RUTGERS HEALTH
Ernest Mario School of Pharmacy

RUTGERS PHARMACY RESEARCH DAY

Posters will be presented from

3:30-5:30 PM on Wednesday April 15th, 2026

at the

Ernest Mario School of Pharmacy

160 Frelinghuysen Road, Piscataway, NJ

Join in this great opportunity to learn about the administrative, basic, translational, and clinical research conducted within the School of Pharmacy

- In-person event
- Open to the Rutgers Pharmacy Community

For more information, please contact: Dr. Carolyn Seyss (Carolyn.Seyss@pharmacy.rutgers.edu)
Dr. Renping Zhou (Rzhou@pharmacy.rutgers.edu)

Welcome to the 2026 Rutgers Pharmacy Research Day!

Welcome to the 2026 Rutgers Pharmacy Research Day! This is an incredible venue to showcase the innovative research conducted at the Ernest Mario School of Pharmacy. Our world-class research is advancing basic science and improving human health, through the discovery of new pharmaceuticals, innovative technologies, and best practices in healthcare. Nationally and internationally recognized for the caliber of our research program, our school consistently ranks as one of the top 15 recipients among 142 accredited schools of pharmacy in funding from the National Institutes of Health.

The School of Pharmacy researchers collaborate on multidisciplinary work among our departments and across the university. As the state university of New Jersey, Rutgers serves a state that is home to leading hospitals and clinical care centers as well as 15 of the world's largest pharmaceutical companies. In this dynamic research environment, pharmacy scientists and clinicians find broad opportunities for exciting clinical, industry, and academic collaborations.

Rutgers Pharmacy Research Day is an opportunity to experience our collaborative, supportive pharmacy research community of faculty, postdoctoral fellows, graduate students, and undergraduate students. This event showcases high-impact research in the core areas of Administrative and Regulatory Science, Basic Science, Clinical Science and Translational Science.

We thank the presenters today for sharing their innovative work with the broader School of Pharmacy community!

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Ernest Mario School of Pharmacy
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Proceedings of the 2026 Rutgers Pharmacy Research Day

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Pharm.D./M.D. Student

Postdoctoral Associate

Abstract 1

Trends in FDA Complete Response Letters: Leveraging New Transparency to Improve Drug Development and Regulatory Approval Success

Isabella Youngberg, John (Eun Sik) Cho, Michael Toscani

Rutgers, The State University of New Jersey, Ernest Mario School of Pharmacy, Piscataway, NJ; Daiichi Sankyo, Inc., Global GMP Quality Assurance, Basking Ridge, NJ

When the FDA determines that a New Drug Application (NDA) or Biologics License Application (BLA) cannot be approved in its current form, it issues a Complete Response Letter (CRL) outlining deficiencies related to safety, efficacy, manufacturing, or labeling. In July and September 2025, the FDA publicly released CRLs for the first time, increasing regulatory transparency. This study evaluates CRL trends to identify recurring deficiencies and inform strategies to improve approval efficiency.

Of 384 identified CRLs (298 NDAs, 86 BLAs), BLAs and pre-2020 NDAs were excluded, yielding 162 NDA CRLs issued between January 1, 2020 and August 18, 2025. For each CRL, approval status, issuance date, NDA number, and therapeutic office were documented.. Deficiencies were categorized as clinical/biostatistics, nonclinical/product quality, or facility inspection, with additional review of labeling components, postmarketing requirements under section 505(o)(3), and other comments. Clinical deficiencies were further assessed for new study requirements.

Among 162 CRLs, 105 (65%) were subsequently approved. No consistent temporal trend was observed; 45 (28%) were issued in 2024. The most common deficiencies involved nonclinical/product quality (90, 56%) and facility inspection findings (82, 51%), followed by clinical/biostatistics concerns (47, 29%) - many requiring additional data and some requiring new clinical studies. Multiple deficiencies were frequently cited within a single CRL. The Office of Neuroscience (27, 17%) and the Office of Cardiology, Hematology, Endocrinology, and Nephrology (23, 14%) issued the most CRLs. Labeling deficiencies were less prevalent [prescribing information (26, 16%), container labeling (25, 15%)] while postmarketing requirements were uncommon (6, 4%); 62 (38%) included additional non-approvability comments.

Between 2020 and 2025, NDA CRLs most frequently cited product quality and facility deficiencies, yet most applications ultimately achieved approval. Public CRL disclosure offers sponsors actionable insight to proactively address common deficiencies and potentially reduce review delays.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF)

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 2

Comparative Analysis of NSCLC Clinical Trial Recruitment Demographics and Resulting Screening Guideline Implications for Female Asian Non-Smoker Patients

Katie Zheng, Minjoo Kang, Evelyn Liang, Morgan Nguyen, Laasya Akurati, Sinduja Sivakumar, Michael Toscani

Rutgers, The State University of New Jersey, Ernest Mario School of Pharmacy; Daiichi Sankyo, Medical Affairs, Basking Ridge, NJ; Johnson and Johnson, Market Access, New Brunswick, NJ

Lung cancer screening guidelines have historically targeted high-risk populations by age and smoking history, but evidence underscores the rising incidence of lung cancer among Asian non-smoking females. Approximately 57% of Asian American females diagnosed with lung cancer have never smoked, compared to 15% in other ethnicities. This subgroup often develops non-small cell lung cancer (NSCLC) without exhibiting traditional risk factors, leading to ineligibility for current screening guidelines, which is associated with advanced stage presentation, limited treatment options, and increased healthcare burden. This review aims to identify gaps in US screening recommendations and highlight the need for more inclusive screening approaches.

With the unexplained rise in NSCLC cases among Asian non-smoking females, greater attention is needed within US clinical research to ensure proper representation of this evolving disease state. This analysis highlights a need for more inclusive clinical trials that adequately represent Asian women, ultimately calling for screening guideline reform. Findings are limited by the inclusion of trials that were incomplete or terminated, and by the lack of data specific to this population. Future research on disease state impact may include conducting an updated cost analysis.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF)

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 3

Benchmark Readability Assessment of Online Asthma Patient Education Materials

Danielle Murat, Emily Robb, Michael Toscani

Rutgers, The State University of New Jersey, Ernest Mario School of Pharmacy, Piscataway, NJ; Rutgers Institute for Pharmaceutical Industry Fellowships

In the growing age of technology, online resources are readily accessible and can empower patients to effectively manage their condition. The American Medical Association (AMA) recommends patient materials be written at a 6th-grade reading level to ensure optimal comprehension. This is especially important for asthma, which affects 26.8 million Americans and inflicts a significant health and economic burden in the United States. This project aimed to evaluate the readability of online asthma patient education materials.

Asthma patient education materials were collected via an Internet search using “asthma patient education materials” on Microsoft Bing and Google in August 2025. Sources were categorized as professional societies, health systems/clinics, or pharmaceutical companies, with five materials selected from each category (n=15). Inclusion criteria required English-language materials published from 2020 to 2025 and intended for patients/caregivers. Disease management materials were prioritized. PDFs were processed in Google Colab using Python code to extract and clean text, removing extraneous elements. Cleaned text underwent manual review and was analyzed using four validated readability formulas: Flesch-Kincaid Grade Level (FKGL), Simple Measure of Gobbledygook (SMOG) Index, Gunning Fog Index (GFI), and Coleman-Liau Index (CLI). Mean readability scores were calculated overall and by source type and compared to the AMA’s 6th-grade recommendation.

The overall average readability score was 10.4, with scores ranging from 5.8 to 15.1. Only one material, from a health system, met the AMA’s 6th-grade recommendation. Professional societies averaged 9.5, health systems/clinics 9.7, and pharmaceutical companies 12.1. All four indices exceeded the recommended level. Online asthma patient education materials may consistently exceed the AMA’s recommendation, suggesting a potential barrier to comprehension. These findings highlight an opportunity for pharmacists to assess material readability and provide supplemental explanations when counseling patients.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF)

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 4

Investigational Role of Glucagon-Like Peptide-1 Receptor Agonists in the Treatment of Liver Fibrosis - A Literature Review

Noorien Ali, Arshya Kazi, Amrita Tejwani, Sana Mansuri, Michael Toscani

Rutgers, The State University of New Jersey, Ernest Mario School of Pharmacy, Piscataway, NJ

Liver fibrosis is a major complication of chronic liver disease that can progress to cirrhosis, liver failure, and death. In 2022, approximately 52,222 deaths were attributed to complications related to liver fibrosis. Currently, no FDA-approved therapies directly target liver fibrosis. However, investigational treatments for nonalcoholic fatty liver disease (NAFLD) and nonalcoholic steatohepatitis (NASH), particularly glucagon-like peptide-1 receptor agonists (GLP-1 RAs), are being studied for their potential role in disease management. This project evaluates the potential role of GLP-1 receptor agonists in the treatment of liver fibrosis by examining their mechanisms of action, therapeutic outcomes, and safety profiles.

A literature review was conducted using PubMed and Google Scholar to identify studies evaluating GLP-1 receptor agonists in NAFLD, NASH, and liver fibrosis. Publications from 2020 onward that assessed GLP-1 therapies and liver disease outcomes were included, while studies without a clear focus on GLP-1 agents and liver disease were excluded.

Ten studies were included in the review, consisting of one controlled trial, seven meta-analyses, and two preclinical studies. Across these studies, GLP-1 receptor agonists demonstrated potential benefits for patients with NAFLD and NASH with concomitant fibrosis. Agents such as semaglutide, liraglutide, dulaglutide, and exenatide were associated with reductions in hepatic steatosis and improved NASH resolution without worsening fibrosis in multiple phase II and III studies. Semaglutide demonstrated the most significant histological improvement. Meta-analyses also reported reductions in liver fat content, C-reactive protein, and aminotransferase levels, likely driven by weight loss and improved insulin sensitivity.

Despite these benefits, direct reversal of fibrosis was limited, suggesting GLP-1 receptor agonists may be more effective at slowing disease progression rather than reversing established fibrosis. Overall, GLP-1 receptor agonists appear to target metabolic drivers of liver injury and may help reduce inflammation and slow fibrosis progression. Longer-term clinical studies will be needed to determine whether these agents can provide sustained antifibrotic benefits.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF)

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 5

Impact of a Student-Driven Journal Club Initiative at an AAPP Collegiate Chapter

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Journal clubs are traditionally incorporated into pharmacy curricula through literature evaluation courses and advanced practice rotations; however, these formats are often limited in flexibility and student ownership. The purpose of this initiative was to develop and evaluate a structured, student-driven journal club model within our American Association of Psychiatric Pharmacists (AAPP) student chapter to promote collaboration, mentorship, and early exposure to scholarly activity, particularly for students with limited prior research experience.

A longitudinal journal club program was implemented within our AAPP student chapter. Students self-selected into groups of 3-6 based on shared interests in psychiatric pharmacy topics. The program consisted of semi-weekly virtual meetings across the fall and spring semesters. The first half of each session focused on guided instruction in research fundamentals, including database navigation, literature review methods, and abstract writing. The second half consisted of breakout sessions in which students delivered a full journal club presentation of a selected article, followed by group discussion. Faculty members and pharmacy residents were assigned as mentors to each group. Students were invited to submit written reflections or recorded narratives describing their experience and learning outcomes, and all participating students were included as co-authors on resulting posters.

Preliminary feedback had many participants reporting this experience as their first exposure to abstract/poster development, and structured literature review. Research groups successfully produced abstracts and posters for presentation at local symposia and national conferences, demonstrating the feasibility of generating scholarly output through a student organization framework. Notably, the initiative expanded beyond our chapter, with AAPP student members from three additional chapters in other states joining the journal club program.

A structured, student-driven journal club model is a feasible, effective, and scalable approach to increasing student engagement, fostering early research skills, and introducing learners to scholarly activity in a supportive, mentored environment.

Program Affiliations: American Association of Psychiatric Pharmacists (AAPP)

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 6

National Survey of Pharmacy Faculty to Determine Time Spent in Preparation of Course Materials

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Faculty workload in pharmacy education includes both direct instruction with learners and extensive preparation time for lectures, laboratories, and assessments. The time spent on these required tasks is poorly characterized, especially on a national level. This study aims to evaluate the average length of time faculty at schools of pharmacy spend to prepare course materials, including didactic lectures and skills, compounding, or simulation labs to identify patterns in and to better understand faculty workload. This cross-sectional, descriptive study used a web-based survey distributed nationally to all pharmacy faculty members in the United States (U.S.) via the American Association of Colleges of Pharmacy (AACP) faculty email listserv. Eligible participants included faculty employed at accredited U.S. schools of pharmacy who are at least 18 years of age. The survey, administered via Qualtrics, was open for one month, with two reminder emails to maximize response rates. The survey collected faculty demographic data, course responsibilities, and estimated time spent preparing different types of instructional materials. Additional questions on the survey evaluated faculty perceptions on challenges encountered during the preparation of course materials. Investigators used descriptive statistics to summarize faculty workload patterns and chi-square or Fisher's exact tests to compare differences in preparation time by faculty characteristics. Survey results suggest that pharmacy faculty usually spend 5-6 hours preparing a new 50-75 minute didactic lecture with proportionate increases with longer duration activities.

Program Affiliations: KNIGHT ScholaRx

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 7

Clearing the Air: Review of State Guidance on Accommodating Use of Cannabis for Therapeutic Purposes in Healthcare Facilities

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Access to cannabis for therapeutic purposes (CTP) remains heterogeneous across the U.S. For healthcare facilities, there is a need to balance the legal challenges of accommodating CTP use with patient care considerations. Therefore, this investigation evaluated which states provided guidance to address this concern.

Healthcare facilities included facilities where patients received care for an overnight stay. Policies of 50 U.S. states, five territories, and the District of Columbia were researched. The states'/territories' cannabis commissions' websites were primarily used to identify specific laws and verbiage. A state/territory was deemed to allow use if regulations allowed CTP for patient use on healthcare facility property, there were regulations protecting patients, or it was allowed at the healthcare facility's discretion. A state/territory was considered not allowed if it did not have a CTP access program, did not mention healthcare facilities in its regulations, or did not allow healthcare facility accessibility. Each state/territory was reviewed by at least two investigators.

For CTP accommodations in healthcare facilities, 48.2% (27 states/territories) provided guidance. A total of 24 states/territories had a CTP access program, but did not permit cannabis use in healthcare facilities as a form of treatment. 12 out of 27 states/territories had legalized adult use, but had not approved cannabis to be used in healthcare facilities as a patient's own medication, even with a CTP program access card.

The fear of losing federal funding, obstacles to obtaining a CTP access card, and self-treating in adult use are barriers that may potentially create a lapse or gap in patient care. Ongoing federal discussions suggest that cannabis may be reclassified from a Schedule I to a Schedule III controlled substance. If enacted, this reclassification may result in consensus for use across healthcare facility settings.

Program Affiliations: Advisory boards: Boehringer Ingelheim, Bristol Myers Squibb; Consultant: Novus Medical Education; Honoraria: Pharmacy Times Continuing Education

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 8

The Efficacy and Safety of Dopamine D3-Selective Atypical Antipsychotics vs. Typical Dopamine D2 Antagonists

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Antipsychotic treatment for schizophrenia has traditionally focused on dopamine D2 receptor antagonism, which is effective for positive symptoms but is associated with extrapyramidal side effects such as parkinsonism and tardive dyskinesia. Second-generation (atypical) antipsychotics demonstrate broader dopaminergic activity, often exhibiting partial agonism and a higher dopamine D3:D2 receptor affinity ratio. Despite widespread use of atypical antipsychotics, their efficacy in treating negative symptoms of schizophrenia remains uncertain. Variability in dosing strategies and inconsistent clinical outcomes have contributed to ongoing debate regarding whether their pharmacologic profiles offer meaningful advantages over first-generation agents. This review evaluates whether atypical antipsychotics with greater dopamine D3 receptor affinity provide therapeutic benefit for the negative symptoms of schizophrenia and whether D3-selective activity reduces motor-related adverse effects compared with traditional D2 receptor blockade. A systematic literature review was conducted using peer-reviewed articles indexed in PubMed. Search terms included “antipsychotics,” “dopamine D3 receptor,” and “schizophrenia.” Studies comparing D2-selective and D2/D3-targeting antipsychotics with respect to clinical outcomes and adverse effects were reviewed. Antipsychotics with combined D2/D3 receptor activity may improve negative symptoms of schizophrenia through engagement of dopamine D3 receptors located in limbic regions involved in sociocognitive regulation. Real-world outcomes indicate that atypical antipsychotics demonstrate superior treatment retention and overall tolerability as well as reduced extrapyramidal symptom (EPS) risk compared with typical agents. This suggests improved clinical acceptability. In contrast, typical antipsychotics show lower retention rates, consistent with reduced tolerability in routine practice. Collectively, these findings support the potential clinical advantage of D2/D3-targeting atypical antipsychotics in balancing efficacy for negative symptoms with improved safety and tolerability. However, current evidence remains limited, and well-designed human studies are needed to more clearly define the contribution of D3-selective mechanisms to antipsychotic outcomes.

Program Affiliations: AAPP Journal Club

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 9

Optimizing Utilization of Medication Information Resources for Bedside Patient Education by Nursing

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Bedside counseling on medication adverse effects is required by healthcare accreditation agencies such as The Joint Commission and the Centers for Medicare & Medicaid Services, yet nurses often report limited knowledge of medication side effects as a barrier to effective patient education. This study examined which resources nurses at Hunterdon Medical Center use for medication information and evaluated whether an educational session on hospital-specific resources increases their utilization, with the goal of improving nurses' comfort with patient education. This IRB-approved single-group pre–post quasi-experimental study used an electronic survey administered before and after an educational session at a community teaching hospital. Nurses working in the general medicine units at Hunterdon Medical Center between July 1, 2025, and September 21, 2025, who were 18 years or older, were eligible. Participants completed the same six-question survey before and after the session. Four Likert-scale questions were analyzed using a 2-tailed unpaired t-test ($p<0.05$), and 1 multiple-choice question was analyzed using a chi-square test ($p<0.05$). One question was excluded from analysis. The primary endpoint assessed nurses' comfort with educating patients about medication side effects. Secondary endpoints included identifying commonly used resources and evaluating awareness of EHR-integrated medication databases. 51 nurses participated and 48 completed the post-survey. Comfort with educating patients on medication side effects increased from 4.08 to 4.44 ($p=0.0293$). Comfort with complex medication education increased from 3.69 to 4.19 ($p=0.0096$), and comfort using EHR-integrated resources increased from 3.90 to 4.54 ($p=0.0021$). Likelihood of consulting on-unit pharmacists increased from 3.51 to 4.02 ($p=0.0178$). Use of only reliable resources increased from 64.7% to 85.4% ($p=0.018$), and awareness of EHR-integrated resources rose from 92.2% to 100%. A pharmacy-led educational session improved nurses' comfort with medication education and increased use of reliable resources.

Program Affiliations: KNIGHT ScholaRx

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 10

Utilization of PRN Constipation Therapies in the Hospital Setting

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This study aims to evaluate administration patterns and outcomes of “as-needed” (PRN) constipation medications across hospital units, with the goal of optimizing protocols and improving evidence-based constipation management.

This study was a retrospective observational cohort study. The electronic health record was used to identify patients who were ordered PRN constipation medications during June 2025 at two hospital campuses. Patients were included in the study if they were 18 years of age or older and had a PRN order for at least one constipation agent or prescribed and received at least one scheduled dose of docusate. Patients were excluded if another constipation medication was administered within 24 hours of scheduled docusate or were admitted for less than 24 hours. The primary outcome was the frequency and effectiveness of PRN constipation medication administration. The secondary outcome was the frequency of docusate as initial monotherapy, subsequent escalation of therapy, and the timing of such escalation.

A total of 52 patients had at least one PRN constipation medication ordered or initial docusate. Duplicate PRN indications were present in 20 patients (38.5%); of these, 11 required additional constipation medications, including 2 who ultimately required enemas. Across all patients, 76 PRN constipation medications were ordered, of which 22 (28.9%) were never administered. Among the 46 patients who received at least one PRN medication, 11 (23.9%) had a bowel movement documented afterward. Duplicate orders were associated with higher escalation rates (OR 2.33, p=0.16), though not statistically significant.

As-needed constipation therapy use in the hospital setting was inconsistent, with fewer than one-fourth of administrations followed by a documented bowel movement. Duplicate PRN orders were frequent, particularly in obstetrics. Among the few patients receiving docusate monotherapy, supplemental agents were frequently added. These findings highlight the need for standardized protocols and clear, consistent definitions of constipation.

Program Affiliations: KNIGHT ScholaRx

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 11

Brexpiprazole and Sertraline Combination Therapy for Posttraumatic Stress Disorder (PTSD): A Review of the FDA's Rejection for Indication Approval

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Background:
Brexpiprazole (Rexulti) is an atypical antipsychotic acting as a 5-HT1A/D2 partial agonist and 5-HT2A antagonist, approved for MDD and schizophrenia. Sertraline, an SSRI, is indicated for PTSD, a condition causing significant cognitive, mood, and arousal impairments. Research explores this combination to address the unmet needs of patients requiring more than standard monotherapy.

Objective:
To evaluate the FDA's decision to reject the use of brexpiprazole and sertraline combination therapy for PTSD treatment.

Methods:
A literature search was conducted through PubMed, using the terms "brexpiprazole" and "PTSD." Only randomized controlled trials were included. No date restrictions were applied. This yielded three results. Additionally, a press release from Otsuka was included to explain the FDA's Complete Response Letter (CRL), which rejected their supplemental New Drug Application (sNDA).

Outcomes:
The primary outcome used to determine efficacy was the change in CAPS-5 total score from week 1 to week 10, comparing brexpiprazole plus sertraline with sertraline plus placebo. Secondary outcomes included the PTSD Checklist (PCL-5) for self-reported symptoms and the Clinical Global Impressions-Severity (CGI-S) for overall illness severity. The findings were inconsistent: one Phase III trial demonstrated significant symptom improvement with combination therapy, whereas a second Phase III trial showed that both the combination and control groups improved at similar rates, failing to establish superiority.

Discussion/Conclusion:
The FDA rejected the application based on "insubstantial evidence of effectiveness." The Advisory Committee voted 1-10 to reject the drug because efficacy had not been established, as the results were not reproducible across all submitted trials. This decision also underscores the FDA's stringent requirement for consistent positive results in large-scale trials to demonstrate a distinct clinical advantage over other SSRI-based treatments. Although the drug has shown promise in the results, they were not enough to change the current treatment model for PTSD and required more well-controlled trials.

Program Affiliations: AAPP Journal Club

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 12

Enhancing Pharmacy Student Empathy Toward Patients with Schizophrenia Through Simulation-based Learning: A Literature Review and Proposed Virtual Reality Intervention

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Schizophrenia is a mental disorder characterized by delusions, hallucinations, disorganized speech or behavior, and negative symptoms. Patients with schizophrenia are at high risk for medication nonadherence, complicating provider treatment optimization. Provider empathy forms a critical component of patient adherence by ensuring shared decision-making. Limited opportunities to develop empathy-based skills within the pharmacy curriculum leave students insufficiently prepared to care for vulnerable populations, including individuals with schizophrenia. Simulations are a tool for increasing provider empathy among healthcare students by preparing them for authentic patient interactions. This literature review analyzes how simulation labs can enhance healthcare students' empathy toward patients, with implications for pharmacy students caring for patients with schizophrenia.

This project uses peer-reviewed PubMed sources focusing on general disease states, as there are currently no studies on schizophrenia simulations. Search terms included "simulation," "healthcare students," "medical students," "pharmacy students," and "empathy." Search filters selected for randomized controlled trials completed within the last five years on humans and written in English.

Of the ten studies retrieved from the search, eight were evaluated. Seven studies found that simulations increased student empathy, patient-provider communication, and confidence in patient counseling. Only one study focused on pharmacy students. Current literature identifies improved patient outcomes through placing healthcare students in simulations, though schizophrenia was not identified among the results. No literature observes pharmacy training for interactions with patients with schizophrenia.

To address gaps in research regarding pharmacy student empathy training, we propose a trial that incorporates virtual reality (VR) simulations of living with schizophrenia, particularly pharmacist counseling sessions. One group would receive VR simulations incorporating auditory and visual hallucinations to illustrate challenges patients with schizophrenia face, while the control group would not; both would follow up with a simulated patient with schizophrenia. Students' empathy scores will be assessed using self-, faculty-, and simulated-patient feedback.

Program Affiliations: AAPP Journal Club

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 13

Evaluating Commercially Available USP-Verified Dietary Supplements: Barriers and Opportunities for Individuals with Non-Meat Diets and Alpha-Gal Syndrome

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Purpose: Dietary supplements do not require pre-marketing approval or extensive testing by the U.S. Food and Drug Administration (FDA), yet 56% of U.S. adults report use. The United States Pharmacopeia (USP) Dietary Supplement Verification Program (DSVP) provides voluntary third-party quality verification. Limited research has assessed whether USP-verified supplements accommodate vegetarian/vegan diets or mammalian meat allergies (e.g., alpha-gal syndrome). We evaluated USP-verified supplements to identify gaps affecting individuals with non-meat diets.

Methods: We identified 155 USP-verified supplements from Quality-Supplements.org; one was excluded for lack of availability (final n=154). Products were classified by dosage form, supplement type, meat status (meat, non-meat, uncertain), and red meat status (red meat, no red meat, uncertain). Classifications were based on USP listings and ingredient data from e-commerce sites. Ingredients commonly associated with animal sources (e.g., gelatin, stearates, chondroitin) were flagged. Descriptive statistics were used.

Results: Of 154 supplements, 96 (62.3%) were meat-based, 24 (15.6%) uncertain, and 34 (22.1%) non-meat. Most softgels (54/56; 96.4%) and gummies (25/31; 80.6%) contained meat-derived ingredients. Tablets (n=47) were evenly distributed (15 meat, 15 non-meat, 17 uncertain). Capsules (n=13) were uncertain or non-meat; liquids (n=2) were non-meat. Nearly all multivitamins (28/31) were meat-based. Seven of 13 mineral supplements and nine of 12 fish oil products contained meat ingredients. Vitamins (29/55) and other supplements (23/40) were predominantly meat-based.

Conclusion: USP-verified supplements frequently contain animal-derived ingredients, limiting access for vegetarian/vegan consumers and individuals with alpha-gal syndrome. Greater transparency and plant-based excipient alternatives may improve accessibility for patients with dietary restrictions.

Program Affiliations: Pharm.D. Honors Research Program

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 14

A Review of Real-World Evidence in Breast Cancer Mutation-Targeted Therapies and Their Applications in FDA Labeling

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Despite the launch of the FDA's Real-World Evidence (RWE) program in 2018, applications in some oncology fields, notably breast cancer, remain underexplored. Breast cancer presents a distinct opportunity to investigate health factors that may be overlooked in randomized clinical trials. This study, therefore, aims to evaluate existing real-world data on breast cancer-targeted therapies, compare them with current regulatory labeling, and identify opportunities to integrate RWE into future decision-making processes.

Studies from clinicaltrials.gov were searched to identify existing observational studies on breast cancer that used targeted therapy as their intervention. Based on the search results, the intervention used, and the primary and secondary outcome measures were extracted. Categories included monoclonal antibodies, tyrosine kinase inhibitors, CDK4/6 inhibitors, mTOR inhibitors, PARP inhibitors, and PI3K inhibitors. The primary and secondary outcomes were analyzed based on what the data measured, which were divided into five sections: clinical outcomes, adverse events, treatment patterns, healthcare resources/cost, and patient-reported outcomes. Labelings for targeted therapy interventions were examined in the FDA's online drug database to determine the inclusion status of observational studies.

