

EXHIBIT 1

Christopher Williams, PhD
Professor of Pharmacology
Chair, Division of Basic Pharmaceutical Science
Xavier University
Pharmacy Annex 425

November 17, 2025

Chip Wagar, Esq.
Wagar Hickman LLC
1401 W. Causeway Approach Mandeville, LA 70471

**Re: Pharmacological Opinion: Death of Harmony Moller
Kathleen Moller v. Martian Sales, Inc. et al.**

Dear Mr. Wagar:

I have been requested to provide expert opinion in the case of Kathleen Moller vs. Martian Sales, Inc., *et al.* I hold a PhD in Pharmacology (Tulane University) and over 20 years of experience in molecular pharmacology research and instruction. Specifically, I have been engaged in pharmacy education in pharmacology since 2009 at Xavier University of Louisiana, where I currently serve as the chair of the Division of Basic Pharmaceutical Sciences and as an endowed chair in pharmacy. My research program in mechanisms of drug action has been consistently funded through National Institutes of Health and foundation grants throughout my tenure. I have mentored over 25 PharmD, MS, and undergraduate students in the pharmaceutical sciences, many of whom went on to expand their expertise in medical, graduate, and postdoctoral training opportunities. Regarding my independent expertise in pharmaco-legal matters, I function under PharmCognitive Consulting, LLC and have consulted in at least 9 cases, of which one proceeded to trial.

My goal in this case is not to identify cause of death, nor is it to provide clinical diagnostic information. Rather, my role is to provide the scientific background on the pharmacological activity of Kratom (*mitragyna speciosa*) alkaloids, and the mechanistic underpinnings of its drug-like effects when consumed or utilized as a so-called nutritional supplement or food. My opinions herein are given to a reasonable degree of scientific certainty.

Harmony Moller, the plaintiff's daughter, was found unresponsive in her home, and later declared deceased, after consuming Kratom, evidenced by the presence of Kratom

packaging on the scene and autopsy reports detecting mitragynine (MG) in collected blood samples. The cause of death was officially documented as “abnormally high left coronary ostia takeoff exacerbated by mitragynine use”. It is my opinion that the mechanisms of Kratom alkaloid activity support this conclusion, and I agree with the findings of Dr. Thundiyil and Dr. Wharton in this regard.

Kratom, or *Mitragyna speciosa*, is a plant species native to Southeast Asia and has been traditionally used as an analgesic and to combat fatigue among laborers and farmers, particularly when either chewed (in leaf form) or steeped as a tea. The species contains several pharmacologically active alkaloids, and as such Kratom has been implicated as both a substance of abuse as well being touted for its’ potential therapeutic applications. Though over 40 alkaloids have been isolated from Kratom, the major constituent is mitragynine (MG), representing over 60% of the alkaloid content in most extracts. Related, 7-hydroxy mitragynine (7HMG) represents a minor component (less than 2%) of the alkaloid content of leaf extracts, but more importantly is generated through hepatic CYP-mediated metabolism of MG once ingested. These Kratom alkaloids exhibit significant opioid-like activity. In experimental models, MG exhibits partial μ opioid receptor agonist activity with approximately 25% relative potency of morphine. Accordingly, MG exhibits naloxone-sensitive antinociceptive properties, providing further evidence that MG indeed functions through opioid-like mechanisms. 7HMG has 10-fold greater potency than morphine and significantly increased latency in response to noxious stimuli in studies of analgesia. Collectively, these studies demonstrate that Kratom contains *alkaloids which rival the potency of clinically available opioids like morphine* in experimental models¹. A third metabolic derivative, mitragynine pseudoindoxyl (MGPI), shows even greater affinity for the μ opioid receptor (80pM range), though the rate of transformation and accumulation in human blood has not been well defined. In addition to their effects on the μ opioid receptor, studies suggest that MG and 7HMG have antagonist functions at the δ and κ opioid receptors.

