# TABLE OF CONTENTS

Year in Review ................................................................. 1
Chairs of Department ......................................................... 7
Emeritus Professors ............................................................... 8
Donors .................................................................................... 9
Kathleen M. Osborn Memorial Lectureship .............................. 17
Faculty .................................................................................. 19
Graduate Students ................................................................. 22
Department Roster ............................................................. 25
Activities of Graduate Students ............................................ 28
Courses Taught ....................................................................... 34
Department Seminars ........................................................... 35

Publications

a. Published (7/1/19 – 6/30/20) ................................................. 41
b. Abstracts ........................................................................... 44

Research Support ................................................................... 45
Activities of Faculty ............................................................... 48
The leadership of the Department of Molecular and Integrative Physiology (MIP) has continued the same during this past academic year. Dr. V. Gustavo Blanco serves as the Kathleen M. Osborn Chair of and Dr. Warren Nothnick as the Vice Chair. The current personnel in our department include 13 tenure-track faculty members, 5 research track faculty, 2 postdoctoral fellows, 1 senior scientist, and 18 graduate students. Two faculty members who had primary appointments with us (Drs. Sam Enna and John Wood) both retired in 2020.

This past year has been particularly different from previous years due to all the challenges imposed by the Covid-19 pandemic. Our School’s leadership responded very well to this and after a relatively short shutdown period in March 2020, activities were reinitiated with the implementation of a series of safety measures. This allowed to continue research and teaching activities under a controlled environment. Fortunately, our personnel stayed healthy and in good spirits. There are not enough words to thank the faculty, postdoctoral fellows, research staff, students, and administrative staff in our department, who despite all the challenges, worked hard to continue our mission.

We continued advancing with our primary goals in three academic areas: 1) engaging in high quality research to generate new discoveries in basic and translational physiology, which contribute to advance human health; 2) performing innovative and high quality teaching to train new generations of physicians, graduate students, and postdoctoral fellows in physiology and pathophysiology; and 3) perform academic service through participation in committees and task forces that aid our department, School, and national and international scientific organizations.

Regarding research, our programs continued to cover several topics including, integrative physiology, male and female reproductive physiology, neurophysiology, and metabolism and energetics. Our researchers have been using a wide variety of approaches, including molecular as well as whole animal physiology to answer relevant questions related to physiology. Research in the department has also continued to be very collaborative, complementing the research efforts of several Centers in our School, as well as other departments in our institution and outside.

With respect to education, our department has had another outstanding year, covering many different educational activities in both the medical and graduate student curriculum. Due to the pandemic, this had to be performed using a hybrid system, with constant changes, switching from in person to virtual classes, depending on the situation. Our faculty continued to play key roles in medical education during the first and second year of the Active Competency Based and Excellence Driven (ACE) curriculum. With the retirement of Dr. Wood, Dr. Nothnick served as the new Thread Head Leader in our department, to provide input on the content and objectives of the medical curriculum. Along with Dr. Paige Geiger, Dr. Blanco took over all the teaching load in the Cardiopulmonary Block that was performed by Dr. Wood. Drs. Stanford and Wolfe, served as Block Directors for the Muscle and Movement and Reproduction and
Sexuality Blocks, respectively. The rest of our faculty have all been actively involved as Facilitators, leading the small group Case Based Clinical Learning (CBCL) activities of the ACE medical curriculum.

Faculty in our department have also had a significant presence in the education of graduate students by participating in the core Integrated Graduate Program in Biological Sciences (IGPBS) curriculum and in our departmental mandatory courses for graduate students. All these courses have done well and received excellent reviews from the students.

The hard work of our faculty in teaching has been recognized with important awards given to individual lecturers and to course directors for their outstanding participation in education.

