

## CURRICULUM VITAE

Neeraj Kapur, PhD

### CONTACT INFORMATION

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**Date of Birth:**

December 7, 1980

**Birthplace:**

Delhi, INDIA

**Social Security Number**

Upon Request

**Citizenship status:**

Permanent Resident (US)

### EDUCATION

B.S.	Hindu College, Delhi University, INDIA.	07/1999 - 07/2003
M.S.	Indian Institute of Technology, Roorkee, INDIA	08/2003 – 09/2005
Ph.D	All India Institute of Medical sciences (AIIMS), Delhi, INDIA	01/2006 – 05/2012

### CONTINUING EDUCATION

University of Kentucky **Part-Time MBA Program**

01/2025-

**Year-1:** *Quantitative Analysis in Business Decision Making, Corporate Financial Policy, Financial/Managerial Accounting, Managerial Economics*

01/2025-12/2025

**Veteran Affairs' Translational Education and Mentoring Centre (VA-TEAM) program**, Phase 1 and 2.

03/2021-02/2022

Certificate course on “**Making Medicines: The process of drug development**”, designed by Eli Lilly.

05/09/2018

**Course objectives:** (a) Gain deeper insight into the drug discovery and development process; (b) Describe the regulatory environment under which drugs are developed; (c) Learn how patient insight informs drug development and clinical trials; and (d) Identify key stakeholders and their contributions to drug development.

**Health Disparities Research Training Program (HDRTP)**

09/2016-08/2017

HDRTP is a core program for few selected junior faculties or post-doctoral fellows, which is organized every year by Minority Health and Health Disparities Research Center (MHRC), University of Alabama at Birmingham School of Medicine. This training program focuses on health disparities research in obesity, cancer, aging, cardiovascular disease, HIV, and other disease conditions.

Certificate course on “**Intellectual Property**”, by World Intellectual Property Organization

03/2009-04/2009

### ACADEMIC APPOINTMENTS

Research Assistant Professor	Division of Gastroenterology, Dept. of Internal Medicine, University of Kentucky, KY	07/2019-
Research Associate	Morehouse School of Medicine, Atlanta, GA	10/2016-06/2019
Post-doctoral Fellow	Morehouse School of Medicine, Atlanta, GA	07/2014-10/2016
Research Associate	All India Institute of Medical sciences (AIIMS), Delhi, INDIA	05/2012-07/2014

## RESEARCH & SCHOLARLY ACTIVITY

### ***Inflammatory Bowel Diseases (07/2019-Present):***

#### a. RESEARCH FOCUS:

***Primary objective:*** To develop therapy that would enhance mucosal healing and mitigate inflammatory responses in IBD patients.

My current research is oriented towards investigating the basic mechanism involved in healing of the colonic mucosal barrier in inflammatory bowel disease (IBD). The prime focus of my research is to examine how intestinal epithelial cell biology is modulated during acute and chronic inflammatory conditions, which can help develop strategies for novel IBD therapy. As a Research Assistant Professor, I have been working on various aspects of intestinal epithelial cell biology, specifically directed towards understanding the role of mitochondrial respiration in intestinal mucosal healing. List of studies conducted since 2019 are as follows:

#### ***Investigating the molecular mechanism involved in ulcer healing in Inflammatory Bowel Disease patients (IBD) and acute DSS-colitis mice model***

The study revolved around the hypothesis that molecular and metabolic reprogramming in intestinal epithelial cells (IECs) governs partial epithelial restitution in IBD. The goal was to investigate how IECs respond to colitis under repressed mitochondrial respiration, a hallmark feature of IBD. ***Study outcome:*** Mitochondrial dysfunction in IBD induces a metabolic switch in IECs from oxidative phosphorylation (OXPHOS) to glycolysis, which is associated with partial epithelial-to-mesenchymal transition (EMT). These findings suggest that a critical driver of chronic ulceration in IBD is the failure of intestinal epithelial cells (IEC) to increase mitochondrial respiration and OxPHOS metabolism may be an important therapeutic target to improve healing in refractory colitis.

#### ***The role of crypt fissioning and mitochondrial function in IBD ulcer healing***

The importance of mucosal healing in inflammatory bowel disease (IBD) derives from clinical data that demonstrate it to be a predictor of remission. Thus, ulcer healing is a marker of therapeutic efficacy and maintenance of healing prevents unwanted clinical sequelae such as surgery. Unfortunately, many IBD patients remain refractory or lose responsiveness to therapies and suffer persistent mucosal ulceration. Earlier studies have shown that reduced mitochondrial gene expression predicts unfavorable outcomes in ulcerative colitis (UC) and Crohn's disease (CD), as patients were less likely to experience progression of complicated disease. This study is based on the hypothesis that mitochondria-deficient IECs are incapable of undergoing crypt fissioning. The study aims to determine the role of mitochondrial dysfunction in IBD mucosal repair using mitochondria-deficient mice and human models. The study proposed that chronic mucosal inflammation suppresses mitochondrial respiration which lower mitochondria-derived ROS needed for phosphoinositide 3-kinase (PI3K) signaling. PI3K signaling is a critical step required for crypt fissioning, a necessary part of mucosal restitution (ulcer healing) in IBD.

#### ***Novel oral therapy that increases mitochondrial function and attenuates colitis***

The study proposes to examine the role of increased mitochondrial ROS in colitis. The primary focus of this study is to investigate the role of drug-induced mitochondrial ROS (mtROS) in normal intestine and in mucosal ulcer healing in colitis. The study used a novel gold (Au)-based drug (AuPhos) that localizes to mitochondria where it increases mitochondrial respiration and mtROS production. These low levels of "endogenous" mtROS are known to promote healthy adaptive responses in cells including antioxidant enzyme activities. ***Study outcome:*** Oral administration of AuPhos in colitis mice has remarkable effect on increasing mucosal repair by: 1) increasing IEC mitochondrial oxygen consumption rate (OCR) and oxidative phosphorylation (OXPHOS), 2) restoring intestinal barrier function 3) accentuating crypt fissioning, 4) reducing mucosal inflammatory cytokines 5) mtROS production in IEC as well as 6) phosphoinositides-3 kinase (PI3K) signaling with 7) improved expression of proteins that induce mitochondrial biogenesis.

#### ***AuPhos, a novel drug that restores intestinal homeostatis by correcting dysbiosis in IBD***

The major goal of this study was to examine the microbiome effects of a novel oral IBD drug (AuPhos) that increases mitochondrial function in the intestine. The effects were measured in germ free wild type

and colitis-prone (*Il-10<sup>-/-</sup>*) mice reconstituted with human IBD stool. These humanized-*Il-10<sup>-/-</sup>* mice are excellent therapeutic model to study gut dysbiosis mimicking a human colitis condition. Study outcome: AuPhos restored microbial balance by facilitating healthy *Firmicute* bloom and correct dysbiosis in these humanized-*Il-10<sup>-/-</sup>* colitis mice. This is critical because the currently available approach of transplanting fecal microbiota from healthy donors to colitis patients has some safety concerns due to potential transmission of infections, pathogens, or parasites from the donor to the recipient. Findings suggest that AuPhos is a “first-in-class” oral therapeutic that corrects microbial dysbiosis in IBD by enhancing IEC OXPPOS and oxygen (O<sub>2</sub>) utilization.