Based on our search criteria, 21 studies were selected from clinicaltrials.gov. Of the 21 studies, 15 evaluated CDK4/6 inhibitors, 3 monoclonal antibodies, 2 PARP inhibitors, and 1 PI3K inhibitor, with 1 study evaluating both a monoclonal antibody and a PI3K inhibitor. The primary and secondary outcomes of the studies were largely focused on clinical outcomes and treatment patterns, followed by adverse events, patient-reported outcomes, and healthcare resources/costs. Despite existing studies, the FDA drug information website revealed only 2 drug approvals or labeling changes for breast cancer-targeted therapies that utilized real-world evidence. Since RWE captures unique outcome measures, such as healthcare utilization, cost, and drug utilization in routine clinical practice, its integration may provide meaningful insights for future regulatory decision-making.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF)

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 15

Assessing the Management of Medetomidine Intoxication and Withdrawal: A Literature Review

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Background:
The United States has been in an opioid overdose epidemic since the 1990s. Until recently, xylazine, an alpha 2-adrenoreceptor agonist that is not reversed by the opioid antagonist naloxone, was a common adulterant detected in the drug supply. Medetomidine, an alpha 2-adrenoreceptor agonist 100 times more potent than xylazine, has become the more common adulterant detected. Exposure to medetomidine can complicate the management of opioid intoxication and withdrawal. Currently, there is no standardized treatment for withdrawal or approved antidote.

Objective:
To describe the current practice for managing medetomidine intoxication and withdrawal based on available literature.

Methods:
A literature search was conducted through PubMed, utilizing the search term “medetomidine.” Only publications on humans in English available until December 13, 2025 were included. The most frequently reported signs and symptoms and treatment strategies for medetomidine intoxication and withdrawal were collected.

Results:
The search term yielded 1,934 results, with 154 results matching filtering criteria. After title and abstract screening, eight articles, including a cohort study, two case series, a CDC report, a brief report, two occupational exposure protocols, and a study of veterinary alpha 2-antagonist atipamezole fulfilled the inclusion criteria. Sedation and bradycardia were commonly reported medetomidine intoxication symptoms. In the cohort study, among 11 intoxicated patients, the median heart rate was 54 beats per minute (bpm). Medetomidine withdrawal symptoms included tachycardia and hypertension. In the cohort study, for 88 withdrawal patients, the median heart rate and blood pressure were 132 bpm and 190/110 mmHg, respectively. Alpha 2-agonists such as oral clonidine and dexmedetomidine were utilized for withdrawal management. Naloxone was administered for concurrent opioid intoxication. Atipamezole was studied to reverse medetomidine and dexmedetomidine-induced sedation and hypotension from occupational exposure.

Conclusions:
Medetomidine intoxication and withdrawal treatment primarily involves symptom management, alpha 2-agonists for hypertension, and naloxone for potential opioid exposure.

Program Affiliations: AAPP Journal Club

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 16

Caregiver & Compliance: Understanding Treatment and Support Needs for Children and Adolescents with Autism Spectrum Disorder (ASD)

Maria Ghaly, Julianna Basily, Emma Anderson

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Purpose: As awareness around autism spectrum disorder (ASD) grows, improving medication adherence is crucial. Pharmacists have the potential to holistically and methodically improve their approach to care for individuals with ASD through a variety of techniques. Because there are no medications that treat the core of ASD, only co-occurring symptoms, supplying caregivers with clear, concise information is imperative. The project aimed to conduct a literature review on pharmacotherapy options for children and adolescents with ASD. Developing an educational pamphlet for caregivers to support ASD patients became a key strategy in the goal to improve medication adherence while also empowering healthcare professionals to transform patient care.

Methods: A literature review of meta-analyses and systematic reviews from the last ten years was conducted by pharmacy students. The PubMed database was used to filter articles relating to ASD and common pharmacotherapy treatments. Keywords “autism spectrum disorder” and “children” were paired with keywords “pharmacotherapy”, “antipsychotics”, “stimulants”, “methylphenidate”, “mood stabilizers”, and “leucovorin”. Among the resulting articles, only meta-analyses and systematic reviews were chosen in the date range 2015-2025. Students made sure to choose articles that focused on the pharmacotherapy treatment in patients under 18 years old with ASD that had some benefit supporting core autism traits and co-occurring symptoms. After the review, pharmacy students worked with a pharmacist to develop an educational brochure for patients, caregivers, and other pharmacy professionals surrounding pharmacotherapy treatment options for children and adolescents with ASD. The intent of this brochure is to provide caregivers in the community with essential knowledge on medication mechanisms, reasons for prescription, indications, side effects, and potential drug-drug interactions.

Results: Based on the search criteria, a variety of pharmacotherapy treatment options are available for children with ASD. Around 100 articles were found with the original keywords. Once the paired keywords were added, our search was refined. The articles chosen were meta-analyses of randomized clinical trials that spoke on the importance of medication adherence in ASD. They discussed what medications were helpful, adherence rates for the treatments, and what treatments or combinations of treatments were most successful. When well-established medications are combined with behavioral approaches, an individual’s autism symptoms can be improved. Such medications include second-generation options to newer pharmacotherapy options such as leucovorin. Extrapolated from the literature review will be digestible educational content formulated into a pamphlet to be distributed in the community setting. With the goal of distributing information across public schools in New Jersey, the first checkpoint will be collaboration with the Rutgers Center for Autism Research, Education, & Services, which provides support services, public outreach, and educational resources.

Conclusion: Medication management alongside behavioral treatment can benefit functioning in patients with ASD. Adherence and knowledge deficits remain an educational gap in the treatment of ASD. Though there is no cure for ASD, the co-occurring symptoms can be targeted to help patients thrive. The role of pharmacy professionals in this patient population lies in the education of the caregiver and the patient. Understanding dosage form options may alleviate adherence barriers and collaborating with other healthcare professionals,, are key to overcoming these deficits. The goal of this pamphlet is to be useful in pharmacy education, caregiver awareness, and patient empowerment.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF)

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 17

The Role of Vitamin D in Psychiatric Disorders

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Vitamin D plays a role in brain function through neuroinflammation, neurotransmitter synthesis, and immune modulation. Emerging evidence suggests that vitamin D deficiency may be associated with the development and severity of psychiatric disorders. This literature review examines if vitamin D levels influence psychiatric disorders, focusing on major depressive disorder (MDD), schizophrenia, and generalized anxiety disorder (GAD). The goal is to evaluate whether vitamin D deficiency contributes to psychiatric symptoms and whether supplementation improves clinical outcomes.

This literature review was conducted using Rutgers Library resources to identify peer-reviewed studies examining the relationship between vitamin D and psychiatric disorders. Approximately 15 studies were included after trial screening. Inclusion criteria consisted of peer-reviewed human clinical trials and observational studies examining serum vitamin D levels or supplementation associated specifically with MDD, schizophrenia, or GAD. Quantitative outcomes included serum 25-hydroxyvitamin D levels and psychiatric symptom scores. Qualitative findings centered on mechanisms of vitamin D and clinical observations. Evidence showed that individuals with MDD consistently exhibit lower vitamin D levels than healthy controls, with deficiency associated with greater symptom severity. Supplementation demonstrated mild-to-moderate improvement in depressive symptoms, particularly in patients with severe deficiency. In schizophrenia, vitamin D deficiency was highly prevalent and linked to negative symptom severity and cognitive impairment. However, supplementation outcomes were inconsistent. For anxiety disorders, the relationship appears weaker, with limiting evidence suggesting that vitamin D may influence physiological stress pathways. Overall, vitamin D supplementation improved symptoms in patients with severe deficiency for MDD.

This review concludes that vitamin D deficiency is common across psychiatric populations and may exacerbate symptoms through neuroimmune and neuroendocrine mechanisms. While supplementation shows promise, it is not recommended as a standalone treatment option. Further trials are needed to clarify optimal dosing and the underlying mechanisms. Understanding vitamin D's role may support targeted psychiatric care.

Program Affiliations: AAPP Journal Club

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 18

Assessing Year-Over-Year Pharmacy Staff Competence in Responding to a Code Blue Cardiac Arrest Simulation

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The primary objective of this study is to assess the competency level of pharmacy staff members in responding to a cardiac arrest scenario using simulation-based learning experience (SBLE). Using simulation-based training in pharmacy education is critical for developing teamwork, decision-making skills, and communication skills. Application of BLS skills and cardiac arrest or code blue response can be evaluated through SBLE, and multiple SBLE sessions could be utilized to determine improvements over time.

The simulations were carried out at Henry J. Austin Health Center Pharmacy Department, an outpatient dispensing pharmacy within a Federally Qualified Health Center in Trenton, NJ, on 9/13/2024 and 9/12/2025 with pharmacy staff as participants. Prior to the 2024 simulation, a teaching seminar on cardiac arrest was held on 8/9/2024 in the Pharmacy Department. The pharmacy staff were instructed to complete a 12 question pre-in-service assessment via Google Forms to determine baseline knowledge and comfortability when responding to cardiac arrest in an outpatient pharmacy. After completing the assessment, the pharmacy staff received a 45-minute presentation on how to respond to cardiac arrest in the pharmacy. No in-service or competency assessment was provided immediately prior to the 2025 simulation. However, the teaching seminar presentation slides from the 2024 simulation were electronically distributed to pharmacy staff (pharmacists, technicians, residents, and support staff) on 8/27/2025, for an overview on how to respond to a code blue emergency, particularly a cardiac arrest.

Initial data shows that compared to the 2024 BLS simulations, the pharmacy staff demonstrated improvements in their competency in responding to a cardiac arrest scenario through SBLE. Areas that improved between the simulation years include team lead identification and checking carotid pulse. An area that continues to present a challenge includes pacing of chest compressions, and new challenges include intercom use.

Program Affiliations: Ernest Mario School of Pharmacy

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 19

Comparison of COVID-19 Vaccine Access Programs Against Vaccination Rates by State

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Purpose:
The COVID-19 pandemic was considered a federal public health emergency until May 11, 2023. Programs were enacted to ensure access to the vaccine since its uptake is essential to preventing infections, hospitalizations, and deaths. The CDC's Bridge Access Program conquered cost barriers by providing adults with incomplete COVID-19 vaccine coverage with free vaccinations until its end in August 2024. Consequently, uninsured and underinsured adults are more reliant on state or local immunization programs for diminishing associated financial burdens. This study will analyze COVID-19 vaccine access through state programs subsidizing vaccines and assess the potential impact of a federal program's termination.

Methods:
This review of state health department resources for obtaining COVID-19 vaccines and COVID-19 vaccination rates will evaluate official state health department websites to determine whether local, state, or region-specific programs are available for accessing COVID-19 vaccinations, or whether uninsured and underinsured individuals are being referred to federal programs such as the 317 program or Vaccines for Children. COVID-19 vaccination rates for the 2023-2024 and 2024-2025 respiratory virus seasons will be gathered from the CDC's Immunization Information Systems Resources (IIS) data by state to capture rates preceding and following the end of the CDC's Bridge Access Program. States' availability of COVID-19 vaccination access programs will be paired with their respective COVID-19 vaccination rates and placed on a continuum of access program availability compared to vaccination rates in order to analyze trends in relative vaccine access and vaccine uptake.

Program Affiliations: Ernest Mario School of Pharmacy

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 20

Vision Under Watch: Ocular Adverse Effects of GLP-1 Receptor Agonists from FAERS Report

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Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) are indicated for glycemic control in type 2 diabetes mellitus and for weight management in individuals with obesity. These agents mimic glucagon-like peptide-1, stimulating insulin secretion, delaying gastric emptying, and promoting satiety. As clinical use expands, emerging evidence has raised concerns regarding potential ocular adverse effects. This study aimed to characterize the ocular safety profile of GLP-1 RAs and evaluate implications for medication monitoring. Data from January 2005 to July 2025 were extracted from the Food and Drug Administration Adverse Event Reporting System (FAERS) for five GLP-1 RAs: semaglutide, liraglutide, dulaglutide, exenatide, and tirzepatide. Demographic data were collected for all adverse event reports, with analysis focused on eye disorder–specific outcomes. Events with ≥10 reports were included. This descriptive, observational study used publicly reported data and reflects reported associations rather than confirmed causality. Among 317,754 total adverse event reports, 11,279 (3.55%) involved ocular events. Semaglutide accounted for the greatest number of ocular reports (3,073), most commonly vision blurred (695), vision impairment (612), and optic ischemic neuropathy (244). For dulaglutide (2,891), exenatide (2,554), tirzepatide (1,688), and liraglutide (1,073), the most frequently reported events were vision impairment, vision blurred, and cataract. From January 2022 to June 2025, hospitalizations related to ocular events increased for semaglutide, liraglutide, and tirzepatide. Life-threatening ocular outcomes increased across four agents. GLP-1 RA–associated ocular events ranged from transient visual disturbances to potentially irreversible conditions such as optic ischemic neuropathy. Increased reporting may reflect expanded use rather than causation; however, the emergence of serious outcomes highlights the need for clinician awareness. Further controlled studies and post-marketing surveillance are warranted to clarify mechanisms and inform ophthalmologic monitoring recommendations.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF)

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 21

Impact of Electrode Placement and Seizure Duration on Electroconvulsive Treatment Response Time for Treatment-Resistant Depression

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Major depressive disorder (MDD) significantly impairs quality of life, often requiring interventions beyond first-line pharmacotherapy and psychotherapy. Electroconvulsive therapy (ECT) has the potential to improve symptoms even in treatment-resistant cases, however, optimal parameters for rapid symptom relief are not fully established. This systematic review investigated whether electrode placement and seizure duration influence the speed of depressive symptom reduction within a one-month period.

A systematic search of PubMed, EBSCO Host, Ovid, and EMBASE was conducted for English-language randomized control trials and observational studies published between 2000 and 2025. Inclusion criteria focused on adult populations with MDD, specifically measuring response speed via the Hamilton Rating Scale for Depression (HRSD) or Clinical Global Impression (CGI) scale. Studies involving pediatric populations or mixed psychiatric comorbidities were excluded. Statistical significance was defined as $p<0.05$, with a significant response defined as >50% reduction in depression scores.

Out of 28 studies, seven met the full inclusion criteria (sample sizes n = 10 to 3,648). Four studies examining electrode placement found no significant difference ($p>0.05$) in HRSD/CGI scores after one month, with unilateral (66%), bitemporal (67%), and bifrontal (64%) placements showing comparable efficacy. Conversely, three studies focusing on seizure duration found that a reduction in seizure length over the course of treatment correlated significantly with HRSD score improvement ($p\geq 0.005$), including one study reporting an 80% score reduction.

The findings from this systematic review indicate that the impact of electrode placement and seizure duration on one-month ECT response time is mixed and requires further investigation. A direct causal link was not established between seizure duration and significant patient recovery, while the studies on electrode placement yielded inconclusive results. As a result, ECT requires further investigation of these factors to improve patient outcomes and minimize length of treatment.

Program Affiliations: Ernest Mario School of Pharmacy

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 22

Five-Year Pembrolizumab Medicare Part B and Part D Expenditure Trends Review (2019-2023)

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Oncology medications represent one of the largest and fastest-growing categories of Medicare Part B and D spending. Of the oncology therapies available, Pembrolizumab has been established as a blockbuster therapy in the U.S. Since approval, it has gained upwards of 40 indications, demonstrating its broad role across diverse patient populations. Ongoing changes to Medicare reimbursement policies further underscore the need to evaluate how payment structures may evolve alongside market dynamics. As Pembrolizumab approaches the end of its patent, examining current expenditure trends in different Medicare reimbursement pathways is critical for anticipating the financial implications of impending changes in product exclusivity. The data indicate that a larger proportion of absolute expenditures was predominantly reimbursed by Part B. However, Part D indicated larger annual percent growth in expenditure. Both Part B and D indicated increased spending within the allotted time frame, displaying the significant impact that the loss of exclusivity may have on future trends. As Pembrolizumab approaches the end of its patent life, and payers anticipate biosimilar product market entry, ongoing evaluation is recommended.

Program Affiliations: Ernest Mario School of Pharmacy

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 23

Managing Anemia in Leukemia Patients: A Literature Review of Erythropoiesis-Stimulating Agents, Iron Therapy, and Red Blood Cell Transfusions

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Anemia affects 60–90% of cancer patients, caused by tumor-related inflammation, chemotherapy-induced myelosuppression, nutritional deficiencies, or chronic blood loss. It causes severe fatigue, impaired function, and reduced quality of life, while potentially limiting cancer treatment through dose delays or reductions. Management options—erythropoiesis-stimulating agents (ESAs), iron supplementation, and red blood cell (RBC) transfusions—each present unique benefits, risks, and cost considerations. This literature review compares and synthesizes current evidence to inform optimal, individualized strategies. Balancing efficacy, safety, and patient-centered care is essential in addressing anemia's impact, ensuring cancer patients maintain treatment tolerance and quality of life throughout their therapeutic journey.

A comprehensive literature search was conducted using PubMed to identify studies on the management of anemia in patients with leukemia. Search terms included "leukemia," "anemia," "erythropoiesis-stimulating agents," "iron therapy," and "red blood cell transfusions." The search was limited to peer-reviewed articles published within the last 10 years. Eligible sources included randomized controlled trials, cohort studies, systematic reviews, and clinical guidelines involving adult leukemia patients. Studies were excluded if they did not report clinical outcomes related to anemia management or if they focused solely on pediatric populations or non-hematologic malignancies. Key data were extracted regarding treatment efficacy, safety, quality-of-life outcomes, and cost considerations. The literature was then synthesized to compare therapeutic approaches and identify gaps for future research.

Thirty-five abstracts were evaluated; 17 studies met inclusion criteria (≥3 relevant MeSH terms).

The literature shows that managing anemia in leukemia patients requires an individualized approach. ESAs consistently improved hemoglobin levels and patient-reported quality of life, but concerns remain regarding increased risks of thrombosis and, occasionally, higher mortality when used aggressively. The addition of intravenous iron enhanced ESA response rates, particularly in patients with iron deficiency, and newer formulations such as ferric carboxymaltose demonstrated both effectiveness and cost efficiency. Intravenous iron therapy alone was also beneficial in selected patients, supporting its role as more than just an adjunct to ESAs. For red blood cell transfusions, recent trials and guideline updates favor a restrictive transfusion threshold of 7–8 g/dL. Outcomes aligned with more liberal approaches while reducing overall transfusion needs, though transfusions continue to carry risks such as alloimmunization and iron overload. Despite these limitations, they remain the most reliable method for rapid correction of anemia

Optimal anemia management in leukemia patients requires a tailored approach, balancing efficacy, safety, and patient-centered outcomes. ESAs, iron therapy, and RBC transfusions each have a role, guided by current evidence and clinical guidelines. Further research is warranted to refine treatment algorithms and address gaps in long-term safety and cost-effectiveness. Integrating restrictive transfusion strategies, optimizing ESA use with iron support, and considering patient quality of life will be key steps toward improving outcomes while minimizing risks.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF)

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 24

The Silent Risk: OTC Sleep Aid Usage in the Elderly Literature Review

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This review explores the use of over-the-counter (OTC) sleep aids among older adults, with a focus on their safety, effectiveness, and potential for misuse. By examining both the risks and benefits associated with these products, the review seeks to raise awareness and encourage informed decision-making around sleep health. The aim is to promote healthier sleep habits and support safer, more effective approaches to managing sleep disturbances in the geriatric population—while minimizing potential harm.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF)

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 25

Assessing Rates of Extemporaneous Compounding in Community Practice Pharmacies and Impacts on Pharmacist Participation in the Compounding Process

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Nonsterile compounding is a vital component of community pharmacy practice, providing patient-specific therapies when commercially available products are unavailable. Vulnerable populations, including pediatrics and patients with dysphagia, have an increased need for compounded formulations. This study evaluated rates of compounding in community practice pharmacies across New Jersey to assess factors influencing pharmacist participation and preparedness to compound.

An anonymous Qualtrics survey was distributed to 706 preceptors affiliated with the Ernest Mario School of Pharmacy at Rutgers University. Survey outcomes included receipt of compounded scripts, participation in compounding, reasons for declining compounded prescriptions, volume of compounds per month, types of products, participation in hazardous compounding, training received, resources available, and level of preparedness to compound. Descriptive statistics were obtained for survey response data.

A total of 42 preceptors completed the survey (5.9% response rate). Forty five percent (n=19) reported actively performing compounding, nineteen percent (n=8) declined compounded prescriptions, and thirty six percent (n=15) reported not receiving compounded prescriptions at their practice sites. Oral formulations (95%, n=18) were most commonly compounded by pharmacists, followed by topicals (63%, n=12), rectal/vaginal formulations (16%, n=3), and otic formulations (5%, n=1). Frequently cited barriers to compounding included institutional policy (63%, n=5), limited financial return (38%, n=3), and time constraints (38%, n=3). Pharmacists reported varying levels of preparedness to compound at their practice sites, with factors such as school training (32%, n=30), time constraints (22%, n=20), employer training (20%, n=18), and availability of resources (14%, n=13) impacting respondents' preparedness to compound.

There is an unmet need for compounded medications, with less than half of pharmacists filling compounded prescriptions. Current reimbursement models often undercompensate pharmacists for the time and resources required to prepare a compounded prescription, causing decreasing compounding rates. It is important to increase pharmacists' time, resources, and personnel to encourage increased participation in compounding.

Program Affiliations: KNIGHT ScholaRx

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 26

Evaluating Online Consistency of Off-Label Drug Use Information for Type 2 Diabetes-Approved GLP-1 Receptor Agonists Used for Weight Loss

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Patients often rely on online resources and AI tools for drug information, including off-label uses. Product A (semaglutide), Product B (tirzepatide), and Product C (liraglutide) are FDA-approved for Type 2 diabetes but are used off-label for weight loss. Although separate brand names with the same formulations are FDA-approved for chronic weight management, FDA regulations prohibit the diabetes-approved versions from being marketed for that purpose. As a result, patients using these drugs off-label must turn to non-FDA-regulated third-party sources. This project evaluates the consistency of off-label information for three GLP-1 receptor agonists across online drug resources to assess patient understanding. Four online drug information sources (ChatGPT, Mayo Clinic, MedlinePlus, UpToDate) were evaluated between August 19 and September 8, 2025. Tailored search methods were used for each source to optimize consistency. AI-generated responses were entered in separate incognito sessions and saved at the time of search. Consumer-facing websites were manually navigated, and professional databases were accessed via homepage search bars. Each source was evaluated using a four-point rubric assessing: disclosure of chronic weight management as an off-label use, disclosure of adverse effects, public accessibility, and clarity of language and tone, including distinction between on-label and off-label brand names. ChatGPT achieved a perfect score (4/4) for Product A and Product C, but 2/4 for Product B. Mayo Clinic scored 3/4 for Product A and 2/4 for Products B and C. MedlinePlus and UpToDate scored 2/4 for all three. Adverse event disclosure was consistent (12/12). Only 2/12 searches (17%) disclosed off-label use. UpToDate scored 0 for public accessibility. Overall, inconsistencies exist across sources in presenting off-label use. Only 17% disclosed that weight loss is not an FDA-approved indication for these products, highlighting potential patient confusion and the need for transparency and clarity.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF)

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D. Student

Abstract 27

Designing a Comparative Study of Psilocybin Versus First-Line Pharmacotherapies for Alcohol Use Disorder

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Purpose: Comparing the efficacy of psilocybin with first-line treatments for alcohol use disorder.

Background: Alcohol use disorder (AUD) is a medical condition where patients drink excessively, despite physiological consequences due to executive dysfunction. The two currently available first-line treatments for AUD are naltrexone and acamprosate. Naltrexone is a mu-opioid receptor antagonist that suppresses ethanol consumption, recommended for moderate to severe patients with AUD. Acamprosate is thought to modulate glutamatergic and GABAergic neurotransmission, stabilizing the AUD-associated neurochemical imbalances, promoting abstinence. Psilocybin binds to neural receptors 5HT2A and TrkB, shown to increase neuroplasticity and assist in controlling impulsivity.

Methods:
PubMed was utilized to find relevant publications using search queries "((naltrexone) AND (efficacy)) AND (AUD)," "(Acamprosate) AND (AUD)," "psilocybin + AUD" set to best match. Inclusion criteria included human clinical trial results, publications after the year 2000, and English language.

Results:
3/3 of the naltrexone clinical trials showed significantly decreased heavy drinking, however, suicide attempts and headaches are notable adverse reactions. 4/4 acamprosate clinical trials showed significantly increased days of abstinence from alcohol. However, acamprosate is not recommended for use in elderly populations and is contraindicated for patients with renal impairment. Generally, naltrexone is preferred over acamprosate for its inhibitory effects in severe AUD. 3/3 clinical trials with psilocybin exhibited significantly higher levels of abstinence for AUD patients, however, sample sizes are still not diverse or large enough.

Discussion:
Naltrexone and acamprosate are both regarded as the best treatments for AUD. Unfortunately, relapse rates remain high, hence other treatments should be considered. The FDA recently granted breakthrough therapy designation to psilocybin-assisted psychotherapy (PAP). Currently, there is limited but encouraging literature on PAP for AUD, suggesting better long-term outcomes. Since PAP shows potential for long-term efficacy, we propose a study design comparing psilocybin to current treatments for AUD to assess long-term outcomes.

Program Affiliations: American Association of Psychiatric Pharmacists Journal Club

Poster Category: Administrative & Regulatory Science

Primary Author Title: Pharm.D./M.D. Student

Abstract 28

Evaluating the NRF2-KEAP1 Responses of Melatonin in Human Kidney Proximal Tubule Cells

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Melatonin is an endogenous neurohormone and dietary supplement used to treat sleep disturbances. Melatonin acts as an antioxidant and reactive oxygen species scavenger, with documented protective effects against diseases in the immune, metabolic, neurological, and renal systems. We have previously reported the anti-apoptotic effect of melatonin against vancomycin-induced cytotoxicity in human kidney proximal tubule HK-2 cells. The mechanism of this protection remains unclear although preliminary studies have suggested that melatonin can promote antioxidant signaling by favoring the release of NRF2, the master regulator of oxidative stress response, from the cytoplasmic regulatory protein KEAP1. This allows NRF2 to translocate to the nucleus and activate a coordinated network of antioxidant genes. Therefore, the purpose of this study was to compare the mRNA levels of NRF2-target genes in HK-2 cells genetically manipulated to have low, normal, or high NRF2 signaling following treatment with melatonin or the prototypical NRF2 activator sulforaphane.

Three HK-2 cell lines, empty vector (EV), KEAP1-knockdown (KD), and NRF2-KD, were generated using stable transfection with short hairpin RNAs and treated with melatonin (32 μM) or a known NRF2 activator, sulforaphane (SFN; 10 μM), either alone or in co- treatment with a non-cytotoxic concentration of vancomycin (VAN; 1 mM) for 24 hours. qPCR was performed to assess the expression of kidney injury biomarker KIM-1, the pro-inflammatory cytokine TNF-a, and NRF2-ARE pathway genes.

As expected NRF2 mRNA was lowest in the NRF2 knockdown cells with little difference in mRNA levels between EV and KEAP1-KD cells. Likewise, SFN induced the expression of NRF2 and its target genes NQO1 and HO-1 in EV and KEAP1-KD cells, but to a lesser extent or not at all in NRF2-KD cells. In general, melatonin and vancomycin had little to no impact on the mRNA levels of NRF2, NQO1, or HO-1 in any of the three cell lines. Notably, VAN treatment did not alter KIM-1 mRNA levels, but it did increase TNF-a mRNA by 145%. Co-treatment of cells with vancomycin and SFN, but not melatonin, mitigated the induction of TNF-a mRNA regardless of NRF2 expression.

The results indicated the attenuation of kidney injury and inflammation biomarkers by sulforaphane may involve both NRF2-dependent and independent mechanisms. By comparison, melatonin had minimal impact on NRF2-KEAP1 signaling in HK-2 cells. Ongoing studies are investigating additional pathways and transporters regulated by melatonin to further elucidate its mechanisms of renoprotection.

