New York ACCP American College of Clinical Pharmacy

NYS-ACCP Insider

Touro College of Pharmacy - New York

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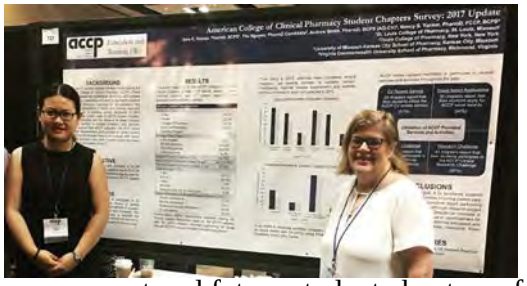
Touro College of Pharmacy's (TCOP) American College of Clinical Pharmacy (ACCP) student chapter was founded in January 2015 with the collaboration of an eager student with a passion for clinical care and several professors of pharmacy practice. Since its induction, our organization has been dedicated to upholding the mission statement and core values of ACCP. We are committed to ensuring members are given exposure to unique fields of clinical pharmacy by providing information about careers and opportunities within the field of clinical pharmacy, including research and academia. Students learn about the importance of dedication to excellence in patient care, and advocating for the role of clinical pharmacists in healthcare, especially within our vibrant Harlem community.



In October, our student co-founder and former chapter president, Thu Nquyen, presented a poster at the ACCP annual conference. In collaboration with the Education and Training PRN, she created and administered a survey to determine ACCP Student Services and Activity utilization as well as strategies to improve current and future student chapters of ACCP.

TCOP-SCCP's student chapter organized a host of events so far this year. Speakers were invited from a multitude of pharmacy specialties to discuss their fields and offer guidance to students about choosing career paths. It was an honor to learn about the experiences associated with a PGY2 Residency in organ transplant from Dr. Nnani. Doctors Ternas and Rozovskiy gave lectures offering insight on their experiences with residency training in managed care and clinical pharmacy. We also hosted a panel of five pharmacists in different fields who discussed their residencies and various scopes of practice. As a way to enhance student skill development, we offered workshops for glucose testing, blood pressure monitoring, and curriculum vitae writing.

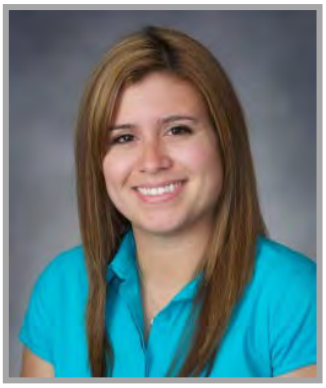
In addition to professional development efforts, we also encourage community outreach and fundraising. In collaboration with other organizations and foundations, we worked to raise funds for disease awareness and were able to volunteer at several community outreach events including 'Dance for Diabetes,' 'Delish-A-Dish' for Corbin's Legacy Charity, 'A Clinical Bake Sale,' American Cancer Society's 'Making Strides Against Breast Cancer,' the Brooklyn Heart & Stroke Walk, the American Diabetes Association's 'Step Out Walk to Stop Diabetes,' and Free Health Screenings at both the 'Harlem Community Health Fair,' and the '48th Annual African American Day Parade.'

Our chapter remains devoted to promoting advocacy, to fostering a passion for clinical pharmacy, to continue to pursue opportunities for expanding the clinical knowledge of our student body, and to encourage our members to be involved in clinical research and publication.

Michelle D. Rabi, Pharm.D. candidate class of 2020

Clinical Spotlight: Rebecca Kavanagh, Pharm.D., BCACP, AAHIVP

Assistant Professor of Pharmacy Practice at Touro College of Pharmacy, New York



Dr. Rebecca (Campbell) Kavanagh earned her Doctorate of Pharmacy from the State University of New York at Buffalo School of Pharmacy and Pharmaceutical Sciences (UBSPPS) in 2015. After earning her degree, she went on to complete a Post-Graduate Year 1 (PGY-1) Pharmacy Practice Residency at The Brooklyn Hospital Center and a Post-Graduate Year 2 (PGY-2) Ambulatory Care Pharmacy Residency with Long Island University at The Brooklyn Hospital Center. She currently practices as an HIV Clinical Pharmacist at the Special Treatment and Research (STAR) Program at SUNY Downstate Medical Center in Brooklyn, and her patient care interest is primary care for underserved patient populations, particularly for patients living with HIV. She recently became the Touro College of Pharmacy student ACCP chapter faculty advisor.