Outside of opioid receptors, MG has demonstrated agonist activity at the α 2A adrenergic receptor, which is thought to contribute to its analgesic effects, as well as CNS depressant activity, and antagonist activity at the serotonin (5HT2A) receptors. These findings collectively provide evidence that Kratom derived alkaloid may function to have significant impact on multiple drug receptor systems, while lacking the selective nature of well-defined pharmaceuticals.

Compound	Relative Potency vs Morphine	Receptor Activity
Morphine	1×	Full μ -opioid agonist
Fentanyl	~50–100×	Full μ -opioid agonist
Oxycodone	~1.5×	Partial μ -opioid agonist
Methadone	~3–5×	Full μ -opioid agonist
Buprenorphine	~25–50×	Partial μ -opioid agonist
Mitragynine	~0.25×	Partial μ -opioid agonist
7-Hydroxymitragynine	~10–20×	Full/Partial μ -opioid agonist

Receptor	Mitragynine	7-Hydroxymitragynine
μ -Opioid (MOR)	Partial agonist (μ M)	Full/Potent partial agonist (nM)
δ -Opioid (DOR)	Weak antagonist (#N/A)	Minimal activity (#N/A)
κ -Opioid (KOR)	Antagonist (μ M)	Minimal binding (#N/A)
A2A-Adrenergic	Agonist-like (μ M)	Minimal (#N/A)
5-HT2A (Serotonin)	Antagonist (μ M)	Minimal (#N/A)

With largely similar pharmacological mechanisms of action and *similar potency to prescription opioids*, it stands to reason that many of the toxicological properties of Kratom alkaloids will mirror those of opioids. Among the most significant opioid-related adverse drug effects is respiratory depression. 7HMG has 4/5 fold greater respiratory depression effect compared to morphine, whereas MG induced a respiratory stimulant activity elicited through its non-opioid actions². It is important to note that MG is hepatically bio transformed to yield 7HMG and therefore has the potential to produce similar effects as well. Human kinetics suggest that ingestion of dried Kratom leaf preparations lead to a blood ratio of 7HMG:MG of 0.20 to 0.29, even though 7HMG only represents about 1% of the total alkaloid content in Kratom. This would suggest that a significant amount of MG is converted to 7HMG by CYP3A4 after ingestion³. As such, the ingestion of Kratom yields significant amounts of both MG and 7HMG, and subsequently yields pharmacological activity associated with both compounds throughout the duration of exposure.

Beyond the respiratory adverse responses, cardiotoxicity has been clearly linked to opioid usage including Kratom, which includes QT prolongation. Experimental models have shown that MG inhibits delayed rectifying K⁺ currents, similar to methadone, potentially leading to cardiac arrhythmias. It is important to note that blockade of K⁺ signaling has been implicated in sudden cardiac death related to toxic opioid exposure through increased duration of action potential in cardiac models⁴. This is reflected in the findings of a 2023 study of the FDA Adverse Events Reporting System (FAERS) which showed that MG was associated with a greater incidence of ventricular arrhythmia/cardiac arrest than any other drug tested, including methadone. In 39% of those cases, MG

exposure was indicated in the absence of concurrent QTc prolonging drugs, thereby suggesting that MG was the primary driver of cardiotoxicity⁵. Individual case studies paint a similar picture. In one such published case, an otherwise healthy 25 year old was hospitalized with compromised left ventricular ejection fraction and elevated troponin I levels, with no other confounding substances found upon urinalysis⁶.

The lack of receptor specificity should be noted as well. MG has documented stimulant-like activity, which has been attributed to its ability to modulate adrenergic receptors. Furthermore, Kratom alkaloids may impact the serotonin receptors and dopamine release, each of which can have substantial impacts on cardiovascular function. It is plausible that these actions contribute to the negative impact on cardiovascular status when concomitantly administered with other drugs with cardiovascular stimulant effects.