Program Affiliations: Joint Graduate Program in Toxicology, Pharm.D./Ph.D. Program

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Poster Category: Basic and Translational Science

Primary Author Title: Ph.D. Student

Abstract 29

Discovery of Antivirals Against Enteroviruses by Targeting Viral Structural Protein VP1 and Non-structural Protein 2C

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Enteroviruses (EVs), including EV-D68, EV-A71, and CVB3, cause a substantial global disease burden, yet no antiviral therapies are currently approved. We developed two antiviral strategies targeting the highly conserved non-structural protein 2C and the viral capsid protein VP1 of EV-D68. Structure-property relationship (SPR) study yielded promising 2C inhibitor Jun6504, whose high-affinity 2C binding was validated using a fluorescence polarization (FP) assay developed through SAR-guided and structure-based design. Jun6504 shows broad-spectrum antiviral activity against multiple EV-D68, EV-A71, and CVB3 strains, along with favorable pharmacokinetic properties. In a neonatal mouse model of EV-D68-induced paralysis, Jun6504 significantly improves clinical scores, weight gain, and reduces viral titers in the spinal cord and quadriceps muscle when administered 24 hours post-infection, highlighting its therapeutic potential. In parallel, structure-based optimization of a virtual screening hit produced VP1-targeting inhibitors Jun11695 and Jun11787, which exhibit nanomolar potency against EV-D68 and micromolar activity against EV-A71 and CVB3. Cryo-EM structures reveal binding within the VP1 hydrophobic canyon, and resistance profiling confirms VP1 as the target. Both VP1 inhibitors demonstrate favorable pharmacokinetics and markedly reduce viral loads and paralysis progression in vivo when treatment is initiated immediately, 24 h, and even 4-6 days post-infection.

Program Affiliations: Graduate Program in Medicinal Chemistry

Poster Category: Basic and Translational Science

Primary Author Title: Ph.D. Student

Abstract 30

Therapy-Induced Rewiring of Synovial Sarcoma Metabolism

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Synovial sarcoma (SS) is one of the most common soft tissue cancers in pediatric, adolescent, and young adult patients in the world. Despite this, present treatment options are limited due to lack of targeted therapies for SS tumors. Current standard-of-care treatment depends on surgery, radiation, and cytotoxic agents such as doxorubicin. Metabolic rewiring in SS in response to treatment is poorly characterized and there are currently no metabolism-targeted interventions available for SS. Therefore, discovering treatment-induced metabolic vulnerabilities in SS tumors will guide the development of new treatment strategies for these patients. In this study, we aimed to characterize the metabolome changes of human SS cells caused by treatment with radiation and doxorubicin. We utilized liquid chromatography-mass spectrometry (LC-MS) to conduct broad targeted analysis on water-soluble metabolites in extracts from HSSYII and SYO1 cells before and after treatment with radiation and/or doxorubicin. LC-MS metabolomics quantified levels of central carbon metabolites, including amino acids, TCA cycle intermediates, and redox-related metabolites. Significant perturbations in metabolite levels were observed post-treatment within 24 hours when compared to non-treated cells. Of particular interest are alterations in levels of redox metabolites such as glutathione and its precursors following radiation treatment, indicating a metabolic response to the treatment-induced oxidative stress and potentially modulating radiosensitivity. Investigation of the efficacy of therapies targeting the metabolism of SS is ongoing and may include both dietary and pharmacological interventions to selectively disrupt tumor nutrient availability, such as for synthesis of glutathione. We also aim to expand our model to better capture clinical conditions through providing multiple doses of radiation to mimic fractionated radiation therapy and expand our analysis to include measuring metabolic pathway fluxes through the use of stable isotope tracers. Continued research is crucial in translating our findings into viable treatments that can help improve outcomes for patients.

Program Affiliations: Joint Graduate Program in Toxicology

Funding: NJ PHORCE

Poster Category: Basic and Translational Science

Primary Author Title: Ph.D. Student

Abstract 31

Cholesterol esterification in macrophages: The effects of Acat1-M/-M on macrophage activity

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Background:
Lipid laden macrophages (LLMS) are characterized by the formation of lipid droplets or vacuoles. Alveolar macrophages (AMs) are poised to readily form LLMs as they are bathed in lipid rich surfactant. LLMs have been observed in a variety of inflammatory pulmonary pathologies and largely associated with exacerbating injury: e-cigarette and vaping lung injury, sulfur mustard exposure, silica dust, etc. LLMs are traditionally characterized by accumulation of oxidized low-density lipoprotein (oxLDL). To reduce lipid droplet formation in cells, we targeted acyl-coenzyme A: cholesterol acyltransferase 1 (ACAT1), the protein responsible for esterification of cholesterol for lipid droplet synthesis. Previously, we found intratracheal instillation of a pharmacological inhibitor reduces macrophage cholesterol accumulation and blunted lung injury. To further explore ACAT1's role in macrophage lipid handling, we generated a myeloid specific ACAT1 knock out (Acat1-M/-M). We hypothesize that Acat1-M/-M will reduce LLM formation and reduce lung injury.
Methods:
Male and female WT and Acat1-M/-M mice given intratracheal bleomycin (ITB) (3U/kg) to induce acute lung injury and necropsied after 7d. Body weights were taken each day to measure weight loss. Bronchoalveolar lavage (BAL) cells were cytospun to assess cell differentials, counted for enlarged foamy appearance, and stained for Oil Red O (ORO) to assess lipid content. A bone marrow derived macrophage (BMDM) model was established to assess Acat1-M/-M macrophages when treated directly with lipids. As a preliminary study, we treated BMDMs with oxLDL to induce a LLM phenotype. BMDMs of WT and Acat1-M/-M mice were isolated and differentiated for 7d and treated with oxidized LDL (oxLDL) on d5 or LPS and IL-4 on d6. BMDMs. On d7 macrophages were stained for ORO, Seahorse glycolytic and mitochondrial metabolism, and qPCR for lipid related genes: Scarb1, Msr1, Cd36, Abca1, Cpt1a, and Nr1h3.
Results:
Within Acat1-M/-M mice ITB led to increased weight loss (5.77±1.94% vs 10.10±1.32%), worse histological lung injury, and increased neutrophils in bronchoalveolar lavage (BAL) fluid (3.99±0.65% vs 7.82±1.66%). Acat1-M/-M mice treated with ITB had significantly higher numbers of enlarged cells than WT ITB (21.14±4.43% vs 39.52±5.74%). When stained for ORO, Acat1-M/-M BAL cells, both PBS (vehicle) and ITB, did not stain positively for neutral lipids, while WT BAL cells, both PBS and ITB, both stained positively. This is consistent with a lack of ACAT function leading to increased phospholipid accumulation.
Both WT and Acat1-M/-M derived BMDMs stained positively for ORO when treated with oxLDL. Acat1-M/-M BMDMs show a trend of increased glycolytic metabolism (404.6±51.2% relative to WT), glycolytic capacity (514.1±222.6% relative to WT) mitochondrial basal respiration (156.6±38.5% relative to WT) and mitochondrial maximal respiration (147.8±13.8% relative to WT). But when treated with oxLDL there is a trend of an increase in glycolytic metabolism in WT, which is not seen in Acat1-M/-M. The qPCR results showed a general increase in lipid handling genes in WT with oxLDL treatment, consistent with an LLM phenotype. But Acat1-M/-M oxLDL BMDMs showed a decrease of these genes, showing oxLDL did not induce a similar LLM phenotype in Acat1-M/-M.
Discussion:
These results show, unlike a whole lung targeted pharmacological inhibition, a myeloid specific loss of ACAT1 function results in exacerbated lung injury and increased number of LLMs. LLMs from WT stained positively for ORO while Acat1-M/-M were negative, indicating either an accumulation of free cholesterol or non-neutral lipid within Acat1-M/-M macrophages. When trying to induce a foam cell phenotype in BMDMs by treating with oxLDL, both WT and Acat1-M/-M showed positive ORO staining, contrasting with LLMs seen in vivo. This indicates the lipid species accumulating in vivo Acat1-M/-M ITB macrophages is not cholesterol but rather a non-neutral lipid, such as phospholipid from lung surfactant. Acat1-M/-M BMDMs treated with oxLDL did not show the shifts in metabolism and transcriptional activity of lipid handling genes found in WT oxLDL BMDMs. Indicating that cholesterol is not driving Acat1-M/-M macrophages into an LLM phenotype. These results contrast the current paradigm which assume LLMs can only be formed from cholesterol and triglycerides. Future work will assess the lipid species found in LLMs of injured Acat1-M/-M by treating BMDMs directly with BAL lipids of injured animals.

Program Affiliations: Joint Graduate Program in Toxicology

Funding: NIH HL086621, CEED ES005022, T32ES007148

Poster Category: Basic and Translational Science

Primary Author Title: Ph.D. Student

Abstract 32

Exaggerated defects in pulmonary mechanics following ozone exposure in mice lacking GCN2

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Ozone is a criteria air pollutant known to cause alterations in pulmonary function including airway hyperresponsiveness in both humans and rodents. We previously demonstrated increased airway resistance and decreased tissue elastance and lung volume following acute ozone exposure in mice. Moreover, ozone causes a reduction in surfactant protein B (SP-B), a component of pulmonary surfactants, which are critical for proper lung functioning. Biochemical pathways underlying the effects of ozone are not fully understood. The integrated stress response (ISR) plays a key role in regulating anti-inflammatory and antioxidant responses. We discovered that ISR signaling through the activating kinase, GCN2, is important in protecting against ozone-induced lung injury and inflammation. The effects of loss of GCN2 on pulmonary mechanics are unknown and were evaluated herein. We hypothesized that lack of GCN2 will lead to more pronounced lung dysfunction following acute ozone exposure.
Male and female C57BL/6 wild-type (WT) and whole-body GCN2 knockout (GCN2-/-) mice (11-14wk) were exposed to filtered air or ozone (0.8ppm) in a whole-body Plexiglass chamber for 3h. Mice were anesthetized 3 or 24h later and respiratory mechanics measured using a SCIREQ flexiVent small animal ventilator.
Loss of GCN2 leads to persistent functional alterations in the airways, but not in parenchymal tissue, as evidenced by differences in resistance at both 3 and 24h after exposure to ozone, with no change in reactance. This is supported by findings that ozone had no effect on expression of SP-B in GCN2-/- mice and that air-exposed GCN2-/- mice were unresponsive to methacholine. Alterations in airway function could also explain the significant reduction in PV loop area observed in GCN2-/- mice following ozone exposure at lower PEEPs (1 and 3cm H_2O). Moreover, because these effects are observed at 3h post-exposure, it is likely that direct oxidative effects of ozone on the airways drive these changes.

Program Affiliations: Joint Graduate Program in Toxicology, Pharm.D./Ph.D. Program

Funding: NIH grants ES004738 and ES005022, and the Air Pollution Educational and Research Grant (APERG) Scholarship Program

Poster Category: Basic and Translational Science

Primary Author Title: Ph.D. Student

Abstract 33

CRISPR-Based Gene Therapy for C9orf72-ALS Treatment

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Amyotrophic lateral sclerosis (ALS) is a fatal neurodegenerative disease, with the most common genetic cause being the intronic abnormally expanded hexanucleotide G4C2 repeats in the C9orf72 gene. CRISPR/Cas-based genome editing tools have been widely applied in targeting gene mutations, and Cas9-based systems delivered via recombinant adeno-associated virus (rAAV) have demonstrated therapeutic benefit in C9orf72-ALS models both in vitro and in vivo. However, their editing efficiency is limited, primarily due to the low virus infection ratio. In addition, concerns about the CRISPR/Cas system inherited off-target activity and virus-related side effects present significant barriers between academic research and clinical translation.
My project aims to address these limitations by utilizing a recently characterized miniaturized CRISPR/Cas system, Un1Cas12f1-GE4.1. It can be loaded within a single viral particle and edits infected cells, while the large-sized Cas9 tool has to be packaged into dual cassettes and work only after both vectors are successfully delivered into the same targeted cell. This feature enhances delivery efficiency and simplifies the gene-editing platform. Additionally, Cas12f has been reported to offer improved target specificity, which reduces the risk of off-target editing. Therapeutic effects of this CRISPR system will be tested in C9orf72-ALS-related cellular models and transgenic mice. Specifically, in order to minimize the systemic toxicity resulting from viral-based gene therapies, this project also explores CNS-restricted delivery routes and brain-targeting AAV serotypes.

Program Affiliations: Graduate Program in Pharmaceutical Science

Poster Category: Basic and Translational Science

Primary Author Title: Ph.D. Student

Abstract 34

Targeting one-carbon production from tryptophan to promote radiosensitivity in triple-negative breast cancer

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Triple-negative breast cancer (TNBC) is the most aggressive and lethal subtype of breast cancer for which radiation therapy is commonly employed to improve prognosis. Residual disease and acquired resistance after radiation remain major challenges, and emerging evidence highlights the therapeutic potential of targeting metabolism to improve radiation therapy. However, the molecular mechanisms by which metabolic changes alter radiosensitivity remain elusive. Here we show that repeated exposure to ionizing radiation increases catabolism of the essential amino acid tryptophan in TNBC cells. Tryptophan catabolites are the most accumulated metabolites after repeated radiation, and stable isotope tracing with 13C-tryptophan revealed repeated radiation increased flux through the kynurenine pathway (KP), the major catabolic route for tryptophan. During the first rate-limiting step of this pathway, tryptophan is enzymatically converted to kynurenine upon the release of formate, a one-carbon unit that supports de novo nucleotide synthesis. Increases in kynurenine pathway flux upon repeated radiation induced labeling from 13C-tryptophan into ATP, demonstrating the capacity of TNBC cells to utilize tryptophan carbons to support purine biosynthesis. These data show that tryptophan serves as a key source of one-carbon units following exposure to ionizing radiation and suggest targeting tryptophan catabolism may be a novel therapeutic approach to promoting radiation therapy efficacy in TNBC.

Program Affiliations: Molecular Biosciences

Funding: NIH/NIEHS Center for Environmental Exposures and Disease (CEED) Grant P30ES005022.

Poster Category: Basic and Translational Science

Primary Author Title: Ph.D. Student

Abstract 35

CO2 Mediated Regulation of Neutrophil NADPH Oxidase and Interaction with Reactive Nitrogen Species

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Background and Purpose: Carbon dioxide (CO,) can modulate inflammatory and redox signaling pathways. Previously it's been shown that in vivo exposure of mice and in vitro exposure of isolated human PMNs to elevated CO2 levels (10%) stimulated reactive oxygen species (ROS) production, leading to microparticle release and activation of NLRP3 inflammasome. These findings suggest that CO2 can modify neutrophil function through redox-dependent mechanisms. Literature shows that CO2 reacts with peroxynitrite (ONOO-) to form caged radical nitrosoperoxycarbonate (ONOOCO,-), redirecting oxidative chemistry toward nitration rather than direct oxidation. Extending these concepts to human exposures we reported that 12 healthy participants exposed to 2,500 ppm CO2 exhibited altered oxidative-burst kinetics in circulating PMNs compared with pre-exposure values, suggesting that environmentally relevant CO2 can modulate innate immune activation.
To determine whether CO2 directly alters neutrophil function, we used differentiated HL60 (dHL60) cells to evaluate bicarbonate-dependent modulation of NADPHoxidase and its interaction with nitric oxide-derived species. We also specifically compared three NO donors-NOC-5, GSNO, and SIN-1, representing distinct redox species. SIN-1 releases both NO and superoxide, forming peroxynitrite, which in the presence of CO2 favors nitration. GSNO, an S-nitrosothiol donor, causing transnitrosylation of protein thiols, can modulate NOX activity, while NOC-5 releases 2NO leading to nitrosative signaling.

Methods: HL60 cells were differentiated for 5 days with 1 μM all-trans retinoic acid (RA). Seahorse XFe96 assays were performed with 40,000 cells /well. Sequential injections were as follows with final concentrations: 1) NaHCO3 (0, 12.5, 25, 50, 100 mM, pH adjusted to 7.4), 2) Rotenone/Antimycin A (0.5 μM), 3) PMA (100 ng/ml) to activate NADPH oxidase, and 4) DPI (10 μM) to inhibit it. The Oxidative Burst (OB) assay was used to study NADPH oxidase activity by measuring real-time oxygen consumption rate (OCR) upon PMA stimulation, which directly reflects NOX2-dependent superoxide generation. Because glycolytic and mitochondrial parameters were unchanged across bicarbonate concentrations, consistent with human data, subsequent experiments focused on OB assays. To test the influence of nitric oxide-related and peroxynitrite signaling, cells were also exposed to NO donors (NOC-5 [150 μM], SIN-1 [1 mM], or GSNO [100 μMl) after Rotenone/Antimycin A and before PMA.

Results: Increasing NaHCO3 concentrations produced a dose-dependent reduction in PMA-stimulated oxygen consumption [3412.8 ± 1391.5 pmole (0 mM NaHCO3) vs 2691.8 ± 1042.2 pmole (12.5 mM NaHCO3), $p = 0.046$] and [[AG1] 3373.7 ± 1391.5 pmole (0 mM NaHCO3) vs 1634.1 ± 1133.5 pmole (25 mM NaHCO3), $p < 0.001$] (n=5), indicating suppression of NADPH oxidase activity[AG2] . When SIN-1 (1 mM) was added, AUC (pmole) decreased at low bicarbonate (1924 at O mM NaHCO3 vs 3569 without SIN-1) and at 12.5 mM NaHCO3 (2197 vs 3473 without SIN-1), but the inhibitory effect plateaued at higher bicarbonate (25 mM = 1732 vs 1747 without SIN-1), suggesting that increasing NaHCO3 concentration blunted SIN-1's effect. Across replicate runs, consistent dose-dependent inhibition patterns were observed with different NO donors. NOC-5 significantly reduced AUC values (pmole) (0 mM: 4889 , 1491; 12.5 mM: 3505 , 1672; 25 mM: 2711 , 460.6; 50 mM: 202.5 , 39.15), while GSNO didn't effect OB (0 mM: 4608 , 4025; 12.5 mM: 3348 , 3302; 25 mM: 2799 , 2594; 50 mM: 470.8 , 173.4).

Conclusions: These data collectively indicate that while bicarbonate alone suppresses NADPH oxidase activity, RNS donors, especially NOC-5 reduces the NOX activity irrespective of bicarbonate and GSNO didn't change PMA induced OB or the effects of bicarbonate. SIN-1 reduces the PMA activity but with bicarbonate the NOX activity loss is restored. We propose that nitrosylation, nitrosation, and nitration are all means by which NOX activity can be regulated and that the presence of CO2 can alter these reactions. In future studies we will examine how CO2 and RNS cooperatively regulate NOX and contribute to systemic inflammatory and vascular changes associated with CO, exposure. Together, these results support a model in which CO, acts not as an inert gas but as a signaling molecule capable of altering neutrophil redox responses and immune activation.

Program Affiliations: Joint Graduate Program in Toxicology

Poster Category: Basic and Translational Science

Primary Author Title: Ph.D. Student

Abstract 36

MAT2A Inhibition Sensitizes Synovial Sarcoma to Ferroptosis

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Synovial sarcoma (SS) is one of the most common soft tissue sarcomas in children, yet effective targeted therapies remain unavailable. Standard treatment strategies, including surgical resection, radiation, cytotoxic chemotherapy, and T-cell receptor gene therapy, have either limited efficacy or toxicity concerns, highlighting the urgent need for novel therapeutic strategies. In this study, we demonstrate that depletion of S-adenosylmethionine (SAM) by MAT2A inhibition increases iron uptake, remodels phosphatidylcholine metabolism, and make SS cells sensitive to ferroptosis. Blocking SAM biosynthesis by small molecule inhibitor AG-270 impairs the proliferation of SS cell lines. RNA-seq analysis shows that SAM depletion increases expression of iron uptake receptor (e.g. TFRC) level, and exogenous supplementation of ferric ammonium citrate increase antiproliferative activity of AG-270. Additionally, water-soluble metabolomics by liquid chromatography-mass spectrometry reveals that MAT2A inhibition causes a time-dependent accumulation of metabolite precursors of PC lipid synthesis. Lipidomics analysis further shows that SAM depletion increases pool size of PC lipids with polyunsaturated fatty acids. Most critically, restoring saturated fatty acids containing PC lipid through exogenous supplementation rescues SS cell growth. This supports that SAM depletion blocks growth through disruption of PC lipid supply. Overall, this work identifies a sensitivity of SS cells to ferroptosis via remodeling of PC lipid biosynthesis and motivates further develop of this metabolism targeting therapy for patients.

Program Affiliations: Graduate Program in Pharmacology

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Poster Category: Basic and Translational Science

Primary Author Title: Ph.D. Student

Abstract 37

Sulfur Mustard Disrupts Epidermal and Dermal Structures in Hairless Guinea Pig Skin

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Sulfur mustard (SM; bis(2-chloroethyl) sulfide) is a highly reactive bifunctional alkylating agent and potent skin vesicant. Following cutaneous exposure, SM induces erythema, inflammation, epidermal erosions, and blistering. In this study, we investigated the temporal progression of SM injury and wound healing in the hairless guinea pig, a translationally relevant animal model for studying SM-induced cutaneous injury. The objective of this work was to characterize the pathogenesis of SM-induced skin injury and the subsequent wound-healing responses in the hairless guinea pig. Air control or saturated SM vapor caps were applied to the dorsal flanks of 6-8 wk-old Hartley hairless guinea pigs for 20 min (MRIGlobal, Kansas City, MO). Forty-eight hours post-exposure, SM-exposed sites were debrided daily for 4d using saline gauze soaks. Animals were euthanized 2d post-SM (prior to debridement) and at 20d and 66d post-SM exposure. Full-thickness skin biopsies from control and SM-treated animals were collected and processed for histopathology using hematoxylin and eosin (H&E) and Masson's trichrome staining. Elastic fibers were visualized using orcein stain. Immunohistochemistry was performed using antibodies against myeloperoxidase (MPO) and keratin 5, with matched IgG controls. The skin of control hairless guinea pigs displayed a well-developed, multi-layered epidermis overlying a dermis composed of an interwoven collagen network with abundant, branching elastic fibers. Two days post-SM skin was characterized by epidermal necrosis and dermo-epidermal clefts containing numerous necrotic heterophils. In the dermis, perivascular infiltrates and extravasated red blood cells surrounding degenerate vascular endothelial cells were observed. By 20d post-SM, moderate epidermal acanthosis and perivascular vacuolization were noted in the stratum granulosum and stratum spinosum. Elastic fibers within the edematous superficial dermis were fragmented and agglomerated. By 66d post-SM, there was a clear demarcation between the superficial and deep dermis, with the superficial dermis containing dense, highly compacted collagen fibers running parallel to the epidermis, which was devoid of elastic fibers and secondary appendages. SM exposure in hairless guinea pig skin produced a well-defined sequence of injury and repair. Overall, these findings demonstrate a progressive transition from acute injury to chronic dermal remodeling following SM exposure.

Program Affiliations: Joint Graduate Program in Toxicology, Pharm.D./Ph.D. Program

Funding: NIH AR055073, NIH ES005022, NIH ES020721, and NIH T32ES007148.

Poster Category: Basic and Translational Science

Primary Author Title: Ph.D. Student

Abstract 38

Concentration-Dependent Modulation of Mitochondrial Health by Vancomycin: Potential Impact of Melatonin

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Drug-induced kidney injury affects millions of individuals annually across the globe. One particular culprit is vancomycin, a glycopeptide antibiotic, that is essential for treating serious Staphylococcus aureus infections. The molecular mechanisms contributing to the toxicity of vancomycin are not fully understood, but preliminary studies suggest that oxidative stress and mitochondrial dysfunction damage proximal tubule cells. As an endogenous antioxidant, melatonin offers cellular protection from oxidative damage by scavenging reactive oxygen species and enhancing cellular defense pathways. In the current study, we sought to 1) evaluate the ability of vancomycin to alter mitochondrial function in cultured human proximal tubule (HK-2) cells and 2) determine whether melatonin can mitigate the vancomycin-induced changes.

HK-2 cells were exposed to vancomycin at pharmacologically relevant concentrations with or without concomitant treatment with melatonin for 24 hours. Mitochondrial health was assessed with the Mito Stress assay performed on the Agilent Seahorse XF Analyzer. This assay measures bioenergetic parameters, including basal respiration and maximal respiratory capacity. The Bioenergetic Health Index (BHI), a quantitative measure of energy production capacity and mitochondrial stress, was calculated using the acquired bioenergetic parameters. A lower BHI is reflective of increased mitochondrial damage and decreased metabolic function.

Exposure of HK-2 cells to vancomycin caused a concentration-dependent reduction of mitochondrial respiration and metabolic function indicated by a decrease in basal and maximal respiration, suggesting compromised mitochondrial integrity. However, cotreatment with melatonin further decreased both the basal and maximal respiration of cells relative to vancomycin treatment alone. By comparison, melatonin did improve the decline in BHI associated with vancomycin. Despite our team previously demonstrating the ability of melatonin to protect against the cytotoxicity of vancomycin in HK-2 cells, we observed mixed mitochondrial responses to the co-treatment. Further studies using real-time monitoring of mitochondrial respiration and changes in morphology and fusion/fission are needed.

Program Affiliations: Joint Graduate Program in Toxicology, Graduate Program in Pharmaceutical Science

Funding: R01DK131214; F31DK141202

Poster Category: Basic and Translational Science

Primary Author Title: Ph.D. Student

Abstract 39

Critical Role of Gelling Agents in the In Vitro Release of Clobetasol Propionate from Topical Gels

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Purpose:
Topical gels are semisolid drug delivery systems whose performance depends on formulation factors. This study evaluated the impact of gelling agent concentration, source, and grade on the physicochemical and structural (Q3) properties and in vitro release (IVRT) of 0.05% clobetasol propionate gels.

Methods:
Fifteen 0.05% w/w clobetasol propionate gels were prepared by varying the concentration, type, and grade of gelling agents (Carbopol® 934; HPMC-K4M, pharmaceutical and cosmetic grades), individually and in combination, while keeping other excipients constant. Reference gels (0.25% or 0.5% gelling agent) and ±10% concentration variants were developed. In vitro release testing (IVRT) was conducted using vertical diffusion cells, and sameness was evaluated according to regulatory guidances1,2 by comparing each variant with its respective reference formulation.

Results:
All gels exhibited acceptable physicochemical and structural properties (Table 1). HPMC gels showed very low viscosity, while Carbopol® gels were highly viscous; in contrast, the combination gels provided optimum viscosity for topical application. Release rates from Carbopol® and pharmaceutical-grade HPMC gels displayed high variability (CV >25%), whereas cosmetic-grade HPMC and the combination gels (A and B) demonstrated more consistent release rates (Figure 1, Table 2). IVRT sameness assessments showed that single gelling agent formulations did not meet the 75–133.33% acceptance interval, while both Gel A variants and the Gel B's (+10%) variant were comparable to their respective references (Table 3).

Conclusion:
Gelling agent type, grade, and concentration strongly influenced the consistency of clobetasol propionate release. The findings highlight the need for careful gelling system selection in topical gel development.

Program Affiliations: Graduate Program in Pharmaceutical Science

Poster Category: Basic and Translational Science

Primary Author Title: Ph.D. Student

Abstract 40

Enhancement effects of DMSO (Procipient®) for skin delivery of Fluconazole.

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Purpose: The objective of the study is to investigate the influence of varying concentrations of DMSO (Procipient®) on the permeation of the antifungal drug fluconazole.

Methodology:
Permeation testing was performed using dermatomed human cadaver skin obtained from an accredited U.S. tissue bank (Science Care, Folcroft, PA,19032). Non-occluded vertical glass Franz diffusion cell (FDC) equipment was used with receptor volumes of 5 mls (Logan, NJ). Five formulations (F1-F5) with different concentrations (0%,1% ,2.5%,5% and 10%) of DMSO(Procipient®) respectively were tested for the permeation of 0.5% fluconazole (n = 3 for each group). A sample of 500 µl of each formulation was applied to each donor compartment (0.64 cm2) of each Franz cell. The samples (0.5ml) were taken in sampling points: 0h,8h, 16h, 24h and the volume of the sample was immediately replaced with the same volume of fresh acceptor medium. During the experiment, temperature in heating blocks was maintained at 32ºC, and the stirring speed was 600 rpm. After 24h, the skin was homogenized with 1 ml methanol using microtube homogenizer, centrifuged, and the supernatant was analyzed by HPLC.