*Enhanced epithelial mitochondrial function corrects dysbiotic metabolomics in humanized colitis mice*

The study tested the effect of our therapeutic agent ‘AuPhos’ on IBD-associated dysbiotic metabolism pertaining to gut microbiome. The study investigated the consequences of mitochondrial (Mito) dysfunction in IBD in perturbing homeostatic gut microbial metabolism. Study outcome: AuPhos- enhanced IEC mitochondrial function reduces enteric O<sub>2</sub> delivery, which corrects disease-associated metabolomics by restoring short-chain fatty acids, secondary bile acids, amino-acid and IEC energy metabolism.

b. PUBLICATIONS:

1. **Kapur N**, Hassan SA (2026). New Insights into Gut Microbiota in Colorectal Cancer. Front Cell Infect Microbiol. **(Editorial- under review)**
2. Gilpatrick ST, Kim JH, Bhogoju S, **Kapur N**, Hewage UM, Daraezinwa J, Parkin S, Barrett TA, Brainson CF, Daniel R. Plaugher DR, Awuah SG (2026). A Cyclometalated Gold(III) Complex Targets Mitochondrial VDAC1 to Drive Immunometabolic Reprogramming in Cancer. J Am Chem Soc. **(Peer-review completed and revised manuscript under-review)**
3. \*Bhogoju S, \***Kapur N**, Goretsky T, Vekaria H, Hassan SA, Patel PH, Wempe LA, Deaciuc AG, Kota V, Kim JH, Gilpatrick ST, Awuah S, Lee G, Sullivan PA, Chaiswing L, Beswick EJ, Barrett TA (2026). Enhanced mitochondrial function reduces colitis. Sci Trans Med **(\*Co-first author; Under Review)**
4. Kapur N, Bhogoju S, Krauth JR, Abomhya AA, Hassan SA, Spadafora VK, Parth PH, Deaciuc AG, Wempe LA, Kota V, Brown P, Goretsky T, Lee G, Gao T, Chaiswing L, Beswick EJ, Barrett TA (2026). Comparison of dysfunctional non-healing ulceration in IBD to physiologic (normal) ulcer healing in healthy adults: surprising roles of mitochondria-driven wnt signaling and antioxidant responses. J Crohn’s Colitis **(In preparation)**
5. **Kapur N**, Alam MA, Hassan SA, Patel PH, Wempe LA, Bhogoju S, Deaciuc AG, Goretsky T, Kim JH, Herzog J, Ge Y, Awuah SG, Byndloss M, Baumler AJ, Zadeh MM, Sartor RB, Barrett T (2026). Enhanced mucosal mitochondrial function corrects dysbiosis and OXPPOS metabolism in IBD. Cell Host Microbe. **((In preparation)**
6. **Kapur N**, Patel PH, Bhogoju S, Hassan SA, Deaciuc AG, Goretsky T, Lee G, Barrett TA (2026). Mitochondrial dysfunction causes cecal patch inflammation in ulcerative colitis. Inflamm Bowel Dis. **(In preparation)**
7. Goretsky T, Deaciuc AG, **Kapur N**, Bhogoju S Hassan SA, Barrett TA (2026). A new post-translational modification of  $\beta$ -catenin butyrylation at Lys345. Scientific reports. **(In preparation)**
8. Goretsky T, Abomhya A, **Kapur N**, Bhogoju S, Deaciuc AG, Avdiushko M, Hassan S, and Barrett TA (2026). Beta-catenin acetylation driven by mitochondrial deficiency in IBD prevents proper crypt architecture restitution in intestinal epithelia ulceration healing. Gastroenterology. **(In preparation)**
9. **Kapur N**, Bradford E, Goretsky T, Qu X, Liu J, Barrett TA (2026). Partial epithelial-to-mesenchymal transition drives intestinal wound healing in inflammatory bowel disease. Cell Mol Gastroenterol Hepatol. **(In preparation)**
10. **Kapur N**, Patel PH, Hassan SA, Bhogoju S, Deaciuc AG, Goretsky T, Lee G, Barrett TA (2026). Epithelial mitochondrial dysfunction in chronic pouchitis. Inflamm Bowel Dis. **(In preparation)**
11. \*Lynch EB, \***Kapur N**, Goretsky T, Bradford EM, Vekaria H, Bhogoju S, Hassan SA, Pauw E, Avdiushko R, Lee G, Gao T, Sullivan PA, Barrett TA (2025). PI3K signaling enhances intestinal crypt epithelial cell recovery after radiation. Am. J. Path. Aug;195(8):1411-1427 **(\*Co-first author; Peer- reviewed)**

12. Haque PS, **Kapur N**, Barrett TA, Theiss AL (2024). Mitochondrial function and gastrointestinal diseases. *Nat Rev Gastroenterol Hepatol*. Aug;21(8):537-555. **(Review)**
13. Hassan SA, **Kapur N**, Sheikh F, Fahad A, Jamal S (2024). Disease clearance in ulcerative colitis: A new therapeutic target for the future. *World J Gastroenterol*. 2024 Apr 7;30(13):1801-1809. **(Peer-reviewed)**
14. **Kapur N**, Alam MA, Hassan SA, Patel PH, Wempe LA, Bhogoju S, Goretsky T, Kim JH, Herzog J, Ge Y, Awuah SG, Byndloss M, Baumler AJ, Zadeh MM, Sartor RB, Barrett T (2024). Enhanced mucosal mitochondrial function corrects dysbiosis and OXPHOS metabolism in IBD. *bioRxiv*. Mar 14:2024.03.14.584471. **(Pre-Print Publication)**
15. Sun J, Ince MN, Abraham C, Barrett T, Brenner LA, Cong Y, Dashti R, Dudeja PK, Elliott D, Griffith TS, Heeger PS, Hoisington A, Irani K, Kim TK, **Kapur N**, Leventhal J, Mohamadzadeh M, Mutlu E, Newberry R, Peled JU, Rubinstein I, Sengsayadeth S, Tan CS, Tan XD, Tkaczyk E, Wertheim J, Zhang ZJ (2023). Modulating microbiome-immune axis in the deployment-related chronic diseases of Veterans: report of an expert meeting. *Gut Microbes*. Dec;15(2):2267180. **(Peer-reviewed)**
16. Bhogoju S, **Kapur N**, Patel P, Hassan S, Wempe L, Deaciuc A, Gilpatrick S, Awuah S, Chaiswing L, Goretsky T, Barrett T. Enhanced antioxidant signaling by mitochondrial-targeted drug AuPhos drives attenuation of colitis. *Gastroenterology* 2025, 168:S65-S66. **(Abstract)**
17. Lynch EB, **Kapur N**, Goretsky T, Bradford EM, Vekaria H, Pauw E, Avdiushko MG, Hassan S, Lee G, Gao T, Sullivan PG, Barrett T. Increased PI3K/Akt-induced survivin drives intestinal crypt healing in response to radiation injury via enhanced mitochondrial-derived ROS signaling. *Gastroenterology* 2025, 168:S67. **(Abstract)**
18. Goretsky T, Deaciuc A, Bhogoju S, Hassan S, **Kapur N**, Barrett T. Lysine acetyltransferases of both p300/CBP (p300 and pCAF) and MYST (Tip60) families butyrylate beta catenin at lysine 345 and increase its transcriptional activity. *Gastroenterology* 2025, 168:S69-S70. **(Abstract)**
19. **Kapur N**, Hassan SA, Patel PH, Wempe LA, Herzog J, Kim JH, Bhogoju S, Goretsky T, Ge Y, Alam MA, Awuah SG, Byndloss M, Baumler AJ, Kamat M, Garrett TJ, Zadeh MM, Sartor RB, Barrett TA. Enhanced epithelial mitochondrial function corrects dysbiotic metabolomics in humanized IL-10 KO mice. [abstract]. In: *Proceedings of Digestive Disease Week 2024*; May 18-21; Washington DC. *Gastroenterology*, Volume 166, Issue 5, S551: American Gastroenterology Association Abstract nr 1852. **(Abstract)**
20. Hassan SA, Rasheed W, **Kapur N**, Perry C (2024). "Su1012 Colorectal cancer related mortality trends in appalachian kentucky from 1999-2020: a persistent healthcare disparity." *Gastroenterology* 166(5): S-636. **(Abstract)**
21. Goretsky T, Bhogoju S, **Kapur N**, Deaciuc AG, Hassan SA, Gao T, Barrett TA. Activation of YAP is increased by acetylated beta catenin, A possible role of glycolytic metabolism in wound healing in IBD? [abstract]. In: *Proceedings of Digestive Disease Week 2024*; May 18-21; Washington DC. *Gastroenterology*, Volume 166, Issue 5, S1354: American Gastroenterology Association Abstract nr 1497. **(Abstract)**
22. Bhogoju S, **Kapur N**, Vekaria H, Goretsky T, Hassan SA, Deaciuc AG, Awuah SG, Sullivan PG, Chaiswing L, Barrett TA. New water-soluble AUPHOS (AUPHOS-Glucamine) enhances mitochondrial biogenesis and antioxidant effects in IBD. [abstract]. In: *Proceedings of Digestive Disease Week 2024*; May 18-21; Washington DC. *Gastroenterology*, Volume 166, Issue 5, S1352: American Gastroenterology Association Abstract nr 1489. **(Abstract)**
23. Parth PH, Hassan SA, Kasem A, Wempe L, Elsayed M, Bhogoju S, Goretsky T, Lee G, Barrett TA, **Kapur N**. Mitochondrial dysfunction causes cecal patch inflammation in ulcerative colitis. [abstract]. In: *Proceedings of Crohn's and Colitis Congress 2024*; May 18-21; Las Vegas, NV. *Gastroenterology*, Volume 166, Issue 3, S82. **(Abstract)**
24. Krauth JR, Hassan SA, ElSaadani M, Wempe L, Kasem A, Bhogoju S, Goretsky T, Lee G, Barrett TA, **Kapur N**. Repressed mitochondrial function limits crypt fissioning in inflammatory bowel disease. [abstract]. In: *Proceedings of Crohn's and Colitis Congress 2024*; May 18-21; Las Vegas, NV. *Gastroenterology*, Volume 166, Issue 3, S84. **(Abstract)**