Kratom derived products also sit at the juxtaposition where pharmacologically active so-called nutritional supplements/foods have robust drug effects and therefore are involved in drug-drug interactions. This can lead to unintentional cases of polypharmacy, where drugs with overlapping off-target effects can result in significant toxicity. In the case of Harmony Moller, Kratom may well impact K⁺ currents in the heart and exacerbate the typically moderate effects of antihistamines like diphenhydramine or promethazine. Of note, the levels of the diphenhydramine (64 ng/ml) and promethazine (18ng/ml) are in accordance with expected levels in therapeutic drug usage, suggesting that these drugs alone were not used at a level that should precipitate cardiorespiratory toxicity (toxicity is apparent near (100ng/ml range for either drug)⁷. Additionally, the typically benign elevated heart rate that is associated with cannabis use might present another potential unrecognized interaction with Kratom alkaloids. While causality is difficult to ascertain in cases of polypharmacy induced drug effects, the mechanistic underpinnings are present for significant drug-drug interactions involving MG and 7HMG.

This report is based on my training and expertise in pharmacology and my assessment of the current consensus in scientific literature. I am being compensated at a rate of \$250/hr. for my research and consultation in this case.

I have no conflict of interest that would result in bias. I am being reimbursed through Plaintiff's counsel for the work that I am providing as an expert on an hourly basis. I am not employed by any company that dispenses or promotes the use of kratom. I never met Harmony Moller, nor do I know the Moller family.

I reserve the right to rephrase or alter my opinions as additional information is received. I reserve the right to supplement this report when further data, documents, or

information becomes available and/or to correct it if errors are discovered. Further, at trial, I may use visual aids or demonstrative exhibits, such as diagrams, images, slides, or charts that illustrate and/or explain my opinions.

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Christopher Williams, PhD

11/18/2025

Date

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- (7) Schulz, M.; Schmoldt, A.; Andresen-Streichert, H.; Iwersen-Bergmann, S. Revisited: Therapeutic and Toxic Blood Concentrations of More than 1100 Drugs and Other Xenobiotics. *Crit. Care* **2020**, 24 (1), 195. <https://doi.org/10.1186/s13054-020-02915-5>.

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Education and Training

2018 Harvard Institutes for Higher Education (HIHE) Management Development Program (MDP)

Cambridge MA

2017 American Association of Colleges of Pharmacy (AACP) Academic Leadership Fellow, Cohort 13

2003 Ph.D. in Pharmacology, Tulane University

New Orleans, LA

1996 B.S. in Biology, Southern University at New Orleans

New Orleans LA

Positions Held

Xavier University Co-Director of *Ochsner Xavier Institute for Health Equity and Research (OXIHER)*.

Xavier University of Louisiana, College of Pharmacy, New Orleans. LA 2009-present

Chair, Division of Basic Pharmaceutical Sciences (2017- present)

Professor, 2022-Present

Associate Professor, 8/2015-8/2022

Assistant Professor, 02/2009-09/2015

Tenure Track Faculty:

As faculty in the COP, my primary teaching responsibilities include instruction in pharmacology across various therapeutic areas within the curriculum. Additionally, I have had the opportunity to participate in ACPE *self-study and accreditation site visits*. *I have served on the university research committee, faculty association executive board, faculty representative for the board trustees, AACP delegate, Academic Affairs Council, and the Institutional Animal Care and Use Committee.* Additionally, I have been integrally involved in the development of a new PharmD curriculum which emphasized the vertical and horizontal integration of core therapeutic areas in pharmacology, medicinal chemistry, and pharmacotherapeutics.

Chair, Division of Basic Pharmaceutical Sciences: As Chair of Basic Pharmaceutical Sciences, I provide leadership, oversee the basic science elements of the didactic curriculum, and serve as an advocate for faculty and staff in our division. My primary goal has been to foster a *“habit of excellence in teaching, scholarship, and service”*, and under my direction the division has made it a priority to provide support for professional development opportunities. In addition to working to support faculty and staff, I collaborate with the chair of clinical sciences to oversee the day-to-day execution of the didactic PharmD curriculum. I am a standing member on the *Dean’s Executive, Curriculum Review, Academic Council, Academic Standing, and Program Assessment Committees*, each of which provides opportunities to participate in the governance of the College.