Results:
The cumulative release of fluconazole in F5 containing 10% DMSO(Procipient®) after 24 hours,16 hours, 12hours and 8 hours was found to be 0.75±0.03µg/cm2, 0.42±0.02 µg/cm2 0.36±0.01 µg/cm2 and 0.29 ±0.01 µg/cm2respectively. There was no release of the drug into receptor in other formulations. The amount itraconazole in epidermis for F5, F4, F3, F2 and F1was found to be 1.10±0.01 µg/mg, 0.91±0.08 µg/mg, 0.65±0.01 µg/mg, 0.91±0.02µg/mg and 0.40±0.01 µg/mg respectively. The amount itraconazole in dermis for F5, F4, F3, F2 and F1was found to be 0.20±0.01 µg/mg, 0.18±0.02 µg/mg, 0.18±0.01 µg/mg, 0.17±0.01 µg/mg and 0.14±0.02 µg/mg respectively.

Conclusions:
There was increased permeation of itraconazole in F5 formulation at the end of 24 hours. The amount of itraconazole in the epidermis was significantly greater than dermis for all the formulations.

Program Affiliations: Graduate Program in Pharmaceutical Science

Funding: Gaylord Chemical Company, L.L.C., Covington, Louisiana, USA.

Poster Category: Basic and Translational Science

Primary Author Title: Ph.D. Student

Abstract 41

Ozone Exposure Alters Alveolar Macrophage Efferocytosis Receptor Gene Expression in Mice

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Neutrophils (PMNs) accumulate in the lungs following inhalation exposure to the oxidant air pollutant, ozone. These short-lived cells undergo apoptosis and are cleared from the lungs by resident alveolar macrophages (AMs) by efferocytosis. We previously reported that efferocytosis is impaired in AMs 48 hr after ozone exposure. Efferocytosis requires recognition of apoptotic cells by macrophage receptors including MerTK, Axl, SR-AI/AII, SR-BI, and CD36. Expression of these receptors is regulated by the transcription factor peroxisome proliferator activated receptor gamma (PPARγ), which is downregulated following ozone exposure. However, the effects of ozone on genetic expression of efferocytosis receptors during the resolution of ozone-induced injury is not clearly defined, and this was assessed in the present studies. Male wild type C57BL6/J mice were exposed to air or ozone (0.8 ppm, 3 h) in a whole-body chamber. Mice were euthanized 48 h later, and lung cells collected by bronchoalveolar lavage (BAL) with gentle tissue massage. Cells were enriched for resident AMs by magnetic depletion of CD11b expressing cells and analyzed for expression of Pparg (encoding PPARγ), Msr1 (encoding SR-AI/AII), Scarb1 (encoding SR-BI), Cd36, Mertk, and Axl using qPCR. Expression levels were normalized to housekeeping genes Actb, Gapdh, or 18s, and fold change values calculated using the ΔΔCT method. Data were analyzed by a Kolgorov-Smirnov test. Exposure to ozone resulted in a decrease in Pparg expression in AMs (fold change = 0.37) this was associated with decreased transcription of Mertk (0.60) and significantly decreased transcription of Cd36 (0.61), with no change in Scarb1 (1.31) or Axl (0.99) expression. Conversely, Msr1 transcription was significantly increased (3.83) following ozone exposure. These data suggest that decreased transcription of macrophage efferocytosis receptor genes contributes to impairment in AM efferocytosis following exposure to ozone. SR-AI/AII is known to promote efferocytosis by augmenting MerTK signaling in macrophages. Upregulation of SR-AI/AII may represent a compensatory mechanism for decreased Mertk transcription. We further speculate that increases in SR-AI/AII are insufficient to compensate for this impairment.

Program Affiliations: Joint Graduate Program in Toxicology, Pharm.D./Ph.D. Program

Funding: NIH Grants ES031678, ES004738, and ES005022

Poster Category: Basic and Translational Science

Primary Author Title: Ph.D. Student

Abstract 42

Profiling Human Hepatic Biotransformation Enzyme Gene Expression According to PFAS Exposure

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Exposure to per- and polyfluoroalkyl substances (PFAS) has been associated with adverse health outcomes. The widespread exposure of humans to PFAS along with the high utilization of pharmaceuticals to treat these associated diseases raises concern about potential pharmacokinetic and pharmacodynamic interactions. PFAS and pharmaceuticals share disposition pathways. As PFAS bioaccumulate, they activate transcription factors and nuclear receptors that regulate the expression of drug metabolizing enzymes. Therefore, the purpose of this study was to evaluate associations between PFAS concentration in banked human liver specimens and expression of mRNAs encoding drug-metabolizing enzymes. Human liver biospecimens were obtained from 34 cadaver donors through the National Disease Research Interchange. 54 PFAS were measured in the liver biospecimens using targeted liquid chromatography high-resolution mass spectrometry (LC-HRMS). Individual PFAS that were detected in more than 60% of the samples were included in the subsequent analysis. For each PFAS, samples were ranked by concentration and divided into tertiles for comparison of mRNA expression. SYBR Green-based RT qPCR was conducted to measure relative mRNA abundance of 170 phase-I-and-II biotransformation enzymes and 5 housekeeping genes. Target gene expression was normalized to housekeeping genes, and fold changes were calculated as 2^(-ΔΔCt). Differences in gene expression changes according to PFAS concentration were assessed using Welch's T-test. PFAS were detected in all 34 individuals, with 17 compounds found in ≥ 3 livers and 6 detected in 60% of specimens. The six most frequently detected PFAS were PFOA, PFNA, PFUdA, L-PFHxS, L-PFOS), and Br-PFOS.

The gene expression of key phase I metabolizing enzymes elevated at high PFAS concentrations. Similarly, phase II enzymes were enriched compared to samples in the lowest 33rd percentile. This study revealed novel associations between hepatic PFAS levels and altered expression of genes encoding Phase-I and -II biotransformation enzymes, suggesting potential effects of the ADME of pharmaceuticals and endogenous compounds.

Program Affiliations: Joint Graduate Program in Toxicology

Funding: T32ES007148 and P30ES005022.

Poster Category: Basic and Translational Science (e.g., bench research, animal studies, pharmacology, pharmacokinetic, dose-ranging studies)

Primary Author Title: Ph.D. Student

Abstract 43

In vitro Modeling of Environmental Susceptibility in Parkinson's Disease

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It is well-documented that environmental risk factors and gene-environment interactions play critical roles in disease pathogenesis in most Parkinson's disease (PD) cases. Decades of epidemiological, mechanistic, and post-mortem studies show an association between specific environmental exposures and increased risk of PD. However, despite long-standing recognition of the role of environmental risk factors, significant knowledge gaps remain about how these exposures contribute to disease pathogenesis, and the environment has been largely neglected in the PD research field. Work to assess PD-related neurotoxicity largely relies on in vivo animal models, which are considered the most physiologically relevant systems for neurotoxicity testing, disease modeling, and drug screening. However, in vivo models have several limitations, and emerging new approach methodologies (NAMs) offer efficient, translatable methods to assess neurotoxicity and disease mechanisms. In this study, we aimed to recapitulate our two-hit in vivo mouse model in which developmental exposure to the organochlorine pesticide dieldrin, a known risk factor for PD, increased neuronal susceptibility in both the α-synuclein pre-formed fibril (PFF) and MPTP models. Using Lund human mesencephalic (LUHMES) cells, we adopted a 3D neurosphere model widely used as a neurotoxicity screening tool because it shows improved differentiation, survival, and cell-to-cell interactions compared to 2D cultures. Here, we replicate work from other labs demonstrating the dopaminergic-like phenotype of LUHMES 3D neurospheres, confirming 1) expression of dopaminergic and neuronal markers using ddPCR and western blots, and 2) susceptibility to 1-methyl-4-phenylpyridinium (MPP+) toxicity, assessed by ATP and neurite outgrowth assays. We demonstrate that these neurospheres are also susceptible to dieldrin toxicity at concentrations consistent with those measured in the brains of exposed mice in our in vivo paradigm, showing a dose-dependent reduction of ATP levels and neurite outgrowth. This work establishes a novel paradigm for dissecting the molecular mechanisms underlying the effects of environmental toxicants on PD risk.

Program Affiliations: Joint Graduate Program in Toxicology, Pharm.D. Honors Research Program, Summer Undergraduate Research Fellowship

Funding: NIH

Poster Category: Basic and Translational Science

Primary Author Title: Ph.D. Student

Abstract 44

Quantifying the rates of epigenetic methylation with stable isotope tracing

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Methionine cycle produces S-adenosylmethionine (SAM) for epigenetic methylation reactions. This global methyl donor is transferred to histones, DNA, and RNA to control chromatin structure and tune oncogenic gene expression in many cancers. Steady state methylation levels are determined by methylation and demethylation rates, which vary across the genome. Current approaches to measure methylation turnover rates require genetic or pharmacological perturbation of methyltransferase enzymes. Here we demonstrate a method to measure chromatin methylation dynamics with minimal perturbation using stable isotope tracing. Synovial sarcoma cells were cultured with deuterium labeled methionine (methyl-D_3) followed by genomic DNA and RNA extractions. After enzymatic digestion of the DNA and RNA, methylated nucleosides, such as 5-methyldeoxycytidine, were detected and their deuterium labeling quantified by liquid chromatography-mass spectrometry. Our results show distinct rates of DNA and RNA methylation, which are both controlled by metabolic supply of SAM. This approach can quantify macromolecule methylation dynamics in tumors to better understand and therapeutically target metabolic control of genomic regulation.

Program Affiliations: Cellular and molecular pharmacology

Poster Category: Basic and Translational Science

Primary Author Title: Ph.D. Student

Abstract 45

A Crystallization Inhibition Assay Developed to Evaluate Inhibitors of Calcium Oxalate Stone Formation in Patients with Hyperoxaluria

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Pathological crystallization of poorly soluble metabolites is responsible for a variety of stone diseases, including kidney stones, which are characterized by high recurrence rates and a significant healthcare burden. Small-molecule crystallization inhibitors represent a promising strategy to prevent pathological crystal formation by stabilizing supersaturated solutions and inhibiting crystal nucleation and growth. In this study, we developed a convenient medium-to-high-throughput assay to evaluate inhibitors of calcium oxalate (CaOx) crystallization under physiologically relevant conditions. Supersaturated CaOx solutions were incubated with candidate compounds, followed by centrifugation and measurement of oxalate or calcium concentrations in the supernatant using an enzymatic oxalate assay or fluorescent calcium indicators. The concentrations remaining in the supernatant correlate with the degree of crystallization inhibition. Dose–response curves were generated to determine inhibitor potency. Using this assay, a series of dioxamate derivatives with varying linker lengths was evaluated. Among them, **LH1521**, which contains a five-carbon linker between two oxamate groups, showed the highest potency with an EC_{50} value of **3.54 ± 0.06 μM**, approximately **60-fold more potent than citrate** (EC_{50} = 212 ± 23 μM). These results demonstrate the utility of this assay for screening and structure–activity relationship studies of CaOx crystallization inhibitors for kidney stone prevention in patients with hyperoxaluria.

Program Affiliations: Graduate Program in Medicinal Chemistry

Poster Category: Basic and Translational Science

Primary Author Title: Ph.D. Student

Abstract 46

Contribution of Microbiome-Derived Drug Metabolism to Interindividual Variability in the Pharmacokinetics of Duloxetine

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The human gut microbiome contributes to inter-individual variability in therapeutic response through different effects, including the direct biochemical transformation of orally administered drugs into metabolites, termed microbiome-derived drug metabolism (MDM). Although systematic studies have demonstrated the metabolic capacity of gut bacteria, the clinical relevance of MDM remains unclear due to the lack of standardized experimental approaches and quantitative models applicable to clinical decision-making. This project aims to address this translational gap by confirming the relevance of MDM in vivo, creating microbiome-dependent pharmacokinetic (PK) profiles, and establishing methodology to capture MDM contributions to variability in clinical PK outcomes.

This study involves a single-dose crossover PK clinical trial involving 18 healthy subjects administered a known MDM-positive drug, duloxetine. Blood samples were collected pre-dose and from 0.5 to 12 hours after oral administration. Stool samples were collected to characterize ex vivo gut microbiome cultures for MDM-screening with duloxetine. Plasma and fecal samples were chemically extracted to identify and quantify parent drug and microbiome-derived metabolites using HPLC-HR-MS/MS. Plasma concentration-time data were analyzed using non-compartmental methods. Individual PK profiles were further evaluated using a mixed-effects modeling approach to estimate population parameters and inter-individual variability. Covariate analysis assessed the influence of subject characteristics on PK parameters, and the statistical significance of the difference in objective function value between the model with or without a certain covariate was tested. Ex vivo MDM data will be compared to quantify variability in duloxetine depletion and metabolite formation across subjects.

The primary outcome will be the identification of MDM contributions on drug exposure by measuring in vivo human PK profiles and corresponding ex vivo MDM profiles for Duloxetine. This work will provide a framework for incorporating microbiome-dependent metabolism into clinical PK modeling.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF)

Poster Category: Basic and Translational Science

Primary Author Title: Pharm.D. Industry Fellow

Abstract 47

Integrated Screening and Target Prioritization for Identification of Non-Hormonal Contraceptive Targets

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Ovulation is a critical and highly regulated process required for female fertility, making it an attractive target for development of non-hormonal contraceptives. To identify possible targets, a tiered high-throughput ex vivo screening platform was developed using a three-dimensional encapsulated in vitro follicle growth (eIVFG) system that recapitulates follicle maturation, steroidogenesis, and ovulation. A total of 1,340 bioactive small molecules were screened through a three-tier pipeline. Tier 1 evaluated inhibition of follicle rupture following human chorionic gonadotropin (hCG) stimulation at 10 μM while assessing preservation of progesterone secretion. 81 compounds inhibited ≥70% of ovulation without suppressing progesterone. Tier 2 performed dose-response analyses (0.1–10 μM), identifying 35 compounds with concentration-dependent inhibition. Tier 3 assessed effects on follicle development and estradiol production, yielding 20 validated hit compounds (1.5% hit rate) that selectively blocked ovulation without disrupting normal folliculogenesis or steroidogenesis. Based on the annotation of these 20 hit compounds, they target multiple established ovulatory genes, as well as new genes that have not been associated with ovulation. Subsequent target assessment was conducted to prioritize candidate genes for non-hormonal contraceptive development. A comprehensive literature review was done to identify genes involved in key reproductive processes. Identified targets were evaluated based on reproductive tissue specificity and relevance to ovulatory signaling pathways. Priority was given to genes with high expression in reproductive tissues and minimal expression in non-reproductive tissues to reduce the likelihood of systemic side effects. Additional criteria included disease association and druggability. Functional validation evidence was also reviewed, including knockout animal model data and human mutation studies, demonstrating that disruption of the gene impairs fertility without affecting overall viability. Collectively, this integrated screening and target assessment strategy enabled systematic prioritization of biologically validated, druggable gene targets for the development of safe, reversible, non-hormonal oral contraceptives.

Program Affiliations: PharmD program

Poster Category: Basic and Translational Science

Primary Author Title: Pharm.D. Student

Abstract 48

Validating Untargeted Discovery of Nephrotoxicity Biomarkers Using mRNA Profiling in Murine Kidneys and Human Kidney Injury Datasets

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Cisplatin is a highly nephrotoxic chemotherapeutic drug prescribed for solid tumors. Current methods of detecting cisplatin-induced acute kidney injury (AKI) are inadequate for revealing the progression from subclinical to clinical injury. Our team recently performed an untargeted discovery of urinary proteins in patients receiving cisplatin chemotherapy within the prior 48 h and identified over 800 differentially enriched proteins.

21 potential protein biomarkers from our previous study were prioritized for validation at the mRNA level using: 1) single cell kidney RNASeq data from the human AKI mRNA dataset in the Kidney Tissue Atlas and 2) kidneys of mice treated with cisplatin. Total RNA was extracted from frozen kidneys of saline-treated control mice (n=5) and cisplatin (20 mg/kg, ip)-treated mice (n=7) at 4 days, and qPCR was performed for 24 genes, including 3 positive control known kidney injury biomarkers (Kim-1, Timp-1, and Lcn-2).

Increased mRNA expression was observed for the apoptosis receptor Tnfrsf10b (8-fold), RNA-binding Carhsp1 (3-fold), calcium-binding S100a11 (6.5-fold), serine protease Prss22 (44-fold), and cytokines Cxcl5 (82-fold) and Ccl5 (3-fold). Notably, Tnfrsf10b, Cxcl5, Carhsp1, S100a11, and Prss22 showed significant positive correlation (Pearson r: 0.7-0.9) with the established injury markers. Decreased mRNA expression was observed for ubiquitin receptor Klhl13 (47% of control) and glycosyltransferase St8sia4 (42% of control). There was low concordance in the directional change between the untargeted protein analysis, the human AKI mRNA dataset, and regulation changes of these genes in kidneys of cisplatin treated mice. Nonetheless, the upregulation of Tnfrsf10b mRNA in the kidneys of cisplatin-treated mice corresponded with increased urinary protein levels of patients receiving cisplatin chemotherapy.

Tnfrsf10b, a TNF-related receptor involved in apoptosis signaling, emerged as a potential novel biomarker of cisplatin-induced nephrotoxicity. Future studies aim to perform longitudinal evaluations of this and other potential kidney injury biomarkers in the entire patient cohort.

Program Affiliations: Summer Undergraduate Research Fellowship

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Poster Category: Basic and Translational Science

Primary Author Title: Pharm.D. Student

Abstract 49

Late-Stage Functionalization of Phenols and Anisoles using N-hydroxymethylpthalimide (NHMP) as a Sulfinyl Radical Precursor

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In pharmaceutical research, the ability to selectively modify complex molecules at a late stage is extremely valuable, as small structural changes can significantly impact drug efficacy, selectivity, and pharmacokinetic properties. Development of mild and selective methods to achieve such functionalizations would allow for rapid diversification of drug scaffolds, accelerating drug discovery efforts. Recent efforts in our group have used N-hydroxymethylpthalimide (NHMP) sulfones to act as sulfinyl radical precursors for late-stage functionalization of anilines. This method eliminates the need for any external oxidant or reductant for completion of the catalytic cycle, allowing for access of oxidant sensitive substrates that would otherwise be unstable under common redox conditions. Moving forward, we are now working on methods to functionalize phenols and anisoles, other motifs commonly found in small-molecule pharmaceuticals. We hypothesize that tailoring the reduction potential of the NHMP sulfone to correspond with the oxidation potential of the oxygen-containing aromatic reagents, and using an appropriate photocatalyst, will allow the oxidation of the phenols/anisoles to precede the reduction of the NHMP sulfone reagent in a unidirectional, cyclical manner. In particular, we are making efforts to synthesize additional reagents to better emulate the reported redox potential of anisoles. Optimization of such methods will allow for late-stage functionalization of phenol and anisole-based drug compounds.

Program Affiliations: Graduate Program in Medicinal Chemistry

Poster Category: Basic and Translational Science

Primary Author Title: Pharm.D. Student

Abstract 50

Evaluating the Neuroprotective Potential of Semaglutide in Alzheimer's Disease

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Glucagon-like peptide-1 receptor agonists (GLP-1 RAs), originally developed for glycemic control in diabetes, are widely recognized for their efficacy in promoting weight loss. Their potential neuroprotective effects remain less defined. This study aims to evaluate the impact of GLP-1 RAs, specifically semaglutide, on the incidence of neurodegenerative pathology.

A systematic literature review was conducted using PubMed, ClinicalTrials.gov, and Ovid MEDLINE to identify articles investigating the potential neuroprotective effects of semaglutide in Alzheimer's disease. Results were restricted to studies published within the last 10 years. Medical Subject Headings (MeSH) terms such as "semaglutide," "Alzheimer's disease," and "neuroprotection" were used to refine search results. After a thorough review of individual articles, a results table with sections for title, authors, publication year, study design, and key findings was constructed.

Four studies qualified for analysis, comprising one target trial emulation and three preclinical studies. All four studies demonstrated the neuroprotective benefits of semaglutide in Alzheimer's disease models, with each suggesting either protection or enhancement of cognitive function. Three studies reported a reduction in amyloid-beta plaque deposition following semaglutide administration, suggesting a potential slowing of disease progression. All four studies further explored the mechanisms by which semaglutide reduces neuroinflammation. One study highlighted oxytocin upregulation as a possible mechanism contributing to decreased inflammation, improved cognitive function, and reduced amyloid-beta deposition. Three studies reported reduced microglial and astrocyte activation, with one reporting a shift from the pro-inflammatory M1 state to the anti-inflammatory M2 state.

Preclinical results have demonstrated that semaglutide may reduce protein aggregation, mitigate neuroinflammation, and offer cognitive benefits in patients with Alzheimer's disease. These findings support further investigation of semaglutide as a potential treatment option in neurological diseases. Further research through large-scale clinical trials is required to confirm semaglutide's safety and efficacy, identify its mechanisms of neuroprotection, and determine its role in disease modification.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF), Pharm.D. Program

Poster Category: Basic and Translational Science

Primary Author Title: Pharm.D. Student

Abstract 51

Targeting KRAS Mutant Cancer with Synergistic PD-1 Blockade and KRAS Inhibition: A Literature Review

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Background:
KRAS G12C mutations are common drivers in colorectal, pancreatic, and non-small cell lung cancers (NSCLC), promoting tumor progression, immune evasion, and therapeutic resistance. KRAS G12C inhibitors, such as Sotorasib and Adagrasib, have demonstrated clinical benefit, but responses are limited in durability. Immune checkpoint inhibitors targeting programmed death-1 (PD-1), such as Pembrolizumab, are increasingly used in clinical practice, though their effectiveness in KRAS-mutant tumors varies due to immunosuppressive tumor microenvironments. Emerging evidence suggests that KRAS inhibition may reprogram the tumor microenvironment (TME) and enhance sensitivity to PD-1 blockade, supporting potential combination strategies.

Methods:
A literature review of preclinical and clinical studies was conducted using PubMed, MEDLINE, and EMBASE with publications from the past five years. Search terms included KRAS G12 mutation, PD-1 inhibitor, immune evasion, and tumor microenvironment, along with specific KRAS inhibitors such as Adagrasib, Sotorasib, and MRTX849. Studies examining colorectal, pancreatic, and NSCLC tumors with KRAS mutations were prioritized.

Results:
KRAS mutations enable immune escape through tissue-specific mechanisms. In lung adenocarcinoma, KRAS signaling increases PD-L1 expression and suppresses T-cell activity. Colorectal tumors show reduced immune infiltration, while pancreatic cancers promote immunosuppression through cytokine-driven metabolic changes. Preclinical studies demonstrate that KRAS G12C inhibitors remodel the tumor microenvironment and increase sensitivity to PD-1 blockade. Early clinical trials show promising antitumor activity and manageable safety when KRAS inhibitors are combined with PD-1 inhibitors.

Conclusion:
Combining KRAS inhibitors with PD-1 blockade shows potential to overcome immune resistance in KRAS-mutant cancers. Biomarker-driven patient selection and further clinical research are needed to optimize treatment outcomes.

Program Affiliations: Pharm.D. Program

Poster Category: Basic and Translational Science

Primary Author Title: Pharm.D. Student

Abstract 52

Nanotechnology-Based Targeting of Glial Cells to Modulate Neuroinflammation in Alzheimer's Disease

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Alzheimer's disease (AD) is a neurodegenerative disorder characterized by progressive cognitive decline and the accumulation of fibrillar amyloid-beta (fAβ) plaques within the brain. Interaction of fAβ with scavenger receptors (SRs) expressed on neurons and glial cells initiates inflammatory signaling cascades that contribute to neurodegeneration. Modulation of these inflammatory pathways represents a potential strategy for limiting AD progression. In the present study, human microglia were developed from human-induced pluripotent stem cells (hiPSCs) using an established differentiation protocol. Cells were treated with exogenous fAβ to model AD pathogenesis. Amphiphilic macromolecule nanoparticles (AM-NPs) were synthesized through flash nanoprecipitation to evaluate their ability to influence microglial inflammatory responses. Three types of AM-NPs were generated: tartaric acid-derived (T12P5(PS)), mucic acid-derived (M12P5(PS)), and a non-bioactive PEG-b-PLA NP formulation serving as a control. The capacity of the nanoparticles to traverse the blood-brain barrier (BBB) was examined in vitro using human brain endothelial cells (hCMEC/D3). Microglial responses to fAβ exposure were assessed in the presence and absence of nanoparticles using immunohistochemistry, fluorescence imaging, and bulk RNA sequencing. Exposure to AM-NPs resulted in a marked attenuation of microglial activation induced by fAβ. Expression levels of inflammatory markers, including CD45, CD68, and CD14, were significantly lower than in cells treated with fAβ alone. Morphological assessment indicated preservation of the ramified, homeostatic microglial phenotype following nanoparticle treatment, whereas cells exposed solely to fAβ exhibited an activated amenoid morphology. Nanoparticle treatment reduced cellular uptake of fAβ by approximately 88%. These findings indicate that AM-NPs can suppress fAβ-driven inflammatory pathways and gene expression, supporting their potential as a therapeutic approach for mitigating neuroinflammation in AD.

Program Affiliations: Rutgers Honors College

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Poster Category: Basic and Translational Science

Primary Author Title: Pharm.D. Student

Abstract 53

Dissecting the Role of Mitochondria-ER Communication in Leukemia Therapy Response

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Acute Myeloid Leukemia (AML) is the most common and lethal leukemia in adults. Venetoclax, a BH3 mimetic and selective antagonist of BCL-2, was recently approved by the FDA for the treatment of AML. However, despite initial promising responses, many AML patients do not respond upfront, and others develop resistance. Understanding underlying mechanisms of BH3 mimetics resistance is crucial for successful treatment and improvements in patient outcomes.

Our recent studies show mitochondrial–endoplasmic reticulum (ER) contact sites, referred to as mitochondria-associated membranes (MAMs), as key mediators of therapy responses in AML. MAMs are critical regulatory hubs for mitophagy, with mitofusin-2 (MFN2) acting as a key coordinator of this inter-organelle communication essential for therapy resistance. CRISPR screens suggest that MFN2 depletion enhances AML cell sensitivity to Venetoclax, while its upregulation enhances resistance. However, precise regulation of MAMs alterations that occur upon the acquisition of resistance and how manipulation of MFN2 affects drug sensitivity in AML are not investigated yet.

These findings imply that therapeutic ablation of MFN2 may enhance AML cell susceptibility to BH3 mimetic treatment.

In our studies, we used a combination of Electron Microscopy (EM), proteomics, and biochemistry. Morphometric quantifications of EM images revealed changes in mitochondrial area, perimeter, and ER distance in venetoclax–resistant AML cells compared to sensitive ones. Through proteomics on mitochondrial extracts, we identified that other than MFN2, several MAMs-residing proteins are expressed differently in venetoclax resistance. Then, using inducing short-hairpin and single guide RNA, we successfully deleted MFN2 in AML cells. Western blotting analysis of the effects of MFN2 ablation in AML revealed an increase of MFN1 levels, potentially as a compensation mechanism, and alterations in a few of the MAMs proteins. Overall, our studies suggest that MFN2 ablation results in upregulation or downregulation of the MAMs proteins, furthering their implication on venetoclax resistance.

Program Affiliations: Pharm.D. Honors Research Program, Rutgers Honors College

Poster Category: Basic and Translational Science

Primary Author Title: Pharm.D. Student

Abstract 54

Orchiectomized male mice supplemented with estrogen display increased perturbation in gut mucosa compared to Estrogen Gender Affirming Hormone Therapy

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The effects of estrogen gender affirming hormone therapy (E-GAHT) on gut homeostasis are unknown. Forty C57BL6 male mice were grouped (n=10/group) as follows: 1) intact with oil, 2) intact with estradiol benzoate (EB, 150 µg/kg) and finasteride (F, 0.25 mg/kg), 3) orchiectomized (ORX) with oil; and 4) ORX with EB (150 µg/kg), daily oral administration for 8 weeks. Ileum and colon were collected, washed with PBS, and prepared for histology and immunohistochemistry. Western blotting of homogenized colonic tissue was performed. F4/80, an inflammatory marker for mouse macrophages, was expressed in the ileum and was increased in ORX:oil and ORX:EB compared to Intact:oil and Intact:EB+F animals. E-cadherin, a glycoprotein part of the cadherin family that mediates cell-cell adhesion at junctions was expressed in the ileum and was decreased in ORX:oil and ORX:EB compared to Intact:oil and Intact:EB+F mice. Estrogen receptor subtypes, ERα and ERβ have a role in the central nervous system and immune system. ERα is found primarily in the mammary gland and uterus and functions to maintain skeletal homeostasis and regulate metabolism. ERβ is primarily found in the colon, prostate, bladder and has a prominent role in the central nervous system and immune system. ERα density was found to be the highest in the colon of ORX:oil treated mice. ERβ density was decreased in the colon of ORX:oil and ORX:EB compared to Intact:oil and Intact:EB+F animals. Taken together, these data suggest that ORX induces changes in the proteins essential for maintaining tight junctions, regulating inflammation, and estrogen distribution in the gut. Further studies will investigate the presence of M1 and M2 macrophages in the ileum and the density of aromatase in the colon.