25. Patel PH, Elsayed M, Hassan SA, ElSaadani M, Kasem A, Wempe L, Bhogoju S, Goretsky T, Lee G, Barrett TA, **Kapur N**. Epithelial mitochondrial dysfunction in chronic pouchitis. [abstract]. In: Proceedings of Crohn's and Colitis Congress 2024; May 18-21; Las Vegas, NV. Gastroenterology, Volume 166, Issue 3, S80. **(Abstract)**
26. Hassan SA, Perry C, Flomenhoft D, Richardson B, **Kapur N**, Berinstein J, Barrett T (2024). "Upadacitinib as second- and third-line salvage therapy for refractory acute severe ulcerative colitis." Gastroenterology 166(3): S124-S125. **(Abstract)**
27. Bhogoju S, **Kapur N**, Vekaria H, Goretsky T, Hassan SA, Kim JH, Awuah S, Sullivan P, Chaiswing L, Barrett TA. Enhanced mitochondrial biogenesis increases antioxidant enzymes and improves tissue inflammation in human IBD tissue. [abstract]. In: Proceedings of Crohn's and Colitis Congress 2024; May 18-21; Las Vegas, NV. Gastroenterology, Volume 166, Issue 3, S79-S80. **(Abstract)**
28. **Kapur N**, ElSaadani M, Warinner JM, Wempe LA, Hassan SA, Herzog J, Elzayat T, Ahmed MEA, Kim JH, Bhogoju S, Goretsky T, Abomhya AA, Alam MA, Lee G, Awuah SG, Byndloss M, Sartor RB, Barrett T. AuPhos, a novel drug that restores intestinal homeostasis by correcting dysbiosis in inflammatory bowel diseases. [abstract]. In: Proceedings of Digestive Disease Week 2023; May 6-9; Chicago, IL. Gastroenterology, Volume 164, Issue 6, S-99: American Gastroenterology Association Abstract nr 562. **(Abstract)**
29. ElSaadani M, Warinner JM, Elzayat T, Wempe LA, Hassan SA, Ahmed MEA, Kim JH, Bhogoju S, Goretsky T, Abomhya AA, Lee G, Awuah SG, Beswick EJ, **Kapur N**, Barrett T. AuPhos, a novel anti-fibrotic agent for chronic colitis. [abstract]. In: Proceedings of Digestive Disease Week 2023; May 6-9; Chicago, IL. Gastroenterology, Volume 164, Issue 6, S-1006: American Gastroenterology Association Abstract nr Tu1250. **(Abstract)**
30. Warinner JM, ElSaadani M, Rosenau K, Kim JH, Hassan SA, Bhogoju S, Wempe LA, Goretsky T, Alam MA, Awuah SG, Barrett T, **Kapur N**. AuPhos, a novel drug that improves colitis by microbiome induced metabolic changes. [abstract]. In: Proceedings of Crohn's and Colitis Congress 2023; Jan 19-21; Denver, CO. Gastroenterology, Volume 164, Issue 4, S62-S63. **(Abstract)**
31. Bhogoju S, **Kapur N**, Chaiswing L, Kim JH, Awuah SG, Goretsky T, Barrett T. A novel drug therapy induces mitochondrial biogenesis and attenuates colitis. [abstract]. In: Proceedings of Crohn's and Colitis Congress 2023; Jan 19-21; Denver, CO. Gastroenterology, Volume 164, Issue 4, S-70. **(Abstract)**
32. Conder E, Shay HC, Vekaria H, Erinkitola I, Bhogoju S, Goretsky T, Sullivan P, Barrett T, **Kapur N**. Butyrate-induced mitochondrial function improves barrier function in inflammatory bowel disease (IBD). [abstract]. In: Proceedings of Crohn's and Colitis Congress 2023; Jan 19-21; Denver, CO. Gastroenterology, Volume 164, Issue 4, S-91. **(Abstract)**
33. Erinkitola I, Abomhya AA, Hassan SA, Conder E, Rosenau K, **Kapur N**, Goretsky T, Barrett T. Epithelial cells of ulcerative colitis patients require normal levels of mitochondria and beta-catenin to utilize butyrate metabolism and promote ulcer healing. [abstract]. In: Proceedings of Crohn's and Colitis Congress 2023; Jan 19-21; Denver, CO. Gastroenterology, Volume 164, Issue 4, S59-S60. **(Abstract)**
34. **Kapur N**, Mohamed RT, Qu X, Liu J, Warinner JM, Wempe LA, Goretsky T, Avduisko M, Kim JH, Abdelsatar A, Awuah SG, Lee G, Barrett TA. Novel oral therapy that increases mitochondrial function and attenuates colitis. [abstract]. In: Proceedings of Digestive Disease Week 2022; May 21-24; San Diego, CA. Gastroenterology, Volume 162, Issue 7, S-405: American Gastroenterology Association Abstract nr Sa1533. **(Abstract)**
35. **Kapur N**, Kim JH, Goretsky T, Vekaria H, Avduisko M, Warinner JM, Mohamed RT, Wempe LA, Abdelsatar A, Awuah SG, Lee G, Sullivan PG, Barrett TA. Novel gold compound that regulates cell metabolism to promote crypt fissioning in IBD. [abstract]. In: Proceedings of Digestive Disease Week 2022; May 21-24; San Diego, CA. Gastroenterology, Volume 162, Issue 7, S-405: American Gastroenterology Association Abstract nr Sa1534. **(Abstract)**
36. Goretsky T, Abomhya A, Elsayed A, **Kapur N**, Avduisko M, Barrett TA. Beta catenin acetylation at lys345 and lys672, driven by glycolysis, is an integral step in intestinal epithelia ulceration healing. [abstract]. In: Proceedings of Digestive Disease Week 2022; May 21-24; San Diego, CA. Gastroenterology, Volume 162, Issue 7, S-206: American Gastroenterology Association Abstract nr