Why did you decide to pursue a clinical pharmacy?

While completing my pharmacy degree, I also worked as an intern in several different pharmacy settings. I worked in Walgreens and Walmart community pharmacies, and at the Western New York Veterans Affairs hospital and the Niagara Falls Memorial Medical Center. I particularly enjoyed the clinical aspect of pharmaceutical care. Making interventions, talking to people, being able to have personal interactions with patients sharpened my passion for clinical pharmacy. During my PGY-2 residency in Ambulatory Care, I chose to further specialize in HIV medicine because I wanted to educate and inform students about HIV in a way that promotes a better understanding of the disease. I enjoy serving underserved and being able to educate patients and assist providers with HIV-related medication problems.

How has ACCP been important in your professional development?

The biggest role that ACCP has for me is providing continuing education and networking with my peers. I am honored to be the advisor for ACCP at our college of pharmacy. It offers a great opportunity to get to know our students, affording us a chance to collaborate and stay current on clinical advances in our field.

What strategies do you take to keep up to date in your field?

I subscribe to a lot of mailing lists and attend pharmacy conferences throughout the year. It can be a big personal effort but to stay current, but you have to see yourself as a lifelong learner, attend continuing education programs, and most importantly, learn from your coworkers.

How would you describe what your typical workday looks like?

It is hard to describe a typical day because no two days are ever the same. However, usually I spend half of my time at the hospital providing direct patient care, and half of my time teaching at the college or precepting students on rotation. At the hospital I precept PGY-1 pharmacy residents, take part in P & T committee meetings, and provide continuing education and in-service education to the medical providers.

What inspired you to become an assistant professor in addition to your role in HIV primary care at Downstate?

I have always wanted to work in academia. I chose to pursue higher-level pharmacy education because teaching and precepting students keeps me connected to the profession and gives me an amazing amount of professional satisfaction.

What advice would you give to a pharmacy student interested in career in clinical pharmacy?

Push yourself, do not be discouraged by difficulties, and follow your passion. Find what speaks to you and gives you passion. Study hard and aim for good grades in your classes. Get involved in community services, research, and student organizations like SCCP.

Melody Kwang Mabial, Pharm.D. candidate class of 2020

The Tango I Trial: A Summary

Introduction:

With the emergence of more Beta-lactam resistant microbes particularly gram negative Enterobacteriaceae such as *Klebsiella pneumoniae,* there is a great need for the development of new antimicrobial agents. The Targeting Antibiotic Non-Susceptible Gram-Negative Organisms (TANGO I)[1] randomized clinical trial, sought to compare meropenem-vaborbactam (M-V) with piperacillin-tazobactam (P-T) in the treatment of complicated UTI and acute pyelonephritis. The trial was published in *The Journal of the American Medical Association* on February 27, 2018.

Pharmacology:

Meropenem-vaborbactam is a combination beta-lactam/beta-lactamase inhibitor. Meropenem, a synthetic bactericidal antibiotic, acts by inhibiting bacterial cell wall synthesis. Meropenem is able to penetrate most gram-negative and gram-positive bacteria without degradation by penicillinases and cephalosporinases. However, bacteria that produce carbapenem hydrolyzing beta-lactamases (carbapenamases) can still render meropenem unstable and the microbe resistant. Vaborbactam, a cyclic boronic acid, is the non-suicidal (not irreversibly bound) beta-lactamase inhibitor component of the drug and lacks antibacterial activity. Its purpose is to prevent the degradation of meropenem in the presence of certain serine beta-lactamases such as *Klebsiella pneumoniae* carbapenemase (KPC).[2]

Selected Inclusion Criteria	Selected Exclusion Criteria
1. Male or female ≥18 years of age. 2. Weight ≤185 kg. 3. Requires initial treatment with at least 5 days of IV antibiotics. 4. Documented or suspected complicated- UTI (cUTI) or Acute Pyelonephritis (AP) as defined by specific criteria.	1. Required Antibiotic/ antifungal treatment in addition to study drug. 2. Antibiotic within 48 hours before randomization Exceptions: single dose of a short-acting oral or intravenous antibiotic with pre-specified criteria. 3. CrCL < 30 mL/min. 4. Pregnant or breastfeeding women. 5. Presence of: uncomplicated urinary tract infection; previous or planned renal transplantation; participants receiving hemodialysis; known candiduria, and other listed conditions. 6. Known non-renal source of infection

Trial design:

