

My Research Voyage at UC: Building Strong Interdisciplinary Research Teams



Gagan Kaushal, Ph.D.
Associate Professor

Department of Pharmaceutical and Administrative Sciences
University of Charleston School of Pharmacy



Active Research Projects

1. Stability testing of routinely compounded large volume parenteral
2. Transdermal patch development of capsaicin using genomic approach for treatment of chronic low back pain
3. Working on projects dealing with the clinical uses of D-Cycloserine (DCS) in pain and phobia

Project 1

STABILITY TESTING OF ROUTINELY COMPOUNDED LARGE VOLUME PARENTERAL

Objective

- To investigate the stability of routinely compounded sterile preparations at a tertiary care health-system in order to improve the operational efficiency and contribute the findings to the pharmaceutical literature

Products Tested

	Product	Concentration	Reconstituted in
1.	Sodium Bicarbonate	150 meq in 850	Dextrose 5%
2.	Sodium Bicarbonate	100 meq in 900	Dextrose 5%
3.	Diltiazem	125 mg in 125	Dextrose 5%
4.	Norepinephrine	80 mcg in 10 mL	Sodium Chloride 0.9%
5.	Magnesium Sulfate	50 gram in 500	Lactated Ringers
6.	Oxytocin	20 units in 1000	Sodium Chloride 0.9%
7.	Calcium Chloride	1 gram in 50 mL	Sodium Chloride 0.9%
8.	Calcium Gluconate	1 gram in 50 mL	Sodium Chloride 0.9%
9.	Calcium Gluconate	2 gram in 50 mL	Sodium Chloride 0.9%
10.	Famotidine	2 mg in 1 mL	Water for Injection
11.	Cardioplegia	Different	Water for Injection

Methods

- Compounding: Done by CAMC Solutions staff in the UCSOP intravenous compounding lab following predefined procedures developed by CAMC Solutions in accordance with United States Pharmacopoeia (USP) Chapter 797 standards.
- Assays: Developed by UCSOP as per the USP direction for each product. Under the stability studies, pH, particulate matter, and the active content were monitored for 30 days. The preparations were stored under 3 different temperature conditions of $-20\text{ }^{\circ}\text{C}$, $2-6\text{ }^{\circ}\text{C}$ and $22-25\text{ }^{\circ}\text{C}$.

Implications

- Can be used as a model of collaboration between a hospital and a school of pharmacy.
- Collaboration lead to mutually beneficial scientific endeavors to improve operational efficiencies, decrease pharmaceutical expenditures, and provide contributions to the pharmaceutical literature by capitalizing on the expertise of both organizations.



Publications

- **Gagan Kaushal**, Brian E. Sayre, and Terrence Prettyman, Stability of intravenous diltiazem hydrochloride infusions prepared in polyolefin bags. American Journal of Health–System Pharmacy (In press).
- Brian E. Sayre, Terrence Prettyman, and **Gagan Kaushal**, Extended Stability of Sodium Bicarbonate Infusions prepared in Polyolefin Bags. Hospital Pharmacy Volume 47 (2012) Pages 538–543.
- **Gagan Kaushal**, Brian E. Sayre, and Terrence Prettyman, Stability–indicating HPLC method for the determination of the stability of extemporaneously prepared norepinephrine parenteral solutions. Journal of Liquid Chromatography & Related Technologies Volume 35 (2012) Pages 2533–2544.
- **Gagan Kaushal**, Brian E. Sayre, and Terrence Prettyman, Stability–indicating HPLC method for the determination of the stability of oxytocin parenteral solutions prepared in polyolefin bags. Drug Discoveries & Therapeutics, Volume 6 (2012) Pages 49–54.
- Brian E. Sayre, Terrence Prettyman, and **Gagan Kaushal**, Extended Stability of Magnesium Sulfate Infusions Prepared in Polyolefin Bags. Hospital Pharmacy, Volume 47 (2012) Pages 289–292.