829. **(Abstract)**

37. Abomhya A, Goretsky T, **Kapur N**, Perry C, Avduisko M, Bradford E, Barrett TA. OxPHOS drives crypt fissioning required for healing of IBD ulcers. [abstract]. In: Proceedings of Crohn's and Colitis Congress 2022; Jan 20-22; Las Vegas, CA. Gastroenterology, Volume 162, Issue 3, S52. **(Abstract)**
38. Elsayed A, Abomhya A, Avduisko M, **Kapur N**, Awuah SG, Barrett TA, Goretsky T. New OxPHOS regulating compound – AuPhos –Increases mitochondrial complexes expression in murine and human intestinal epithelial cells [abstract]. In: Proceedings of Crohn's and Colitis Congress 2022; Jan 20-22; Las Vegas, CA. Gastroenterology, Volume 162, Issue 3, S51. **(Abstract)**
39. Mohamed RT, Warinner JM, Wempe LA, Goretsky T, Avduisko M, Kim JH, Abomhya A, Lee G, Awuah SG, Barrett TA, **Kapur N**. AuPhos, a novel therapeutic that improves mitochondrial function and ameliorates chronic colitis [abstract]. In: Proceedings of Crohn's and Colitis Congress 2022; Jan 20-22; Las Vegas, CA. Gastroenterology, Volume 162, Issue 3, S2-S3. **(Abstract)**
40. Wempe LA, Mohamed RT, Warinner JM, Goretsky T, Avduisko M, Kim JH, Abomhya A, Lee G, Awuah SG, Barrett TA, **Kapur N**. AuPhos, a “first-in class” oral agent for Correcting metabolic dysfunction in IBD [abstract]. In: Proceedings of Crohn's and Colitis Congress 2022; Jan 20-22; Las Vegas, CA. Gastroenterology, Volume 162, Issue 3, S2. **(Abstract)**
41. Goretsky T, **Kapur N**, Abdelsatar A, Avduisko M, Barrett TA. Colitis-induced glycolysis drives yap-dependent Reprogramming of intestinal epithelial cells (IEC) needed for ulcer healing. [abstract]. In: Proceedings of Digestive Disease Week 2020; 2020 May 2-5; Chicago, IL. Gastroenterology 2020; 158:6 (S-30): American Gastroenterology Association Abstract nr 143. **(Abstract)**
42. **Kapur N**, Thomas JM, Perry C, Barrett TA. Transcription of mitochondria-transcribed genes differentiates normal wound healing in humans from delayed ulcer healing in inflammatory bowel disease (IBD) [abstract]. In: Proceedings of Digestive Disease Week 2020; 2020 May 2-5; Chicago, IL. Gastroenterology 2020; 158:6 (S-31): American Gastroenterology Association Abstract nr 146. **(Abstract)**
43. **Kapur N**, Bradford E, Thomas M, Perry CL, Barrett TA. OxPHOS induction in healing: a critical missing step in inflammatory bowel disease? [abstract]. In: Proceedings of Crohn's and Colitis Congress 2020; 2020 Jan 23-25; Austin, TX. Gastroenterology 2020; 158:3 (S48-49): American Gastroenterology Association Abstract nr 146. **(Abstract)**
44. Perry C, Kapur N, Barrett TA. DDP-4 as a Novel Biomarker for Inflammatory Bowel Disease: Is It Ready for Clinical Use? Inflamm Bowel Dis. 2020 Jan 8. **(Editorial)**

C. PROJECTS:

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|-----------------|--|
| 04/2025-03/2029 | <b>VA Merit award:</b> BCCMA: Modulating microbiome-immune axis in the deployment-related chronic disease of veterans; CMA2: Determine the impact of enhanced intestinal mitochondrial Function on mucosal inflammation, metabolism & microbiome in IBD.<br>#I01BX006870-01 <b>(Active)</b><br>Role: <b>Co-I</b> |
| 04/2025-09/2025 | <b>Mid-South REACH:</b> Mitochondrial Biogenesis Modulator for Treatment of Inflammatory Bowel Disease. <b>(Prior)</b><br>Role: <b>Co-PI</b>   |
| 01/2022-12/2025 | <b>VA Merit award:</b> Modulation of Mitochondrial Respiration to Treat Colitis<br>#5I01CX001353 <b>(Prior)</b><br>Role: <b>Co-Investigator</b>  |
| 03/2023-01/2025 | <b>National Institute of General Medical Sciences:</b> COBRE in Pharmaceutical Research and Innovation<br>#5P20GM130456-05 <b>(Prior)</b><br>Role: <b>Co-Investigator</b>  |
| 02/2021-01/2025 | <b>NIH-NIDDK:</b> The Role of Crypt Fissioning in IBD Ulcer Healing<br># 5R01DK095662-12 <b>(Prior)</b>  |

- 01/2024-12/2024      Role: **Co-Investigator**  
**CCF Litwin:** Therapeutic regulation of the human intestinal microbiome in IBD  
# 900783 (**Prior**)  
Role: **Co-Investigator**
- 02/2023-1/2024      **CCF Litwin:** Gold Complexes that Regulate Metabolism and Microbiome to Accelerate Mucosal Healing in IBD  
# 1000400285 (**Prior**)  
Role: **Co-Investigator**
- 06/2024-05/2025      **CCF-Student Research Fellowship Awards:** Role of Mitochondrial Dysfunction in Microscopic Colitis (PI: Justice Mudd, Undergraduate student)  
# 1267972 (Awarded but not initiated because of administrative issue at institute level)

**Cancer Biology (07/2014-06/2019):**

RESEARCH FOCUS:

Primary objective: To develop new treatment modalities for cancer, using chemokine receptors directed therapies either alone or in combination with another chemotherapeutics.

Role of chemokines in cancer progression

- Demonstrated that increased ADAM10 protease expression in Ovarian cancer (OvCa) cell lines is correlated with increased cleavage of CXCL16 resulting into increased level of soluble CXCL16, which subsequently upregulated the migrating and invasive potential of OvCa cells via modulating matrix metalloproteinases (MMPs).
- Determined the expression of CXCR6 and its sole ligand CXCL16 in different breast cancer cell line using flow cytometry and played a major part in investigating the role of CXCR6 signaling in promoting breast cancer. This study showed that ADAM10 promotes breast cancer (BrCa) via CXCL16 constitutive cleavage, thereby upregulating CXCR6 signaling mediated BrCa cell migration and invasion potential.
- Performed expression analysis of mucin-1 (MUC-1) and estrogen receptors (ER $\alpha$ / $\beta$ ) in OvCa cells after CCR9 activation and studied the role of CCR9-CCL25 axis in OvCa progression.
- Studied the effect of CCR9-CCL25 axis in activating androgen receptor (AR) signalling in prostate cancer (PCa), by performing ingenuity pathway analysis (IPA) on antibody microarray data, which was further supported by real-time PCR and western blot analysis.
- Investigated the role of chemokine signaling in cytoskeleton remodeling in prostate cancer (PCa) and showed that CXCR6-CXCL16 interaction in PCa cells promotes Ezrin activation and integrin clustering in PCa cells.
- Demonstrated that CXCR6-CXCL16 axis upregulates the expression of specific proteolytic enzymes, known as matrix metalloproteinases (MMPs) that degrade the extracellular matrix and basement membrane, which increases metastatic potential of tumor cells.
- Elucidated the role of chemokine receptor CCR6 in epithelial-to-mesenchymal transition (EMT) of colon cancer cells, which is responsible for disease progression from nodal to distant metastatic stage.

Role of Chemokine signaling in drug resistance

- Investigated the role of CXCR6-CXCL16 axis in inducing drug resistance against one of the most used drugs (Docetaxel, DTX) for PCa and showed that cytotoxic effect of this drug could be increased by blocking CXCR6 with anti-CXCR6.
- Demonstrated that CXCR6 activation by the soluble CXCL16 resulted in increased GSK-3 $\beta$ , NF- $\kappa$ B and ERK1/2 phosphorylation, and survivin expression, which could be responsible for compromised DTX response in PCa.
- Demonstrated that treatment of PCa cells with anti-CXCR6 monoclonal antibody synergistically or additively induced cell death with ~1.5 – 4.5-fold reduction in the effective concentration of DTX.

- Investigated the role of CCR9-CCL25 axis in regulating the therapeutic efficacy of DTX in **mouse xenograft models** of PCa and showed that DTX+anti-CCL25 treatment significantly decreased the proliferation (**Ki67 staining**) and increased the apoptosis (**TUNEL assay**) of PCa cells in xenografts, by reducing the activation of pro-survival molecules (survivin, phospho-PI3K p85 and phospho-ERK).