Program Affiliations: Pharm.D. Honors Research Program, Rutgers Honors College

Funding: Rutgers University Faculty Funds and NIH R25ES020721

Poster Category: Basic and Translational Science

Primary Author Title: Pharm.D. Student

Abstract 55

Measurement of Biochemical and Physiological Markers of Vascular Function in Sleep Apnea Patients

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Background: Obstructive sleep apnea (OSA) is characterized by arousals and oxygen desaturation events caused by a variety of factors including obesity and loss of respiratory drive. Systemically, oxygen delivery is tightly regulated by endothelial function including the production of nitric oxide (NO). Endothelial function can be compromised by poor NO production by the endothelial form of Nitric Oxide Synthase (eNOS) or NO consumption by oxidative stress. Conversely, inflammation can increase NO production by stimulating inducible NOS (iNOS) synthesis, while also increasing oxidative stress. We predict that, through these mechanisms, OSA causes worsening endothelial function.
Methods: To investigate, pre- and post-sleep plasma samples were collected from 38 subjects with OSA and assessed for inflammation (IL-6, TNFR1, TNFR2), altered NO production (nitrite and nitrate) and oxidative stress (8-isoprostane). The collected biomarkers were correlated with OSA severity as defined by the American Academy of Sleep Medicine recommended criteria: mild OSA (apnea-hypopnea index [AHI] = 5-15 events/hr; n=11), moderate(AHI = 15-30 events/hr; n=19) or severe (AHI ≥30 events/hr; n=9) and the reactive hyperemia index (RHI), a metric of endothelial dysfunction. IL-6, TNFR1, TNFR2, and 8-isoprostane were measured by ELISA, while NO was assessed by chemical reduction and chemiluminescence.
Results: Post sleep TNFR1 and TNFR2 were correlated (R2=0.60) consistent with inflammatory activation. Detectable levels of 8-isoprostane, which are not seen in normal, healthy populations, were found in all subjects indicating oxidative modification of lipids. In subjects with severe OSA, TNFR1 was negatively correlated with nitrite (R2=0.19), and AHI was negatively correlated with RHI (R2=0.40). AHI was positively correlated with nitrite (R2=0.45) in the mild group, but this correlation was not seen in the severe group. Overnight we observed a significant decrease in nitrate (75.8±56.0μM vs 47.6±32.1μM p< 0.01), nitrite (413.2±380.9nM vs 282.9±145.3nM p=0.022), 8-isoprostane(5.2±7.2pg/mg vs 2.6±4.3pg/mg p=0.047) and significant increases in TNFR1(12.1±4.7pg/mg vs 13.4±6.0pg/mg p=0.041) and TNFR2(27.2±9.0pg/mg vs 30.7±11.1pg/mg p=0.019).
Conclusion: The decrease in oxidative markers may be due to lower metabolic rate while sleeping however the TNFR1/2 increase does indicate inflammatory activation during sleep apnea. These studies aid in demonstrating a relationship between sleep apnea and decline in vascular function.

Program Affiliations: Joint Graduate Program in Toxicology, Pharm.D. Honors Research Program, Summer Undergraduate Research Fellowship, Pharm.D./Ph.D. Program

Funding: NIH

Poster Category: Basic and Translational Science

Primary Author Title: Pharm.D. Student

Abstract 56

Optimizing in Silico Approaches to Assess the Likelihood of Nitrosylation of Cysteine Residues

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A principal mechanism of nitric oxide (NO) regulation of cellular function is the nitrosylation of cysteine (Cys) residues to alter protein function. Nitrosylation is a ubiquitous modification that regulates biological processes ranging from cell survival and growth to physiological function, and its disruption is implicated in a wide variety of pathologies. Approximately 15,000 putative nitrosylation targets have been determined; however, there is no simple consensus sequence for the modification, which makes prediction of NO effects on cellular processes difficult. The mechanism of nitrosylation for a specific cysteine can be dictated by its microenvironment, including pKa, hydrophobicity, and surface accessibility. This suggests that the determinants of nitrosylation may be defined by 3D structure rather than merely sequence. The purpose of this study was to determine whether an AI-generated 3D model can be used to predict protein nitrosylation sites. Protein microenvironments were predicted using AlphaFold (AF), a modeling software that can estimate the 3D structure of a protein. An AF-generated model was produced for the enzyme PTEN, which has ten cysteine residues and is a known nitrosylation target. Computational parameters including pKint, hydrophobicity, and solvent-accessible surface area (SASA) were calculated from the AF-model for cysteine residues implicated in nitrosylation and compared with potential mechanisms of nitrosothiol formation namely direct nitrosylation, transnitrosation, or nitrosation. AF modeling of PTEN revealed distinct microenvironmental signatures among cysteine residues. Cys83 exhibited a high SASA value and is predicted to undergo transnitrosation. Cys124 displays a low pKint and is predicted to favor nitrosation. Cys136 has a high hydrophobicity index and is predicted to favor direct nitrosylation. In preliminary studies, SNOPPM had the highest level of nitrosylation, GSNO showed a low level of nitrosylation, and no SNO formation was seen with DEANONOATE. These data implicate direct nitrosylation of Cys136 as the most efficient mechanism of NO-modification of PTEN.

Program Affiliations: Pharm.D. Honors Research Program

Poster Category: Basic and Translational Science

Primary Author Title: Pharm.D. Student

Abstract 57

Protein-Protein Interactions, AlphaFold2, HADDOCK, TM-Align, RoseTTAFold2, PyMOL

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Protein-protein interactions (PPIs) underpin most cellular processes, and disruptions to these interactions can lead to cellular dysfunction and disease. Understanding PPIs is essential for studying disease mechanisms, yet traditional experimental approaches are time- and labor-intensive. Recent advances in AI-based structural prediction tools, including AlphaFold2 and RoseTTAFold2, now enable efficient in silico exploration of potential PPIs. To develop an integrated and practical multi-tool system for PPI investigation, we present a dual-arm computational pipeline centered on the ZWINT (SIP30) kinetochore protein, which we identified as a key gene in neuropathic signaling. The first arm of the workflow generates PPI models using AlphaFold2 and RoseTTAFold2 and evaluates model consistency using TM-Align. The second arm assesses binding affinity by identifying interface residues with PyMOL and calculating docking scores with HADDOCK. Together, these methods provide both quantitative and qualitative evaluations of candidate PPIs. Using this framework, we examined three established interactors (SNAP25, CAMK2A, UBC) and four exploratory proteins (STX1A, VCP, BLOC1S2, ARC) in complex with ZWINT. This study demonstrates that AI-supported in silico analysis can streamline PPI discovery by prioritizing biologically plausible interactors and guiding downstream experimental validation.

Program Affiliations: Pharm.D. Honors Research Program

Funding: NIH Grant Funding

Poster Category: Basic and Translational Science

Primary Author Title: Pharm.D. Student

Abstract 58

Quantitative Analysis of Ceramide-Induced Differentiation in Hematopoietic Stem Cells Using ImageJ-Based GFP Tracking

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Hematopoietic stem cells (HSCs) maintain all blood cell lineages throughout life by balancing self-renewal and differentiation. Disrupting this balance can lead to hematologic disorders such as anemia or stem cell depletion. Ceramides, a class of sphingolipid signaling molecules involved in apoptosis and cellular stress responses, may also influence stem cell fate decisions. Understanding how ceramide signaling affects HSC division patterns is important for clarifying mechanisms that regulate stemness and differentiation.

The objective of this study was to determine how different concentrations of ceramide affect HSC self-renewal versus differentiation following mitosis. α-Catulin–GFP transgenic mice were used as a model system to visualize stemness, where GFP signal correlates with Catulin expression and HSC self-renewal potential. Bone marrow cells were extracted from transgenic mice and cultured to visualize HSCs via fluorescence. Cells were exposed to ceramide treatments of 6 nM and 10 nM alongside untreated controls. Live-cell imaging was performed for 72 hours across two mitotic cycles. Individual cells were manually tracked using ImageJ software, and GFP fluorescence intensities were recorded for mother and daughter cells. GFP ratios were used to classify cell divisions as symmetric renewal, symmetric differentiation, or asymmetric differentiation.

Ceramide exposure influenced HSC division patterns in a dose-dependent manner. C6 ceramide did not significantly alter GFP intensity or fate outcomes. In contrast, C10 ceramide increased symmetric renewal events and reduced symmetric differentiation, suggesting preservation of stemness. GFP-Catulin tracking provided a rapid functional readout of HSC fate following division. Manual cell tracking was informative but time-intensive, highlighting the need for automated analysis methods.

Future work will focus on automated cell tracking using the TrackMate ImageJ plugin combined with AI-based classification to analyze larger datasets and improve accuracy in identifying HSC fate outcomes.

Program Affiliations: Pharm.D. Honors Research Program

Funding: NIH Grant Funding

Poster Category: Basic and Translational Science

Primary Author Title: Pharm.D. Student

Abstract 59

Disruption of Enterohepatic Bile Acid and Lipid Homeostasis by Per and Polyfluoroalkylated Substances

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Per and polyfluoroalkyl substances (PFAS) are environmental pollutants with high resistance to degradation. Nuclear receptors, such as FXR, PPARα, CAR, and PXR are ligand-activated transcription factors that play a crucial role in regulating lipid and bile acid synthesis, transport, and detoxification. The purpose of this study was to investigate the effects of PFAS on nuclear receptors and their regulation of gene expression in lipid and bile acid homeostasis. Eight-week-old CD-1 female mice received 0, 0.4, 1.2, and 4 μg/mL of Perfluorononanoic acid (PFNA) via drinking water for 8 weeks. Gene expression at mRNA levels was quantified using RT-qPCR. Dose dependent inhibition of Fgf15 was observed, with preserved classical bile acid synthesis and suppression of the alternative pathway. This signifies a partial disruption of enterohepatic bile acid signaling. Enzymes and transporters involved with fatty acid oxidation, lipid transport and metabolism were upregulated. These changes imply PFAS exposure disrupts bile acid detoxification and hepatic lipid metabolism. This study provides insight into how forever chemicals disrupt lipid and bile acid homeostasis and can contribute to the pathogenesis of liver diseases.

Program Affiliations: Summer Undergraduate Research Fellowship

Funding: by NIH R25TR004777 NJ ACTS CREST Program

Poster Category: Basic and Translational Science

Primary Author Title: Pharm.D. Student

Abstract 60

Developmental Exposure to the Parkinson's Disease-Associated Organochlorine Pesticide Dieldrin Alters Inflammasome Pathways

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Exposure to the organochlorine pesticide, dieldrin, increases the risk of Parkinson's disease (PD). Since PD occurs later in life, PD-related exposures can accumulate throughout the lifetime long before symptom onset. Two-hit models enable identification of these pre-degenerative changes that increase PD susceptibility. Our lab has developed a two-hit model that combines developmental dieldrin exposure with the alpha-synuclein preformed fibril (PFF) model of PD, in which exposure causes a male-specific exacerbation of PFF-induced toxicity. In this model, we have identified longitudinal sex-specific epigenetic and gene expression changes in genes related to neuroinflammation and the inflammasome that occur before PFF injection, suggesting that epigenetic changes to transcriptional regulation of neuroinflammatory genes could contribute to increased PD susceptibility in our two-hit model. Here, we tested the hypothesis that developmental dieldrin exposure causes dysregulation of neuroinflammatory and inflammasome-related genes, increasing susceptibility to subsequent PD-related insults. Starting at 8 weeks of age, female C57BL/6 mice were exposed orally to 0.3 mg/kg dieldrin twice a week throughout mating, lactation, and weaning. Male and female F1 pups from independent litters were sacrificed at 12 weeks of age and expression of neuroinflammatory and inflammasome-related markers was assessed. A targeted reanalysis of existing epigenetic and expression data from the midbrain of 12-week-old pups revealed that developmental dieldrin exposure leads to sex-specific changes in neuroinflammatory and inflammasome-related markers in PD-relevant brain regions. Additional studies are ongoing to confirm gene expression changes by ddPCR and assess dieldrin-induced changes in this pathway.

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Poster Category: Basic and Translational Science

Primary Author Title: Pharm.D./Ph.D. Student

Abstract 61

An inducible AAV vector for Fragile X Syndrome

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Fragile X syndrome (FXS) is the most common inherited cause of intellectual disability and autism spectrum disorders. It results from expansion of CGG trinucleotide repeats in the Fragile X Mental Retardation 1 (FMR1) gene, which leads to promoter hypermethylation, transcriptional silencing, and loss of fragile X mental retardation protein (FMRP). Restoring FMRP expression therefore represents a promising therapeutic strategy for FXS. However, excessive FMRP expression has been reported to be toxic, highlighting the need for precise control of FMRP dosage. In this study, we developed a regulatable FMRP supplementation strategy using a Tet-On–based FMR1 expression system delivered via recombinant adeno-associated virus (rAAV). This system enables neuron-specific and doxycycline-dependent control of FMRP expression, allowing restoration of protein levels within a physiologically appropriate range. The approach is designed to correct the underlying molecular deficiency while minimizing the risk of overexpression. Ongoing studies evaluate its therapeutic efficacy in vitro and in vivo by assessing FMRP expression and FXS-associated phenotypes. This strategy provides a controllable gene therapy platform for FXS and may enhance the translational potential of FMRP replacement therapies.

Program Affiliations: Department of Chemical Biology

Poster Category: Basic and Translational Science

Primary Author Title: Postdoctoral Associate

Abstract 62

Mapping Immune-Driven Kidney Injury During Checkpoint Immunotherapy

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Immune checkpoint inhibitor (ICI) therapy can trigger immune-mediated toxicities affecting multiple organs, including the kidney, yet the mechanisms linking immune activation to renal injury remain poorly understood. Understanding how immune cells interact with host tissues during checkpoint immunotherapy is essential for defining the drivers of toxicity and identifying early biomarkers of organ injury. Humanized immune system (HIS) mouse models provide a powerful experimental platform to study these interactions in vivo by enabling simultaneous analysis of human immune signaling and host tissue responses. To generate HIS-mice, neonatal BRGS (BALB/c-Rag2nullIl2rynullSirpαNOD) immunodeficient recipients were injected with human CD34+ cells from cord blood (CB) donors. After confirmation of human immune chimerism, human tumor (MDA-MB-231) cells were implanted into the flanks of the HIS-BRGS mice as well as non-humanized BRGS controls. Once tumor growth was confirmed, mice were treated with vehicle control or ICIs (nivolumab and ipilimumab, 20 and 10 mg/kg/week ip, respectively) for 4 weeks. Bulk RNA sequencing was performed on RNA from frozen kidney tissue, and sequencing reads were aligned to both mouse and human genomes to distinguish host renal transcriptional programs from signatures derived from engrafted human immune cells. Differential gene expression analysis using DESeq2 with false discovery rate correction revealed a focused transcriptional response following checkpoint blockade. Mouse genes associated with immune recruitment and inflammatory signaling were increased in kidneys of ICI-treated HIS-BRGS mice, whereas genes involved in epithelial transport and renal homeostasis were reduced. In parallel, human-derived transcripts revealed coordinated immune activation signatures consistent with trafficking and activation of immune cells within the renal microenvironment. Together, these findings define compartment-specific transcriptional programs linking immune cell recruitment to renal tissue stress during checkpoint immunotherapy. These results establish the humanized mouse platform as a valuable translational system for dissecting mechanisms of immune-mediated kidney injury and for guiding the discovery of early biomarkers of toxicity during ICI therapy. This work was supported by the National Institutes of Health R01CA277313 and K12GM093854.

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Poster Category: Basic and Translational Science

Primary Author Title: Postdoctoral Associate

Abstract 63

Prolonged Ozone Exposure Induces Sex-Specific Changes in the Gut Microbiota and Production of Short Chain Fatty Acids in Mice

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Background: Prolonged exposure to ozone induces pulmonary injury and oxidative stress. Evidence suggests that respiratory diseases are accompanied by changes in the gut microbiota and short chain fatty acids (SCFAs). The effects of prolonged ozone exposure on the gut microbiota and cecal SCFAs are unknown and were assessed in the present studies.

Methods: C57BL/6 mice were exposed to filtered air or 1.5 ppm ozone for 2h, 2x/wk for 6 wk and euthanized 24h after the final exposure. Genomic DNA from fecal samples was extracted, bacterial DNA sequencing was performed, and amplicon sequence variants (ASVs) matched. Alpha diversity and relative abundances of bacteria were analyzed using QIIME2 and the phyloseq package in R. SCFAs were assayed using gas chromatography-mass spectrometry from cecal samples. Beta diversity was performed in the vegan R package. Colon tissue mRNA expression of SCFA-associated receptors were analyzed using the ΔΔCT. All statistical analyses set at $p<0.05$.

Results: Alpha diversity identified a significant increase in ASVs in female, but not male mice exposed to ozone. Beta diversity identified significant differences between mice exposed to air compared to ozone in both sexes. Following ozone exposure, there were significant decreases in the SCFA-producing genera Bifidobacterium in female mice and Faecalibaculum in male mice. Additionally, an increased abundance of Clostridia UCG-014, a genus associated with inflammation, was noted in male mice exposed to ozone. Whereas decreases in acetate and propionate were evident in response to ozone in male and female mice, respectively, butyrate was increased in both sexes. Expression of Ffar2 was reduced in males, while Hcar2 expression was significantly increased in female mice after ozone exposure.

Conclusions: Prolonged ozone exposure alters bacterial communities in both male and female mice, which can influence cecal SCFAs. mRNA expression of SCFA receptors is also altered by ozone in a sex-related manner.

Program Affiliations: Joint Graduate Program in Toxicology

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Poster Category: Basic and Translational Science

Primary Author Title: Postdoctoral Associate

Abstract 64

From Strips to Models: A New Framework for Topical Bioequivalence

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Purpose: Bioavailability and bioequivalence (BA/BE) assessment of topical dermatological products is challenging, limiting generic availability. Tape stripping (TS), a minimally invasive technique to study dermatopharmacokinetics (DPK), involves complex procedures and assumptions. This work aimed to develop a model-based approach using TS data for direct estimation of drug input into the skin to support BA/BE assessment.

Methods: A pharmacokinetic (PK) model was developed from the TS data in healthy participants. A reference 1% clotrimazole (CLZ) cream (R) was compared with itself in a replicate design (n=13) to test the model's validity. A 1% CLZ gel (T) was compared with R in a partially replicated design (n=6) to assess BE across formulations. Population PK (PPK) analysis was performed using the maximum likelihood expectation-maximization (MLEM) algorithm in ADAPT5®. A 14-compartment model was established, focusing on Kin (first-order absorption rate) and Fs (fraction of dose delivered). Average BE (ABE) criteria were applied.

Results: Several models were explored; the final 14-compartment model best described the data. Simulations indicated that with 25 participants, BE could be concluded for R vs. R in terms of Kin and Fs. The gel, however, did not meet the BE acceptance criteria.

Conclusions: The model-based TS approach captures both the rate and extent of drug input into the skin, providing a more robust framework for BA/BE evaluation than conventional TS. This strategy can improve regulatory assessment of topical dermatological products and support generic development

Program Affiliations: Postdoctoral Program

Funding: MITACS

Poster Category: Basic and Translational Science

Primary Author Title: Postdoctoral Associate

Abstract 65

Implications of HAX1 and its interactor CLPB on Venetoclax Resistance in Acute Myeloid Leukemia

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Acute Myeloid Leukemia (AML) is a malignant hematopoietic disorder characterized by the accumulation of undifferentiated myeloid progenitor cells. Despite recent advancements, outcomes remain poor, especially in cases where resistance to Venetoclax, a BCL2 inhibitor, develops. Venetoclax in combination with hypomethylating agents has become a frontline therapy, yet approximately 30% of patients show no initial response and many responders acquire resistance. Understanding the molecular mechanisms underlying this resistance is critical for improving therapeutic strategies. Recent CRISPRi screening in AML cells has identified two mitochondrial proteins, HAX1 and CLPB, as key contributors to Venetoclax resistance. Both proteins are upregulated in resistant cells, and preliminary findings suggest that CLPB stabilizes HAX1, a protein suspected to inhibit apoptosis by blocking caspase-9. However, the precise mechanisms by which CLPB regulates HAX1 and how HAX1 contributes to resistance remain unclear. This study investigates the post-translational regulation of HAX1 by CLPB and determined the functional consequences of HAX1 loss in human AML. Using lentiviral CRISPR-Cas9 delivery, HAX1 and CLPB were deleted in MOLM-13 cells. Western blotting confirmed protein depletion and showed that CLPB loss reduces HAX1 protein levels in the cytoplasm but increases and concentrates it in mitochondria. Dose-response experiments using Venetoclax demonstrated that HAX1 loss sensitizes AML cells to treatment, with increased apoptosis confirmed by flow cytometry. Future directions include cell fractionation to assess HAX1 localization in CLPB knockout cells, and TMRM assays to evaluate mitochondrial membrane potential following HAX1 knockout. This research supports HAX1 as a therapeutic target for overcoming Venetoclax resistance in AML.

Program Affiliations: Graduate Program in Pharmaceutical Science, Aresty Research Program, Department of Cell Biology and Neuroscience

Funding: ARESTY Research Grant; NIH R00 Grant

Poster Category: Basic and Translational Science

Primary Author Title: Undergraduate Student

Abstract 66

Investigating S-adenosylmethionine depletion in triple-negative breast cancer under hypoxic conditions

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Triple-negative breast cancer (TNBC) is a highly aggressive breast cancer with limited therapeutic options and a rising incidence rate in women under 40 years old. Like many solid tumors, TNBC cells harbor a hypoxic microenvironment, which stabilizes the transcription factor hypoxia-inducible factor-1α (HIF-1α) and increases transcription of its target genes, including those involved in anaerobic respiration, to support tumor survival and growth. Previously, it has been reported that HIF-1α binds to the promoter region to increase methionine adenosyltransferase 2A (MAT2A) expression in other solid cancer types. The enzyme MAT2A biochemically produces the universal methyl donor S-adenosylmethionine (SAM) from the amino acid methionine. Our research demonstrated that blocking SAM synthesis with the MAT2A inhibitor AG-270 decreases expression of 11 hypoxia-related genes, many of which are glycolysis-related, and selectively sensitizes TNBC cells to hypoxic conditions. Furthermore, water-soluble metabolomics analysis by liquid chromatography-mass spectrometry (LC-MS) revealed that SAM depletion decreases the levels of metabolic intermediates in glycolysis and glycolysis-linked pathways. Overall, our research found that SAM depletion causes unique changes in the regulation of TNBC gene expression, to suppress expression of hypoxia-linked genes, and that a hypoxic environment enhances the antiproliferative activity of MAT2A inhibition in TNBC, suggesting this as a novel therapeutic strategy.

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Poster Category: Basic and Translational Science

Primary Author Title: Undergraduate Student

Abstract 67

Hormone Secretion and Membrane Transporter Regulation in Human Placental Explants Under Standard and Accelerated Culture Conditions

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Ex vivo culturing of human placental explants is a physiologically relevant model as cell-cell communication remains intact. Previous studies have suggested that trypsin treatment accelerates renewal of the syncytiotrophoblast by inducing early shedding of the syncytial layer. However, little investigation has examined how this protocol affects hormone secretion, morphological changes, and the expression of transporters. Therefore, this study sought to profile these dynamic changes that human placental explants undergo over a 7-day period, with or without trypsin treatment.
Six healthy term placentas were collected during scheduled Cesarean sections. Placental villous tissue samples were dissected and cultured in 24-well dishes. For the trypsin-treated group, explants were incubated in 0.25 mg/mL trypsin for 20 minutes at 37 °C before replacement with standard culture media on Day 0. Cultures were maintained at 37 °C with 5% CO_2 and 20% O_2 for up to 7 days.

In the control group, explants appeared similar under a light microscope until around Day 3 to 4 when gradual aggregation occurred, and tissue density increased. In the trypsin-treated group, on Day 0, the extracellular matrix (ECM) was degraded and became gelatinous. By Day 1, the degenerated ECM had disappeared, and the explants aggregated and became smaller in size. In both control and trypsin-treated groups, the hCG concentration and LDH peaked on Day 1 and gradually declined over Days 2 and 3. Notably, trypsin-treated explants had 70% higher hCG levels on Day 1 compared to the non-treated group ($p<0.001$). Quantitative Targeted Absolute Proteomic (QTAP) analysis of transporters and histopathological analyses of explant morphology are ongoing.

In conclusion, delineating the morphological and biochemical profiles of human placental explants with and without trypsinization provides a foundation for establishing appropriate and time-efficient models for placental toxicology studies.
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Poster Category: Basic and Translational Science

Primary Author Title: Visiting Scholar

Abstract 68

Characterization of Circulating miRNAs in Rodents after Pulmonary Exposure to Radiation and Nitrogen Mustard

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Background and Purpose: Acute exposure to ionizing radiation (IR) or chemical warfare agents including mustard vesicants such as sulfur mustard and nitrogen mustard (NM) can lead to chronic lung disease, resulting in long-term morbidity and mortality months to years after the initial insult. Both IR and NM exert their harmful effects primarily through DNA damage. Notably, the DNA-damaging effects of NM were recognized as "radiomimetic" 75 years ago, highlighting their mechanistic similarity to radiation-induced injury. Both IR and NM cause DNA single- and double-strand breaks; NM alkylates DNA, causing inter- and intra-strand crosslinking. DNA damage from both agents leads to cell cycle arrest, apoptosis, oxidative stress, and inflammation. We observed conserved miRNA responses in plasma from mice, non-human primates and humans following exposure to IR leading to pulmonary fibrosis. Dysregulation of miRNAs included increases in miR-34 family members and decreases in miR-155-5p and miR-199 family members. Changes in these miRNAs were linked to pathways associated with fibrosis, within the first 30 days post exposure. In the present studies, we analyzed the effects of NM exposure on plasma miRNAs with the overall goal of identifying a common repertoire of miRNAs that could be used to pre-symptomatically predict the onset of pulmonary fibrosis.

Methods: Male Wistar rats (225-250 g) were treated intratracheally with NM (0.125 mg/kg) or PBS control using a 22-gauge gavage needle (1.25 mm ball diameter). Animals were euthanized 1, 3, 7, 14, or 28 days later and plasma collected (n = 3–6 per time point). Small RNAs were extracted, sequencing libraries prepared, and mature miRNA sequences quantified using next-generation sequencing. Longitudinal miRNA profiles for PBS and NM-treated animals were fit to a regression spline model using 3 degrees of freedom (df) that assumes miRNA expression changes smoothly over time. A moderated F-test was conducted on each miRNA on 3 df to detect differences between treatment and control groups. miRNA with FDR-corrected p-values < 0.05 were considered significant.

Results: The top four plasma miRNAs altered by NM exposure (miR-126a-3p, miR-199a-5p, miR-155-5p, and miR-34c-5p) corresponded to those identified in plasma after IR exposure. These miRNAs regulate signaling pathways linked to fibrogenesis. Plasma levels of these miRNAs increased rapidly following NM exposure reaching a peak at 3 d; this was followed by a decrease at 14 d. By 28 d post-NM, miR-126a-3p, miR-199a-5p, and miR-155-5p were at control levels, while miR-34-5p remained reduced.