TANGO I was a phase 3, multicenter, randomized, double-blind, double-dummy, active-control trial which enrolled a total of 550 participants from November 2014 to April 2016 in 60 sites across 17 countries. Eligible patients were randomly assigned 1:1 to receive either IV meropenem-vaborbactam (2g/2g over 3-hour infusion, (N= 274)) or piperacillin-tazobactam (4g/0.5g over a 30-minute infusion, (N= 276)) every 8 hours, for a total of 10 days ± oral therapy. Patients received at least 15 doses of IV therapy before they could be (if they met pre-specified criteria) switched to oral Levofloxacin (500mg every 24 hours) till the end of the 10-day treatment. Stratification was based on region and type of infection. Clinical outcome assessments were performed at 5 different points during the study: on day 3 of study treatment, at end of intravenous treatment, on the last day of total therapy (end of treatment,) at end of treatment +7 days, and at the end of treatment +14 days. The primary efficacy endpoint according to FDA criteria was overall success at the end of IV treatment. Overall success was a composite of clinical cure and microbial eradication defined as: complete resolution or significant improvement of baseline signs and symptoms of either cUTI or AP, and baseline pathogens reduced to <104 CFU/mL urine, respectively. Moreover, the pre-specified non-inferiority margin was a difference of 15%.

Results:
Baseline pathogens included *E. coli* (64.7%) *K. pneumoniae* (15.5%) *Enterococcus faecalis* (7.2%) *Proteus- mirabilis* (4.8%) *Enterobacter cloacae* (4.0%) *P. aeruginosa (4.0%)*. Baseline characteristics: total N= 545. **AP**: 59%, **cUTI(removable** focus): 19.1%, **cUTI** (**non-removable** focus): 21.8%, **Age (>65)**: 34.9%, **Female**: 66.2% , **CrCL≤50:** 12.4%, **DM:** 15.8%, **Systemic Inflammatory Response Syndrome:** 30.6%**, Charlson Comorbidity Index Score ≥ 3:** 53.2%. Of the 550 patients that were randomized with ITT, only 545 (272 M-V; 273 P-T) received treatment and were included in the modified ITT which was defined as receiving 1 or more doses of treatment. Furthermore, of those 545 subjects in modified ITT only 374 (68.6%) were included in the microbiological- modified ITT (had bacterial pathogens of 105 CFU/mL or greater in baseline urine culture or the same bacterial pathogen present in concurrent blood and urine cultures), and this was the population that was used to analyze the primary efficacy outcomes. It was determined that approximately 500 patients with 60% in the microbiological modified intention-to-treat, an overall success of 80% in both M-V and P-T, and 15% non-inferiority margin provided a 90% to demonstrate non-inferiority of M-V to P-T.

Outcome	**Meropenem-Vaborbactam N= 192 No. of patients (%)**	**Piperacillin-Tazobactam N= 182 No. of patients (%)**	**95% CI (0.7, 9.1)**	**p-value**
Primary (Overall success)	189 (98.4)	171 (94)	4.5	$P < .001$

The occurrence of adverse events between the groups was as follows: 106 (39.0%) patients receiving M-V and 97 (35.5%) on P-T, the majority of which were non-serious. Approximately 50% more discontinuations were observed due to P-T vs. M-V.

Critiques:
While overall this study was well designed, there are limitations with regards to its external validity. The authors acknowledge that the majority of patients enrolled in the study are outside the U.S; it is unclear if they would have met hospitalization criteria in the U.S., which adds complicating factors to the treatment of infection.

Conclusion:
Meropenem-vaborbactam demonstrated non-inferiority, when compared with Piperacillin-Tazobactam in the treatment of complicated UTI or acute pyelonephritis. Moreover, meropenem-vaborbactam exhibited a similar side-effect profile to piperacillin-tazobactam, and can potentially be used to treat acute pyelonephritis or complicated-UTI in patients meeting the criteria studied in the TANGO I trial.