Role of natural plant products in cancer treatment

- Determined the effect of Quercetin treatment on decreasing pro-survival and increasing apoptotic molecules in different PCa cell lines.
- Investigated the anti-survival and pro-apoptotic effects of Cinnamtannin B-1 (CTB-1) in colon cancer, by performing immunofluorescence analysis of CTB-1 mediated cell death.
- Performed the proteomic profiling and analysis of signaling molecules involved in colon cancer cell survival and cell death, after Emodin treatment. Analysis showed that Emodin downregulates signaling pathways (MAPK/JNK, PI3K/AKT, NF- $\kappa$ B and STAT) associated with cell growth and differentiation.
- Investigated the mechanism underlying an anticancer effect **Andrographolide (AG)** in PCa. We showed that AG inhibits PCa by targeting cell cycle regulators as well as by reducing ability of PCa cells to migrate via modulating expression of chemokine receptors CXCR3 and CXCR7.
- Performed antibody microarray analysis on **Emodin** treated BrCa cells and investigated the signalling pathways activate or inhibited by the treatment using IPA platform.
- Investigated the innate and adaptive immune response elicited by **AG** in immunodeficient PCa xenograft mice models. The effect of **AG** in overcoming the tumor induced immune suppression was studied using syngeneic mouse PCa models. The work showed that **AG** offers an excellent therapeutic modality for PCa by selective depletion of Treg cells and increased proliferation of effector T cells and NK cell.

Role of chemokines in governing racial disparity in cancer

- Examined the association of CC chemokines in BrCa outcomes and disparity by exploring the genome-wide gene expression analysis using *ONCOMINE* (cancer microarray database) and The Cancer Genome Atlas (TCGA) datasets.
- Investigated CCR9-mediated differential G-protein signaling associated with disparate disease and therapeutic outcome in PCa patients from different ethnicity.
- Performed immunoprecipitation assays using CCR9 antibody and investigated G-protein coupling-uncoupling in CCL25 stimulated PCa cells from African-American and European- American origin.
- Performed antibody microarray analysis on CCL25 treated PCa cells derived from patients with AA and EA racial background.
- Investigated the signaling pathways activate or inhibited in PCa cells by the CCL25 treatment using IPA platform.
- Demonstrated hyper activation of survival molecules and down-regulation of pro-apoptotic molecules in AA PCa cells compared to EA PCa cell lines, following CCL25 stimulation.

b. PUBLICATIONS:

1. Mir H, **Kapur N**, Gales DN, Sharma PK, Oprea-Illies G, Johnson AT, Singh R, Singh S (2021). CXCR6-CXCL16 Axis Promotes Breast Cancer by Inducing Oncogenic Signaling. *Cancers*, 13, 3568. **(Peer-reviewed)**
2. Thomas JK, Mir H, **Kapur N**, Singh S (2019). Racial Differences in Immunological Landscape Modifiers Contributing to Disparity in Prostate Cancer. *Cancers*, 11(12), 1857. **(Peer-reviewed)**
3. **Kapur N**, Mir H, Sonpavde GP, Jain S, Bae S, Lillard JW, Jr, & Singh, S. (2019). Prostate cancer cells hyper-activate CXCR6 signaling by cleaving CXCL16 to overcome effect of docetaxel. *Cancer letters*, 454, 1–13. **(Peer-reviewed)**

4. Saunders IT, Mir H, **Kapur N**, Singh S (2019). Emodin inhibits colon cancer by altering BCL-2 family proteins and cell survival pathways. *Cancer cell international*, 19, 98. **(Peer-reviewed)**
5. Thomas JK, Mir H, **Kapur N**, Bae S, Singh S (2019). CC chemokines are differentially expressed in Breast Cancer and are associated with disparity in overall survival. *Scientific reports*, 9(1), 4014. **(Peer-reviewed)**
6. Mir H, Kaur G, **Kapur N**, Bae S, Lillard Jr. JW, Singh S (2019). Higher CXCL16 exodomain is associated with aggressive ovarian cancer and promotes the disease by CXCR6 activation and MMP modulation. *Scientific reports*, 9(1), 2527. **(Peer-reviewed)**
7. Carriere PP, **Kapur N**, Mir H, Ward AB, Singh S (2018). Cinnamtannin B-1 inhibits cell survival molecules and induces apoptosis in colon cancer. *International journal of oncology*, 53(4), 1442–1454. **(Peer-reviewed)**
8. Ward AB, Mir H, **Kapur N**, Gales DN, Carriere PP, Singh S (2018). Quercetin inhibits prostate cancer by attenuating cell survival and inhibiting anti-apoptotic pathways. *World journal of surgical oncology*, 16(1), 108. **(Peer-reviewed)**
9. **Kapur N**, Mir H, Clark III CE, Krishnamurti U, Beech DJ, Lillard Jr. JW, Singh S (2016). CCR6 expression in colon cancer is associated with advanced disease and supports epithelial-to-mesenchymal transition. *British journal of cancer*, 114(12), 1343–1351. **(Peer-reviewed)**
10. Mir H, **Kapur N**, Singh R, Sonpavde G, Lillard Jr. JW, Singh S (2016). Andrographolide inhibits prostate cancer by targeting cell cycle regulators, CXCR3 and CXCR7 chemokine receptors. *Cell cycle* (Georgetown, Tex.), 15(6), 819–826. **(Peer-reviewed)**
11. Singh R, **Kapur N**, Mir H, Singh N, Lillard Jr. JW, Singh S (2016). CXCR6-CXCL16 axis promotes prostate cancer by mediating cytoskeleton rearrangement via Ezrin activation and  $\alpha\beta 3$  integrin clustering. *Oncotarget*, 7(6), 7343–7353. **(Peer-reviewed)**
12. Thomas JK, **Kapur N**, Mir H, Gales DN, Lillard Jr. JW, S Singh. Antibody microarray analysis of signaling networks regulated by the CCR9/CCL25 axis in African American and Caucasian American triple-negative breast cancer [abstract]. In: Proceedings of the Eleventh AACR Conference on the Science of Cancer Health Disparities in Racial/Ethnic Minorities and the Medically Underserved; 2018 Nov 2-5; New Orleans, LA. Philadelphia (PA): AACR; *Cancer Epidemiol Biomarkers Prev* 2020;29(6 Suppl): Abstract nr C113. **(Abstract)**
13. Mir H, Thomas JK, **Kapur N**, Johnson AT, Singh S. Association of CXCR6/CXCL16 axis in triple-negative breast cancer and racial disparity [abstract]. In: Proceedings of the Twelfth AACR Conference on the Science of Cancer Health Disparities in Racial/Ethnic Minorities and the Medically Underserved; 2019 Sep 20-23; San Francisco, CA. Philadelphia (PA): AACR; *Cancer Epidemiol Biomarkers Prev* 2020;29(6 Suppl\_2): Abstract nr B082. **(Abstract)**
14. Mir H, **Kapur N**, Singh S. Ovarian cancer cells overcome the cytotoxic effect of cisplatin by hyper activating CCR9-mediated signaling in response to cisplatin [abstract]. In: Proceedings of the American Association for Cancer Research Annual Meeting 2019; 2019 Mar 29-Apr 3; Atlanta, GA. Philadelphia (PA): AACR; *Cancer Res* 2019;79(13 Suppl): Abstract nr 1883. **(Abstract)**
15. Saunders IT, **Kapur N**, Mir H, Singh S. Emodin inhibits colon cancer by altering BCL-2 family proteins and cell survival pathways [abstract]. In: Proceedings of the American Association for Cancer Research Annual Meeting 2019; 2019 Mar 29-Apr 3; Atlanta, GA. Philadelphia (PA): AACR; *Cancer Res* 2019;79(13 Suppl): Abstract nr 2494. **(Abstract)**
16. Thomas JK, Mir H, **Kapur N**, Singh S. CC chemokines are differentially expressed in breast cancer and are associated with racial disparity [abstract]. In: Proceedings of the American Association for Cancer Research Annual Meeting 2019; 2019 Mar 29-Apr 3; Atlanta, GA. Philadelphia (PA): AACR; *Cancer Res* 2019;79(13 Suppl): Abstract nr 4237. **(Abstract)**
17. **Kapur N**, Mir H, Singh S. Race specific differences in G-protein decoupling from CCR9 in prostate cancer cells contribute to the differences in docetaxel response [abstract]. In: Proceedings of the American Association for Cancer Research Annual Meeting 2019; 2019 Mar 29-Apr 3; Atlanta, GA. Philadelphia (PA): AACR; *Cancer Res* 2019;79(13 Suppl): Abstract nr 4288. **(Abstract)**
18. **Kapur N**, Mir H, Sonpavde G, Singh S. CXCR6-directed therapeutic approach potentiates efficacy