Project 2

**TRANSDERMAL PATCH
DEVELOPMENT OF CAPSAICIN
USING GENOMIC APPROACH FOR
TREATMENT OF CHRONIC LOW**

Goals and Objective

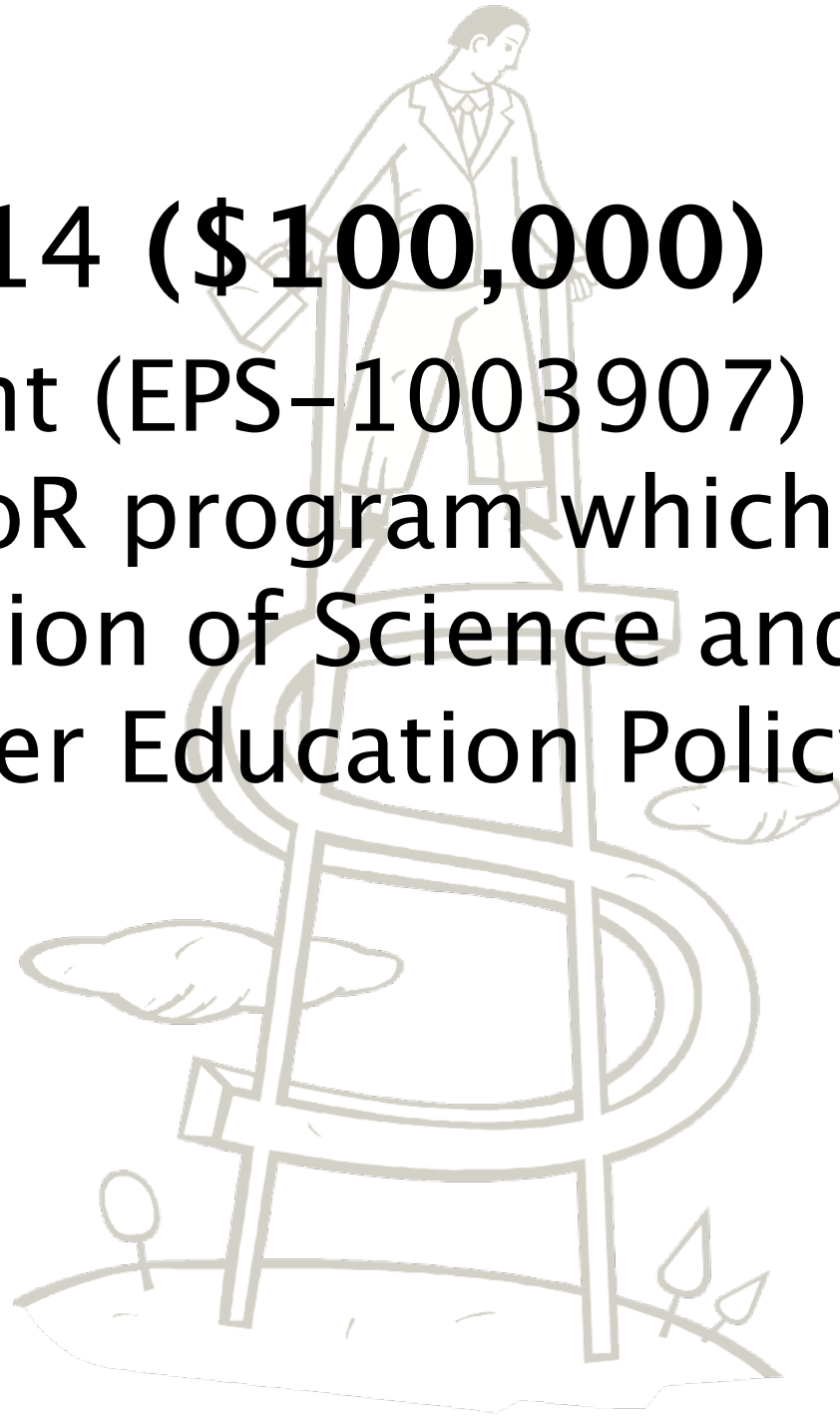
- The primary goal of our pepper breeding program is to pyramid the genes for various health related compounds such as capsaicin, carotenoids, ascorbic acid and total phenolics by genomics assisted selection (GAS)
- A key objective in the current proposal is to develop value added pepper varieties adapted to local conditions.
- From the capsaicin extracted from these peppers, a better tolerated capsaicin transdermal drug delivery system would be developed for the local application to the patients with neuropathic back pain

Implications

- The development of capsaicin patch without any burning sensation will be a breakthrough not only in the treatment of chronic back pain.
- West Virginia State University, a team of scientists under Dr. Reddy's (co-PI) supervision is working in pepper breeding and genomics and metabolomics of health related compounds. Dr. Kaushal's (PI) expertise is in pharmaceuticals, with emphasis on formulation development, drug delivery, analytical method development, and stability studies.
- This research will pave way for not only back pain treatment, but also the use of capsaicin as an anti-cancer drug.

Financial Support

- **2012–2014 (\$100,000)**
 - NSF Grant (EPS–1003907) awarded to the WVEPSCoR program which is managed by the Division of Science and Research at the WV Higher Education Policy Commission.



Project 3

ENHANCEMENT OF EXPOSURE THERAPY FOR ANXIETY DISORDERS USING D-CYCLOSERINE

Our Study on ClinicalTrials.gov

Study 8 of 55 for search of: D CYCLOSERINE

[← Previous Study](#) [Return to Search Results](#) [Next Study →](#)

Full Text View

[Tabular View](#)

No Study Results Posted

[Related Studies](#)

D-Cycloserine-Enhancer of One-Session Treatment for Phobia of Heights

This study is currently recruiting participants.

Verified by CAMC Health System, December 2009

First Received: December 18, 2009 No Changes Posted

Sponsor:	CAMC Health System
Collaborators:	Charleston Area Medical Center Health Education and Research Institute West Virginia University University of Charleston
Information provided by:	CAMC Health System
ClinicalTrials.gov Identifier:	NCT01037101

▶ Purpose

D-Cycloserine Clinical Trial Studies

PHOBIA

PAIN

Acrophobia

Site: CAMC and WVU,
Charleston Division
PI: Drs. Cristian Sirbu
and Gagan Kaushal

Dental Phobia

Sites: WVU,
Morgantown and
Indiana University
PI: Dr. Daniel McNeil

Chronic Back Pain

Sites: Northwestern
University, Chicago, IL
PI: Dr. A. Vania Apkarian

Financial Support

PI: Gagan Kaushal

- 2007–2009 (\$50,000) CAMC Health Education and Research Institute, Charleston Area Medical Center Foundation, Robert C. Byrd, Health Sciences Center, West Virginia University, Charleston Division
- 2009–till date (\$125,000, total direct cost)
 - Faculty Research Development Grant Applications by NIH WV–INBRE (Grant numbers: NIH P20RR016477 and P20GM103434).
 - 2012–2013 (\$50,000) Clinical and Translational Science Institute (CTSI)

My Group

