/Technology Assessment; Number 20*. Rockville, Md: Agency for Healthcare Research and Quality; October 2000. AHRQ Publication No. 01-E022.
5. Birks J, Grimley Evans J. Gingko biloba for cognitive impairment and dementia. *Cochrane Database Syst Rev*. 2007;2:CD003120.



*“Enjoy a refreshing cup of  
Chamomile herbal tea the  
next time you have motion sickness.”*

Image Source: [http://www.sciencedaily.com/  
releases/2008/09/080915164519.htm](http://www.sciencedaily.com/releases/2008/09/080915164519.htm)

## THE PATHOPHYSIOLOGY OF SYDENHAM'S CHOREA BY: NEAL SHAH, CO EDITOR-IN-CHIEF

Dyskinesias are abnormal, involuntary movement disorders. Subsets of dyskinesias include choreas and athetosis. Chorea is irregular and sporadic contraction of muscles whereas athetosis involves a twisting and writhing of muscles. These two dyskinesias often occur together and are thus termed choreathetosis.<sup>1</sup> Common conditions which feature choreathetosis are Huntington's, and Sydenham's.<sup>2</sup> Since chorea involves the dopaminergic pathway, first generation antipsychotics, anti-epileptic drugs, and levodopa are among the drugs that trigger this dyskinesia.

Huntington's is a genetic disease that results

from an aberrant elongation of the huntingtin protein leading to overexpression of the dopaminergic pathway.<sup>3</sup> Considered the pharmacologic antagonists of Parkinson's disease, first generation antipsychotics like haloperidol and fluphenazine are shown to ameliorate symptoms of Huntington's disease.<sup>4</sup> While tetrabenazine remains the only FDA-approved pharmacological treatment for Huntington's chorea, there is no true cure for the disease.<sup>4,5</sup> Tetrabenazine works in a similar fashion as reserpine: it depletes monoamines such as dopamine by inhibiting their incorporation into vesicles. Also like reserpine, this agent is linked

to depression and suicidal tendencies, and is thus reserved for advanced cases of chorea after other neuroleptic agents have failed.<sup>5,6</sup>

Sydenham's is a lesser-known dyskinesia. Unlike Huntington's, it is relatively curable and those afflicted usually have complete recovery.<sup>7</sup> Sydenham's chorea results from an auto-immune reaction against a prolonged *S. pyogenes* infection, where the body forms antibodies against antigens of the bacteria known as epitopes. Similar epitopes are found in the basal ganglia, an area in the brain which controls movements. Antibodies then begin to attack the basal ganglia, causing the dyskinetic movements clinically seen with Sydenham's chorea.<sup>7,8</sup> Sydenham's chorea is part of the Rheumatic Fever component of auto-immune reaction against *S. pyogenes* infection, which includes rheumatic heart disease, strept throat, and polyarthritis.<sup>9</sup> Sydenham's chorea mainly affects children aged 5–13 and has a predisposition to affect more females than males in roughly a 2:1 ratio.<sup>10</sup>

The treatment for Sydenham's chorea is empiric against *S. pyogenes*: penicillin or amoxicillin dosed at 500 mg three-to-four times a day for ten days. These beta-lactams are relatively inexpensive and show very low resistance rates among *S. pyogenes* strains.<sup>11</sup> For patients with severe Sydenham's chorea who are admitted inpatients, a single penicillin G benzathine injection of 600,000–1,200,000 units will suffice. In penicillin-allergic patients, clindamycin or the macrolides are safe to use and provide similar clinical efficacies. These agents are also given for a duration of ten days.<sup>11</sup>

Other treatments include valproic acid, immunoglobulins, and corticosteroids.<sup>12-13</sup> The latter two are administered based on the auto-immune component of Sydenham's chorea. Valproic acid is an anticonvulsant that is generally reserved as an alternative treatment.

## SOURCES:

1. NINDS Chorea Information Page. Available at: <http://www.ninds.nih.gov/disorders/chorea/chorea.htm>. Accessed June 24, 2012.
2. Chorea. Available at: <http://www.movementdisorders.org/disorders/chorea.php>. Accessed June 24, 2012.
3. Bonelli RM, Beal MF. Huntington's disease. *Handb Clin Neurol*. 2012;106:507–26.
4. Pidgeon C, Rickards H. The pathophysiology and pharmacological treatment of Huntington disease. *Behav Neurol*. 2012 Epub ahead of print.
5. Killoran A, Biglan KM. Therapeutics in Huntington's Disease. *Curr Treat Options Neurol*. 2012. [Epub ahead of print].
6. Scott LJ. Tetrabenazine: for chorea associated with Huntington's disease. *CNS Drugs*. 2011;25(12):1073–85.
7. NINDS Sydenham Chorea Information Page. Available at: <http://www.ninds.nih.gov/disorders/sydenham/sydenham.htm>. Accessed June 24, 2012.
8. Cunningham MW. Streptococcus and rheumatic fever. *Curr Opin Rheumatol*. 2012;24(4):408–16.
9. Rheumatic fever. Available at: <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0004388/>. Accessed June 24, 2012.
10. Rheumatic fever. Available at: <http://www.uptodate.com/contents/sydenham-chorea>. Accessed June 24, 2012.
11. Prevention of Rheumatic Fever and Diagnosis and Treatment of Acute Streptococcal Pharyngitis. Available at: <http://circ.ahajournals.org/content/119/11/1541.full>. Accessed June 24, 2012.
12. Peña J, Mora E, Cardozo J et al. Comparison of the efficacy of carbamazepine, haloperidol and valproic acid in the treatment of children with Sydenham's chorea: clinical follow-up of 18 patients. *Arq Neuropsiquiatr*. 2002;60(2-B):374–7.
13. Walker KG, Wilmshurst JM. An update on the treatment of Sydenham's chorea: the evidence for established and evolving interventions. *Ther Adv Neurol Disord*. 2010 Sep;3(5):301–9.



## INNOVATION COMPETITIONS: APPS FOR HEALTHCARE

BY: MOHAMMAD A. RATTU, PHARM.D. [PGY-I RESIDENT AT VA NYHHS]



As many of my friends and colleagues know, one of my many hobbies is computer programming. I enjoy being involved in and leading promising computer projects that aim to reduce redundancies and improve predefined outcomes. I personally focus on the purpose and quality of my code, and keep in mind that monetization is never my primary goal. Back in sixth grade, I wanted to do something ‘useful’ on the internet, and over the years, this desire evolved into complex tests of critical thinking, time management, and leadership. Although the only formal training that I had was through high school courses in Java and C/C++, I learned most web-related computer languages on my own.

I became serious with web application programming after my first year of college, and still remember the first day I registered as a Facebook Application (or App, for short) developer. In May 2007, I immediately read-up on the service’s application programming interface (API) documentation, connected to its REpresentational State Transfer (REST) servers via the hypertext preprocessor (PHP) library, and launched my first Facebook App – a program that utilized Heron’s formula for determining the area of any triangle.<sup>1</sup> Within one year, I developed roughly 75 unique Apps (you could contact me directly for their specific functions), which generated decent advertising revenue by fall of 2008. Of course, the economic circumstances were different back then – now, corporations (e.g. Zynga) flourish in the App market and, from my perspective, have minimized sole proprietorships.<sup>2</sup>

In contemporary times, we have many opportunities for developing outside of the Facebook platform and with greater relevance to our profession. Although many social networking outlets (e.g. Twitter, MySpace, and Flickr, to name a few) offer various API, they do not provide upfront

monetary rewards for developers’ final products.<sup>3</sup> In other words, you have to finance your own program’s success or lack thereof. If your App somehow becomes a big hit with users, your out-of-pocket costs will significantly increase, particularly as you have to consider user data scalability and security. Although there are a few web applications that are in the realm of healthcare, I feel that they are very generic and (more often than not) related to lifestyle and exercise tracking (e.g. Nike+ GPS versus RunKeeper) rather than patient education and medication adherence.<sup>6,7</sup>

**“Although many social networking outlets... offer various API... you have to finance your own program’s success or lack thereof.”**

In contrast to the aforementioned, Challenge.gov and Health2Con.com have current and archived lists of federal and private competitions that encourage application development for healthcare.<sup>8,9</sup> Each website contains concise eligibility criteria, deadlines, and substantial monetary prizes.<sup>8,9</sup> In my opinion, whether or not you have a degree in Pharmacy (or any other health-related profession), if you have innovative ideas for improving tangible aspects of healthcare, you have surpassed the most difficult part of the App development process. Of course, the next couple of steps would involve learning aspects of computer programming on your own or joining a team of App developers as a clinical consultant. In my experience, the latter is more difficult to achieve, as App development teams seldom seek to fill these positions.

On Health2Con.com, one specific innovation competition that recently caught my attention was Aetna’s “CarePass® Platform and Medication Reminder Developer Challenge.”<sup>10</sup> In this challenge, Aetna, an American managed healthcare company, is inviting software developers to utilize its CarePass API to, at the very least, create med-

ication reminders for users of the App.<sup>10</sup> From a simple search of the current market, Aetna's request described something similar to what already exists in Apple's App Store (RxmindMe Prescription / Medicine Reminder and Pill Tracker), but the company has additional emphases on the costs of medications / alternatives and integration with the CarePass® Platform.<sup>10,11</sup> The preferred goals of the App are to track and improve adherence rates among the patients who utilize the innovation.<sup>10</sup> While the RxmindMe App is free and probably generates revenue from mobile advertising, Aetna is willing to pay \$100,000 in prizes (\$75,000 for the grand prize winner and \$25,000 for the runner-up) – a major contrast and impetus for this niche.<sup>10,11</sup> I sense that it would be unlikely to generate the same funding from a free App with mobile adverts, unless the development company has major investors.