- of docetaxel in prostate cancer. American Association for Cancer Research, Annual Meeting, April 14-18, 2018, Chicago, IL. **(Abstract)**
19. Mir H, **Kapur N**, Lillard Jr. JW, Singh S. Role of CXCL16 and ADAM10 in ovarian cancer pathogenesis. American Association for Cancer Research, Annual Meeting, April 13th-18th, 2018, Chicago, IL. **(Abstract)**
  20. Gales DN, Mir H, **Kapur N**, Lillard Jr. JW, Singh S. ADAM10 promotes breast cancer via CXCL16 constitutive cleavage and CXCR6 signaling [abstract]. In: Proceedings of the American Association for Cancer Research Annual Meeting 2018; 2018 Apr 14-18; Chicago, IL. Philadelphia (PA): AACR; Cancer Res 2018;78(13 Suppl): Abstract nr 5080. **(Abstract)**
  21. Saunders IT, **Kapur N**, Mir H, Singh S. Emodin inhibits colon cancer by modulating apoptotic and cell survival signals [abstract]. In: Proceedings of the American Association for Cancer Research Annual Meeting 2018; 2018 Apr 14-18; Chicago, IL. Philadelphia (PA): AACR; Cancer Res 2018;78(13 Suppl): Abstract nr 312. **(Abstract)**
  22. Thomas JK, **Kapur N**, Mir H, Gales DN, Lillard JW, Singh S. Race-specific differential expression of CCL25 and CCR9 in triple-negative breast cancer [abstract]. In: Proceedings of the American Association for Cancer Research Annual Meeting 2018; 2018 Apr 14-18; Chicago, IL. Philadelphia (PA): AACR; Cancer Res 2018;78(13 Suppl): Abstract nr 2590. **(Abstract)**
  23. **Kapur N**, Mir H, Sonpavde G, Singh S. Effect of CXCR6/CXCL16 axis on efficacy of docetaxel in prostate cancer. The Society of Basic Urologic Research, Fall Symposium, November 9-12, 2017, Tampa, FL. **(Abstract)**
  24. **Kapur N**, Mir H, Sonpavde G, Singh S. Race specific hyper-activation of CCR9-mediated survival signals and its impact on efficacy of Docetaxel in prostate cancer. American Association for Cancer Research, Annual Meeting, April 1-5, 2017, Washington, DC. **(Abstract)**
  25. Mir H, **Kapur N**, Sonpavde G, Singh S. Andrographolide inhibits prostate cancer by suppressing cytokine involved in promoting epithelial to mesenchymal transition. American Association for Cancer Research, Annual Meeting, April 1-5, 2017, Washington, DC. **(Abstract)**
  26. Ward AB, Mir H, **Kapur N**, Sonpavde G, Singh S. Quercetin inhibits prostate cancer by modulating ROS and key regulators of apoptosis and cell survival [abstract]. In: Proceedings of the American Association for Cancer Research Annual Meeting 2017; 2017 Apr 1-5; Washington, DC. Philadelphia (PA): AACR; Cancer Res 2017;77(13 Suppl): Abstract nr 5252. **(Abstract)**
  27. Saunders IT, Mir H, **Kapur N**, Singh S. Emodin exerts its anticancer effect on colon cancer cells by inhibiting proliferation and inducing apoptosis [abstract]. In: Proceedings of the American Association for Cancer Research Annual Meeting 2017; 2017 Apr 1-5; Washington, DC. Philadelphia (PA): AACR; Cancer Res 2017;77(13 Suppl): Abstract nr 1267. **(Abstract)**
  28. Carriere PP, Mir H, **Kapur N**, Clark CE, Singh S. Anti-proliferative effects of cinnamon extract in colon cancer [abstract]. In: Proceedings of the American Association for Cancer Research Annual Meeting 2017; 2017 Apr 1-5; Washington, DC. Philadelphia (PA): AACR; Cancer Res 2017;77(13 Suppl): Abstract nr 312. **(Abstract)**
  29. Mir H, **Kapur N**, Singh R, Sonpavde G, Lillard Jr. JW, Singh S. Andrographolide prevents prostate cancer by targeting CXCR3/CXCR7 and regulators of cell cycle. American Association for Cancer Research, Annual Meeting, April 16-20, 2016, New Orleans, LA. **(Abstract)**
  30. **Kapur N**, Mir H, Clark III CE, Krishnamurti U, Beech DJ, Lillard Jr. JW, Singh S. CCR6 associates with colon cancer metastasis. American Association for Cancer Research, Annual Meeting, April 16-20, 2016, New Orleans, LA. **(Abstract)**
  31. **Kapur N**, Mir H, Singh R, Lillard Jr. JW, Singh S. Racial Differences in CCR9- mediated Molecular Signature in Prostate Cancer. 8th AACR Conference on the Science of Cancer Health Disparities in Racial/Ethnic Minorities and the Medically Underserved, Nov. 13 - 16, 2015 Sheraton Atlanta Hotel, Atlanta, Georgia. **(Abstract)**
  32. **Kapur N**, Mir H, Singh R, Singh S. CCR6-mediated molecular mechanisms involved in colon cancer. American Association for Cancer Research, Annual Meeting, April 18-22, 2015, Philadelphia, PA. **(Abstract)**

33. Ward AB, Mir H, **Kapur N**, Shailesh Singh. Quercetin inhibits prostate cancer by modulating molecules involved in apoptosis and cell proliferation. [abstract]. In: Proceedings of the 106th Annual Meeting of the American Association for Cancer Research; 2015 Apr 18-22; Philadelphia, PA. Philadelphia (PA): AACR; Cancer Res 2015;75(15 Suppl): Abstract nr 4642. **(Abstract)**
34. King J, Mir H, **Kapur N**, Singh S. Improving therapeutic efficacy of Docetaxel in breast cancer. [abstract]. In: Proceedings of the 106th Annual Meeting of the American Association for Cancer Research; 2015 Apr 18-22; Philadelphia, PA. Philadelphia (PA): AACR; Cancer Res 2015;75(15 Suppl): Abstract nr 3499. **(Abstract)**
35. Mir H, **Kapur N**, Singh R, Sonpavde G, Lillard JW, Singh S. Andrographolide inhibits prostate cancer by modulating chemokine and cytokines. [abstract]. In: Proceedings of the 106th Annual Meeting of the American Association for Cancer Research; 2015 Apr 18-22; Philadelphia, PA. Philadelphia (PA): AACR; Cancer Res 2015;75(15 Suppl): Abstract nr 5362. **(Abstract)**
36. Carriere PP, Mir H, **Kapur N**, Singh R, Sonpavde G, Lillard JW, Singh S. CCR9/CCL25 mediates epithelial-mesenchymal transition in prostate cancer. [abstract]. In: Proceedings of the 106th Annual Meeting of the American Association for Cancer Research; 2015 Apr 18-22; Philadelphia, PA. Philadelphia (PA): AACR; Cancer Res 2015;75(15 Suppl): Abstract nr 4107. **(Abstract)**

#### ***Molecular Virology (01/2006-07/2014):***

##### a. RESEARCH FOCUS:

Primary objective: To utilize artificial non-replicative hepatitis E virus (HEV) particles to understand the life cycle of this virus, and therapeutic interventions to viral hepatitis.

##### *Mechanism of attachment, entry, and replication of Hepatitis E Virus (HEV) into liver cells*

The study was focused on understanding the virus-host interaction for HEV using in vitro assembled reporter-linked virus-like particles (VLPs). Study outcome: HEV attaches to the host cell by specific high-affinity receptor and enters the cytoplasm by non-caveolar clathrin-mediated endocytosis. Further, fluorescence resonance energy transfer (FRET) analysis identified that HEV replicase is localized on the endoplasmic reticulum membranes where it interacts with 3' end of HEV genome and brings about its replication by alternating negative- and positive-sense RNA synthesis. Findings opened new avenues for designing therapies against viral hepatitis.