I have made concerted efforts to increase the educational offering that we have availed to our students. I have led our efforts with LSU Health Sciences Center for a ***PharmD-PhD bridge program***, which allows for the attainment of both PharmD and PhD degrees for students whose interests lie in the area of translational/clinical pharmacology. In addition, I have spearheaded the development of a new ***MS in Pharmaceutical Sciences***, and contributed to the development of our recent ***MS in Physician Assistant Studies***. Most recently, we were recipients of \$1M in funding through the National Institute for Innovation in Manufacturing Biopharmaceutical (NIIMBL), with the goal of training students in the manufacturing of biologics. Currently, I am also overseeing the launch of our COVID19 testing hub for HBCUs in our geographical area and our on campus COVID19 molecular testing laboratory, funded by the Just project (ThermoFisher). I also serve as the Xavier co-director for the Ochsner Xavier Institute for Health Equity and Research (OXIHER), which is supported by \$1.2M from the WK Kellogg Foundation.

Research: As chair, I have maintained an active research program in breast cancer experimental therapeutics. The three main projects are summarized below:

Functional dichotomy of NURR1 in breast cancer etiology and progression- Our laboratory is currently studying the etiological significance of the orphan nuclear receptor NURR1 in breast cancer etiology. These studies center around

investigating the mechanisms underlying the conditional tumor suppressor function of NURR1, with an ultimate goal of designing pharmacological agents targeting the receptor.

Cell-extrinsic effects of metformin in the breast tumor microenvironment- Metformin, the first line anti-diabetic drug, has recently achieved attention as a potential antineoplastic agent. Our lab has shown that metformin impacts the expression of inflammatory intermediates in breast cancer cells. Here, our goal is to determine if metformin can alter the development of chronic inflammatory conditions within the breast tumor microenvironment, and thereby prevent breast tumorigenesis. Successful completion of these studies may support a role for metformin usage as chemo preventive among patients at risk for development of breast cancer.

CK2 mediated regulation of estrogen receptor function- CK2 is a ubiquitously expressed kinase which is overexpressed in rapidly proliferating tissues. Our previous studies have shown that CK2 modulates estrogen receptor activity by impacting specific phosphorylation sites in the receptor. We are currently investigating the impact of CK2 on agonist and antagonist sensitivity of estrogen receptor in BCa. Successful completion of these studies may support the role of CK2 as a viable pharmacological target in breast cancer which is refractory to hormonal therapy.

Teaching/Instruction:

"Pharmacology I and II" "Pharmacology Lab", "Principles of Drug Action", "Medicinal Chemistry/Pharmacology I, II, III and IV," "Pharmacogenomics".

Instructional focus areas include- general pharmacokinetics/pharmacodynamics, introduction to autonomic physiology/pharmacology, cholinergic drugs, drugs for the treatment of dyslipidemia, drugs for the treatment of anemia, anticoagulant/fibrinolytic drugs, anti-inflammatory drugs, antineoplastic drugs, principles of toxicology. In pharmacogenomics, instructional areas focused on genetic variability in drug targets. With curricular revision, we integrated medicinal chemistry with pharmacology, with the intention of creating more synergy in the context of teaching the two disciplines. This content was also coordinated into the pharmacotherapeutics course series.