**“... if you have innovative ideas for improving tangible aspects of healthcare, you have surpassed the most difficult part of the App development process.”**

The “Reporting Patient Safety Events Challenge” is another interesting project for developers to look into.<sup>12</sup> Its sponsor is the US Department of Health and Human Services, the Office of the National Coordinator (ONC) for Health IT.<sup>12</sup> Looking through previous projects on Health2Con.com, it is evident that there was a similar innovation competition for reporting safety events with the “Reporting Device Adverse Events Challenge.”<sup>13</sup> While device adverse event forms would be simple / streamlined, patient safety data collection is quite broad and event-specific, as evidenced by the Agency for Healthcare Research and Quality's (AHRQ) Common Formats for reporting patient safety events to Patient Safety Organizations (PSOs).<sup>13,14</sup> In addition, this challenge reminds me of something that already exists in the private sector: the Medical Event Reporting System – Total HealthSystem (MERS-TH) software utilized by inpatient institutions like NewYork-Presbyterian Hospital.<sup>15-17</sup> The prize

breakdown for the “Reporting Patient Safety Events Challenge” is \$50,000 with a demo opportunity for first place, \$15,000 for second place, and \$5,000 for third place.<sup>12</sup>

**“It is okay to think of the potential rewards in the end, but that should not deter you from the patient-oriented goal or compromise your work.”**

While I feel that such projects would be fun for a development team to pursue, there are many factors to consider. These include but are not limited to a team's interests, capabilities, formal agreements, and timelines. In addition, the developers would have to consider the other competitors. For example, in Aetna's “CarePass® Platform and Medication Reminder Developer Challenge,” there are already three registered teams (Healthline, Plus Assist, and Surfadoc), and there are still about two months to go before the deadline.<sup>10</sup> As somewhat expected, in the “Reporting Patient Safety Events Challenge,” there is significantly greater competition with 13 registered teams (LearnOnce, SaferPatients, HealthBuzz, IDinc Shands, Decide Mobility, Originative, Empower IT, McKesson, Cydek, Midas+ Solutions, Morgridge Institute for Research PSO [MIRPSO], Healthcare SafetyZone, and Active Safety).<sup>12</sup> Any of these registered teams may have already completed a majority of the programming that the respective sponsors desire.<sup>10,12</sup>

While I presented only two specific innovation competitions, I could indeed spend hours upon hours describing the other various opportunities and barriers that exist on Challenge.gov and Health2Con.com. However, before I even think of doing such a thing, I implore readers of this article to visit these websites to discover interesting and feasible challenges. If you become passionate about working on a particular project, but do not have any background in application development, you could contact any of the registered teams listed on the competition website(s) or... simply get in touch me for further guidance!

## RHO CHI POST ([RHOCHISTJ.ORG](http://RHOCHISTJ.ORG))

In the end, you and/or your team should aim to create the most comprehensive, high quality, usable App. It is okay to think of the potential rewards in the end, but that should not deter you from the patient-oriented goal or compromise your work. If you impress the competition's sponsor(s) and judge(s) with your entry, you may just win that very decent prize for all of your efforts!

**Note:** *This article contained considerable computer terminology. For any clarifications, questions, comments, or concerns, please contact mohammad.rattu06@stjohns.edu*

### SOURCES:

1. Facebook. Old REST API. Website. Available online: <https://developers.facebook.com/docs/reference/rest/>. Apr 2012. Accessed Jun 16, 2012.
2. Zynga Inc. About Zynga. Website. Available online: <http://company.zynga.com/about/>. Jun 2012. Accessed Jun 16, 2012.
3. Twitter. Twitter Developers. Website. Available online: <https://dev.twitter.com/>. Jun 2012. Accessed Jun 16, 2012.
4. MySpace. MySpace Developer Center. Website. Available online: <http://developer.myspace.com/>. Jun 2012. Accessed Jun 16, 2012.
5. Yahoo! Inc. Flickr Services. Website. Available online: <http://www.flickr.com/services/api/>. Jun 2012. Accessed Jun 16, 2012.
6. Apple Inc. App Store - Nike+ GPS. Website. Available online: <http://itunes.apple.com/us/app/nike+-gps/id387771637?mt=8>. Jun 2012. Accessed Jun 16, 2012.
7. Apple Inc. App Store - RunKeeper - GPS Running, Walking, Cycling and more! Website. Available online: <http://itunes.apple.com/us/app/runkeeper-gps-running-walking/id300235330?mt=8>. Jun 2012. Accessed Jun 16, 2012.
8. ChallengePost Inc. The central platform for crowdsourcing US Government challenges, contests, competitions and open innovation prizes | Challenge.gov. Website. Available online: <http://challenge.gov/>. Jun 2012. Accessed Jun 16, 2012.
9. Health 2.0. Home - The Health 2.0 Developer Challenge. Website. Available online: <http://www.health2con.com/devchallenge/>. Jun 2012. Accessed Jun 16, 2012.
10. Health 2.0. Aetna's CarePass® Platform and Medication Reminder Developer Challenge. Website. Available online: <http://www.health2con.com/devchallenge/aetna-carepass-challenge/>. Jun 2012. Accessed Jun 16, 2012.
11. Apple Inc. App Store - RxmindMe Prescription / Medicine Reminder and Pill Tracker. Website. Available online: <http://itunes.apple.com/us/app/rxmindme-prescription-medicine/id379864173?mt=8>. Jun 2012. Jun 16, 2012.
12. Health 2.0. Reporting Patient Safety Events Challenge. Website. Available online: <http://www.health2con.com/devchallenge/reporting-patient-safety-events-challenge/>. Jun 2012. Accessed Jun 16, 2012.
13. Health 2.0. Reporting Device Adverse Events Challenge. Website. Available online: <http://www.health2con.com/devchallenge/reporting-device-adverse-events-challenge/>. Jun 2012. Accessed Jun 16, 2012.
14. Agency for Healthcare Research and Quality. Common Formats. Website. Available online: <http://www.pso.ahrq.gov/formats/commonfmt.htm>. Jun 5, 2012. Accessed Jun 16, 2012.
15. MERS USA. Medical Event Reporting System – Total HealthSystem. Website. Available online: [http://www.mers-international.com/mers\\_usa.html](http://www.mers-international.com/mers_usa.html). Oct 17, 2007. Accessed Jun 16, 2012.
16. Gasparis G. NewYork-Presbyterian Adverse Event Reporting Policy. PDF Document. Available online: <http://dept.irb/policies/documents/NYPAEReportingpolicy.pdf>. Jul 9, 2009. Accessed Jun 16, 2012.
17. Weill Cornell Medical College. Patient Safety / Risk Mitigation. Website. Available online: [http://med.cornell.edu/risk-management/best\\_practices/patient\\_safety.html](http://med.cornell.edu/risk-management/best_practices/patient_safety.html). Jun 2012. Accessed Jun 16, 2012.



# LOOKING FOR THE BRIGHTEST MINDS IN HEALTH IT



Morgenthaler Ventures and Health 2.0 DC to VC: Health IT Startup Showcase is a nationwide contest to find the best venture backable startup ideas in health IT. It culminates the top 10 finalists presenting on stage at the Annual 2012 Health 2.0 Conference in San Francisco, to a crowd of health IT enthusiasts on October 10, 2012.

For more information, visit: <http://www.dctovc.com/challenge/>

Image Source: <http://www.dctovc.com/wp-content/themes/twentyeleven/images/dc2vcSketch.jpg>

## DONEPEZIL IN PATIENTS WITH DELIRIUM WITHOUT DEMENTIA BY: LUNBAO (JERRY) HUANG, PHARM.D. CANDIDATE C/O 2013

Donepezil, brand name Aricept®, is an acetylcholinesterase inhibitor indicated as monotherapy for Alzheimer's disease, the most common form of dementia. Cholinergic deficiency in the cortex and basal forebrain contributes to cognitive deficits in these patients. Donepezil reversibly, non-competitively inhibits centrally active acetylcholinesterase, the enzyme responsible for hydrolysis of acetylcholine. This results in increased concentrations of acetylcholine available for synaptic transmission in the central nervous system. As opposed to the chronic, slow mental digressions of Alzheimer's disease, delirium is an acute state of sudden severe confusion and rapid changes in brain function that are brought on by physical or mental illness. Many disorders cause delirium, including conditions that deprive the brain of oxygen or vital nutrients. Anticholinergic drugs can cause delirium in patients, thus the theory of increasing acetylcholine in the brain using acetylcholinesterase inhibitors to reverse this effect. Yet, since donepezil is only indicated for Alzheimer's disease and not for delirium, more studies were needed to evaluate the effectiveness of this treatment.