##### *In vitro synthesized recombinant virus-like particles (VLPs) as RNA nanocarriers*

The study was focused on developing the nano-delivery system using recombinant VLPs of HEV with a potential of targeted gene delivery specifically to liver cells. The work involved synthesizing the HEV- VLPs encapsidated with foreign mRNA, which were then utilized to investigate the delivery and expression of a foreign gene in both in vitro and in vivo models. Study outcome: The hybrid HEV-VLPs can be used as a promising non-replicative nanocarrier for cell-specific delivery of nucleic acids providing a new dimension to gene therapy.

##### b. PUBLICATIONS:

1. Panda SK, **Kapur N**, Paliwal D, Durgapal H. Recombinant Hepatitis E virus like particles can function as RNA nanocarriers. J Nanobiotechnology. 2015 Jun 24;13:44.
2. Paliwal D, Panda SK, **Kapur N**, Varma SP, Durgapal H. Hepatitis E virus (HEV) protease: a chymotrypsin- like enzyme that processes both non-structural (pORF1) and capsid (pORF2) protein. J Gen Virol. 2014 Aug;95(Pt 8):1689-700.
3. **Kapur N**, Thakral D, Durgapal H, Panda SK. Hepatitis E virus enters liver cells through receptor-dependent clathrin-mediated endocytosis. J Viral Hepat. 2012 Jun;19(6):436-48.
4. Varma SP, Kumar A, **Kapur N**, Durgapal H, Acharya SK, Panda SK. Hepatitis E virus replication involves alternating negative- and positive-sense RNA synthesis. J Gen Virol. 2011 Mar;92(Pt 3):572-81.
5. Rehman S, **Kapur N**, Durgapal H, Panda SK. Subcellular localization of hepatitis E virus (HEV) replicase. Virology. 2008 Jan 5;370(1):77-92.

## INSTRUCTION

### c. MENTORING/ADVISING

2023-2024                      Mentored and supervised **2** International scholars, **2** Medical students and **1** Graduate student for their projects.

Outcome:

- **Three** invitations for poster presentation at Crohn's & Colitis Congress 2024 (Las Vegas, NV). The abstracts were published in supplement of *Gastroenterology* Journal, Volume 166, Issue 3.
- Research proposal "**AuPhos-induced mitochondrial dynamics in inflammatory bowel disease (IBD)**" for Elective: Research in Medicine MD-851 (Evan Conder, MD candidate, Class of 2025).
- Research project entitled "**Stem cell activation in inflammatory bowel disease (IBD) and diverticulitis**" for Professional Student Mentored Research Fellowship Program (James Krauth, MD candidate, Class of 2024)

2022-2023                      Mentored and supervised **2** International scholars, **1** Medical student, **1** Graduate student and **1** High school student for their projects.

Outcome:

- **Two** invitations for poster presentation at Crohn's & Colitis Congress 2023 (Denver, CO). Out of these invitations, abstract for the work entitled "**AuPhos, a novel drug that improves colitis by microbiome induced metabolic changes**" was rated as one of the highest scoring abstracts and published in 2023 supplement (Issue 4) of *Gastroenterology* Journal.
- **One** invitation for poster presentation at Digestive Disease Week 2023 (Chicago, IL). The abstracts were published in supplement of *Gastroenterology* Journal, Volume 166, Issue 3.
- Research project entitled "**Butyrate Induces Mitochondrial Respiration in Colon Epithelial Cells**" for Professional Student Mentored Research Fellowship Program (Evan Conder, MD candidate, Class of 2025)

2021-2022                      Mentored and supervised **2** International scholars, **1** Medical student, **2** Graduate students and **1** High School student for their projects.

Outcome:

- **Young Investigator Award** for the work entitled "**AuPhos, a novel therapeutic that improves mitochondrial function and ameliorates chronic colitis**" by Mohamed *et al.*, presented at Crohn's & Colitis Congress 2022 (Las Vegas, CA).
- **Quick spot presentation** for the work entitled "**AuPhos, a "first-in class" oral agent for correcting Metabolic dysfunction in IBD**" by Wempe *et al.*, presented at Crohn's & Colitis Congress 2022 (Las Vegas, CA).
- Research project entitled "**Role of Mitochondrial Metabolism in Butyrate-Induced Barrier Function in IBD**" for Professional Student Mentored Research Fellowship Program (Henry Shay, MD candidate, Class of 2024)
- 360 hour **Capstone Research Project** for Math, Science, and Technology Center (**MSTC**) program. Student: Kian Rosenau (High School Junior); School: Paul Laurence Dunbar High School, Lexington; Project Title:

### **Toxicity Assessment of AuPhos In Digestive Cells Of Mice.**

- 2019-2020                      Research Mentored **1** International scholar.
- 2014-2019                      Trained masters/graduate students in developing theoretical and practical research skills.
- Designed in vitro and in vivo experiments for graduate students and helped them with troubleshooting related to their research projects.
  - Trained PhD candidates in basic molecular biology techniques (SDS-PAGE, RT-qPCR), Animal cell culture, Flow cytometry, Cryo-sectioning of tumor sections, Automated slide scanning and Image analysis.
  - Supervised and assisted students for their PhD project to help them learn presentations and manuscript preparation skills, which led to the fulfilment of their graduate program with publications in the internationally acclaimed journals.
  - Mentored master students and graduating students of medicine for their summer projects.
- 2006-2014
- Trained graduate students and summer-trainees for their research projects that involved sharing of both theoretical as well as practical knowledge. I
  - Trained **12** MD candidates focused on Research in Medicine, specifically associated with highly advanced confocal live-cell imaging, western blot, laser-capture microdissection and DNA microarray.

### **SERVICES**

#### **International:**

##### Editorial Board

Guest Editor, MDPI Pharmaceutical journal  
Topic editor of Antioxidants  
Guest editor of Frontiers Research Topics  
Guest editor of Pharmaceuticals (Chemokines and Chemokine Receptors)  
Topical Advisory Board: Pharmaceuticals  
Journal of Molecular Nanotechnology and Nanomedicine  
Frontiers in Cellular & Infection Microbiology  
Academia Immunity and Disease

##### Review Panel

Journal of Molecular Nanotechnology and Nanomedicine  
Frontiers in Cellular & Infection Microbiology  
Antioxidants

##### Journal Peer-Reviewing

Inflammatory Bowel Diseases  
Cancers  
International Journal of Molecular Sciences  
PLoS ONE  
Nutrients  
Antioxidants  
Gastrointestinal Disorders  
Journal of Clinical Medicine  
Journal of Forensic Sciences  
Research & Reviews: Journal of Pharmaceutics and Nanotechnology  
Journal of Molecular Nanotechnology and Nanomedicine

Journal of Translational Medicine

**National:**

- Mentorship to High School Students for a special program on “The Conquest of Cancer and the Next Generation of Cancer Researchers”, organized by American Association of Cancer Research (AACR) 2019
- Mentorship to High School Students at AACR Special Program, 10th AACR Annual Conference on the Science of Cancer Health Disparities in Racial/Ethnic Minorities and the Medically Underserved 2017
- Mentorship to High School Students at AACR Special Program, 8th AACR Annual Conference on the Science of Cancer Health Disparities in Racial/Ethnic Minorities and the Medically Underserved 2015

**University/ Medical School:**

- Judge for poster session at annual Markey Cancer Center Research Day 2024, 2022
- Participated in a teaching program for graduate and medical students, selected for 8-week Summer Cancer Research Education Program (SCREP) organized by Morehouse School of Medicine (MSM), Tuskegee University (TU), and University of Alabama at Birmingham (UAB). 2017

**PROFESSIONAL MEMBERSHIP AND DEVELOPMENT**

**Professional Societies:**

Sigma Xi- The Scientific Research Honor Society	Associate Member	2024-Current
American Gastroenterology Association	Member	2020-Current
Society of Basic Urologic Research (SBUR)	Member	2017-2019
American Society of Clinical Oncology (ASCO)	Member	2015-2019
Associate member, American Association for Cancer Research (AACR)	Member	2014-2019