Tulane School of Medicine, Cancer Center (2004-2008)

Postdoctoral Fellow, Department Structural and Cellular Biology,

The major focus of our laboratory was the study of nuclear receptor signaling in cancer. We identified novel post-translational regulatory sites in ER α , and assessed their role in cellular signaling in breast cancer. These studies included the characterization of estrogen receptor α crosstalk with growth factor receptor kinase signaling pathways in mediating resistance to therapy in breast cancer. Pilot projects included the study of NR4A orphan nuclear receptor signaling in breast cancer. Our group's studies focused on the role of ErbB4 tyrosine receptor signaling in breast cancer. We demonstrated that ErbB4 mediates nuclear accumulation of the transcription factor STAT5A, physically

associates with an endogenous STAT5A responsive promoter, and is required for ErbB4-mediated transcriptional activation of STAT5A. These studies were the first to show that ErbB4 acts as a transcriptional coactivator in breast cancer. Additionally, our lab identified novel serine residues in STAT5A which are phosphorylated in response to ErbB4. Mutation of these serine residues abrogates STAT5A transcriptional activity in response to ErbB4. In addition we studied the regulation of estrogen receptor transcriptional activation in a process requiring ErbB4 cleavage and nuclear localization.

University/Community Service

Institutional Service:

XU Research Committee 2009-12

XU Institutional Animal Care and Use Committee (IACUC)- member 2011- present

XUCOP Board for Professional and Ethical conduct 2013-17

XU Faculty Association Executive Board 2016– 17

XU Board of Trustees Student Affairs Committee Faculty Representative, ex officio, 2016– 17

XU-COP Executive Committee 2017-present

XU-COP Academic Council 2013-present

XUCOP Curriculum Review Committee 2015-present

XUCOP Physician Assistant Curriculum Development Committee 2018-19

XUCOP Academic Standing Committee 2017-present

XU COVID19 testing Hub Coordinator 2020-present

Community Service:

Youth Basketball, Baseball, Softball coach 2013- present

Louisiana Youth Challenge Program 2007-2011

Christmas Family Project 2017-present

Research

Peer-Reviewed Publications

Christopher Williams, June G. Allison, Luis Marrero, Gregory A. Vidal, and Frank E. Jones.

“The ERBB4 receptor tyrosine kinase regulates expression by functioning as a STAT5A nuclear chaperone” *Journal of Cell Biology*. 167(3):469-78, 2004 Nov 8.

Christopher Williams, Debasis Mondal, Krishna Agrawal

“HIV-1 Tat protein enhances CREB co-activation by CBP and increases megakaryocytic commitment of K562 cells” *Experimental Biology & Medicine*. 230(11):872-84, 2005

Debasis Mondal, **Christopher Williams**, Krishna Agrawal

“HIV-1 Tat modulates expression of the HIV-1 co-receptors CXCR4 and CCR5 in K562 hematopoietic progenitor cells” *Experimental Biology & Medicine*. 230(9):631-44, 2005 Oct.

Christopher Williams, Diane Clark, Tamika Duplessis, and Frank E Jones.

“ErbB4 regulates STAT5a transcriptional activity by modulating phosphorylation of both serine and phosphotyrosine residues”. *Journal of Biological Chemistry*. 280(25):24175-80, 2005 Jun 24

Yun Zhu, Lacey Sullivan, Sujit Nair, **Christopher Williams**, Arvind, Pandey Luis Marrero, Ratna Vadlamudi, Frank Jones

“Coregulation of Estrogen Receptor by Estrogen-Inducible ERBB4/HER4 Establishes a Growth Promoting Autocrine Signaling Pathway in Breast Cancer.” *Cancer Research* 66(16) 7991-7998 2006

George., Brian., Mariam-Dhaheri, **Christopher**, Sandy, Sanela, Michelle, Peter and Leigh.

“Immunohistochemical validation of multiple phospho-specific epitopes for estrogen receptor α (ER α) in tissue microarrays of ER α positive human breast carcinomas”
Breast Cancer Research and Treatment 2009 Dec;118(3):443-53

Leigh Murphy, Georgios Skliris, Brian Rowan, Mariam Al-Dhaheri, **Christopher Williams**, Carla Penner, Snady Troup, Senela Begic, Michelle Parisien, Peter Watson

“The relevance of phosphorylated forms of estrogen receptor in human breast cancer *in vivo*” *Journal of Steroid Biochemistry and Molecular Biology*, 114 (1-2) 2009, 90-95

Christopher Williams, Aninda Basu, Latonya Carrier, Carolyn Smith, Brian Rowan
"Novel Phosphorylation Sites in Estrogen Receptor α : Impact on Receptor-Dependent Gene Expression and Phosphorylation by Protein Kinase CK2" BMC Biochem. 2009 Dec 31;10:36.