**“...delirium is an acute state of sudden severe confusion and rapid changes in brain function that are brought on by physical or mental illness.”**

In 2004, Kobayashi et al. reported a case of a 68-year-old man with a history of mixed-type delirium caused by a right basal forebrain vascular lesion after surgery for craniopharyngioma.<sup>1</sup> Magnetic resonance imaging showed hemorrhagic infarcts in the brain. Treatment with antipsychotics, antidepressants, and hypnotics resulted in little improvement for this patient. Donepezil administration dramatically improved his intractable delirium after 19 days of treatment; however, this was followed by amnesic symptoms. Therefore, the clinical evidence suggests that there is a

correlation between delirium and efficacy of donepezil treatment, which supports the cholinergic theory of delirium.

Within the same year, another case reported by Slatkin et al. describes successful treatment with an acetylcholinesterase inhibitor on a 55-year-old woman with advanced ovarian cancer, severe pain, and hypoactive delirium caused by an increase in her opioid dosage.<sup>2</sup> Intravenous physostigmine, an acetylcholinesterase inhibitor, was administered, which resulted in drastic improvements of her myoclonus and delirium. The improvement was maintained during the administration of oral donepezil, which is another acetylcholinesterase inhibitor.

**“Donepezil reversibly, noncompetitively inhibits centrally active acetylcholinesterase, the enzyme responsible for hydrolysis of acetylcholine.”**

Liptzin et al. performed a relatively small study of 80 patients in a randomized, double-blind, placebo-controlled trial on using donepezil to treat delirium.<sup>3</sup> Each participant was evaluated before surgery and then received either donepezil or placebo for 14 days before surgery and 14 days afterward. Postoperative delirium was assessed using Delirium Symptom Interview, Confusion Assessment Method, daily medical record, nurse-observation reviews, and DSM-IV diagnostic criteria. Subsyndromal delirium was also assessed for each participant. There were no significant differences found between the donepezil and placebo groups. When delirium was present, it lasted only one day. This may suggest that postoperative delirium was not a major problem in this population of relatively young and cognitively-intact elderly patients undergoing elective orthopedic surgery.

Similar results were seen in a pilot randomized trial in 2011 by Marcantonio et al.<sup>4</sup> The study

looked at 16 patients randomly placed in two groups to receive either donepezil or placebo. Treatment began at 24 hours, preoperatively or postoperatively. Daily treatment continued for 30 days or until side effects or clinical situations required termination of treatment. The donepezil treatment group experienced more adverse effects and had no significant improvements in delirium presence or severity. Overall, sufficient evidence was not found to warrant a definitive Phase III trial.

Outcomes of a later randomized, double-blind, placebo-controlled trial done by Sampson et al. suggested a consistent trend towards possible benefit from donepezil treatment for patients with postoperative delirium after elective total hip replacement.<sup>4</sup> This study consisted of 33 patients with 19 patients placed on donepezil, and 14 on placebo. Donepezil was well tolerated with no serious adverse events; however, the drug did not significantly reduce the incidence of delirium or length of hospital stay. These unsatisfactory results may be due to an insufficient number of study participants to meet adequate power; a larger sample size may be required for a more definitive trial.

### **“Patient cases ... suggest a benefit with giving donepezil in delirium.”**

To date, previous studies are insufficient to suggest that donepezil is effective in treating delirium. Most studies investigated postoperative delir-

ium, which some suggest is reversible and does not require preventative therapy. Patient cases do however suggest a benefit with giving donepezil in delirium. This is an interesting prospect and a bigger, well-designed study is required to attain a definite answer.

### **SOURCES:**

1. Kobayashi K, Higashima M, Mutou K et al. Severe delirium due to basal forebrain vascular lesion and efficacy of donepezil. *Prog Neuropsychopharmacol Biol Psychiatry*. 2004;28(7):1189—94.
2. Slatkin N, Rhiner M. Treatment of opioid-induced delirium with acetylcholinesterase inhibitors: a case report. *J Pain Symptom Manage*. 2004;27(3):268—73.
3. Liptzin B, Laki A, Garb JL, et al. Donepezil in the prevention and treatment of post-surgical delirium. *Am J Geriatr Psychiatry*. 2005; (12):1100—6.
4. Sampson EL, Raven PR, Ndhlovu PN, et al. A randomized, double-blind, placebo-controlled trial of donepezil hydrochloride for reducing the incidence of postoperative delirium after elective total hip replacement. *Int J Geriatr Psychiatry*. 2007;22(4):343—9.
5. Marcantonio ER, Palihnich K, Appleton P, et al. Pilot randomized trial of donepezil hydrochloride for delirium after hip fracture. *J Am Geriatr Soc*. 2011;59(2):S282—8.

## **THE PATHOLOGY OF PURE RED CELL APLASIA** BY: NEAL SHAH, CO EDITOR-IN-CHIEF

Pure Red Cell Aplasia (PRCA), also known as erythroblastopenia, is characterized by a suppression of erythrocytes in the bone marrow. It is a peculiar oddity that the bone marrow's progenitor cells still differentiate into white blood cells and platelets.<sup>1</sup> PRCA has idiopathic, viral, autoimmune, and genetic etiologies. Diamond-Blackfan syndrome features PRCA due to defective red blood cell (RBC) production<sup>1</sup> resulting

from genetic abnormalities in ribosomal protein production.<sup>2</sup> Infection with the parvovirus B19 is linked to PRCA in immunocompromised patients,<sup>3</sup> and thymomas often present in up to 15% of PRCA cases.<sup>4</sup>

Drug induced PRCA is often seen with administration of erythropoiesis stimulating agents (ESA) such as Aranesp® (darbepoetin) and Pro-

## RHO CHI POST ([RHOCHISTJ.ORG](http://RHOCHISTJ.ORG))

crit® (epoetin).<sup>5</sup> The administration of these exogenous peptides results in antibody formation and subsequent destruction of erythrocyte precursors. PRCA occurs most frequently when ESAs are administered subcutaneously.<sup>6</sup> Discontinuation of the ESA usually does not stop PRCA from occurring, but immunosuppressive agents are shown to slow progression.<sup>7</sup> In March 2012, the FDA approved the drug Omontys® (peginesatide).<sup>8</sup> This drug does not resemble typical ESA because it is not a direct erythropoietin mimetic; instead it is a pegylated dimer that directly activates erythropoiesis. It is currently indicated for the treatment of anemia due to chronic kidney disease for patients on dialysis.<sup>10</sup>

### **“Drug induced PRCA is often seen with administration of erythropoiesis stimulating agents...”**

Treatment of PRCA involves discontinuation of all ESA agents and a course of corticosteroids to suppress the immune system.<sup>11</sup> Some immunosuppressants including cyclophosphamide and cyclosporine are also successful in mitigating PRCA.<sup>12,13</sup> Rituximab is also shown to be effective in treating PRCA.<sup>14</sup>

### **SOURCES:**

1. Raphael Rubin, David Strayer. Rubin's Pathology, 5<sup>th</sup> edition. Lippincott Williams & Wilkins, Wolters Kluwer. 2008;867.
2. Diamond-Blackfan anemia. Available at: <http://ghr.nlm.nih.gov/condition/diamond-blackfan-anemia>. Accessed June 24, 2012.
3. Gilsanz F, Garcia Vela J, Vargas JA et al. Acquired pure red cell aplasia: a study of six cases. *Ann Hematol*. 1995;71(4):181—3.
4. Pure Red Cell Aplasia. Available at: <http://emedicine.medscape.com/article/205695-overview#a0104asd>. Accessed June 24, 2012.
5. Information on Erythropoiesis-Stimulating Agents (ESA) Epoetin alfa (marketed as Procrit, Epogen), Darbepoetin alfa (marketed as Aranesp). Available at: <http://www.fda.gov/drugs/drugsafety/postmarketdrugsafetyinformationforpatientsandproviders/ucm109375.htm>. Accessed June 24, 2012.
6. Erythropoiesis-stimulating agents and antibody-mediated pure red-cell aplasia: here are we now and where do we go from here? Available at: <http://ndt.oxfordjournals.org/content/19/2/288.full>. Accessed June 24, 2012.
7. Rossert J, Macdougall I, Casadevall N. Antibody-mediated pure red cell aplasia (PRCA) treatment and re-treatment: multiple options. *Nephrol Dial Transplant*. 2005;20 Suppl 4:iv23—2
8. Mikhail A. Profile of peginesatide and its potential for the treatment of anemia in adults with chronic kidney disease who are on dialysis. *J Blood Med*. 2012;3:25—31. Epub 2012 May 23.
9. Green JM, Leu K, Worth A et al. Peginesatide and erythropoietin stimulate similar erythropoietin receptor-mediated signal transduction and gene induction events. *Exp Hematol*. 2012;40(7):575—87. Epub 2012 Mar 6.
10. Omontys [package insert]. Palo Alto, CA: Affymax, Inc; 2012.
11. Sawada K, Fujishima N, Hirokawa M. Acquired pure red cell aplasia: updated review of treatment. *Br J Haematol*. 2008;142(4):505—14.
12. Gupta R, Ezeonyeji A, Thomas A, Scully M, Ehrenstein M, Isenberg D. A case of pure red cell aplasia and immune thrombocytopenia complicating systemic lupus erythematosus: Response to rituximab and cyclophosphamide. *Lupus*. 2011;20(14):1547—1550.
13. Björkholm M. Intravenous immunoglobulin treatment in cytopenic haematological disorders. *J Intern Med*. 1993;234(2):119—26.
14. D'Arena G, Vigliotti ML, Dell'Olio M, Villa MR, Mantuano S, Scalzulli PR, et al. Rituximab to treat chronic lymphoproliferative disorder-associated pure red cell aplasia. *Eur J Haematol*. 2009;82(3):235—9.