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Aviva Rakhamimova, Pharm.D. candidate class of 2020

New Drug Update: Biktarvy® (Bictegravir, Emtricitabine, Tenofovir Alafenamide)

On February 7, 2018, the U.S. FDA approved Gilead Sciences to produce Biktarvy®, a new antiretroviral agent used to treat HIV-1 infection in adults. Biktarvy® is a single tablet complete HIV regimen that consists of three different medications: bictegravir 50mg, emtricitabine 200mg, and tenofovir alafenamide 25mg, (BIC/FTC/TAF) that is taken once daily with or without food.[1] Bictegravir is a novel intergrase inhibitor (INSTI) that works by obstructing HIV integrase and blocking integration into the host DNA. Emtricitabine and tenofovir alafenamide are both nucleoside reverse transcriptase inhibitors (NRTIs) which inhibit reverse transcriptase causing viral DNA chain termination.[2]

Biktarvy® has shown efficacy both in patients with no prior antiretroviral treatment history and in switch studies of virologically suppressed subjects.[3] The most common adverse reactions associated with Biktarvy® include: diarrhea, nausea and headache, with nausea occurring less frequently with Biktarvy® than with Triumeq®

HIV regimens have undergone remarkable advancements in drug development over the years. These changes have helped people with HIV live longer, healthier lives with decreased pill burden and increased satisfaction with their medical care. Current treatment goals for HIV include undetectable viral load, increase in CD4 count, improvement in quality of life, enhanced immune system, and reduction of morbidity and mortality. [4] As per the current Department of Health and Human Services (DHHS) guidelines, the standard initial anti-retroviral regimens should consist of three medications: two nucleoside reverse transcriptase inhibitors (NRTIs) and an integrase inhibitor (INSTIs). Alternative regimens to be considered are two NRTI's plus a boosted protease inhibitor (PI) or a non-nucleoside reverse transcriptase inhibitor (NNRTIs). [5]

In response to this new drug approval, the Panel on Antiretroviral Guidelines for Adults and Adolescents has released a position statement adding Biktarvy® as one of the recommended initial regimens for most adults with HIV.[5] It is noteworthy to mention that this novel antiviral therapy is not recommended for patients under 18 years old, pregnant women, individuals with a creatinine clearance of < 30 ml/min., or with severe liver impairment.

Biktarvy® is a CYP 3A4 inhibitor and a UGT 1A1 substrate, its metabolism may interfere with concomitant use of CYP 3A4 and UGT 1A1 inducers or inhibitors. It is important to avoid rifampin while taking Biktarvy® because it can reduce bictegravir and tenofovir plasma concentrations which can lead to a decrease in therapeutic effect and resistance.[3] Biktarvy® inhibits the drug transporters OAT2 and MATE1, this can result in increased concentrations of drugs that are substrates of these transporters. Because creatinine is secreted via these pathways, Biktarvy® is expected to increase SCr levels without causing nephrotoxicity. Similarly, to other INSTIs, it is not advisable to co-administer bictegravir with polyvalent cations (like calcium, iron, magnesium, or aluminum) due to expected chelation and loss of therapeutic effect on virologic suppression.

When compared to Triumeq® (dolutegravir, abacavir and lamivuidine), Biktarvry® has fewer adverse drug effects and avoids the requirement to perform HLA-B*5701 testing prior to therapy.[5] Biktarvy® can be given without regard to food, unlike Complera® and Odefsey®. The small tablet size makes it an attractive alternative to Triumeq® and avoids the drug-interaction potential of Genvoya® (elvitegravir/cobicistat/emtricitabine/tenofovir alafenamide).

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Monique A Scott, Pharm.D. candidate class of 2019

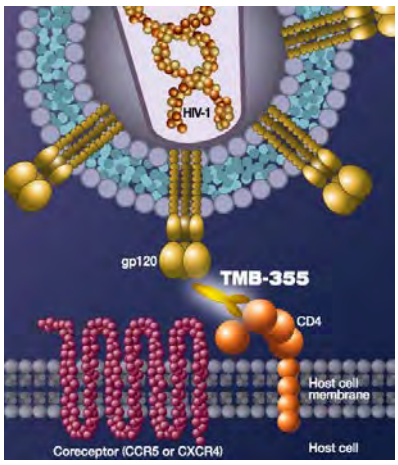
Drug Update: Trogarzo™ (ibalizumab-uiyk)

Trogarzo™ (ibalizumab-uiyk) was recently approved by the U.S. FDA in March 2018. Trogarzo™ is available as an injection for intravenous (IV) administration. It is used for the treatment of multidrug resistant HIV-1 infection in combination with other antiretroviral(s). Trogarzo™ is indicated for the treatment of human immunodeficiency virus type 1 (HIV-1) infection in heavily treatment-experienced adults with multidrug resistant HIV-1 infection failing their current antiretroviral regimen.