Melissa Heard, Claude V. Main, Benjamin E. Morehead, Marius C. Hoener, Tri Q. Nguyen, **Christopher C. Williams**, Brian G. Rowan, Chris R. Gissendanner
"A functional NR4A nuclear receptor DNA-binding domain is required for organ development in *C. elegans*" Gen. 2010 Aug;48(8):485-91

Tamika T. Duplessis, **Christopher C. Williams**, Steven M. Hill, and Brian G. Rowan
"Phosphorylation of ER α at Serine 118 directs recruitment of promoter complexes and gene specific transcription", *Endo* 2011 152: 2517-2526

Brandy Huderson, Tamika Duplessis, **Christopher Williams**, Henry Segar, Steven Hill, Brian Rowan, "Stable inhibition of specific estrogen receptor alpha (ER α) phosphorylation confers increased growth, migration/invasion and disruption of estradiol signaling in MCF-7 breast cancer cells." *Endo* 2012, 153:4144-59.

Shawn D Llopis, Brittany A Singleton, Tamika T Duplessis, Latonya Jackson, Brian G Rowan and **Christopher C Williams** "Dichotomous roles for the orphan nuclear receptor NURR1 in breast cancer." BMC Cancer 2013 13:139

Christopher C. Williams, Brittany A. Singleton, Shawn D. Llopis, Elena Skripnikova
"Metformin induces a senescence-associated gene signature in breast cancer." J Health Care Poor Underserved 2013, 24(1 Suppl):93-103.

Syreeta L. Tilghman, Ian Townley, Qiu Zhong, Patrick P. Carriere, Jin Zou, Shawn D. Llopis, Lynez C. Preyan, **Christopher C. Williams**, Elena Skripnikova, Qiang Zhang and Guangdi Wang "Proteomic Signatures of acquired letrozole resistance in breast cancer: suppressed estrogen signaling and increased cell motility and invasiveness." Mol Cell Proteomics 2013 12: 2440-2455

Marlon Williams, Thu Nguyen, Patrick Carriere, Syreeta Tilghman, **Christopher Williams**. "Protein Kinase **CK2** Expression Predicts Relapse Survival in ER α Dependent Breast Cancer, and Modulates ER α Expression in Vitro." Int J Environ Res Public Health. 2015 Dec 22;13(1):ijerph13010036.

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ROS Production and COX2 Expression in MDA-MB-231 Breast Cancer Cells.” Int J Mol Sci. 2018 Nov 21;19(11). pii: E3692.

Nina Pavuluri, Rajender R. Aparasu, Kathleen M.K. Boje, Jennifer Danielson, Shareen Y. El-Ibiary, Anand Krishnan V. Iyer, Leslie A. Ochs, Jennifer D. Robinson, Samit Shah, **Christopher C. Williams**, Timothy M. Moore, Kurt A. Wargo “Consideration of Aggressive and Strategic Approaches in Addressing Declining Enrollment” Am J Pharm Educ. 2019 Aug;83(6):6959

Michelle McCarthy, Theodore Brown , Andrea Alarcon, **Christopher Williams**, Xiying Wu, Rosalyn Abbott , Jeffery M Gimble, Trivia Frazier “Fat-on-a-Chip models for research and discovery in obesity and its metabolic co-morbidities” T.Tissue Eng Part B Rev. 2020 Mar 26. doi: 10.1089/ten.TEB.2019.0261.

Robert Bender, Michelle McCarthy, Theodore Brown, Joanna Bukowska, Stanley Smith, Roseleyn Abbott, David Kaplan, **Christopher Williams**, James Wade, Andrea Alarcon, Xiying Wu, Frank Lau, Jeffery Gimble, Trivia Frazier “Human Adipose Derived Cells in Two- and Three-Dimensional Cultures: Functional Validation of an In Vitro Fat Construct”. Stem Cells Int. 2020 Jun 10;2020:4242130. doi: 10.1155/2020/4242130. eCollection 2020.