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### RHO CHI EXECUTIVE BOARD MEMBER INSIGHT: YINING SHAO 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. Clearly, 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 third executive board member insight is with Yining Shao, current fourth year student pharmacist and President of St. John's University's Rho Chi Beta Delta chapter.*

**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: I used to use the English name "Nick" when I lived in West Babylon because no one there can pronounce my name. If you call the CVS where I work, ask for Nick!

**Q: Never would have guessed that! What are some of the things that you like doing outside of pharmacy?**

A: I enjoy reading, especially books about religion. C.S. Lewis is one of my favorite authors.

**Q: I am sure that the Doctor of Pharmacy program also provides you a ton of literature to read. Ha-ha! So, what is your favorite quote?**

A: My favorite quote would be: "Ideas are bulletproof," which is from my favorite movie, *V for Vendetta*.

**Q: Interesting – I have heard many quotes about "ideas," and I was unfamiliar with that one! Now, when you received an invitation to the Rho Chi Academic Honor Society, why did you accept it?**

A: Just like Aleena (back in Issue #8), I thought, "Why not?" I felt the need to become more involved in my field, as pharmacy is more of a career than a job. I knew that it would be beneficial to join any pharmacy-related group, especially Rho Chi. The organization simply has so many successful members, such as you Mohammad!

**"My favorite quote would be: 'Ideas are bulletproof'..."**

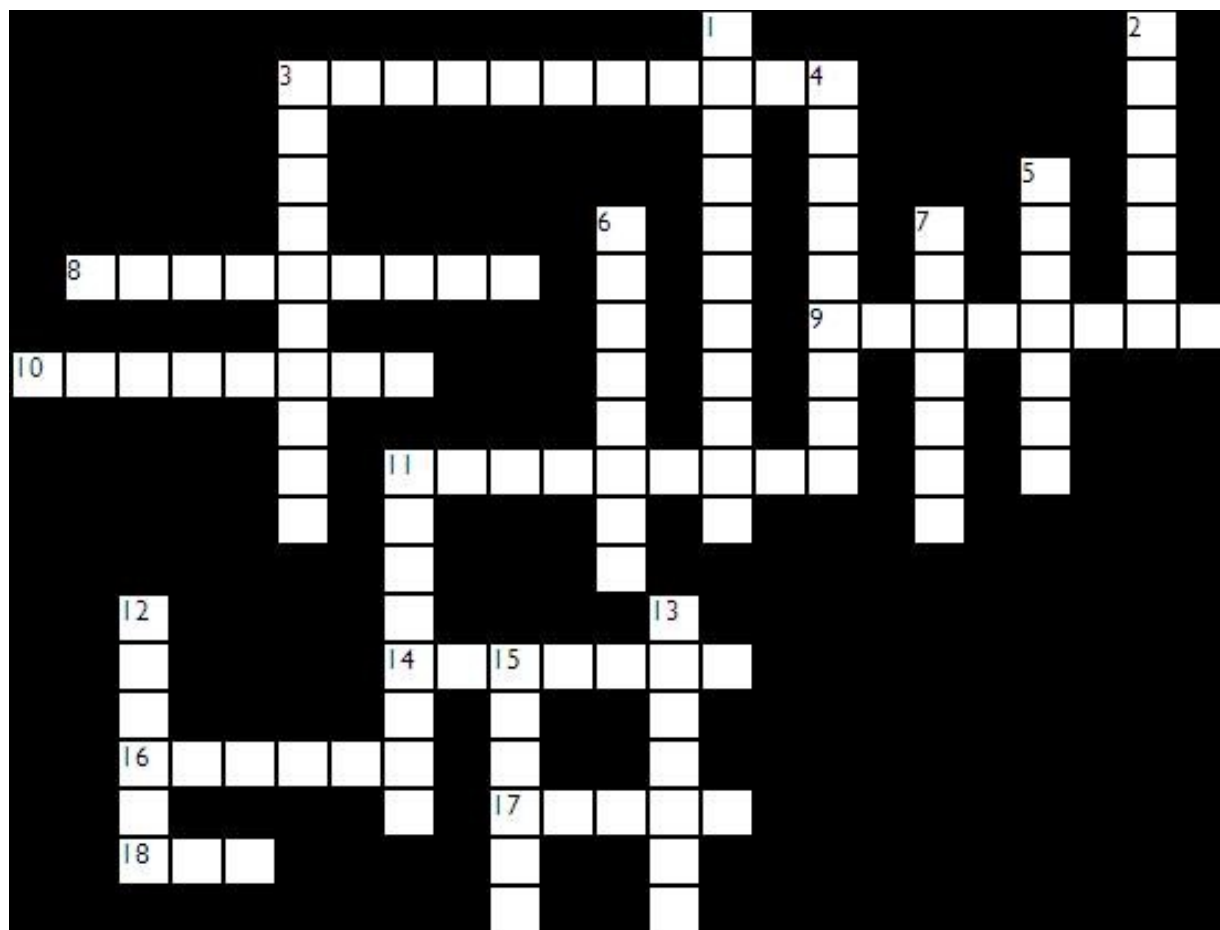
**Q: Indeed, we tried (and continue to try our best) to keep our Rho Chi chapter successful! Finally, what was your impetus for applying to an executive board position?**

A: I wanted to have an influence on the success of my profession. If I feel Pharmacy school is "boring" or "tiresome," it is my own responsibility to make it not so. I dislike being in an organization and feeling powerless to change something that I feel is not right. On the other hand, I also love being in the middle of all the action and excitement. I thought, "What better way to immerse myself in pharmacy than to take on more responsibility in a pharmacy organization?"

*We thank Yining for taking the time to provide us with this insight, and look forward to highlighting the other Rho Chi executive board members.*

*If you have any additional questions for Yining, please email him at [yining.shao08@stjohns.edu](mailto:yining.shao08@stjohns.edu)!*

# PUZZLE: CROSSWORD BY: MAHDIEH DANESH YAZDI, ASSOCIATE STUDENT EDITOR



## ACROSS

3. Generic Amaryl®
8. Most commonly used oral hypoglycemic agent
9. DPP-4 inhibitor which does not require dose adjustment for liver and kidney dysfunction
10. Extended-release formulation of exenatide administered once weekly
11. Second generation sulfonylurea also available in an extended-release formulation
14. Thiazolidinedione pulled from shelves due to cardiac risk
16. Rapid-acting insulin marketed by Eli Lilly
17. Thiazolidinedione associated with increased risk of bladder cancer when used for more than one year
18. Intermediate-acting insulin that is an isophane suspension of human insulin

## DOWN

1. First marketed DPP-4 inhibitor
2. Brand sitagliptin/metformin
3. Device used to measure blood glucose levels
4. Generic Byetta®
5. Long-acting insulin marketed by Novo Nordisk®
6. Only insulin available for intravenous injection
7. Brand nateglinide
11. Drug administered in cases of severe hypoglycemia; hormone that counteracts insulin's action in the body
12. Analog of amylin
13. Long-acting glucagon-like peptide 1 (GLP-1) receptor agonist
15. Rapid-acting insulin approved by the FDA in 2000

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## 2012 DR. CHARLES I. JAROWSKI INDUSTRIAL PHARMACY SYMPOSIUM BY: STEVE SOMAN, CO EDITOR-IN-CHIEF







## SPECIAL THANKS TO ALL THE GUEST SPEAKERS



Gary Liversidge, Ph.D.  
*Chief Technology Officer and Vice President  
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Sessa Neervannan, Ph.D.  
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Former Chairman and CEO,  
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**Right:**  
David R. Taft, Ph.D.  
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## MATCHING CHALLENGE: LOOK-ALIKES, SOUND-ALIKES BY: ADDOLORATA CICCONE, STUDENT CO-COPY-EDITOR

The following medications are easily confused.  
Try to match each one with its corresponding fun fact.