**XII. HONORS & AWARDS**

- 2025 **Talk:** AGA Research Forum session in Digestive Disease Week, held at McCormick Place in Chicago, IL, from May 6-9, 2023. Session Title: Immune Cells in Intestinal Inflammation, Presentation Title: **Enhanced mitochondrial function increases activated Tregs and reduces inflammation in colitis.**
- 2024 **Session Moderator:** Digestive Disease Week® (DDW) 2024, held at Walter E. Washington Convention Center in Washington, D.C on May 18, 2024. The session title was “**Metabolic Regulation of Gut Tissues**”.
- 2023 **Talk:** AGA Basic Science Plenary session in Digestive Disease Week, held at McCormick Place in Chicago, IL, from May 6-9, 2023. Topic: **AuPhos, a novel drug that restores intestinal homeostasis by correcting dysbiosis in Inflammatory Bowel Diseases.**
- 2020 **Lecture:** Invitation by American Gastroenterology Association Institute Council to deliver a lecture during Digestive Disease Week 2020 at Chicago. The topic of the lecture was related to my abstract (Abstract # 3356109) entitled “**Transcription of mitochondria-transcribed genes differentiates normal wound healing in humans from delayed ulcer healing in inflammatory bowel disease (IBD)**”, selected for Cell Biology of GI

- Regeneration and Tumorigenesis session in the DDW2020 Research forum. (Unfortunately, DDW2020 conference was called-off due to Covid-19 pandemic)
- 2019 **Judge:** Invitation by American Association of Cancer Research (AACR) Science Education Committee to participate as a judge for the **14th Annual AACR Undergraduate Student Caucus and Poster Competition.**
- 2019 **Mentor:** Invitation by American Association of Cancer Research (AACR) to mentor **high school students for a special program on “The Conquest of Cancer and the Next Generation of Cancer Researchers”.**
- 2017 **Travel award,** SBUR 2017 fall symposium
- 2017 **Mentor:** Invited Mentor at **AACR Special Program for High School Students, 10th AACR Annual Conference on the Science of Cancer Health Disparities in Racial/Ethnic Minorities and the Medically Underserved**
- 2016-2017 Selected Scholar, Health disparity research training program
- 2015 **Mentor:** Invited Mentor at AACR Special Program for **High School Students, 8th AACR Annual Conference on the Science of Cancer Health Disparities in Racial/Ethnic Minorities and the Medically Underserved**
- 2015 **Scholar-in-Training Award,** 8th AACR Annual Conference on the Science of Cancer Health Disparities in Racial/Ethnic Minorities and the Medically Underserved
- 2008 **Senior Research Fellowship,** Council of Scientific and Industrial Research (CSIR), Government of India
- 2005 **Junior Research Fellowship,** Council of Scientific and Industrial Research (CSIR), Government of India
- 2005 **Junior Research Fellowship,** Indian Council of Medical Research, Government of India

#### **SPEAKING ENGAGEMENTS-**

- Invited Talk (2025):** AGA Research Forum session in **Digestive Disease Week**, held at McCormick Place in Chicago, IL, from May 6-9, 2023. Session Title: Immune Cells in Intestinal Inflammation, Presentation Title: **Enhanced mitochondrial function increases activated Tregs and reduces inflammation in colitis.**
- Invited Talk (2023):** AGA Basic Science Plenary session in **Digestive Disease Week**, held at McCormick Place in Chicago, IL, from May 6-9, 2023. Topic: **AuPhos, a novel drug that restores intestinal homeostasis by correcting dysbiosis in Inflammatory Bowel Diseases.**
- Invited Talk (2017):** Lecture on **“Scientific data presentation, communication and fundamentals of Good Lab Practices (GLP)”**, organized by Minority Health and Health Disparities Research Center (MHRC), University of Alabama at Birmingham School of Medicine.
- Oral Presentation (2016):** **Curtis Parker symposium** for students, held at Morehouse school of Medicine in Atlanta, GA, 10th Feb, 2016. Topic: **Racial differences in CCR9-mediated molecular signatures in prostate cancer.**

#### **Poster Presentation:**

##### *Crohn's & Colitis Congress*

1. Lynch EB, **Kapur N**, Goretsky T, Bradford EM, Vekaria H, Paw E, Avdiushko MG, Hassan S, Lee G, Gao T, Sullivan PG, Barrett T. Increased PI3K/Akt-induced survivin drives intestinal crypt healing

in response to radiation injury via enhanced mitochondrial-derived ROS signaling. Crohn's & Colitis Congress, February 6-8, 2025; San Francisco, CA.

2. **Kapur N**, Bradford E, Thomas M, Perry CL, Barrett TA. OxPHOS induction in healing: a critical missing step in inflammatory bowel disease? Crohn's and Colitis Congress 2020; 2020 Jan 23-25; Austin, TX.

Digestive Disease Week

3. **Kapur N**, Hassan SA, Patel PH, Wempe LA, Herzog J, Kim JH, Bhogaju S, Goretsky T, Ge Y, Alam MA, Awuah SG, Byndloss M, Baumler AJ, Kamat M, Garrett TJ, Zadeh MM, Sartor RB, Barrett TA. Enhanced epithelial mitochondrial function corrects dysbiotic metabolomics in humanized IL-10 KO mice. Digestive Disease Week 2024; May 18-21; Washington DC.
4. **Kapur N**, Mohamed RT, Qu X, Liu J, Warinner JM, Wempe LA, Goretsky T, Avduisko M, Kim JH, Abdelsatar A, Awuah SG, Lee G, Barrett TA. Novel oral therapy that increases mitochondrial function and attenuates colitis. Digestive Disease Week 2022; May 21-24; San Diego, CA.
5. **Kapur N**, Kim JH, Goretsky T, Vakeria H, Avduisko M, Warinner JM, Mohamed RT, Wempe LA, Abdelsatar A, Awuah SG, Lee G, Sullivan PG, Barrett TA. Novel gold compound that regulates cell metabolism to promote crypt fissioning in IBD. Digestive Disease Week 2022; May 21-24; San Diego, CA.
6. **Kapur N**, Thomas JM, Perry C, Barrett TA. Transcription of mitochondria-transcribed genes differentiates normal wound healing in humans from delayed ulcer healing in inflammatory bowel disease (IBD). Digestive Disease Week 2020; 2020 May 2-5; Chicago, IL.

American Association of Cancer Research (AACR):

7. **Kapur N**, Mir H, Singh S. Race specific differences in G-protein decoupling from CCR9 in prostate cancer cells contribute to the differences in docetaxel response. American Association for Cancer Research Annual Meeting; Mar 29-Apr 3, 2019, Atlanta, GA.
8. **Kapur N**, Mir H, Sonpavde G, Singh S. CXCR6-directed therapeutic approach potentiates efficacy of docetaxel in prostate cancer. American Association for Cancer Research Annual Meeting; April 14-18, 2018, Chicago, IL.
9. **Kapur N**, Mir H, Sonpavde G, Singh S. Race specific hyper-activation of CCR9-mediated survival signals and its impact on efficacy of Docetaxel in prostate cancer. American Association for Cancer Research, Annual Meeting, April 1-5, 2017, Washington, DC.
10. **Kapur N**, Mir H, Clark III CE, Krishnamurti U, Beech DJ, Lillard Jr. JW, Singh S. CCR6 associates with colon cancer metastasis. American Association for Cancer Research, Annual Meeting, April 16-20, 2016, New Orleans, LA.
11. **Kapur N**, Mir H, Singh R, Lillard Jr. JW, Singh S. Racial Differences in CCR9- mediated Molecular Signature in Prostate Cancer. 8th AACR Conference on the Science of Cancer Health Disparities in Racial/Ethnic Minorities and the Medically Underserved, Nov. 13 - 16, 2015 Sheraton Atlanta Hotel, Atlanta, Georgia.
12. **Kapur N**, Mir H, Singh R, Singh S. CCR6-mediated molecular mechanisms involved in colon cancer. American Association for Cancer Research, Annual Meeting, April 18-22, 2015, Philadelphia, PA.

Society of Basic Urologic Research:

13. **Kapur N**, Mir H, Sonpavde G, Singh S. Effect of CXCR6/CXCL16 axis on efficacy of docetaxel in prostate cancer. The Society of Basic Urologic Research, Fall Symposium, November 9-12, 2017, Tampa, FL.