Trivia Frazier, **Christopher Williams**, Michael Henderson, Tamika Duplessis, Emma Roger, Xiying Wu, Katie Hamel, Elizabeth Martin, Omair Mohiuddin, Shahensha Shaik, Ram Devireddy, Brian Rowan, Daniel Hayes, Jeff Gimble. Breast Cancer Reconstruction: Design Criteria for a Humanized Microphysiological System. Tissue Eng Part A. 2021 Apr;27(7-8):479-488.

Robert Bender, Michelle McCarthy, Theodore Brown, Joanna Bukowska, Stanley Smith, Roseleyn Abbott, David Kaplan, **Christopher Williams**, James Wade, Andrea Alarcon, Xiying Wu, Frank Lau, Jeffery Gimble, Trivia Frazier “Human Adipose Derived Cells in Two- and Three-Dimensional Cultures: Functional Validation of an In Vitro Fat Construct”. Stem Cells Int. 2020 Jun 10;2020:4242130. doi: 10.1155/2020/4242130. eCollection 2020.

Trivia Frazier, **Christopher Williams**, Michael Henderson, Tamika Duplessis, Emma Roger, Xiying Wu, Katie Hamel, Elizabeth Martin, Omair Mohiuddin, Shahensha Shaik, Ram Devireddy, Brian Rowan, Daniel Hayes, Jeff Gimble. Breast Cancer Reconstruction: Design Criteria for a Humanized Microphysiological System. Tissue Eng Part A. 2021 Apr;27(7-8):479-488.

Rashidra Walker, Jankiben Patel, Akash Gupta, A Micheal Davidson, **Christopher Williams**, Florastina Payton –Stewart, Stephen Boue', Matthew Burrow, Rahul Khupse, Syreeta Tilghman. "Glyceollins trigger anti-proliferative effects in hormone-dependent aromatase inhibitor resistant breast cancer cells through induction of apoptosis" Int J Mol Sci. Mar 7:23(5):2887

Shahensha Shaik, Ha'reanna Campbell and **Christopher Williams** "NURR1 Is Differentially Expressed in Breast Cancer According to Patient Racial Identity and Tumor Subtype" BioMedInformatics 2022, 2(4), 680-691; <https://doi.org/10.3390/biomedinformatics2040045>

Research Support

Completed Research Support

UNCF/Merck Science Initiative, 9/1/07- 1/30/08

Estrogen receptor phosphorylation and SERM resistance

The goal of these studies was to characterize the role of estrogen receptor phosphorylation in mediating resistance to SERMs in breast cancer

Christopher Williams, PI

NIH 1K01CA129078-01, PI. 9/14/07-8/31/13

Novel Estrogen Receptor Phosphorylation Sites in Sensitivity/Resistance to SERMs

These studies centered on novel phosphorylation sites in the ER and their impact on sensitivity to SERMs

Christopher Williams, PI

Office of Naval Research PI, - 9/1/09-9/01/12

"Orphan Nuclear Receptor-Based Biosensors"

In this subproject, the applicability of utilizing NR4A responsive promoters as determinants of environmental stress was studied

Christopher Williams PhD , PI

Louisiana Cancer Research Consortium- 2/1/09-6/30/11 New Lab Start-Up funding, 2011-2012 Bridge Funding,

These studies focused on determining the significance of NURR1 in breast cancer progression

Christopher Williams, PI

NIH SC3 "Induction of a tumor hostile microenvironment by metformin " 9/1/15 -6/30/19

In this project, we investigate the antineoplastic mechanisms of metformin via the tumor microenvironment signaling.

Christopher Williams, PI

NIH Research Centers at Minority Institutions (RCMI), Drug Discovery Core (Guangdi Wang, PI) 2019-2023 My role in the drug discovery core is to facilitate the development and implementation of in vivo studies for our constituent faculty and scientists.