*Please view the sources and answers on page 28*

1. This immunosuppressant agent is indicated for the prevention of organ rejection in heart, kidney, or liver transplant recipients. Patients should be educated to take this medication on an empty stomach and to avoid concurrent use of grapefruit and pomegranate juice, which may increase this drug's serum level and/or toxicity.
  2. This analgesic may be considered as an alternate to opioids for pain control. There is however, a caution for use in patients prone to seizures, as it lowers the seizure threshold.
  3. This antidepressant is sometimes used to manage insomnia. As far as side effects, besides sedation, this agent may cause erectile dysfunction, priapism, impaired bladder emptying in patients with an enlarged prostate or bladder outlet obstruction, QT-interval prolongation, and orthostatic hypotension.
  4. This first-generation sulfonylurea is initially dosed at 250mg orally once daily, and can be increased to a maximum of 1,000mg per day. Onset of hypoglycemic affect is 20 minutes, peaking at 4-6 hours.
  5. This first-generation sulfonylurea is initially dosed at 1g orally once daily, and can be increased to a maximum of 3g per day. Onset of hypoglycemic affect is one hour.
  6. This original P2Y<sub>12</sub> inhibitor is unfavorable due to its life-threatening hematologic side effects (i.e. neutropenia, agranulocytosis, thrombotic thrombocytopenia purpura [TTP], and aplastic anemia), GI upset, and twice daily dosing. These drawbacks fueled the development of newer P2Y<sub>12</sub> inhibitors.
  7. This P2Y<sub>12</sub> inhibitor, most recently available as a generic product, is a pro-drug that requires hepatic activation by the CYP450 2C19 enzyme. Drug-drug interactions with proton pump inhibitors (PPIs) and genetic polymorphisms are thus clinically important concerns for patients on this medication.
  8. This new reversible P2Y<sub>12</sub> inhibitor is associated with significantly reduced rates of ischemic events and a decrease in mortality without increased overall risk of fatal bleeding. In comparison to other P2Y<sub>12</sub> inhibitors, this agent has a faster onset and offset and reaches a greater degree of platelet inhibition; it is preferable when desiring immediate platelet inhibition or for patients who may require unanticipated surgical procedures.
  9. This alpha-2 adrenergic agonist is a skeletal muscle relaxant indicated for the treatment of muscle spasticity. Consistency in administration should be practiced as there are clinically significant differences in pharmacokinetics between capsules and tablets taken under fasting and nonfasting states.
  10. It is unknown whether this antiepileptic is teratogenic. Pregnant patients who begin taking this drug are to register with the North American Antiepileptic Drug (NAAED) Pregnancy Registry, which collects information about the safety of antiepileptics during pregnancy.
- A. Clopidogrel
  - B. Tiagabine
  - C. Ticagrelor
  - D. Ticlopidine
  - E. Tacrolimus
  - F. Tizanidine
  - G. Tolazamide
  - H. Tolbutamide
  - I. Tramadol
  - J. Trazodone

## UNDERSTANDING DIABETIC KETOACIDOSIS BY: MOHAMED DUNGERSI, ASSOCIATE STUDENT EDITOR

### ***What is diabetic ketoacidosis (DKA)?***

Diabetic ketoacidosis (DKA) is an acute complication of uncontrolled diabetes or hyperglycemia. It is usually observed in cases of extreme hyperglycemia (usually in excess of 500 mg/dl, though it can occur over 250 mg/dl).<sup>1,2</sup> It is usually characterized by the presence of hyperglycemia, ketosis, and acidosis, but underlying conditions may be present as well. The diagnostic criteria for DKA include a serum glucose >250 mg/dl, arterial pH <7.3, serum bicarbonate <18 mEq/l, and moderate ketonuria or ketonemia.<sup>1</sup> This article aims to provide a brief understanding of the epidemiology, pathogenesis, and treatment of DKA.

### ***Who does DKA normally affect?***

DKA is more common in young (<65 years) female diabetic patients.<sup>2,3,4</sup> The National Diabetes Surveillance Program of the Centers for Disease Control (CDC) estimated that there were 120,000 hospital discharges for DKA in 2005 in the United States, compared to 62,000 in 1980.<sup>3</sup> On the other hand, DKA mortality per 100,000 diabetic patients declined between 1985 and 2005 with the greatest reduction in mortality among those 65 years of age and older.<sup>3</sup> The prognosis of DKA is substantially worse at the extremes of age and in the presence of coma and hypotension.<sup>2</sup> In summary, the number of cases of DKA is rising with increasing levels of obesity and increasing diagnosis of Diabetes Mellitus (DM). However, mortality is declining despite the increase in prevalence. This possibly indicates that DKA is better understood than in the past, which in turn led to more effective treatment. It is important to keep in mind that mortality from DKA is primarily due to the underlying precipitating illness and only rarely due to the metabolic complications of hyperglycemia or ketoacidosis.<sup>5</sup>

### ***What causes DKA?***

The most common causes of DKA include

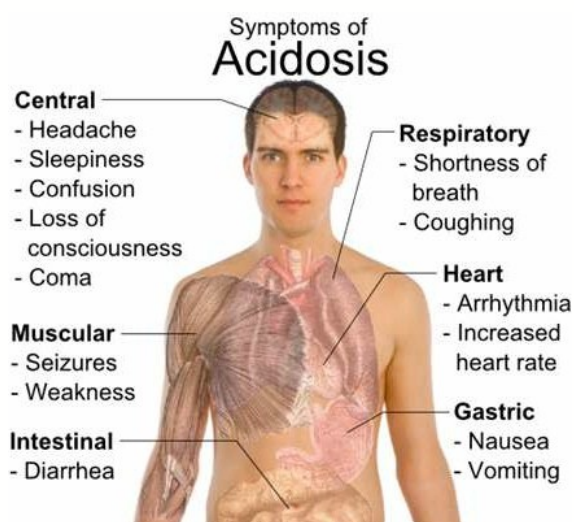
inadequate insulin treatment from non-adherence; new –onset or undiagnosed diabetes; cardiovascular disease, especially myocardial infarction (MI); and infections, particularly pneumonia, urinary tract infections, and sepsis.<sup>4</sup> Other causes of DKA include insulin resistance, acanthosis nigricans, pancreatitis, cerebrovascular accidents, and hyperthyroidism.<sup>4</sup> DKA may also be caused by medications such as corticosteroids and sympathomimetic agents (e.g. albuterol, glucagon, atypical antipsychotics).<sup>4</sup> Treatment of DKA will therefore also involve treatment of underlying conditions.

**“...the number of cases of DKA is rising with increasing levels of obesity and increasing diagnosis of Diabetes Mellitus (DM)”**

Two hormonal abnormalities are largely responsible for the development of hyperglycemia and ketoacidosis in patients with uncontrolled diabetes: insulin deficiency and/or resistance, and glucagon excess, which may result from absence of the normal suppressive effect of insulin.<sup>6</sup> Glucagon excess is not required for DKA to occur, but is a contributory factor.<sup>6</sup> Normally, when hyperglycemia occurs, insulin restores normoglycemia via two mechanisms: increasing glucose uptake by skeletal muscle and adipose tissue, and diminishing hepatic glucose production by reducing both glycogenolysis and gluconeogenesis.<sup>6</sup> Insulin inhibits glucagon secretion and further reduces hepatic glucose production by directly inhibiting the glucagon gene in the pancreatic alpha cells.<sup>6</sup> In cases of low levels of insulin and/or insulin resistance, hepatic glucose production and glucagon secretion are not inhibited.<sup>6</sup>

**“...DKA is primarily due to the underlying precipitating illness and only rarely due to the metabolic complications of hyperglycemia or ketoacidosis.”**

The basic mechanism underlying DKA is a reduction in the effective action of circulating insulin, with concomitant elevation of counterregulatory hormones, primarily glucagon, but also catecholamines, cortisol, and growth hormone.<sup>1,6</sup> As a result, an increase in lipolysis occurs, which leads to free fatty acid conversion into ketone bodies in the liver. Acetoacetic acid is the initial ketone formed; it may then be reduced to beta-hydroxybutyric acid, which is also an organic acid, or nonenzymatically decarboxylated to acetone, which is chemically neutral. Ketones provide an alternate source of energy when glucose utilization is impaired.<sup>6</sup> The development of DKA requires a specific alteration in hepatic metabolism so that free fatty acyl CoA can enter the mitochondria, where conversion to ketones occurs.<sup>7,8</sup> The presence of ketones in the blood causes hyperketonaemia and ketoacidosis.



**Image Source:** [www.diabetestreatmentguide.org/signs-symptoms-of-diabetic-acidosis/](http://www.diabetestreatmentguide.org/signs-symptoms-of-diabetic-acidosis/)

### **What are the signs and symptoms of DKA?**

Patients with DKA usually present with polyuria, polydipsia, polyphagia, weakness, and Kussmaul's respirations. Often, the patient's breath has a fruity odor.<sup>1,6</sup> Nausea and vomiting are present in 50-80% of patients, and abdominal pain is present in about 30%.<sup>6</sup> Coffee-ground emesis, usually from hemorrhagic gastritis, occurs in about 25% of vomiting patients. Body temperature usually is normal or low, even with an infection. If the pa-

tient's temperature is elevated, infection is invariably present.<sup>6</sup> Signs of dehydration, such as dry mucous membranes, tachycardia, and hypotension, often are found. Most patients are dehydrated by about 10% and consciousness ranges from alert to confused to comatose in less than 20% of patients.<sup>6</sup>

## **"The presence of ketones in the blood causes hyperketonaemia and ketoacidosis."**

### **How should DKA be treated?**

The most important goals for treatment of DKA include repletion of fluid deficits, resolving hyperglycemia, resolving acidosis, and normalizing levels of potassium.<sup>12</sup> Other serum levels such as magnesium, sodium, anion gap, etc. may or may not be of importance depending on the case at hand. If an underlying condition is present, treatment for the underlying condition will also be of importance. A priority of treatment should be to protect and maintain the airway, particularly in the obtunded patient, and to treat shock if present. Patients should be monitored closely and frequently with the blood glucose being evaluated every one to two hours until the patient is stable.<sup>1</sup> Also, the blood urea nitrogen, serum creatinine, sodium, potassium, and bicarbonate levels should be monitored every two to six hours depending on the severity of DKA.<sup>1</sup> Cardiac monitoring may be warranted for patients with significant electrolyte disturbances.<sup>1</sup>