Conclusions. The relative abundance of miRNAs in plasma is increasingly recognized as a reflection of tissue-specific physiology. Importantly, changes in circulating miRNA profiles have been shown to indicate organ damage prior to the onset of clinical symptoms, offering a window for early detection and timely medical intervention. Our findings that two well characterized pulmonary toxicants known to cause fibrosis, NM and IR, induce similar preclinical changes in circulating miRNAs suggest that selective groups of miRNAs may be useful as predictive biomarkers for the development of this chronic lung disease.

Program Affiliations: Graduate Program in Medicinal Chemistry

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Poster Category: Basic and Translational Science

Primary Author Title: Faculty

SLC7A11 (xCT) Regulates Metastatic Phenotypes in mGluR1-Driven Melanoma

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Metastatic dissemination is the primary driver of mortality in melanoma, yet the cellular adaptations that enable tumor cells to survive metastatic stress remain incompletely understood. In a subset of melanomas, ectopic expression of the neuronal glutamate receptor mGluR1 (encoded by Grm1) promotes tumor initiation and progression through glutamatergic signaling pathways. In the present study, we investigated whether the cystine-glutamate antiporter SLC7A11 (xCT) contributes to metastatic fitness in mGluR1-positive melanoma. xCT imports cystine for glutathione synthesis to support intracellular redox homeostasis while exporting glutamate into the tumor microenvironment. To examine the functional role of xCT in this context, we generated CRISPR-Cas9 mediated knockouts of SLC7A11 in mGluR1-positive melanoma cells and assessed cell viability and metastatic phenotypes using cell migration, cell invasion, and anchorage-independent growth assays. In colony formation assays, xCT-deficient cells displayed reduced proliferative capacity and achieved optimal growth only in the presence of N-acetylcysteine (NAC)—a membrane-permeable cysteine precursor that replenishes intracellular cysteine and glutathione pools—consistent with impaired cystine import following loss of xCT. Loss of xCT also significantly reduced cell migratory and invasive capacities and impaired colony formation in anchorage-independent conditions, indicating diminished metastatic potential. Notably, NAC supplementation did not fully rescue these phenotypes. Together, these findings suggest that xCT contributes to metastatic phenotypes in mGluR1-positive melanoma, but that the consequences of xCT loss cannot be explained solely by impaired antioxidant capacity and may involve additional functions of cystine-glutamate exchange. Ongoing studies aim to define metabolic and signaling mechanisms underlying the anti-metastatic phenotype observed after xCT loss. We are evaluating effects on extracellular glutamate and redox balance and testing whether riluzole, an FDA-approved glutamate-release inhibitor with reported activity in melanoma, phenocopies xCT loss. Proteomic profiling using LC-MS/MS will determine whether riluzole and xCT depletion induce similar or distinct protein expression programs and signaling pathways associated with melanoma progression.

Program Affiliations: Joint Graduate Program in Toxicology, RWJMS MD/PhD Program, Masters of Biomedical Sciences (MBS) Program

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Poster Category: Basic and Translational Science

Primary Author Title: M.D./Ph.D. Student

Gestational Inhalation Exposure to Micro-Nanoparticles Alters Mammary Gland Metabolites within Sprague Dawley Rats

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Higher concentrations of fine particulate matter have been associated with adverse health outcomes, including pregnancy complications and fetal growth restriction. Both micro-nanoplastics and nano-titanium dioxide (nano-TiO2) have been found in air samples, indicating the likelihood of inhalation exposure. We hypothesized maternal inhalation exposure to inhaled pollutants (micro-nanoplastics or nano-TiO2) would differentially alter the presence of metabolites within the mammary glands.

Pregnant Sprague Dawley rats were randomly separated into naïve or exposed (nano-TiO2, or polyamide-12 [PPA]) as representative environmental particulates; (n=5-6/treatment group). Whole-body inhalation exposures occurred from gestational day (GD) 5 – GD 19 at aerosol concentrations of ~10 mg/m3 for 4hr per day for both particles. On GD 20, mammary gland tissues were collected for processing. Polar and non-polar metabolomics were acquired using Liquid Chromatography-Mass Spectrometry (LC-MS). Mean differences in mammary metabolites from naïve animals were compared to TiO2 and PPA groups, respectively via t-test.

Broad capture targeted LC-MS resulted in acquisition of 75 identified metabolites within the rat mammary glands. Within the nano-TiO2 exposed mammary glands, 17 (22.7%) metabolites were significantly lower among nano-TiO2 exposed dams compared to naïve dams ($p<0.05$). The majority of compounds (58.8%) were amino acids (AA) and AA-metabolites (2 essential AAs, 4 non-essential AAs, and 4 AA derivatives/intermediates). Remaining compounds were from classes of carbohydrates (17.6%), nucleic acids (11.8%), lipids (5.9%), and vitamins (5.9%). Within PPA exposed mammary glands, 6 (7.89%) were significantly altered by exposure compared to naïve controls ($p<0.05$). Most (83.3%) metabolites were significantly reduced (xanthine, hypoxanthine, inosine, 4-pyridoxic-acid, ribose) with urocanate being the only metabolite significantly increased by PPA exposure. Both nano-TiO2 and PPA exposure resulted in a significant reduction in Vitamin B6 (VB6) metabolites.

Overall, these data suggest micro-nanoparticles have unique impacts on metabolites within the rat mammary glands during pregnancy. Exposure to nano-TiO2 changed metabolites predominantly related to amino acid metabolism, while exposure to PPA altered metabolites related to purine and histidine metabolism. These outcomes indicate differential physiological impacts within the mammary glands between the particle exposures. Future studies should examine changes in the milk metabolome, lipidome, and proteome near birth to determine whether milk composition differs by exposure to specific micro-nanoparticles.

Program Affiliations: Joint Graduate Program in Toxicology

Poster Category: Basic and Translational Science

Primary Author Title: M.S. Student

Determinants of Placental OATP2A1 and OATP2B1 Transporter Protein Concentrations within the UPSIDE Birth Cohort

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Background: Organic anion transporting polypeptides (SLCO gene, OATP) mediate the uptake of a wide range of anionic substrates into human placentas. OATP2A1, a transporter with high affinity to prostaglandins, is primarily found on the maternal-facing side of the blood-placental barrier. On the other hand,OATP2B1 is primarily found on the fetal side and has a broader substrate profile of xenobiotics and endogenous chemicals. By utilizing the Understanding Pregnancy Signals and Infant Development (UPSIDE) cohort (NY, USA), we sought to evaluate how maternal factors, gestational and infant factors, and prenatal environmental toxicant exposures influence concentrations of OATP2A1 and OATP2B1 proteins in healthy term placentas.

Methods: Villous placenta tissue (N=255) was homogenized and membrane fractions isolated for quantitative targeted absolute proteomic analysis of OATP2A1 and2B1 using liquid chromatography mass spectrometry. Extant data were used to evaluate bivariate associations between OATP2A1 and 2B1 concentrations and 1)maternal factors: maternal age, gestational age, pre-pregnancy BMI, gestational weight gain, parity, delivery mode, complications (PE, GDM, smoking during pregnancy) and 2) infant factors: birth weight, race, sex. Mutually adjusted models were built including predictors with $p<0.2$ in bivariate analyses. Extended models also considered exposure to environmental toxicants including PFAS (2nd trimester serum), cadmium (placenta), and mycoestrogens (placenta).

Results: OATP2A1 and 2B1 protein concentrations in term placentas were modestly correlated ($r=0.34$, $p<0.05$). Median OATP2A1 and 2B1 transporter enrichment from UPSIDE was 0.49 pmol/mg protein (IQR: 0.34 - 0.67) and 0.27 pmol/mg protein (IQR: 0.18 - 0.37), respectively. In bivariate analyses, OATP2A1 levels were associated with pregnancy complications, infant weight, gestational weight gain, serum PFHXS, and placental cadmium levels. In extended models fit for each toxicant, a one log-unit increase in circulating PFHxS was associated with a 6.2% (95% CI: 0.00, 13.9) increase in OATP2A1 levels, while a one log-unit increase in placental cadmium levels was associated with a 4.1% (95% CI: 1.0, 8.3) increase. By comparison, in bivariate analyses, OATP2B1 levels were associated with gestational age, parity, serum PFHxS, and placental mycoestrogen levels. In mutually adjusted models, only parity was associated with a 6.18% (95%CI: 2.02, 9.42) increase in OATP2B1 levels.

Conclusion: To our knowledge, this is the first study to explore predictors of placental OATPs in a human cohort. OATP2B1 was higher in multiparous pregnancies similar to other xenobiotic transporters which may indicate a maternal adaptation during subsequent pregnancies. By comparison, OATP2A1 protein levels were positively correlated with cadmium and PFHxS. We speculate that induction of OATP2A1 following toxicant exposure influences overall uteroplacental prostaglandin handling, an important mechanism that regulates induction of labor and rupture of the fetal membranes.

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Poster Category: Clinical Science

Primary Author Title: Ph.D. Student

Re-evaluation of Medication Management to Prevent Restraint Episodes in Adult Patients Admitted to an Inpatient Psychiatric Facility Following Quality Improvement Efforts

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Background: Physical restraint is used in acute psychiatric settings to manage disruptive or violent behaviors; however, literature demonstrates significant physical and psychological risks associated with its use. Phase 1 of this quality-improvement (QI) initiative was a retrospective review of 81 restraint episodes at a community psychiatric hospital of which 64 (79%) were associated with actionable medication-related gaps preceding restraint events. Key findings included underutilization of as-needed (PRN) medications, subtherapeutic initial dosing of mood stabilizers, failure to act on low serum drug concentrations, and undertreated psychosis. In response, multidisciplinary practice changes were implemented to address modifiable contributors at the prescriber, nursing, and pharmacy levels. Weight-based dosing of select mood stabilizers was encouraged by hospital leadership and reinforced by psychiatric pharmacists during multidisciplinary rounds. Nursing staff received education emphasizing timely PRN medication use through annual competency modules and in-person training focused on agitation prevention, recognition of violence-risk language, and standardized documentation. Pharmacist-driven intervention on subtherapeutic mood stabilizer levels was expanded through in-person education sessions, which provided standardized resources and escalation pathways for identification and management of low serum concentrations.

Methods: This continuation study used the same retrospective chart-review methodology as Phase 1. Adult patients (≥18 years) admitted to voluntary or involuntary psychiatric units between February 1, 2025, and September 30, 2025, who experienced a physical restraint or therapeutic hold were identified through the electronic health record. Phase 2 data collection began one month after completion of interventions to allow for practice adoption and stabilization. Data collected included scheduled and PRN medication administrations or refusals, every-15-minute nursing documentation, and provider notes within the 24 hours preceding each restraint. Chlorpromazine equivalents were used to standardize antipsychotic exposure. Post-intervention restraint episodes were compared with Phase 1 (January 1, 2024–August 31, 2024) to evaluate changes in medication-related missed opportunities.

Outcomes: We will report the total number of restraint episodes and the proportion associated with missed opportunities to optimize medications before restraint. The impact of the QI interventions will be assessed by comparing Phase 1 and Phase 2 data.

Program Affiliations: Rutgers, The State University of New Jersey, Ernest Mario School of Pharmacy, Dept. of Psychiatry; RWJBH Monmouth Medical Center

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Resident

Optimization of Intravenous Tobramycin Therapeutic Drug Monitoring in Pediatric Patients with Cystic Fibrosis

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Intravenous (IV) tobramycin is frequently included in cystic fibrosis (CF) pulmonary exacerbation treatment and requires therapeutic drug monitoring. Supratherapeutic doses cause nephrotoxicity and ototoxicity; subtherapeutic doses cause bacterial resistance and poor treatment outcomes. The purpose of this study was to evaluate the efficacy of Bayesian area under the curve (AUC)-based monitoring of IV tobramycin, compared to peak monitoring, in CF patients. If it is determined that Bayesian AUC-based monitoring results in a quicker time to attainment of therapeutic range, such results could lead to fewer blood collections, less reliance on timing of collections, and better dose individualization.

This retrospective cohort study was conducted using data from the electronic medical records of a large academic medical center which traditionally utilized peak/trough monitoring. All patients aged 28 days to 25 years affiliated with the Pediatric Pulmonary and Cystic Fibrosis Program, with a confirmed diagnosis of CF, who were admitted for treatment of an acute exacerbation, received at least three doses of IV tobramycin, and had at least one documented tobramycin peak/trough were included. Pregnant patients and those with renal insufficiency were excluded. The primary outcome was the average time to attainment of therapeutic range, comparing peak monitoring (goal of 25-35 mcg/mL) to Bayesian AUC24 monitoring (goal of 80-110 mg/L/hr). Secondary outcomes included the average recommended weight-based therapeutic tobramycin dose, the efficacy metric of pulmonary function, and the safety metrics for renal function and hearing. Patient demographics and laboratory values were extracted and utilized in calculations. Data was analyzed using Chi square for nominal outcomes and one-way ANOVA for continuous outcomes.

The median time (interquartile range) to therapeutic peak and AUC24 were 5 days (3, 7) and 3 days (3, 4), respectively (P=0.008), indicating a statistically significant difference. Bayesian AUC-based monitoring was associated with a quicker attainment of therapeutic range than peak monitoring.

Program Affiliations: Robert Wood Johnson University Hospital; Ernest Mario School of Pharmacy; Robert Wood Johnson Medical School; Bristol-Myers Squibb Children's Hospital

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Resident

Balancing Reversal and Risk: A Retrospective Study of Flumazenil Use in Patients Predisposed to Seizures

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Purpose:
Flumazenil is an antidote used to reverse benzodiazepine effects but is often avoided in patients with seizure risk due to its boxed warning. However, limited evidence exists evaluating seizure incidence following flumazenil use in benzodiazepine toxicity or for reversal of anesthesia. In a fast-paced medical environment, one challenge is the difficulty in consistently obtaining an accurate list of preoperative medications, which increases the potential for administering flumazenil to patients at high risk of seizures. This retrospective study aims to characterize the incidence of seizures and other adverse events following flumazenil use in adults with pre-existing or drug-induced risk factors.

Methods:
This is an Institutional Review Board–approved, single-center, observational cohort study. Adult patients (> 18 years) who received at least one dose of flumazenil between June 2018 and December 2024 will be included. Pregnant or incarcerated persons will be excluded. A total of 106 medical records will be evaluated for inclusion. The following data will be collected from the electronic health record: age, sex, agent reversed with flumazenil, documented mental status before and after administration, flumazenil dose, comorbidities (chronic kidney disease, alcohol use disorder, benzodiazepine use disorder, seizure disorder), documented seizure or seizure-like activity prior to use, pertinent home medications, adverse events following administration, pertinent medications received in the 24 hours prior to reversal, ventilatory failure, naloxone co-administration, anticonvulsant use within 24 hours, and death. For pertinent medications, a list of drugs known to lower the seizure threshold or increase seizure risk was pre-selected before beginning data collection to maintain consistency and systematically determine seizure risk. The primary objective is to characterize patients predisposed to seizures, and the secondary objective is to compare seizure incidence between high and non–high-risk groups. Descriptive statistics are used to analyze outcomes. Results are presented here.

Program Affiliations: KNIGHT ScholaRx

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Availability and Challenges of Implementing Respiratory Syncytial Virus Immunizations in Pediatrics

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Respiratory Syncytial Virus (RSV) is a leading cause of lower respiratory tract infection and hospitalization in infants and young children. The FDA approved pediatric RSV immunizations (e.g., nirsevimab, clesrovimab) and the maternal RSV vaccines (e.g., Abrysvo) have expanded the prevention options for the pediatric population. The implementation and availability of the RSV immunization across pediatric practices has been inconsistent due to various barriers. The aim of this study is to assess the accessibility and challenges of RSV immunization implementation for the prevention of RSV across pediatric practice sites in the state of New Jersey.

The list of the pediatricians in New Jersey was obtained from the New Jersey Chapter of the American Academy of Pediatrics (NJAAP) listserv, which includes approximately 3,800 pediatricians. An electronic Qualtrics survey will be distributed to these pediatricians via email with a total of three reminder emails, and the survey will remain open for one month. The survey is expected to take less than 10 minutes to complete. The survey will assess the types of RSV immunizations available, the seasons in which they were offered, and challenges encountered when they were not offered at each practice site. The primary outcome is the percentage of practices in New Jersey who are offering RSV immunizations. The secondary outcomes include the frequency of each barrier selected for RSV immunization implementation and the frequency of each type of support identified to enhance uptake in pediatric practices. Statistical analysis will be conducted using descriptive statistics.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF)

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 76

Evaluation of Diabetic Ketoacidosis Protocol at a Community Hospital

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Diabetic ketoacidosis (DKA) is a complication of diabetes, typically caused by insulin deficiency. Current American Diabetes Association (ADA) guidelines recommend continuous intravenous (IV) insulin infusion, followed by bridging to long-acting subcutaneous (LASC) insulin 2 hours prior to discontinuing IV insulin after DKA resolution. At this small community hospital, the protocol follows ADA guidelines on LASC insulin initiation. Emerging evidence suggests that earlier administration of LASC insulin may accelerate DKA resolution and reduce intensive care unit (ICU) length of stay (LOS). This study evaluates whether early administration of LASC insulin should guide updates to the DKA management protocol.

Program Affiliations: KNIGHT ScholaRx

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 77

Comparative Analysis of Phase III Metastatic NSCLC Trial Participants and SEER Registry Patients (2025)

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Lung cancer is the second most commonly diagnosed cancer worldwide and the leading cause of cancer-related mortality. In the United States, the American Cancer Society estimated 234,580 new lung cancer cases and 125,070 deaths in 2024, while globally, the WHO/IARC reported approximately 2.2 million new cases in 2020. Non–small cell lung cancer (NSCLC) accounts for approximately 80-85% of lung cancer cases. Despite metastatic NSCLC treatment advancements, strict eligibility criteria often limit the generalizability of findings to real-world populations.

This study used real-world data to compare demographic and clinical characteristics between Phase III trial participants and patients represented in the SEER database to identify gaps and inform future trial design. A search was conducted using ClinicalTrials.gov to identify Phase III randomized controlled trials in NSCLC from January 1, 2020, to September 1, 2025. Inclusion criteria were adult patients (≥18 years), both sexes, and trials with an active (not recruiting) or completed status. Trials were excluded if they included patients with an ECOG performance status >1 to maintain consistency and reduce confounding in treatment outcomes. Furthermore, studies that did not report brain metastasis criteria were also excluded to ensure comparability due to the significant prognostic and therapeutic implications of brain metastases. After applying these criteria, 10 trials were included in the final analysis.

Across these 10 trials, enrolled patients had better ECOG status and lower disease burden when compared to the overall disease population. These differences limit the external validity of trial findings and may overestimate treatment efficacy and tolerability when applied to the broader population. Overall, these results demonstrate that current Phase III trials fail to reflect real-world diversity, highlighting the need for more inclusive trials.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF)

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 78

Evaluation of Practice Patterns for Stress Ulcer Prophylaxis with Proton Pump Inhibitors in the Critical Care Environment

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The recently updated joint guidelines from the Society of Critical Care Medicine and American Society of Health-System Pharmacists for provision of stress ulcer prophylaxis (SUP) have clarified appropriate indications and supporting data to avoid unnecessary therapies, which can result in adverse events or unnecessary continuation of medications (polypharmacy). This study aims to review the practice of de-prescribing SUP therapy when patients are discharged from critical care and/or the hospital, as well as to analyze the practice of initiation of proton pump inhibitors (PPIs) for SUP to assess appropriateness of indication based on the current guidelines.

A total of 200 patients were evaluated for inclusion in this study. We excluded 133 patients, with the most common reason being the exclusion criteria of inappropriate indication for initiation of PPI therapy. Upon admission, 30% of patients were already receiving a PPI at home, with the indications for numerous patients being unclear based on information available. Of the 67 patients in the final analysis, 70.1% had their PPI discontinued or continued for an appropriate indication upon their downgrade from the ICU. This rate was higher at hospital A at 80.6% (n=36) vs. 58.1% (n=31) at hospital B. Initiation of SUP based on indication was appropriate in 72% of patients overall, and was similar between the two hospitals (70.6% vs. 73.8%). Discontinuation rate at discharge was 86.6% system-wide, higher at hospital B at 96.8% vs. 77.8%.

Program Affiliations: KNIGHT ScholaRx

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 79

Viral Infection as a Possible Modifier of Neuroleptic Malignant Syndrome: a Systematic Review

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Neuroleptic malignant syndrome (NMS) is a life-threatening complication affecting approximately 0.07–0.2% of patients treated with antipsychotic medications. Hallmark symptoms include severe muscle rigidity and hyperthermia. Its rare occurrence and nonspecific presentation complicate timely recognition and differential diagnosis. No universally accepted mechanism explains the pathogenesis of NMS. Established risk factors include initiation, dose escalation, abrupt discontinuation, or concurrent use of multiple antipsychotic agents. During the coronavirus disease 2019 (COVID-19) pandemic, clinicians reported cases of NMS in infected individuals, raising questions about a potential interaction between viral illness and antipsychotic exposure. The clinical significance of this association, its underlying biological mechanisms, and whether similar patterns extend to other viral infections remain uncertain. This systematic review evaluates whether concurrent viral infection modifies the risk or clinical severity of NMS in patients receiving antipsychotic therapy. PubMed and Embase were systematically searched using MeSH and Emtree terms including “neuroleptic malignant syndrome” and “virus.” Only English-language primary literature was eligible. Covidence facilitated title, abstract, and full-text screening by two independent reviewers. Reporting followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Nineteen studies met inclusion criteria, comprising 16 case reports and three case series totaling 26 cases. Viral conditions included COVID-19 infection (8/26, 30.1%), human immunodeficiency virus infection (6/26, 23.1%), viral encephalitis (6/26, 23.1%), COVID-19 vaccination (4/26, 15.4%), and influenza (2/26, 7.7%). Haloperidol was the most common precipitating agent. Management frequently involved discontinuation of neuroleptics and initiation of dopamine agonists. Evidence regarding viral contribution to NMS severity was inconsistent. Some authors propose that viral-induced inflammation disrupts dopaminergic regulation in patients exposed to neuroleptics. However, clustering of HIV and COVID-19 reports suggests possible recency bias. Current evidence does not demonstrate a clear association between viral infection and NMS; further research is required.

Program Affiliations: AAPP Journal Club

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Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 80

Recognizing and Mitigating the Impact of Medications on Heat-Related Illness in Older Adults: A Scoping Review

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Heat waves have intensified since the 1960s. Older adults are uniquely susceptible to heat-related illness, which are defined in the present review as both hyperthermia-related conditions and fluid-electrolyte imbalances. It is generally recognized among clinicians that certain medications can increase a patient's vulnerability to heat, but the exact role played by medication use and its interplay with other heat-sensitizing patient characteristics is unclear. The objective of this scoping review was to investigate current literature regarding the heightened risk of heat-related illness due to medication use in older adults and to reveal areas of future research need. This review was conducted using the Joanna Briggs Institute framework for scoping reviews and the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) guidelines. Investigators queried four databases; English-language primary literature published between January 2000 and June 2025 were considered for inclusion based on a predefined Population, Concept, Context (PCC) pertaining to the research questions. A grey literature search was conducted to map existing mitigation strategies in the United States. Two reviewers independently screened studies for eligibility using Covidence and one reviewer extracted data. A total of 61 primary studies and 41 grey literature sources were identified. An abundance of epidemiological studies demonstrate greater incidence of heat-related morbidity and mortality for older age groups, but few experimental studies evaluating the role of medications exist. There are many efforts aimed at reducing health impacts of heat, yet limited well-researched, specific information is available on managing drug-heat interaction. The drug classes most frequently associated with heat-related illness in a primary study were diuretics, angiotensin-converting-enzyme (ACE) inhibitors, angiotensin II receptor blockers (ARBs), anticholinergics, and antipsychotics. This scoping review highlights a need for more studies investigating the confluence of age, multimorbidity, medication use, and heat-related illness in order to inform future mitigation efforts.

Program Affiliations: Summer Undergraduate Research Fellowship

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 81

Evaluation of Time to Sedation and Analgesia Following Neuromuscular Blockade in a Small Community Hospital

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The administration of neuromuscular blocking agents (NMBAs) is essential for rapid sequence intubation (RSI) but poses a risk of awareness since NMBAs lack sedative or analgesic properties. Delayed post-paralytic sedation and analgesia may result in psychological distress. Rocuronium has been associated with delayed sedation and analgesia. This study evaluated the time to post-paralytic sedation (TTS) and analgesia (TTA) following NMBA use during RSI. This retrospective review included 56 adult patients at a small community hospital (March-August 2025). Eligible patients were ≥18 years old and received paralytics for procedures outside the operating room. Cases were excluded if performed in operative areas (except emergent), if NMBAs were used for non-sedation purposes, or if patients were already intubated. Patients were identified from RSI waste sheets. Medication timestamps were obtained from EPIC or waste sheets. Post-procedural sedation and analgesic timing, documentation of awareness/recall, Richmond Agitation-Sedation Scale (RASS) and Critical-Care Pain Observation Tool (CPOT) scores were collected. Psychological outcomes were rarely documented. Logistic regression evaluated correlations between awareness and TTS/TTA; no association was found. One-tailed t-tests compared TTS and TTA between rocuronium and succinylcholine. Fifty-four intubations (52 patients, mean age 68 years) were analyzed. Procedures were mainly performed by emergency medicine (53.70%) and intensive care (42.59%) providers. No significant differences between rocuronium-only (n=25) and succinylcholine-only (n=26) groups were seen in mean TTS (67.82 vs. 52.00 minutes, p=0.246) or TTA (349.43 vs. 145.14 minutes, p=0.075). Propofol (61.11%) and fentanyl (79.63%) were most common; 11.11% received no sedation and 18.52% no analgesia. CPOE documentation was complete in 37% of cases. Invasive procedures within 15 minutes occurred in 13 patients, 9 receiving rocuronium. Clinically significant delays in TTS and TTA and documentation gaps highlight the need to enhance patient safety.

Program Affiliations: KNIGHT ScholaRx

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 82

Hyponatremia Diagnosis and Response Assessment (HYDRA)

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Hyponatremia, formally defined as a serum sodium level of < 135 mEq/L, is associated with increased morbidity and mortality. Prompt treatment of hyponatremia is imperative, but challenges exist in preventing overcorrection of sodium as well as avoiding osmotic demyelination syndrome (ODS). This research aims to evaluate current hyponatremia correction agents and practices to find potential areas of improvement to maximize patient outcomes.

Patients being treated for hyponatremia with a serum sodium level of < 130 mEq/L at Cooperman Barnabas Medical Center (CBMC) in Livingston, NJ from November 1, 2024, to June 30, 2025, were included. Patients with pseudohyponatremia, postpartum within the last 48 hours, or those who did not receive fluids were excluded. The primary objective was a composite safety endpoint of overcorrection, defined by an increase of 10 mEq/L within the first 24 hours of admission, and treatment of overcorrection. Secondary objectives included time until a stable serum sodium > 130 mEq/L, hospital length of stay, and 30-day readmission for hyponatremia.

Sixty-three patients were screened, fifty-five patients met the inclusion criteria. After receiving treatment for 24 hours, twelve patients (21.8%) met the composite outcome of overcorrection (21.8%). Amongst the different treatment modalities there was no statistically significant difference between the treatment received and the rate of overcorrection ($p = 0.188$). When comparing receipt of hypertonic saline and isotonic saline, overcorrection occurred in three (60%) and nine (21.8%) of patients respectively.

Overcorrection occurred in 21.8% of patients receiving either isotonic or hypertonic saline for treatment of hyponatremia in our study. While the use of hypertonic saline was primarily reserved for severe symptomatic cases, its use carried a significant risk of overcorrection. These findings underscore the need for careful monitoring and more conservative treatment, especially in patients who may not be symptomatic, with therapy tailored to patient specific factors.