NIIMBL Biopharmaceutical Manufacturing Test Beds, PI (subaward). 6/20022-7-2023 I direct the establishment of the biomanufacturing infrastructure at Xavier University College of Pharmacy for research and workforce training purposes.

Ongoing Support

NIH SC1 “Effect of CX4945 in tamoxifen resistant BCa” 8/4/2020-3/31/2024

For this project, we seek to disrupt the mechanisms of tamoxifen resistance by inhibiting signaling of CK2 in BCa.

Christopher Williams, PI

NIH Research Centers at Minority Institutions (RCMI), Multi-PI) 8/1/2023-5/1/2024

Serve as one of the multi-PIs to provide leadership for the RCMI program at XULA. Serve as Therapeutic Development co-director.

WK Kellogg Foundation “Ochsner Xavier Institute for Health Equity and Research” (PI, subaward) 1/1/2021-12/31/2023

I serve as the XU Co-director and liaison for the institute, with the goal of improving the health of Louisiana citizens by 2030.

John Lewis Endowment, XULA PREDICT Institute (Multi-PI) 6/1/2023-5/30/2028

As Multi-PI, I serve toward the overall leadership of the program, as well as the spearheading the faculty and student research scholars program.

Honors, Awards

2019-present, Bynum and Sons, Inc Endowed Professor of Pharmacy

2011 Norman C. Francis Award for Scholarship finalist (junior faculty), Xavier University of Louisiana. Xavier University grants this award to a single junior faculty member for exemplary performance in scholarship.

American Association for Cancer Research (AACR) Health Disparities in Cancer Conference- Minority Serving Institution (MSI), Scholar Faculty Scholar, Miami, FL Oct 2010

Featured cover article for issue of Journal of Cell Biology

The ErbB4/Her4 Tyrosine Kinase Regulates Gene Expression by Functioning as a STAT5A Nuclear Chaperone—*Journal of Cell Biology*. 167(3) Nov 8, 2004

Article also featured in Science's Signal Transduction Knowledge Environment (STKE) Science. STKE, Vol. 2004, Issue 259, pp. tw410, 16 November 2004.

Jorgen and Birgitte Schlegel Award for Excellence in Research, Tulane University, 2005. This award is presented to a first year postdoctoral fellow judged to have shown excellence in research

Cum Laude graduate, 1996, Southern University at New Orleans

Award for Academic Excellence, Southern University at New Orleans, Department of Biology 1996

References

Kathleen Kennedy, PharmD- Dean Xavier University of Louisiana, College of Pharmacy kkenned1@xula.edu

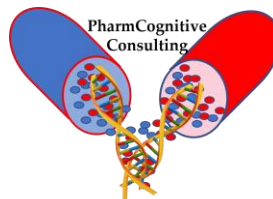
Vimal Kishore, PhD— Former Division Chair and Professor Emeritus, Xavier University, Basic Pharmaceutical Sciences. vkishore@xula.edu

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Retainer fee: \$300.

Records Review, Research: \$250/hr.

Teleconferences, meetings: \$250/hr.

Deposition: 1st hour, \$1200.

Subsequent hours, \$500/hr.

Trial appearance: \$2500, Up to one day. \$500 each additional day

Notations and terms: The retainer fee is due at the outset of the consult and is not applied to the expert's professional hours to be incurred. A deposit for the first hour of deposition must be received at minimum 10 days prior to the deposition please, or it cannot be scheduled. The deposit is non-refundable at that juncture. Similarly, a non-refundable fee for trial must be received four weeks prior to the scheduled appearance. The total of invoiced expenses including depositions and trial fees, are agrees to be paid on receipt of invoices by the retaining law firm. Trial fees are specific to Orleans and Jefferson Parishes.

Trial appearances in other location may require appropriate travel expenses.

All Checks are to made payable to Christopher Williams, PhD