## **"The most important goals for treatment of DKA include repletion of fluid deficits, resolving hyperglycemia, resolving acidosis, and normalizing levels of potassium."**

The average fluid loss in DKA is 3-6 liters due largely to osmotic diuresis that occurs from excreting excess glucose; this is usually initially treated with isotonic saline (0.9 percent sodium chloride).<sup>2,4</sup> This will replace the fluid deficit, cor-

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rect the extracellular volume depletion, lower the plasma osmolality (since it is still hypoosmotic to the patient), and reduce the serum glucose concentration both by dilution and by increasing urinary losses as renal perfusion is increased.<sup>9</sup> The exact regimen will depend on the hydration status of the individual patient. In cases of severe hypovolemia, normal saline is initially used.<sup>11</sup> In cases of mild dehydration, corrected sodium levels are evaluated, and therapy is dependent upon the sodium concentration. If Sodium levels are low, normal saline is used. If sodium levels are high, half normal saline is used.<sup>11</sup> It is important to note that once the blood glucose level reaches 200 mg/dl, the patient will receive dextrose along with half normal saline. Since the aim of therapy is to replete the extracellular fluid volume without inducing cerebral edema due to too rapid reduction in the plasma osmolality.<sup>2,4</sup>

Treatment of hyperglycemia comprises of insulin therapy. Insulin lowers the serum glucose concentration (primarily by decreasing hepatic glucose production rather than enhancing peripheral utilization), diminishes ketone production (by reducing both lipolysis and glucagon secretion), and may also augment ketone utilization.<sup>9,12</sup> The only indication for delaying insulin therapy is a serum potassium below 3.3 meq/L, since insulin will worsen the hypokalemia by driving potassium into the cells.<sup>11</sup> A continuous intravenous infusion of regular insulin is the treatment of choice, preceded by a larger initial bolus dose. Uncomplicated DKA, may be treated subcutaneously.<sup>1,11</sup> Blood glucose values must be closely monitored to ensure that levels are dropping or else the insulin doses need to be increased. Once blood glucose levels reach 200 mg/dl, dextrose is started with the saline solution in order to prevent hypoglycemia and cerebral edema.<sup>2,4</sup>

### **“A continuous intravenous infusion of regular insulin is the treatment of choice...”**

Almost all patients with DKA have a substan-

tial potassium deficit due to urinary, and in some cases gastrointestinal, losses.<sup>1,9</sup> The increase in renal potassium excretion is primarily related to the glucose osmotic diuresis and to hypovolemia-induced hyperaldosteronism.<sup>1,9</sup> However, because of a shift in potassium out of the cells due to insulin deficiency and hyperosmolality, the serum potassium is often elevated at presentation. In such patients, potassium repletion is not begun until serum potassium concentrations fall below 5.3 meq/L.<sup>9</sup> The serum potassium should be maintained between 4.0 and 5.0 meq/L.<sup>9</sup> Potassium repletion is more urgent in patients with massive potassium deficits who are hypokalemic prior to therapy; such patients require aggressive potassium replacement. Since insulin will worsen the hypokalemia, insulin therapy should be delayed until the serum potassium is above 3.3 meq/L to avoid possible arrhythmias, cardiac arrest, and respiratory muscle weakness due to worsening hypokalemia.<sup>4,9</sup>

### **“Potassium repletion is more urgent in patients with massive potassium deficits who are hypokalemic prior to therapy...”**

Bicarbonate is used to treat acidosis if pH < 6.90. The venous pH should be monitored every two hours, and bicarbonate given until the pH rises above 7.<sup>1,11</sup> Additionally, treatment of underlying conditions is a priority i.e. the treatment of infections or cardiovascular disease. The American Diabetes Association (ADA) has identified the following criteria for resolved DKA: serum glucose below 200 mg/dL (11.1 mmol/L), serum anion gap <12 meq/L (or less than the upper limit of normal for the local laboratory), serum bicarbonate ≥18 meq/L, and venous pH >7.30.<sup>11</sup>

### ***The role of pharmacists in preventing DKA***

Pharmacists play an important role in preventing patients from developing DKA, especially if patients are on diabetic medications. Diabetic education is vital and can help prevent non-

adherence to insulin therapy or other medications. Educating patients to regularly monitor blood glucose levels can prevent hyperglycemia and ultimately help prevent DKA. Additionally, a sick-day-management plan will help prevent secondary DKA from occurring. Some patients may require supplemental short acting insulin regimens and/or reduced insulin intake instead of completely eliminating it, when patients are not eating. In such cases, recommendations should be made to the physicians. Certain patients may also find home monitoring of blood ketones to be beneficial in preventing repeated DKA. Regardless of the method employed, education of patients can help prevent many cases that would otherwise occur due to lack of education. With DKA incidence and the number of patients with diabetes both rising, pharmacists must ensure patients are well educated to help prevent modifiable complications.

**“Educating patients to regularly monitor blood glucose levels can prevent hyperglycemia and ultimately help prevent DKA.”**

#### **SOURCES:**

1. Trachtenbarg DE. Diabetic ketoacidosis. *Am fam physician* 2005;71:1705—14.
2. Kitabchi AE, Umpierrez GE, Murphy MB, et al. Management of hyperglycemic crises in patients with diabetes. *Diabetes Care* 2001; 24:131.
3. National Center for Health Statistics. National hospital discharge and ambulatory surgery data. Available at [www.cdc.gov/nchs/nhds.htm](http://www.cdc.gov/nchs/nhds.htm). Accessed May 17, 2012.
4. Kitabchi AE, Umpierrez GE, Miles JM, Fisher JN. Hyperglycemic crises in adult patients with diabetes. *Diabetes Care* 2009; 32:1335.
5. Centers for Disease Control and Prevention: Diabetes Data & Trends. Available at <http://www.cdc.gov/diabetes/statistics/dkafirst/fig1.htm>. Accessed May 17, 2012.
6. Kitabchi AE, Nathan DM, Wolfsdorf JL, et al. Epidemiology and pathogenesis of diabetic ketoacidosis and hyperosmolar hyperglycemic state. In: UpToDate, Mulder, JE (Ed), UpToDate, Waltham, MA, 2012.
7. Rose, BD, Post, TW. Clinical Physiology of Acid-Base and Electrolyte Disorders, 5th ed, McGraw-Hill, New York 2001, p. 794.
8. Foster DW. Banting lecture 1984, From glycogen to ketones--and back. *Diabetes* 1984; 33:1188.
9. Wiggam MI, O'Kane MJ, Harper R, et al. Treatment of diabetic ketoacidosis using normalization of blood 3-hydroxybutyrate concentration as the endpoint of emergency management. A randomized controlled study. *Diabetes Care* 1997; 20:1347.
10. Luzi L, Barrett EJ, Groop LC, et al. Metabolic effects of low-dose insulin therapy on glucose metabolism in diabetic ketoacidosis. *Diabetes* 1988; 37:1470.
11. Kitabchi AE, Rose BD. Treatment of diabetic ketoacidosis and hyperosmolar hyperglycemic state in adults. In: UpToDate, Nathan, DM (Ed), UpToDate, Waltham, MA, 2012.

**Would you like to learn more  
about other diseases?**

**Write to our editors at [rhochis@gmail.com](mailto:rhochis@gmail.com) and  
we will feature them in our next issue!**



## PhORCAS: STREAMLINING RESIDENCY RECRUITMENT

BY: MOHAMMAD A. RATTU, PHARM.D. [PGY-I RESIDENT AT VA NYHHS]



There is great news for students, pharmacists, and PGY-I residents who wish to apply to ASHP-accredited residencies this fall. The American Society of Health-System Pharmacists (ASHP) and Liaison International have teamed up to work on a Pharmacy Online Residency Centralized Application Service (PhORCAS).<sup>1-4</sup> Unlike current, individualized procedures for residency applications (which could sometimes be quite expansive and demanding, in terms of the required paperwork), PhORCAS aims to streamline areas of the “residency recruitment process wherever possible – for programs, resident applicants, and reference writers.”<sup>1-4</sup>

PhORCAS may be quite similar to the Pharmacy College Application Service (PharmCAS), “a centralized application service for applicants applying to [select] colleges and schools of pharmacy.”<sup>5</sup> Although not a service that St. John’s University College of Pharmacy and Health Sciences uses, PharmCAS includes 114 schools of pharmacy.<sup>5,6</sup>

In addition to PharmCAS and PhORCAS, Liaison International has previously developed several centralized applications for its clients.<sup>6</sup> The organization has worked with:<sup>6</sup>

- Academy of Nutrition and Dietetics (AND),
- Accreditation Commission for Audiology Education (ACAE),
- American Association of Colleges of Nursing (AACN),
- American Association of Colleges of Podiatric Medicine (AACPM),
- American Dental Education Association (ADEA),
- American Occupational Therapy Association (AOTA),
- American Physical Therapy Association (APTA),
- American Psychological Association, Com-

- mission on Accreditation (APA-CoA),
- Association of Accredited Naturopathic Medical Colleges (AANMC),
- Association of American Veterinary Medical Colleges (AAVMC),
- Association of Chiropractic Colleges (ACC),
- Association of Psychology Postdoctoral and Internships Center (APPIC),
- Association of Schools and Colleges of Optometry (ASCO),
- Association of Schools of Public Health (ASPH),
- Association of University Programs in Health Administration (AUPHA),
- Boston University School of Dental Medicine (BUSDM),
- Commission on Accreditation for Health Informatics and Information Management Education (CAHIIM),
- Commission on Accreditation for Respiratory Care (CoARC),
- Council of Academic Programs in Communications Sciences and Disorders (CAPCSD),
- National Commission on Orthotic & Prosthetic Medicine (NCOPE),
- Physician Assistant Education Association (PAEA),
- Public Health Accreditation Board (PHAB),
- The Association of Schools of Allied Health Professions (ASAHP), and
- Weill Cornell Medical College in Qatar (WCMC-Q).