Program Affiliations: KNIGHT ScholaRx

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 83

Incidence of Uterine Tachysystole with Prostaglandins for Labor Induction: A Comparative Review of Misoprostol and Dinoprostone

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Pharmacological agents such as prostaglandins (misoprostol and dinoprostone) can be administered to mature the cervix for labor inductions. Available evidence suggests that prostaglandins have comparable efficacy to oxytocics for labor induction. However, the use of prostaglandins comes with the risk of uterine tachysystole which has been correlated with fetal hyperstimulation. The purpose of this literature review is to evaluate the safety of prostaglandins for labor induction with a focus on uterine tachysystole. A literature search was conducted on PubMed using the keywords of “uterine tachysystole,” “labor induction,” and “prostaglandin.” Keywords of “efficacy” and “safety” were emphasized during this process to focus on the comparison of misoprostol and dinoprostone. The initial search produced 23 studies which met the predefined search criteria. After excluding two articles which did not evaluate misoprostol, dinoprostone, or tachysystole, 21 studies were analyzed. Evaluation of the included studies revealed conflicting safety results. This may be due to the wide range of comparators, variation in drug regimens, such as misoprostol routes and dosing versus dinoprostone forms that produce different tachysystole metrics, and patient population. Variations in baseline Bishop score, membrane status, or predisposed health disorders may also contribute to the inconclusive result. This literature review highlights the uncertainty regarding the incidence of uterine tachysystole when misoprostol or dinoprostone are used in labor induction. While some studies suggest that misoprostol may be associated with higher risk of tachysystole, others report no significant difference between the two agents. Current research does not permit a definitive conclusion concerning comparative safety in relation to tachysystole. This underscores the need for well-controlled studies of prostaglandin use in patients predisposed to uterine tachysystole, such as those with pre-eclampsia and uterine fibroids. Research using direct comparators is warranted to clarify the risk profiles of misoprostol and dinoprostone usage.

Program Affiliations: Ernest Mario School of Pharmacy

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 84

Aromatase Inhibitors vs. Standard Hormonal Therapies in Endometriosis – A Comparative Literature Review

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Endometriosis is a chronic disease affecting approximately 10% of reproductive-age women worldwide and is characterized by ectopic growth of endometrial tissue, leading to pelvic pain, inflammation, infertility, and dysmenorrhea. Current treatments primarily involve hormonal therapies such as progestins, combined oral contraceptives, and gonadotropin-releasing hormone (GnRH) agonists. Aromatase inhibitors (AIs), including letrozole and anastrozole, may benefit patients with refractory disease by inhibiting aromatase-mediated estrogen synthesis. This review compares the efficacy and safety of aromatase inhibitors with standard hormonal therapies in the management of endometriosis. A literature search was conducted in PubMed using the terms “endometriosis” and “aromatase inhibitors.” Only randomized controlled trials evaluating aromatase inhibitors compared with alternative hormonal therapies were included, and no date restrictions were applied due to the limited number of studies. Titles and abstracts were screened by four independent reviewers, and study characteristics including enrollment, treatment regimens, duration, and outcomes were extracted. The search yielded 317 studies, with 11 remaining after screening and three randomized controlled trials meeting inclusion criteria. In one study (n=31), postoperative treatment resulted in a 43% overall symptom reduction, including a 51% reduction in the anastrozole group, though differences between groups were not statistically significant ($p>0.05$). Another study (n=144) found similar postoperative recurrence rates between letrozole and GnRH agonist therapy at six months (6.4% vs. 5%, $p=0.48$). In a third study (n=820), letrozole plus oral contraceptives significantly improved dysmenorrhea and chronic pelvic pain compared with oral contraceptives alone ($p<0.05$). Overall, aromatase inhibitors appear to improve endometriosis-related symptoms, particularly when used alongside standard hormonal therapy; however, recurrence outcomes were similar to conventional treatments. Further research is needed to clarify the long-term efficacy and safety of aromatase inhibitors in endometriosis management.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF)

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 85

Current State and Needs of Health-System Pharmacists Related to Antimicrobial Recommendations in Pediatric Patients with Acute Kidney Injury: A National Practice-Based Survey

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Acute kidney injury (AKI) is often underrecognized and underdiagnosed in children. While there are established recommendations for diagnosing and classifying AKI in pediatrics, there are no formal guidelines for dosing antimicrobials in this population. This inconsistency leads to disparities in practice and potentially suboptimal therapy, affecting clinical outcomes. The objective of this study was to assess the practices and needs of health-system pharmacists regarding antimicrobial dosing in pediatric patients with AKI. An electronic survey was distributed to members of the American College of Clinical Pharmacy (ACCP) Pediatric Practice and Research Network (PediPRN) and the Pediatric Pharmacy Association (PPA). The survey captured demographic information, education, training, and practices concerning antimicrobial dosing in pediatric AKI. Participants were also presented with three hypothetical case scenarios involving piperacillin-tazobactam, cefazolin, and fluconazole dosing in pediatric AKI. Exclusion criteria included those exclusively caring for neonatal intensive care or pediatric outpatient settings and incomplete surveys. A total of 77 responses were collected, resulting in a 5.5% response rate. Of the respondents, 75% worked in academic hospitals, and 62% had completed a pediatric residency. Thirty-one percent managed about 5-10 pediatric AKI patients monthly. The primary drug information references used were Lexidrug (100%) and Micromedex (27%). Notably, 70% reported their institution lacked local guidelines for antimicrobial dosing in pediatric AKI, and 62% felt that having such guidelines would be beneficial. Despite being comfortable with the available resources, there was significant variability in responses to the case scenarios. This indicates a lack of consensus among health-system pharmacists regarding antimicrobial dosing in pediatric AKI, highlighting the need for evidence-based recommendations for this demographic. Future research should focus on developing specific dosing guidelines for pediatric AKI.

Program Affiliations: KNIGHT ScholaRx

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 86

Impact of Smoking and Vaccination Status on Pneumonia Readmission Rates: A Retrospective Study

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Purpose:
Hospital readmission after pneumonia has critical implications for worsening patient outcomes and increasing healthcare costs. Identifying modifiable risk factors for pneumonia readmission is essential to guiding preventive strategies. This study evaluated the association between smoking status (current, former, non-smoker) and vaccination history (influenza, pneumococcal, COVID-19) on hospital readmissions at 30, 60, and 90 days post-discharge.

Methods:
This retrospective cohort study included 1,298 adults hospitalized for pneumonia between December 2023 and February 2025 across a midsize health system. Patients were stratified by smoking and vaccination status documented prior to admission. The primary outcome was 30-day readmission; secondary outcomes included readmissions at 31-60 and 61-90 days. Data were analyzed using descriptive statistics and two-proportion testing ($p < 0.05$).

Results:
Thirty-day readmission rates by smoking status were 14.7% for current smokers, 18.0% for non-smokers, and 17.6% for former smokers. At 60 days, former smokers had the highest readmission rate (10.5%) compared to non-smokers (5.0%) and current smokers (2.9%). By 90 days, current smokers had the highest rates (13.2%) versus non-smokers (4.2%) and former smokers (5.3%). Vaccination associations varied: 30-day readmission was 16.5% for influenza, 20.2% for pneumococcal, and 17.7% for COVID-19. While vaccination was not uniformly protective in the short term, patients receiving all three vaccines demonstrated the lowest 90-day readmission rate (3.0%).

Conclusion:
Smoking and vaccination status appear to influence pneumonia readmission patterns. Current smokers face significantly higher long-term (90-day) readmission risks. Former smokers demonstrated higher 60-day readmissions, while current smokers had the highest 90-day readmissions. Vaccination was not uniformly protective; however, patients with all three vaccines had the lowest 90-day readmission rate. These findings suggest that both smoking history and comprehensive vaccination status may play roles in long-term pneumonia outcomes. Prospective studies are warranted to further evaluate these associations and to guide preventive interventions aimed at reducing readmissions.

Program Affiliations: Ernest Mario School of Pharmacy

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 87

Medication Use Evaluation of Rivaroxaban and Apixaban in Patients with Obesity in an Urban Academic Medical Center

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Direct oral anticoagulants (DOACs) are standard for VTE and stroke prophylaxis, yet dosing evidence for obese patients remains poorly defined. This retrospective cohort study evaluated the efficacy of rivaroxaban and apixaban dosing regimens and adherence to current guidelines within the Robert Wood Johnson University Hospital system. Data utilizing ICD-10 codes for obesity identified patients treated between July 1, 2024, and June 30, 2025. The study excluded those with history of bariatric surgery, recent GLP-1 use, cirrhosis, cancer, or interfering medications. Investigators extracted baseline characteristics including BMI, comorbidities, and indication. The primary objective was to assess dosing efficacy and guideline adherence, while secondary outcomes focused on safety via the incidence of major, minor, or gastrointestinal bleeds. Descriptive statistics and logistic regression were utilized. The findings will be used to update institutional dosing protocols and publish data to optimize anticoagulation strategies in the obese population.

Of 209 adult inpatients, 31 (14.8%) met the inclusion criteria for this study. The cohort's mean BMI was 36.84, with a mean age of 63.3 years. Participants were predominantly male (58%) and White (71%), with apixaban being the most frequently prescribed agent (87.1%). The primary indication was stroke prophylaxis for atrial fibrillation (74.2%). Regarding clinical outcomes, no patients experienced a stroke or VTE after initiating treatment. However, 12.9% (n=4) received dosing regimens inconsistent with current guidelines. Safety outcomes revealed a 9.7% (n=3) total bleed rate, including one major, one minor, and one GI bleed. These findings highlight that while initial efficacy was maintained, significant gaps in guideline adherence persist. Further research is essential to determine if non-adherence in the obese population leads to long-term detrimental outcomes, ultimately informing more precise institutional dosing protocols.

Program Affiliations: KNIGHT ScholaRx

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 88

Assessing the Effectiveness of an Interprofessional Education Program for Reducing Health Professions Student Stigma of Formerly Incarcerated Individuals

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Individuals confined in correctional institutions face heightened vulnerability to healthcare disparities due to hindered access to care and adverse socioeconomic factors. These individuals also experience disproportionately high rates of discrimination and mental health comorbidities. Interprofessional education (IPE) programs provide a structured approach to preparing health professions students for the specific needs of incarcerated populations by addressing stigma, accessibility, and delivery of care.

This study aims to educate students on the vulnerability of patients who have experienced incarceration and reduce stigma surrounding them, as well as highlight the role and value of interprofessional teams for optimizing delivery and quality of patient care.

An IRB-approved pilot IPE program will be implemented for medical, nursing, pharmacy, physician assistant, and graduate psychology students at our institution. The program will include asynchronous educational modules and collaborative virtual case-based discussion amongst interprofessional teams. Participants will be surveyed on stigma towards individuals who faced incarceration, and perceptions of working in an interprofessional setting. Surveys will be administered before and after the program, utilizing the 9-item Interprofessional Socialization and Valuing Scale (ISVS-9A) and 40-item Police and Community Attitudes Towards Offenders with Mental Illness (PACAMI-O) questionnaires. A target sample of 10 students will be taken from each participating school, with a projected total of 50 students (n=50). Participants will be included if they provide informed consent and are a graduate-level student over the age of 18 enrolled in one of the five participating schools. Gift card raffle entries and certificates of completion will be offered as incentives for participation.

Changes in student perceptions of incarcerated populations and IPE would justify if this pilot program should be annually offered for health professions students at the institution, allowing students to attain IPE competency and confidence in engaging with vulnerable populations.

Program Affiliations: American Association of Psychiatric Pharmacists (AAPP) Journal Club

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 89

How Pharmacy Students Experience IPE: Longitudinal Feedback Trends and Improvement Targets (2022-2025)

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Background: Interprofessional education (IPE) equips healthcare students to collaborate effectively in diverse teams for optimal patient care. The IPE Committee at Rutgers EMSOP oversees and evaluates IPE activities in coordination with other health profession programs. To assess their effectiveness, we analyzed student feedback from the 2022-2025 IPE events.

Objective: Identify key takeaways, areas for improvement, and overall student perceptions regarding these collaborative learning experiences.

Methods: EMSOP students completed a 16-item Qualtrics survey for each IPE activity attended, composed of rating-scale, Likert-scale, and open-ended feedback questions. Data was collected from academic years 2022-23 (n=82), 2023-24 (n=186), and 2024-25 (n=146). Quantitative analysis was performed on ordinal data, while qualitative analysis identified recurring themes. Longitudinal and categorical analyses were used to assess trends and activity-specific feedback for optimizing future IPE activities.

Results/Discussion: Feedback from 2022-2025 reveals trends in participation, representation, and areas for improvement. Survey responses more than doubled from 82 to 186, then decreased to 146. While the reason for this decrease is currently being postulated, response rates likely remain high due to the diversity of events, increased student engagement, and improved survey distribution. Representation during 2024–25 was concentrated among four events, similar to 2022–23, when nearly half of the responses came from the dental and stroke case events. In contrast, participation was more evenly distributed across events in 2023–24. The percentage of the highest ratings (“strongly agree” or “excellent”) remained similar to the previous year after declining from 2022–23. However, total participation decreased slightly compared to the prior year, prompting consideration of strategies to increase engagement moving forward.

Qualitative feedback demonstrated increased professional confidence and increased appreciation for shared perspectives among participating students. Areas identified for improvement included establishing pre-IPE communication frameworks and clarifying role boundaries. Notably, there was improved student perception of implementing more in-person events.

Program Affiliations: EMSOP Interprofessional Education (IPE) Committee

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 90

Narrative Review of Antimicrobial Stewardship Programs Targeting Pediatric Infectious Diarrhea in Developing Countries

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This narrative review evaluates antimicrobial stewardship programs in developing countries for the reduction of inappropriate antibiotic prescribing and the feasibility of diagnosing pediatric infectious diarrhea caused by E. coli, Salmonella, and Shigella species (spp). A PubMed search found 771 articles on “antibiotic use for pediatric infectious diarrhea” in developing countries, of which 221 were published within the last 5 years (2021-2026). Articles were also excluded if the study included adult populations, case reports, antibiotic-associated diarrhea, or secondary causes such as pneumonia, malignancies, H. pylori, immunodeficiencies, or organ transplants. Overall, 19 articles were selected, which represented two primary approaches: innovative diagnostic tools and algorithms, and enhanced specificity of regional bacterial resistance patterns. Seven articles referenced diagnostic tools that optimize antibiotic prescribing for infectious diarrhea by improving pathogen identification and reducing unnecessary empiric antibiotic use. Notably, a clinical prediction rule (CPR) used predictive models to determine when to use point-of-care testing for Shigella spp. Additionally, mobile clinical decision support (MCDS) systems are being employed to interpret presenting signs, symptoms, and characteristics to determine the etiology of diarrhea and prevent inappropriate antibiotic use for viral etiologies. Twelve articles referenced gene mapping to detect genetic diversity within bacterial strains, finding unique resistance patterns within each isolate. This data was further extrapolated to determine regional resistance patterns and influence antibiotic prescribing practices and guidelines. Diagnostic tools such as CPR and MCDS have the potential to save time and resources in developing countries with limited access to stool sample analysis. Gene mapping can detect resistance patterns and enable appropriate prescribing. However, these resources need to be further studied in different patient populations and etiologies of infectious diarrhea.

Program Affiliations: Department of Pharmacology and Toxicology

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 91

Lamotrigine Treatment Interruptions and Reinitiation: Evaluation of Inpatient Dosing Strategies and Adverse Events

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Lamotrigine, an anticonvulsant FDA-approved for the treatment of epilepsy and bipolar disorder, requires gradual dose titration due to the risk of serious dermatologic reactions such as Steven-Johnson-Syndrome. Current guidelines recommend re-titration if therapy is interrupted. Lamotrigine is often resumed at the prior dose despite interruptions during hospitalization. It remains unclear whether gradual re-titration or resuming the prior dose affects adverse events in the inpatient settings. This study aims to evaluate the incidence and duration of lamotrigine treatment interruptions, re-titration practices, and associated adverse events in hospitalized patients.

This is an Institutional Review Board-approved, single-center, retrospective cohort study. Electronic medical records were used to identify adult patients (18 years) admitted between January 2023 and December 2024, with lamotrigine documented as a home medication prior to index hospitalization. Patients who were newly initiated on lamotrigine during hospitalization, pregnant, or incarcerated, were excluded.

A total of 692 medical records were screened, and 504 patients met inclusion criteria. Data collection is ongoing and includes the following variables: age, sex, race, weight, admission diagnosis, relevant comorbidities, pertinent concomitant medications that affect the metabolism of lamotrigine, indication for lamotrigine, home dose, duration of therapy interruption, re-titration regimen, and adverse reactions. Timing of reinitiation (on admission, within days 3-6, or after day 6 of hospital admission) and titration strategy (dose reduction vs. continuation of home dose) are also being assessed. The primary objective of this study is to evaluate the incidence and duration of lamotrigine treatment interruptions during hospitalization, as well as the dosing regimens used for re-titration. The secondary objective is to assess the incidence and types of adverse events associated with treatment interruption and dose re-titration. Descriptive statistics will be used to analyze the primary and secondary endpoints.

Program Affiliations: KNIGHT ScholaRx

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 92

Impact of Sodium-Glucose Cotransporter 2 (SGLT-2) Inhibitors on the Resolution of Acute Kidney Injury

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Purpose: Sodium-glucose cotransporter 2 (SGLT-2) inhibitors are used to manage type 2 diabetes (T2DM), heart failure (HF), and chronic kidney disease (CKD). Clinical trials that studied SGLT-2 inhibitors excluded patients with active acute kidney injury (AKI), leading to limited data in this setting. This study assessed the impact of SGLT-2 inhibitors on the resolution of AKI.

Methods: This was a single-center retrospective cohort study. Admissions were categorized into continuation or discontinuation of SGLT-2 inhibitor therapy during AKI. Adult patients had to meet Kidney Disease: Improving Global Outcomes criteria for AKI, have a minimum hospital stay of 48 hours, and be taking an SGLT-2 inhibitor prior to admission. Exclusion criteria included active renal replacement therapy, pregnancy, T1DM, and initial intensive care unit admission. The primary outcome was days to resolution of AKI to a serum creatinine within 0.2 mg/dL of the baseline or a newly established baseline. Secondary outcomes included 30-day hospital readmission, renal replacement therapy initiation, and 30-day mortality. Outcomes were assessed with Mann-Whitney U and Fischer's Exact tests.

Results: Eighty-six patients were included in the study. Thirty-nine patients continued an SGLT-2 inhibitor during AKI and 47 patients discontinued therapy, of which the primary outcome was assessed in 25 of 39 and 34 of 47 patients. The median days to resolution of AKI in the SGLT-2 inhibitor continued group was 3 (2-4) days and 3 (2-4) days in the discontinued group ($p = 0.68$). Rates of 30-day hospital readmissions, mortality, and renal replacement therapy initiation were not significant ($p = 1.00$).

Conclusion: SGLT-2 inhibitor continuation during AKI was not associated with a statistically significant difference in time to AKI resolution. Further studies are needed to establish the relationship between SGLT-2 inhibitors and AKI.

Program Affiliations: KNIGHT ScholaRx

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 93

Evaluation of Prescription Patterns and Guideline Directed Medical Therapies (GDMT) in Chronic Obstructive Pulmonary Disease (COPD) and Heart Failure (HF) Patients at Hospital Discharge

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Chronic obstructive pulmonary disease (COPD) and heart failure (HF) are common causes of 30-day hospital readmissions, negatively impacting patient outcomes and quality of life while increasing healthcare costs. Clinical guidelines outline evidence-based therapies that reduce hospitalizations and improve survival. However, these therapies are underutilized, resulting in suboptimal guideline-directed medical therapy (GDMT) at discharge. This study evaluated whether GDMT was prescribed at discharge for patients with COPD and HF to identify gaps in prescribing.

A proposal to retrospectively collect de-identified data was approved by the Institutional Review Board. Patients ≥18 years admitted to an academic community hospital with a diagnosis of COPD and/or HF between September 2023 and September 2024 were included. Patients were excluded if discharged to hospice or a non-inpatient unit, discharged from the emergency department without admission, or left against medical advice. Data collected included demographics, comorbidities, discharge disposition, pre-admission and discharge medications, insurance status, prior hospitalizations, and readmission data. Patients were stratified into COPD, HF, or concomitant COPD and HF groups. The primary outcome was the proportion of patients prescribed GDMT at hospital discharge. Descriptive statistics were utilized to describe binary outcomes and continuous variables.

A total of 149 patients were included in the primary analysis (COPD n=77, HF n=11, COPD and HF n=51). Among patients not optimized on GDMT at admission, 19.0% of COPD patients and 33.3% of HF patients were discharged on newly optimized therapy. Patients with concomitant COPD and HF demonstrated the lowest rates of GDMT optimization, with 3.0% receiving COPD GDMT and 10.0% receiving HF GDMT at discharge.

There continues to be a clear lack of prescribing of COPD and HF GDMT upon discharge. Future efforts should focus on provider education and identifying barriers to GDMT optimization to improve outcomes and reduce hospital readmissions.

Program Affiliations: KNIGHT ScholaRx

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 94

Analysis of Novel Therapeutic Mechanisms for Ovarian Cancer: Recently Approved and Investigational Therapeutics in Phase III Human Trials

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Ovarian cancer is the fifth deadliest cancer among women in North America. This literature review evaluates novel mechanisms of action in recently approved and investigational ovarian cancer therapeutics, to identify advances in treatment innovation that may improve patient outcomes.

Our literature review was conducted comprehensively across PubMed, ClinicalTrials.gov, FDA Novel Drug Approvals, package inserts, and relevant articles. First-in-class medications approved for ovarian cancer by the FDA were identified, followed by late-phase clinical trials investigating novel first-in-class therapies for ovarian cancer that were started in the United States, all between the years of 2021–2025.

The first search phase produced three results. Mirvetuximab soravtansine-gynx is an antibody-drug conjugate of chimeric IgG1 bound to the small molecule tubulin inhibitor Doxorubicin-maytansine-4 (DM4), targeting the tumor surface folate receptor α (FRα) and indicated for FRα positive, platinum resistant epithelial ovarian cancer (EOC). Avutometinib & Defactinib, a combination of two kinase inhibitors, is the first and only FDA-approved treatment for KRAS-mutated recurrent low-grade serous ovarian cancer (LGSOC). Both therapies were granted accelerated approval by the FDA and are indicated for patients who have received prior systemic therapy. Pafolacianine is an optical imaging agent indicated as an adjunct for intraoperative identification of malignant lesions in ovarian cancer.

The second phase produced two results. IMNN-001 is an IL-12 DNA plasmid vector encased in a nanoparticle delivery system, currently being investigated in combination with standard neoadjuvant and adjuvant chemotherapy in newly diagnosed advanced EOC. Relacorilant is a selective glucocorticoid receptor (GR) antagonist and chemotherapy sensitizer, currently being investigated in combination with nab-paclitaxel in advanced, platinum-resistant, high-grade EOC.

This review highlights five recently approved and investigational phase III therapeutic advancements developed for various ovarian cancers within the past five years. Additional research into these mechanisms may contribute to new insights, advance the therapeutic landscape, and ultimately improve patient outcomes.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF)

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 95

Comparing the Impact of Tetrahydrocannabinol (THC) on 30-day Readmission Rates and Hospital Length of Stay in Patients with Depression

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Major depressive disorder (MDD) is a prevalent psychiatric condition marked by depressed mood and anhedonia. Length of stay and readmission rates are key indicators of treatment response and prognosis. Delta-9-tetrahydrocannabinol (THC), the primary psychoactive component of cannabis, continues to be evaluated for its potential therapeutic and safety implications. This study evaluates THC's impact on 30-day readmission and length of stay among inpatient MDD individuals at an academic hospital.

A single-center retrospective chart review was conducted among patients discharged from an inpatient psychiatric unit between August 2018 and May 2025. Inclusion criteria were age ≥18 years, diagnosis of MDD, positive or negative urine THC screen, antidepressant therapy during admission and discharge, and psychiatric hospitalization for MDD. Collected data included demographics, admission ICD-10 codes, psychiatric comorbidities, suicidal behaviors, antidepressant therapy, prior psychiatric hospitalizations, time to readmission, and readmission length of stay. The primary outcomes were 30-day psychiatric rehospitalization and hospital length of stay. Secondary outcomes included subsequent length of stay, and 6-month and 1-year rehospitalization rate.

Of the 1,700 patients assessed, 744 met inclusion criteria, with 212 (28.5%) testing positive for THC and 532 (71.5%) testing negative. Overall, 96 patients were readmitted: 26 (23.6%) within 30 days, 53 (48.2%) within 6 months, and 31 (28.2%) within 1 year. Thirty-day readmission occurred in 3.3% of positive for THC group and 3.6% of negative for THC group. Mean LOS was 5.77±4.4 days overall (THC-positive 5.33±4.27; THC-negative 5.95±4.47).

The number of readmissions was insufficient to provide adequate statistical power to draw reliable conclusions about the effect of THC on readmission rates. Interpretation is limited by the retrospective single-center design, polysubstance use, and lack of data on THC dose, formulation, or frequency. Further research is warranted to clarify the relationship between cannabis exposure and hospitalization outcomes in MDD.

Program Affiliations: KNIGHT ScholaRx

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 96

Intravenous Magnesium Infusion Time and Observed Outcomes in Acute Asthma Exacerbation

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Purpose: To observe the effects of different infusion rates of intravenous magnesium sulfate as an adjunct therapy in the treatment of acute asthma exacerbation in the emergency department.

Methods: This retrospective, single-center study enrolled patients seen at Jersey City Medical Center from July 2023 through December 2024 who received intravenous magnesium sulfate within 4 hours of presenting with an acute asthma exacerbation. Concomitant bronchodilator use, including albuterol, ipratropium, terbutaline, and epinephrine, was recorded both before (initial therapy) and after (rescue therapy) magnesium administration. Patients were categorized by infusion duration: 20 minutes or 1 hour. The primary outcome was hospital admission rate; secondary outcomes included post-magnesium rescue medication use, intubation rates, and adverse effects such as hypotension, bradycardia, and flushing. Chi-square and Student's t-test were used for categorical and continuous variables, respectively.

Results: Of 195 eligible patients, 65 received the 20-minute infusion and 130 received the 1-hour infusion. Admission rates were 36.9% and 27.7%, respectively (absolute difference 9.2%; 95% CI −4.8 to 23.3; p=0.187). Mean rescue medication doses were 1.38 vs. 1.05 (difference 0.33; 95% CI −0.06 to 0.72; p=0.096). Intubation occurred in one patient in the 20-minute group and two in the 1-hour group (p=1.0). Adverse effects were reported in four and six patients, respectively (OR 1.54; p=0.646).

Conclusion: Different infusion rates of intravenous magnesium sulfate were not associated with a difference in admission rates, intubation rates, rescue medication use, or incidence of adverse effects. This study is limited by its retrospective design and small sample size; future studies are needed with greater sample sizes and prospective designs to better control for confounding variables.

Program Affiliations: KNIGHT ScholaRx

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 97

Adverse Events Associated with Bone Cement in Hip and Knee Arthroplasty: A Literature Review

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Joint arthroplasty is one of the most common procedures performed worldwide. Nearly 10% of the 1.3 million procedures fail. Failures resulting from bone cement hypersensitivity reactions and subsequent adverse reactions remain underexplored. By examining the prevalence of hypersensitivity to bone cement and identifying its potential impact on patient outcomes, this work highlights the need for preoperative screening to reduce implant failure.

A PubMed literature review was conducted to identify prospective and retrospective observational studies and case reports published from 2000 to 2025 on cement hypersensitivity in hip or knee joint arthroplasty worldwide. Extracted data included study type, sensitization testing, cement components associated with hypersensitivity, and local and systemic manifestations. Bone cement implantation syndrome (BCIS), strategies to improve patient outcomes with cementless endoprosthetics were also considered.

Patients who had undergone joint arthroplasties, specifically total knee arthroplasty (TKA) and total hip replacements (THR), experienced hypersensitivity reactions to bone cement and presented with post-operative local and systemic symptoms. Confirmatory testing of a bone cement allergy required patch tests or lymphocyte transformation testing. In comparison to patients who were nonsensitive to bone cement, those who were implant-sensitive were more likely to report internal joint itching and aseptic loosening. Swelling, chronic pain, burning, and prosthetic instability were symptoms that occurred similarly between sensitive and nonsensitized patients with joint arthroplasty failure.