Up to 25,000 Americans living with HIV are currently multidrug resistant, of which 12,000 are in an urgent need of a new treatment option because their current treatment regimen is failing, jeopardizing their health and increasing the risk of transmitting HIV to others.[2] The best way to prevent transmission of multidrug resistant HIV is to control the virus. According to new guidance from the Centers for Disease Control and Prevention (CDC), the HIV virus cannot be transmitted when a patient's viral load is undetectable.[3]

Therefore, the new HIV treatment strategies focus on the development of new ARV agents with a high generic barrier to resistance and low toxicity. The advantages of monoclonal antibodies (MAbs) for HIV treatment are related to their antiviral effect, lack of toxicity, good resistance profile, additional synergy with other ARV drug classes and ability to restore CD4 T-cell responses.

Trogarzo™ is a novel CD4-directed post-attachment HIV-1 inhibitor. Ibalizumab-uiyk is recombinant humanized monoclonal antibody of immunoglobulin G (IgG). It blocks HIV-1 from infecting $CD4^+$ T cells by binding specifically to domain 2 of CD4 and inducing the conformational changes that ultimately prevent the interaction of gp 120 and HIV-co-receptors that explains the broad spectrum of ibalizumab against CCR5 and CXCR4 isolates. The cellular epitope targeted by ibalizumab on CD4 receptors is distant from the binding site of the major histocompatibility complex (MHC) class II molecules. This configuration prevents an MHC II mediated immune response following the interaction between ibalizumab and the CD4 receptor. As a consequence, ibalizumab inhibits the post-binding entry of HIV-1 without causing immunosuppression.[1,4] Trogarzo™ is available in a single dose, 2 mL vial containing 150mg/mL of ibalizumab-uiyk. Each vial delivers approximately 1.33 mL containing 200mg of ibalizumab-uiyk.



Trogarzo™ is administered intravenously, after diluting the appropriate number of vials in 250mL of 0.9% Sodium Chloride Injection, USP. Patients should receive a single loading dose of 2,000 mg. followed by maintenance dose of 800mg every 2 weeks.[1] A major phase 3 trial evaluated 40 patients with virologic failure on failing ARV treatment exhibiting mean viral loads of >1,000 copies/mL and a mean CD4 T cell count of 150 cells/ml. The primary endpoint was the viral load reduction at 14 days after ibalizumab monotherapy with a loading dose of 2,000 mg IV; secondary end-points focused on the proportion of patients able to sustain an undetectable viral load and CD4 T cell count increase as well as a satisfactory safety and tolerability profile throughout 24 weeks of treatment. The study disclosed good tolerability and high efficacy even in patients experiencing virologic failure to more than 10 ARV agents.[4]

- Trogarzo™ significantly reduced viral load within seven days after the first dose of functional monotherapy and maintained the treatment response when combined with optimized background regimen that included at least one other active ART for up to 24 weeks of treatment, while being safe and well tolerated.
- More than 80% of patients achieved the study primary end point – at least a 0.5 $\log_{10}$ (or 70%) viral load reduction from baseline seven days after receiving a 2,000 mg loading dose of Trogarzo ®and no adjustment to the failing background regimen.
- The average viral load reduction after 24 weeks was 1.6 $\log_{10}$ with 43% of patients achieving undetectable viral loads.

- Patients experienced a clinically-significant mean increase in CD4+ T-cells of 44cells/mm^3, and increases varied based on T-cell count at baseline. Rebuilding the immune system by increasing T-cell count is particularly important as people with multidrug-resistant HIV-1 often have the most advances form of HIV.
- The most common drug-related adverse reactions (incidence>=5% were diarrhea (8%), dizziness (8%), nausea (5%) and rash (5%). No drug-drug interactions were reported with other ARTs or medications, and no-cross resistance with other ARTs were observed.[2]

Although many patients living with HIV find success when treated using a combination of 2 or more antiretroviral drugs, a small percentage of patients have multidrug resistance. This effectively eliminates available treatment options and substantially increases the patient's risk of HIV-related complications including the risk of death. One obstacle for utilization of this new drug may be cost as the wholesale price acquisition is approximately $118K for a year of therapy, however, TaiMed (the company that manufactures Trogarzo™) is offering patient assistance for those who cannot afford to pay. Trogarzo™ is the first available drug on the market in its class of antiretroviral medications that has the potential to provide significant benefits to patients when resistance has compromised their HIV treatment options.

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Liliya Serebryakova, Pharm.D. candidate class of 2018

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