The PhORCAS advisory committee includes:<sup>1-4</sup>

- **Andrew Barnes, Pharm.D.**<sup>7,8</sup>  
Web Developer; Clinical Pharmacist; Director of PGY-2 Critical Care Pharmacy Residency Program at University of Washington Medical Center
- **Jim Carlson, Pharm.D.**<sup>9-10</sup>  
Director of Pharmacy Health Plan Services at Group Health Cooperative

- **Kate Farthing, Pharm.D., BCPS<sup>11</sup>**  
Clinical Pharmacy Specialist at Legacy Health
- **Melissa Heigham, Pharm.D., BCOP<sup>12</sup>**  
Hematology / Oncology Clinical Pharmacy Manager; Director of PGY-2 Pharmacy Residency Program at St. Louis Children's Hospital
- **Frank P. Paloucek, Pharm.D., DABAT<sup>13,14</sup>**  
Clinical Associate Professor; Director of PGY-I Pharmacy Residency Program at University of Illinois at Chicago
- **Brendan Reichert, M.S., R.Ph.<sup>15-16</sup>**  
Assistant Director of Med Use Informatics at The Johns Hopkins Hospital
- **John Roefaro, Pharm.D.<sup>17-18</sup>**  
Director of PGY-I Pharmacy Residency Program at VA Boston Healthcare System
- **Jean Venable Goode, Pharm.D., BCPS<sup>19</sup>**  
Director of PGY-I Community Pharmacy Residency Program at Virginia Commonwealth University School of Pharmacy
- **Jenny Van Amburgh, B.S., Pharm.D., CDE<sup>20-21</sup>**  
Assistant Dean of Academic Affairs; Associate Clinical Professor and Director of Clinical Pharmacy Services; Director of PGY-I Pharmacy Residency Program at Northeastern University

More information about the ASHP and Liaison International staff (as well as the anticipated benefits of PhORCAS to programs, applicants, and reference providers) is available at: <http://www.ashp.org/menu/Accreditation/ResidencyAccreditation/phorcas.aspx>.<sup>3</sup>

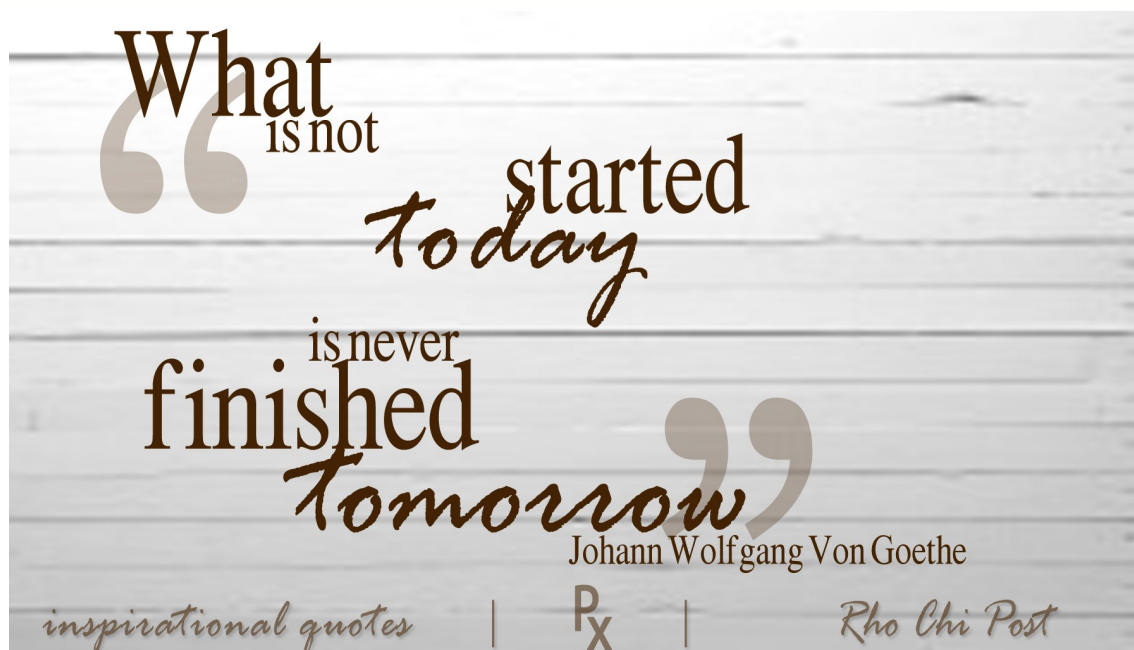
By November 2012 (or perhaps earlier), we expect to have additional information about PhORCAS via webinars and online tutorials.<sup>1-4</sup> So, if you are interested in pursuing a residency position, stay tuned for updates on PhORCAS!

## SOURCES:

1. American Society of Health-System Pharmacists. Pharmacy Online Residency Centralized Application Service (PhORCAS). PDF Document. Available online: <http://www.ashp.org/DocLibrary/Accreditation/PhORCAS.aspx>. Apr 16, 2012. Accessed Jun 23, 2012.
2. American Society of Health-System Pharmacists. The COMMUNIQUÉ. PDF Document. Available online: <http://www.ashp.org/DocLibrary/Accreditation/Communiqu-Newsletter/Communique-Spring-2012.aspx>. Jun 15, 2012. Accessed Jun 23, 2012.
3. American Society of Health-System Pharmacists. Pharmacy Online Residency Centralized Application Service. Website. Available online: <http://www.ashp.org/menu/Accreditation/ResidencyAccreditation/phorcas.aspx>. Jun 23, 2012. Accessed Jun 23, 2012.
4. American Society of Health-System Pharmacists. Pharmacy Online Residency Centralized Application Service: Presentation to Regional Residency Conferences; Developed by the Advisory Task Force. PowerPoint Presentation. Available online: <http://www.ashp.org/DocLibrary/Accreditation/PhORCAS-Residency-Conf.aspx>. Apr-May 2012. Accessed Jun 23, 2012.
5. PharmCAS. Welcome to PharmCAS. Website. Available online: <http://www.pharmcas.org/>. Jun 2012. Accessed Jun 23, 2012.
6. Liaison International. Our Clients. Website. Available online: <http://www.liaison-intl.com/clients/index.html>. May 24, 2012. Accessed Jun 23, 2012.
7. LinkedIn. Andrew Barnes. Website. Available online: <http://www.linkedin.com/pub/andrew-barnes/4/92b/584>. Jun 2012. Accessed Jun 23, 2012.
8. University of Washington. UW Medicine Pharmacy Services. Website. Available online: <http://www.pnrx.org/residency/contacts.html>. Oct 12, 2011. Accessed Jun 23, 2012.
9. LinkedIn. Jim Carlson. Website. Available online: <http://www.linkedin.com/pub/jim-carlson/8/a3/99>. Jun 2012. Accessed Jun 23, 2012.
10. Carlson Consulting Group. About Us. Website. Available online: <http://www.carlsonconsultinggroup.com/about.aspx>. Jun 2012. Accessed Jun 23, 2012.

11. ASHP Research and Education Foundation. Kate Farthing. Website. Available online: <http://www.ashpfoundation.org/MainMenuCategories/CenterforPharmacyLeadership/PharmacyLeadershipAcademy/KateFarthing.aspx>. Jun 2012. Accessed Jun 23, 2012.
12. St. Louis Children's Hospital. Preceptors / Clinical Specialists. Website. Available online: <http://www.stlouischildrens.org/our-services/pharmacy/pharmacy-residency-program/preceptorsclinical-specialists>. Jun 2012. Accessed Jun 23, 2012.
13. The Board of Trustees of the University of Illinois. Frank P. Paloucek. Website. Available online: [http://www.uic.edu/pharmacy/depts/Pharmacy\\_Practice/Faculty\\_profile/paloucekf.htm.php](http://www.uic.edu/pharmacy/depts/Pharmacy_Practice/Faculty_profile/paloucekf.htm.php). Jun 2012. Accessed Jun 23, 2012.
14. LinkedIn. Frank Paloucek. Website. Available online: <http://www.linkedin.com/pub/frank-paloucek/6/562/85b>. Jun 2012. Accessed Jun 23, 2012.
15. The Johns Hopkins Hospital. Pharmacy Residency Program: Pharmacy Informatics. Website. Available online: [http://www.hopkinsmedicine.org/pharmacy/residents/programs/practice\\_residency\\_Informatcs.html](http://www.hopkinsmedicine.org/pharmacy/residents/programs/practice_residency_Informatcs.html). Jun 2012. Accessed Jun 23, 2012.
16. LinkedIn. Brendan Reichert. Website. Available online: <http://www.linkedin.com/profile/view?id=63322637>. Jun 2012. Accessed Jun 23, 2012.
17. VA Boston Healthcare System. PGY-I Residency Program. PDF Document. Available online: [http://www.boston.va.gov/services/pharmacy/pharm\\_brochure.pdf](http://www.boston.va.gov/services/pharmacy/pharm_brochure.pdf). Nov 3, 2011. Accessed Jun 23, 2012.
18. LinkedIn. John Roefaro. Website. Available online: <http://www.linkedin.com/pub/john-roefaro/3/6aa/138>. Jun 2012. Accessed Jun 23, 2012.
19. American Society of Health-System Pharmacists. Residency Listing. Website. Available online: <http://accred.ashp.org/aps/pages/directory/residencyProgramInformation.aspx?ID=52810>. Jun 2012. Accessed Jun 23, 2012.
20. Northeastern University. Jenny Van Amburgh | Department of Pharmacy Practice. Website. Available online: <http://www.northeastern.edu/bouve/directory/faculty.php?name=Jenny%20Van%20Amburgh>. Jun 2012. Accessed Jun 23, 2012.
21. LinkedIn. Jenny Van Amburgh. Website. Available online: <http://www.linkedin.com/pub/jenny-van-amburgh/7/507/84b>. Jun 2012. Accessed Jun 23, 2012.