The nonspecific clinical presentation of bone cement hypersensitivity demonstrates the need to standardize preoperative screening methods as a means to decrease the likelihood of an unsuccessful arthroplasty, including patch tests or lymphocyte transformation testing. Further investigation is required to assess the long-term benefit of cementless implant revisions. Patients experiencing bone cement allergy revised with a non-sensitizing implant had significant improvement in specific symptoms such as persistent pain and swelling.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF)

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 98

Systematic Review of Glucagon-Like Peptide-1 Receptor Agonists on Neurocognition

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Patients with mild neurocognitive disorders (NCD) show a noticeable decrease in thinking and cognitive skills, which can progress to major neurocognitive disorders that interfere with independence in daily activities. A common cause of NCD is Alzheimer's disease (AD), characterized by an accumulation of β-amyloid plaques and tau neurofibrillary tangles that lead to chronic neuron damage and a loss of brain network connectivity. Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) may exert disease-modifying, neuroprotective effects in Alzheimer's disease through multimodal mechanisms, including neuroinflammatory and vascular pathways. Accordingly, clinical trials are investigating their potential to slow cognitive decline in early-stage symptomatic AD. This systematic review of available literature aims to determine the effect of GLP-1 RAs on treating early-stage symptomatic AD. A literature search was conducted on PubMed, using GLP-1 receptor agonists, neurocognitive, and Alzheimer's. Clinical trials in humans in English-language published prior to November 28, 2025 were included. The search term yielded twenty results, with six publications matching the inclusion criteria. The six studies included three randomized controlled trials (RCT), an open-label RCT, a post-hoc analysis of an RCT, and a retrospective cohort study. Of the six studies, one study demonstrated that patients treated with liraglutide once a week performed better on cognitive tests when compared to an inactive placebo. In a 12-week study comparing liraglutide to placebo, magnetic resonance imaging (MRI) demonstrated improved intrinsic connectivity within the default mode network but no difference in cognitive function. Likewise, a 32-week trial comparing slow-release exenatide with no treatment showed no beneficial effect on cognitive performance. There is limited evidence to show the benefit of GLP-1 RA on cognitive function. Further research is needed to evaluate the effects of GLP-1 RA on disease progression of AD and other NCDs.

Program Affiliations: Ernest Mario School of Pharmacy; Penn Medicine Princeton Health; Penn Medicine Princeton House Behavioral Health

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 99

Perioperative Continuation and Discontinuation of Sodium-Glucose Cotransporter-2 Inhibitors and Risk of Euglycemic Diabetic Ketoacidosis: A Retrospective Cohort Study

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Objective:
To evaluate whether holding sodium glucose transport inhibitors (SGLT2i) for at least 72 hours prior to surgery reduces postoperative euglycemic diabetic ketoacidosis (euDKA) compared with discontinuation less than 72 hours prior to surgery.

Methods:
This institutional review board-approved retrospective cohort study included 50 adult patients who received an SGLT2i and were hospitalized for at least two days postoperatively. Patients were stratified based on the timing of SGLT2i discontinuation before surgery: less than 72 hours (continued group) versus greater than 72 hours (discontinued group). The primary outcome was the incidence of postoperative euDKA. Secondary outcomes were length of stay and 30 day-readmission. Outcomes were analyzed using Chi-square, Fisher's exact test, and Mann-Whitney U tests.

Results:
Among 50 patients, 13 were in the continued group and 37 were in the discontinued group. One case of euDKA occurred in the discontinued group (2.7%, $p>0.05$). Median length of stay was shorter in the continued group (9 vs 13 days, $p=0.02$). Thirty-day readmission rates were 15.4% in the continued group versus 18.9% in the discontinued group ($p>0.05$).

Conclusion:
Based on these findings, perioperative discontinuation of SGLT2i for more than 72 hours did not reduce postoperative euDKA, and continuation was not associated with prolonged hospitalization or higher readmission rates. Overall, median length of stay was statistically significant and may also have clinical relevance, suggesting that continuation of SGLT2i therapy was not associated with prolonged hospitalization. Thirty-day readmission rates did not show a difference in statistical significance and likely have limited clinical significance due to the small difference between groups. These results suggest that perioperative SGLT2i management should remain individualized. However, interpretation is limited due to the small sample size and low occurrence rate of euDKA. Larger prospective multicenter studies are needed to better define the optimal timing of SGLT2i discontinuation.

Program Affiliations: KNIGHT ScholaRx

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 100

The Therapeutic Evolution of SGLT2 Inhibitors: Examining the Potential Use in COPD – A Literature Review

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Purpose
SGLT2 inhibitors have evolved from diabetes medications to multi-system treatments for heart failure and chronic kidney disease. Patients with COPD experience systemic inflammation and elevated cardiovascular risk. This literature review examines the therapeutic role of SGLT2 inhibitors in COPD patients, focusing on mortality, respiratory events, and healthcare utilization.
Methods
A literature review evaluating real-world outcomes associated with SGLT2 inhibitor use in patients with T2DM and comorbid COPD. PubMed was searched using the MeSH terms “Sodium-Glucose Transporter 2 Inhibitors” AND “Pulmonary Disease, Chronic Obstructive.” Studies published in English since 2010 involving human subjects with T2DM and COPD reporting COPD-specific outcomes among SGLT2 inhibitor users were included. Editorials, narrative reviews, meta-analyses, case reports, and studies lacking COPD-specific endpoints were excluded. Extracted data included demographics, study design, interventions, comparator groups, outcomes, and follow-up duration. Primary endpoints included all-cause mortality, COPD exacerbations, hospitalizations, and emergency department utilization.
Results
Eight studies of over 300,000 patients with T2DM and COPD across the United States, Taiwan, the United Kingdom, and Hong Kong were analyzed. Observational comparisons generally favored SGLT2 inhibitors over most comparators, though benefits were not observed versus GLP-1 receptor agonists. Mortality reductions were reported in the largest studies (Wu et al.: HR 0.76; Yen et al.: HR 0.64). COPD exacerbation rates were lower, including a 31% reduction reported by Chang et al. Ray et al. reported 19% reduction versus DPP-4 inhibitors, but no difference versus GLP-1 agonists. Lower hospitalization rates were seen in Wu et al. (14% fewer hospitalizations) and Geetha et al. (55% vs 87.8%, $p<0.001$).
Conclusion
Current evidence suggests a potential therapeutic expansion for SGLT2 inhibitors. Findings across populations indicate possible reductions in mortality and COPD exacerbations among patients with T2DM and COPD. Randomized controlled trials are needed to confirm causal relationships and guide prescribing.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF)

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 101

Evaluating the Impact of Oncology Pharmacist Consults on Chemotherapy-Induced Nausea and Vomiting Management and Adherence Programs

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Chemotherapy-induced nausea and vomiting (CINV) affects up to 80% of cancer patients, significantly impacting their quality of life and straining healthcare resources. This leads to decreased quality of life, chemotherapy treatment nonadherence, and increased healthcare utilization. Although antiemetic guidelines are well-established, real-world management remains inconsistent. Emerging literature suggests that oncology pharmacists play a vital role in optimizing CINV prevention strategies, resulting in enhanced adherence to chemotherapy. This review explores the current evidence on the beneficial clinical impact of pharmacist-led interventions in CINV management and their potential to decrease CINV incidence and increase treatment adherence.

A comprehensive literature search was conducted in PubMed, Embase, and Google Scholar for peer-reviewed studies published between January 2000 and July 2025. Inclusion criteria consisted of studies assessing oncology pharmacist interventions in CINV prevention or management, adult patients receiving moderately or highly emetogenic chemotherapy, randomized controlled trials, observational studies, and systematic reviews. Primary outcomes were adherence to antiemetic guidelines, incidence and severity of acute and delayed CINV, and adherence to chemotherapy regimens.

Fourteen studies consistently demonstrated the value of pharmacists in optimizing CINV management. A 2020 pharmacist-run CINV protocol improved complete response rates from 65% to >90% while reducing provider workload. Pharmacist-led telephone follow-up and SMS-based monitoring programs enhanced early intervention, improved antiemetic prescribing, and lowered unplanned healthcare utilization. Collectively, evidence demonstrates that pharmacist integration enhances CINV control, strengthens adherence to antiemetic guidelines, supports chemotherapy completion, and reduces healthcare burden.

Pharmacist-led interventions significantly improve CINV outcomes by enhancing adherence to antiemetic guidelines, optimizing prophylaxis, and reducing healthcare utilization. These findings underscore the importance of fully integrating oncology pharmacists into multidisciplinary care teams to optimize supportive cancer care and improve both treatment adherence and quality of life for patients.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF)

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 102

Artificial Intelligence Implications in Clinical Research: Past, Present, and Future

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This literature review examines the evolution of the use of artificial intelligence (AI) in clinical research and drug development across past, present, and future contexts. In the past, AI showed early promise in predicting dosages, clinical responses, and enhancing disease detection. Currently, AI continues to expand with applications in target identification and biomarker discovery, with around 75 AI-discovered molecules entering the clinic, and Phase I success rates reaching 80-90% which is above industry averages. Looking into the future, using generative AI for creating digital "twins" could revolutionize trial design by simulating human biological systems, reducing toxicity, and accelerating approval rates.

We conducted a comprehensive literature search into the evolving role of artificial intelligence (AI) in clinical trials including drug development as well as discovery. Our research methodology includes databases such as PubMed, Embase, and clinicaltrials.gov, to identify articles focusing on studies reporting AI's role in drug discovery, success in biomarker discovery and future applications in creating twin models. We searched key terms including "artificial intelligence", "clinical trials", "pharmaceutical trials", and "drug development" in combination with Boolean operations such as "AND", "OR" and "NOT". After collecting data, articles were organized into three time frames: past (2010-2020), present (2020-2025), and future implications included in articles to reflect the progression of artificial intelligence across different timelines. Upon separation into these categories, further evaluation was conducted based on the role of AI in trial phases, different therapeutic focuses such as adenoma detection and oncology, and outcome measures such as prediction accuracy, disease detection rates and effectiveness in early drug development versus further phases of the drug development process. In addition to identifying advancements, we also specifically included literature that examined the limitations of AI use in clinical trials such as issues of transparency, interpretability and privacy to provide a balanced perspective. This structured approach allowed systematic comparison across time frames, ensuring consistency in evaluation and a comprehensive assessment of both AI's progression and its challenges in clinical research.

Our findings demonstrate that AI has progressively influenced clinical research and will continue to transform it. In the past, AI was applied in pharmacoepidemiology to optimize dosing, predict treatment responses, and identify adverse effects. Its role has since extended into clinical practice; for example, in colonoscopy, AI detected 0.53 adenomas per patient compared with 0.31 by conventional methods, nearly doubling the detection of small lesions and highlighting its potential to improve early cancer detection. At present, AI is increasingly used to interpret large datasets for biomarker discovery and target identification, with notable progress in drug development. Phase I trials of these candidates achieved success rates of 80–90%, considerably higher than traditional benchmarks, though Phase II outcomes remain comparable to standard methods. Looking forward, digital twin models capable of simulating human biology present a promising application for clinical trials by enabling outcome prediction without direct patient involvement, reducing toxicity risks, and helping prevent adverse effects. Despite these advances, challenges remain, including data privacy risks, limited interpretability of "black box" models, and uncertainties regarding reliable integration into healthcare.

Artificial intelligence has been applied across clinical trials to improve dosage prediction, trial efficiency, and diagnostic accuracy. We reviewed past, present, and emerging applications of AI, with recent studies showing higher success rates compared to traditional methods. Key challenges include limited transparency, bias, and underreporting of negative data, which hinder complete clinical characterization. AI has demonstrated transformative potential in clinical research and drug development, yet its full capabilities are still unfolding. Future directions should emphasize data security and the validation of generative AI and digital twin models to optimize patient outcomes and reduce costs.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF)

Poster Category: Clinical Science

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Abstract 103

Gender Diversity in Coronary Heart Disease (CHD) Clinical Trials

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Women and transgender individuals have historically been underrepresented in coronary heart disease (CHD) clinical trials, despite being at risk for the disease. The objective of this study is to evaluate the gender ratios and inclusion criteria of clinical trials on CHD pharmacotherapy.

A literature search was done on PubMed for phase 2 and 3 clinical trials evaluating pharmacologic treatments for CHD in adult patients. Gender ratios were collected through tables in the research articles, and eligibility criteria were analyzed through trial registry records. The gender ratios in the clinical trials were compared to gender ratios of CHD in the general population, reported in articles searched by PubMed and Consensus.APP.

From the literature search, 18 clinical trials were identified. The percentages of females in 17 trials ranged from 17.9% to 34.1%, significantly lower compared to overall CHD patients (45% female in a large registry). One trial analysis found worse outcomes among females; women were 59.4% of patients receiving blood transfusions after percutaneous coronary intervention (PCI) + antiplatelets, despite being 27.8% of total patients in the analysis. Transgender percentage was delineated in one trial on pitavastatin in HIV-infected adults, which had 1.6% transgender participants (breakdown on men/women unspecified). This is similar to the percentage of transgender HIV patients (1.3% of US HIV-positive adults are transgender women). However, transgender individuals are disproportionately likely to be HIV-infected, and face increased stressors that could predispose them to cardiovascular diseases.

The literature review shows women and transgender individuals are underrepresented in coronary heart disease (CHD) clinical trials. Future CHD clinical trials could make criteria more inclusive of women's symptoms, and transgender representation could be increased by stricter adherence to the Sex and Gender Equity in Research guidelines, which promote fairness in research design and analysis.

Program Affiliations: Rutgers Institute for Pharmaceutical Industry Fellowships (RPIF), Pharm.D./M.P.H. Program

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 104

Radiofrequency Therapy for Pain Management of Temporomandibular Joint Disorders: A Review of Standard Therapies and Emerging Approaches

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Temporomandibular disorders (TMD) are among the most common causes of nondental orofacial pain and affect an estimated 6% to 12% of the general population, with a subset progressing to chronic disease. Pain in TMD is multifactorial, arising from structural, muscular, and systemic contributors. Key anatomic pain generators include the highly innervated and vascularized retrodiscal tissues, which may become inflamed during internal derangement, while chronic myogenous TMD may also involve central sensitization, amplifying pain perception and functional impairment. Current management is typically conservative and multimodal, combining nonpharmacologic strategies with pharmacologic therapy. The preferred first-line treatment is non-pharmacologic such as heat compress, facial massage, mouth guards, and soft diet. First-line drug treatment commonly includes nonsteroidal anti-inflammatory drugs and skeletal muscle relaxants, while refractory cases may require agents such as benzodiazepines, tricyclic antidepressants, anticonvulsants, or botulinum toxin.

Given the limitations of standard therapies and the persistent burden of chronic TMD pain, radiofrequency-based treatment has emerged as a promising area of interest in pain management. As a minimally invasive or noninvasive modality, radiofrequency therapy is being explored for its potential to reduce pain, improve jaw function, and expand treatment options for patients who do not achieve adequate relief with conservative care alone. Within the broader TMD treatment landscape, this approach represents part of a growing shift toward emerging therapies that may bridge the gap between first-line management and more invasive surgical interventions. Early investigation in temporomandibular joint treatment, including pilot study and clinical trial interest in radiofrequency applications, suggests that this modality may have value in improving pain outcomes and maximal incisal opening, although further research is needed to better define its role, efficacy, and long-term clinical utility.

Program Affiliations: N/A

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 105

Healing the Healers: Evaluating Wellness in Physicians and Pharmacy Students

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Introduction: Several behaviors contribute to a healthy lifestyle, including adherence to the Mediterranean diet, obtaining 7–8 hours of sleep nightly, engaging in at least 150 minutes of moderate physical activity weekly, managing stress, and avoiding risky substances.

Methods: A cross-sectional survey including validated measures assessing diet, physical activity, sleep, stress, and substance use was administered to pharmacy students and internal medicine physicians. Following the educational session on lifestyle medicine guidelines, the physicians completed a post-lecture survey which included a behavioral change goal.

Results: 29 pharmacy students and 76 physicians completed the initial survey. No students and 6% of physicians demonstrated high adherence to the Mediterranean diet. Exercise adherence was similar between groups (42% of students vs. 41% of physicians meeting recommendations). Most students reported sleeping 7–8 hours nightly (68%) compared with 59% of physicians, with 37% physicians vs. 26% of students sleeping ≤6 hours. However, physicians reported better perceived sleep quality. Alcohol use was common in both groups (87% of students and 80% of physicians), with higher rates of unhealthy consumption among students. Tobacco smoking was rare, with 100% of students and 95% of physicians reporting never smoking. 45% of students scored ≥8 on the PSS-4, indicating high perceived stress. Readiness to change behaviors was reported by 29% of students and 38% of physicians, while 23% of each group reported high confidence in their ability to change. 33 physicians completed the post-lecture survey; 75% (25/33) created a SMART goal, most focused on personal lifestyle changes (80%) rather than patient-related goals (20%).

Discussion: These findings suggest suboptimal adherence to several lifestyle medicine pillars among both physicians and students. Innovative strategies are needed to support healthcare professionals in improving their wellness.One suggestion is to include lifestyle medicine in healthcare curriculums.

Program Affiliations: Pharm.D. Honors Research Program

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 106

Impact of Pneumonia Order Set Utilization on Readmission Rates and Mortality: A Retrospective Evaluation

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The management of pneumonia remains a significant challenge due to its association with hospital readmissions and mortality. Order sets are designed to standardize care and improve outcomes, but their impact in pneumonia has not been consistently evaluated. The purpose of this study was to assess whether use of a standardized pneumonia order set was associated with differences in readmission rates at 30, 31–60, and 61–90 days, as well as one-year mortality among hospitalized patients.

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Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 107

Pharmacological vs Non-Pharmacological treatments for Neurological Disorders

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Neurodegenerative diseases such as Alzheimer's disease and Parkinson's disease present a growing global health burden, characterized by progressive neuronal loss and declining cognitive and motor function. Current treatment strategies typically fall into two broad categories: pharmacological therapies and non-pharmacological interventions. Pharmacological approaches—including cholinesterase inhibitors, NMDA receptor antagonists, and dopaminergic therapies—primarily aim to alleviate symptoms or modestly slow disease progression through targeted modulation of neurotransmitter systems and pathological protein pathways. In contrast, non-pharmacological strategies such as physical exercise, cognitive training, dietary modification, and social engagement seek to improve neurological resilience by enhancing neuroplasticity, reducing inflammation, and supporting overall brain health.

While these approaches are often studied independently, emerging evidence suggests that combining pharmacological and non-pharmacological interventions may produce synergistic benefits. This review explores the relative effectiveness of each treatment category and proposes a conceptual framework in which integrated therapy may enhance therapeutic outcomes beyond what either approach can achieve alone. We hypothesize that pharmacological treatments may stabilize key neurochemical pathways, thereby creating a physiological environment in which lifestyle-based interventions can more effectively promote neuroplasticity, cognitive reserve, and functional recovery. By examining existing literature through this combined lens, this work aims to highlight the potential for multimodal therapeutic strategies to improve disease management and patient quality of life in neurodegenerative disorders.

Program Affiliations: EMSOP

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 108

Retrospective Study on the Effect of In-Hospital Initiation of Empagliflozin on Readmission Rates in Patients with Heart Failure

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Heart failure affects over 6 million Americans and is associated with substantial healthcare costs, largely driven by frequent hospitalizations. Repeated admissions increase both economic burden and mortality risk. Empagliflozin, a sodium-glucose cotransporter 2 (SGLT2) inhibitor, has been shown to reduce hospitalization risk in patients with heart failure with reduced ejection fraction (HFrEF). Given this benefit, this study evaluated whether in-hospital initiation of empagliflozin reduces 30-day readmission rates among patients with HFrEF at Hunterdon Medical Center. A retrospective chart review was conducted using medication administration reports generated from the electronic health record. Data collected from January 1, 2022, to December 31, 2024, included patient demographics, comorbidities, guideline-directed medical therapy use, renal function, admission date, initiation date, and discharge date. Patients were eligible for inclusion if they were Medicare beneficiaries admitted within the study timeframe with a diagnosis of HFrEF and were initiated on empagliflozin during hospitalization with continuation at discharge. Exclusion criteria included dialysis or palliative care status, prior use of an SGLT2 inhibitor before admission, and admission to maternity, pediatric, or psychiatric units. Thirty-day all-cause readmission rates among patients initiated on empagliflozin were compared with Hunterdon Medical Center's Medicare overall heart failure readmission rates from 2022–2024. Fisher's exact test was used to compare proportions, and absolute differences with 95% confidence intervals were calculated. Statistical significance was defined as $p < 0.05$. The primary outcome was 30-day all-cause hospital readmission, and the secondary exploratory outcome was 90-day all-cause readmission. From January 2022 to December 2024, 29 Medicare patients with HFrEF were initiated on and discharged with empagliflozin. Three patients (10.3%) were readmitted within 30 days compared with 139 patients (17.2%) among the hospital's overall Medicare heart failure population ($n = 809$). The absolute risk difference was −6.8% (95% CI, −18.2% to 4.5%), which was not statistically significant ($p = 0.45$). At 90 days, five patients (17.2%) in the empagliflozin group were readmitted. In-hospital initiation of empagliflozin in Medicare patients with HFrEF was associated with numerically lower 30-day readmission rates; however, the difference was not statistically significant. This may be due to the small sample size and the hospital's relatively low baseline readmission rates. Additional limitations include the lack of a direct comparison group, as the hospital's overall heart failure population may include patients receiving SGLT2 inhibitors or those with ejection fractions greater than 40%. Further studies with larger sample sizes and more direct comparison groups are needed to confirm these findings.

Program Affiliations: KNIGHT ScholaRx

Poster Category: Clinical Science

Primary Author Title: Pharm.D. Student

Abstract 109

Suzetrigine: A Review of the First Voltage-gated NaV1.8 Channel Blocker Approved for Acute Management of Pain

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Objective: This article reviews clinical trial data regarding safety, efficacy, and clinical applicability of suzetrigine, a voltage-gated NaV1.8 channel blocker, for the treatment of acute pain.

Data sources: A review was conducted using MEDLINE(PubMed) and Clinicaltrials.gov. The search terms included “suzetrigine”, “VX-548”, and “Journavx”.
Study selection: Relevant articles in English related to the safety, efficacy, pharmacodynamics, and pharmacokinetics of suzetrigine were included.

Data Synthesis: In a phase II trial comparing hydrocodone/acetaminophen and middle/high-dose suzetrigine to placebo in postoperative abdominoplasty patients, the high-dose suzetrigine group showed a statistically significant reduction in Numeric Pain Rating Scale (NPRS) scores versus placebo: least squares mean (LSM) difference 37.8 (95% CI: 9.2–66.4). In another phase II trial comparing hydrocodone/acetaminophen and low-, middle-, and high-dose suzetrigine to placebo in postoperative bunionectomy patients, the high-dose group demonstrated a statistically significant NPRS reduction versus placebo: LSM difference 36.8 (95% CI: 4.6–69.0).

Two phase III trials in postoperative abdominoplasty and bunionectomy patients compared suzetrigine with placebo and hydrocodone/acetaminophen. Suzetrigine demonstrated statistically significant reduction on the NPRS versus placebo with LSM differences of 48.4 ($p<0.0001$) and 29.3 ($p=0.0002$), respectively. However, no statistically significant LSM difference was observed versus hydrocodone/acetaminophen in abdominoplasty (6.6; $p=0.2781$), and statistically significant inferiority was observed in bunionectomy (LSM difference −20.2; $p=0.0016$).

In a single-arm phase III safety study, only mild adverse events were reported: headache 7.0%, constipation 3.5%, and nausea 3.1%.

Relevance to Clinical Practice: Suzetrigine is safe and effective for acute pain management and may compliment multimodal pain regimens. Unlike opioids, which pose a risk of addiction, dependence, and respiratory depression/overdose, suzetrigine demonstrates only mild adverse effects.

Conclusion: Suzetrigine is safe and effective for the treatment of acute moderate-to-severe pain in adults. Future studies are needed to establish superiority/inferiority to opioids/established pain regimens and to better understand synergy in multimodal pain regimens.

Program Affiliations: Pharm.D./M.D. Program

Poster Category: Clinical Science

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Abstract 110

Longitudinal Monitoring of Patients Receiving Immune Checkpoint Inhibitors to Support Early Detection of Treatment-Associated Toxicities

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Immune checkpoint inhibitor therapy can induce immune-mediated toxicities affecting multiple organs, yet identifying early signals of these events during treatment remains challenging. In routine clinical practice, symptom reporting and standard laboratory measurements may fail to detect subtle biological changes that precede clinically apparent toxicity. Prospective longitudinal monitoring of patients undergoing immunotherapy offers an opportunity to systematically capture treatment-associated changes and establish a framework for early biomarker discovery. We are conducting an ongoing prospective cohort study at the Rutgers Cancer Institute of New Jersey to longitudinally monitor patients receiving immune checkpoint inhibitors. During infusions, patients complete a standardized survey of chemotherapy side effects known as the Patient-Reported Outcomes version of the Common Terminology Criteria for Adverse Events (PRO-CTCAE) and extant data for clinical chemistry measurements are extracted from the electronic health records. In parallel, serial plasma and urine biospecimens are collected across treatment cycles, enabling within-patient baseline-to-follow-up comparisons for discovery of immunotoxicity biomarkers. To date, twenty patients receiving immune checkpoint inhibitors have been enrolled in the Rutgers cohort. Preliminary longitudinal analysis demonstrates generally mild symptom burden across visits based on PRO-CTCAE severity scores (0–4 scale) and relatively stable laboratory markers during early follow-up. Because several patients remain on therapy and have not yet completed follow-up, enrollment and biospecimen collection are ongoing. These findings demonstrate the feasibility of prospective longitudinal clinical monitoring in patients receiving immune checkpoint inhibitor therapy while highlighting the limited sensitivity of conventional symptom and laboratory measures for detecting early treatment-associated changes. Continued collection of paired plasma and urine samples in this cohort will support future studies aimed at identifying sensitive metabolic biomarkers capable of detecting immune-related toxicity prior to overt clinical manifestations. This work was supported by the National Institutes of Health R01CA277313 and K12GM093854.

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Poster Category: Clinical Science

Primary Author Title: Postdoctoral Associate

Abstract 111

Epigenetic Signatures of Adolescent Insecticide Exposure and Risk for Attention-Deficit/Hyperactivity Disorder (ADHD)

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Adolescence is a critical developmental window during which the brain undergoes extensive maturation, particularly in neural circuits underlying executive function, attention, and impulse control. These processes are strongly influenced by pubertal hormonal changes and are highly sensitive to environmental toxicants. Insecticide exposure is widespread among adolescents through dietary, residential, and occupational pathways, yet its long-term neurobehavioral consequences remain poorly understood.

We study a cohort of Egyptian adolescent pesticide applicators who experience seasonal occupational exposure to the insecticides α-cypermethrin and chlorpyrifos during agricultural spraying. Prior work in this cohort demonstrates that increased exposure to these insecticides correlates with increased ADHD-related symptoms and impaired neurobehavioral performance. Notably, these impairments persist months after peak exposure, suggesting that transient exposures during adolescence produce lasting biological changes.

The epigenome represents a promising mechanistic mediator linking environmental exposures to long-term neurobehavioral outcomes. Epigenetic modifications such as DNA modifications are highly responsive to environmental stimuli and regulate gene expression across the lifespan. Previous studies demonstrate that insecticide exposure is associated with altered DNA modification patterns in humans and experimental models, including genes involved in dopaminergic signaling and neurodevelopment.

We hypothesize that adolescent exposure to α-cypermethrin and chlorpyrifos induces persistent changes in DNA modifications that alter neurobiological pathways underlying attention and executive function. By integrating human epidemiological data with experimental models, this translational approach provides mechanistic insight into how adolescent insecticide exposure influences long-term brain function and ADHD-related outcomes, informing policies and interventions to protect adolescent neurodevelopment.

Program Affiliations: Joint Graduate Program in Toxicology

Poster Category: Clinical Science

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