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



## RHO CHI POST ([RHOCHISTJ.ORG](http://RHOCHISTJ.ORG))

### PUZZLE: WORD SEARCH BY: MARIE HUANG, ASSOCIATE STUDENT EDITOR

S	A	O	N	Z	O	A	D	B	W	Y	S	K
W	M	I	E	E	R	T	L	R	J	R	A	O
J	C	A	S	S	A	G	N	O	L	N	L	O
K	C	A	A	Y	J	R	D	C	M	O	I	R
A	C	E	T	Z	E	L	Z	A	R	C	H	D
R	R	E	R	R	O	T	Z	V	Y	N	C	R
C	R	T	W	W	K	S	M	I	Y	R	A	I
A	A	L	S	C	I	R	D	C	T	A	A	O
H	H	K	R	Z	Z	V	O	H	A	O	T	K
A	I	A	A	R	C	O	Y	I	N	V	D	L
S	O	Z	A	I	A	O	L	R	R	O	Z	E
B	O	I	N	N	J	Z	Y	R	A	S	W	N
C	C	S	S	E	C	E	A	R	R	E	A	O

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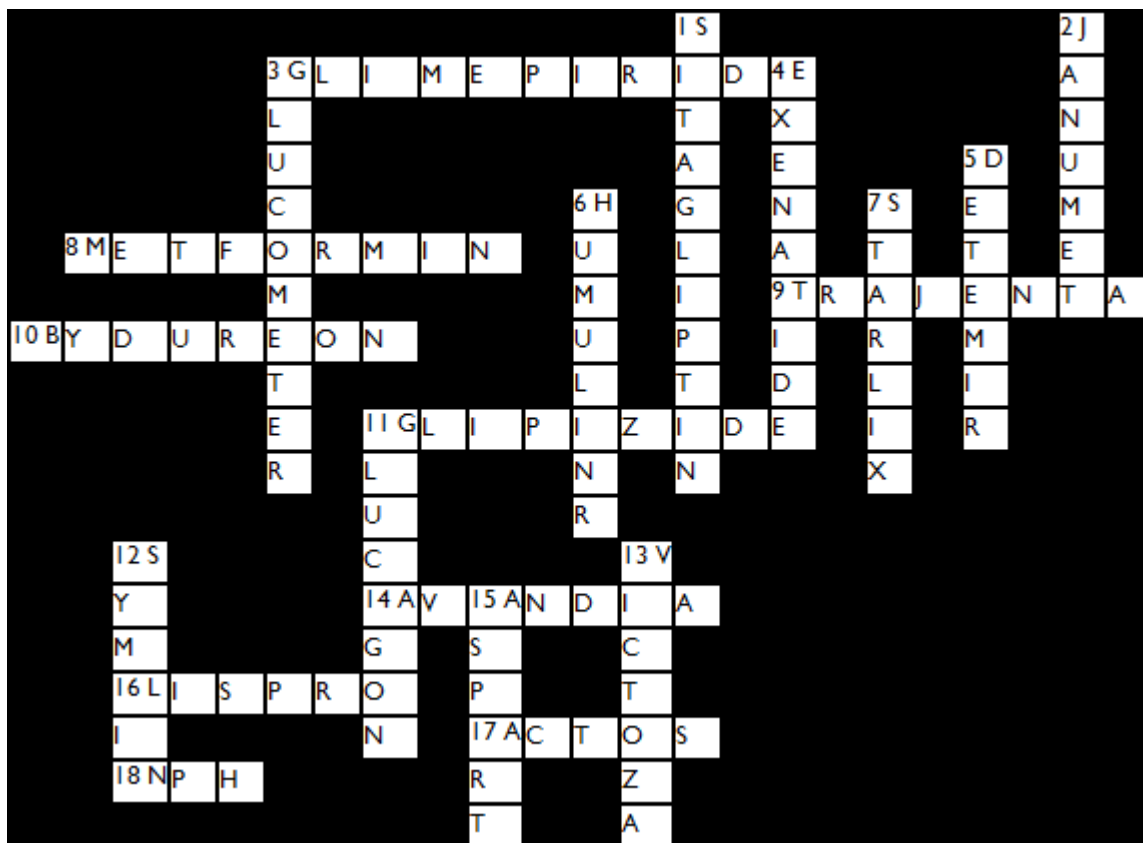
TORRE  
JODLOWSKI  
ETZEL  
ZITO  
KANMAZ  
CASSAGNOL  
BROCAVICH  
CONRY  
HILAS  
ARYA

### NOTICE A THEME?

**TRIVIA:** Of these professors, who served in the US Army National Guard?

ANSWER: DR. JODLOWSKI

## PUZZLE: CROSSWORD (SOLUTION) BY: MAHDIEH DANESH YAZDI, ASSOCIATE STUDENT EDITOR



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

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

*Go back to page 19?*

### SOURCES:

1. American Diabetes Association. Standards of Medical Care in Diabetes Mellitus. *Diabetes Care*, 2012, 35(Suppl):11—63.
2. American Psychiatric Association. Practice guideline for the treatment of patients with major depressive disorder (3rd Edition). October 2010. Available at <http://www.psych.org/guidelines/mdd2010>. (Accessed June 25, 2012).
3. Drugs for type 2 diabetes. *Pharmacist's Letter* 2011; 27(7):270702.
4. Gurbel PA, Bliden KP, Butler K, et al. Randomized double-blind assessment of the ONSET and OFFSET of the antiplatelet effects of ticagrelor versus clopidogrel in patients with stable coronary artery disease: the ONSET/OFFSET study. *Circulation* 2009;120:2577—85.
5. Lexi-Comp Online. Available at <http://www.crlonline.com/crlsql/servlet/crlonline>. Accessed June 25, 2012.
6. Wallentin L, Becker RC, Budaj A, et al. Ticagrelor versus clopidogrel in patients with acute coronary syndromes. *N Engl J Med* 2009;361:1—13.

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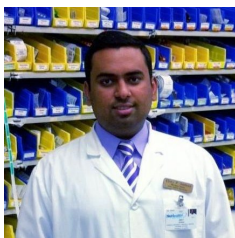
Send us a suggestion for a brainteaser at [rhochis@gmail.com](mailto:rhochis@gmail.com)

We will feature your work in our next issue!



# RHO CHI POST: EDITORIAL TEAM

## CO-EDITORS-IN-CHIEF



@ Steve P. Soman (6<sup>th</sup> 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 (6<sup>th</sup> 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!



## ASSOCIATE STUDENT EDITORS

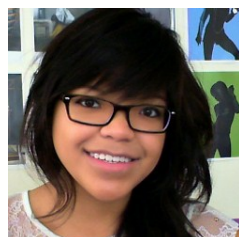


@ Mahdiah D. Yazdi (6<sup>th</sup> Year, STJ)

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 (6<sup>th</sup> 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 (6<sup>th</sup> 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 (6<sup>th</sup> 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 (6<sup>th</sup> 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.



@ Aleena Cherian (5<sup>th</sup> 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!



## STUDENT CO-COPY EDITORS

## 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

- Jul 2: ASHP-Accredited Residencies Begin  
(Multiple sites and times)
- Jul 9-11: 16th Annual 340B Coalition Conference  
(Improving Access to Pharmaceutical Care and Ensuring Compliance with Federal and State Laws in Omni Shoreham Hotel in Washington, DC)
- Jul 14-18: 2012 AACP Annual Meeting  
(Gaylord Palms Resort and Convention Center in Kissimmee, Florida)
- Jul 16-20: July Land O'Lakes Conference  
(Emerging Technology for Bioanalysis in the Next Decade at Devil's Head Resort and Conference Center in Merrimac, WI)
- Jul 25: 2012 Rxperts Conference & Expo  
(Student Pharmacist Special Educational, Career Programs, and Networking Events at the Woodlands Waterway Marriott Hotel, Woodlands, Texas)
- Jul 26-29: Thomas R. Temple Leadership Pharmacy Conference  
(Eagle Ridge Inn and Conference Center in Galena, IL)

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