We are also proud of the service activities that faculty have been engaged in. They serve in numerous key leadership roles and on committees, which are essential to the overall mission of our department and School. Dr. Smith continues to serve as the Senior Associate Dean for Research and the Co-Director of the Kansas Intellectual and Developmental Disabilities Research Center (KIDDRC); Dr. Nothnick is the Director of the Center for Reproductive Sciences; Dr. Stanford is the Program Director of the KUMC Biomedical Research Training Program and the Campus Coordinator, K-INBRE Program Director; Dr. Blanco is the K-INBRE Research Developmental Core Director; Dr. Geiger is the Facility Co-Director of the Metabolic and Obesity Research Phenotyping Facility (Morph); Dr. Thyfault is the Scientific Director of Children’s Mercy Healthy Lifestyle and Nutrition Center (KUMC/CMH joint funded center); and Dr. Wolfe serves as the Research Integrity Officer of our School. This past year, Dr. Stanford was selected to serve as the new Associate Dean for Research and Graduate Education.

In addition, we have maintained our presence at the national and international level, with faculty serving on different review panels of the National Institutes of Health as well as other funding agencies. They have also served as editors and members of the editorial boards for a variety of journals. We are very grateful to our faculty who, through their talent and hard work, have continued maintaining the high academic standards and success that gives our department the great national and international visibility that it has.

In the department’s office Shari Standiferd continues as the Director of Operations, Liam Higgins (Assistant Director of Operations) and Jennifer Wallace (Accountant) Fernie Bahena joined us in February 2020 as our Administrative Program Manager working with our PhD program and web updates, finances, etc. Our special thanks go to them. They provide outstanding administrative support to our department through their hard work and continuous dedication. In addition, we would like to thank our work study student, Christine Younker, who has provided additional excellent administrative support to our office.
HIGHLIGHTS FROM THE 2019 – 2020 ACADEMIC YEAR

**RESEARCH FUNDING:** The Department of Molecular and Integrative Physiology has had a better year compared to 2018-2019, with respect to funds coming from the School of Medicine Allocation Model and extramural funding. Our faculty have been actively submitting new grant proposals and several of them were able to obtain new awards. Currently, members of our department continue to work hard to produce and submit high quality grant proposals and our goal is to increase this number. Based on data provided by KUMC Enterprise Analytics, the total grant direct costs for FY20 was $2,726,454, which represents a growth of ~35 % compared to the 2019 period. The latest data available shows that our department was ranked 35 at the national level for NIH research funding among 49 medical schools receiving NIH funding. While this is a good position, we would like to continue improving this ranking.

**EDUCATION:** Continuing a long tradition the physiology department has had another outstanding year with respect to teaching. The Cardiopulmonary block was selected and awarded by the students as one of the best modules in the ACE curriculum. Dr. Blanco received individual Student Voice awards for excellence in teaching. These awards were presented by the medical students at the Grande Affair celebration in January 2020. Due to the importance of physiology in years 1 and 2 of the medical curriculum, faculty in our department will continue to have a key role in teaching new generations of physicians.

With respect to the graduate student curriculum, besides our involvement with the IGPBS, we continued offering our two main courses. These include PHSL 842 Comprehensive Human Physiology and PHSL 843 Physiology of Disease, directed by Drs. Wolfe and LeVine respectively. In addition, several advanced courses were offered. These included the PHSL 835 Integrative Physiology of Exercise course (directed by Drs. Geiger and Thyfault), PHSL 848 Molecular Mechanisms of Neurological Disorders (lead by Dr. LeVine), and Physiology of Reproduction, PHSL 834 (directed by Dr. Chennathukuzhi).

**TENURE TRACK APPOINTMENTS:** E. Matthew Morris, Ph.D. was hired as an Assistant Professor on the tenure track on January 1, 2020. His research is related to the influence of the nervous system in the metabolism of the liver and the entire body.

**RESEARCH TRACK APPOINTMENTS:** Colin McCoin, Ph.D. was appointed as Research Assistant Professor, beginning on August 19, 2019. Dr. McCoin’s research is centered on investigating the impacts of obesity and related diseases on mitochondrial quality and function across multiple tissues including the liver and skeletal muscle and the sex-dependence influencing metabolism and energetics.
**JOINT AND ADJUNCT APPOINTMENTS:** The following researchers received joint appointments at their current ranks.

Adam Rouse, MD/PhD from Neurosurgery became a joint appointment on November 1, 2019.

Courtney Marsh, MD/MPH from Obstetrics and Gynecology became a joint appointment on January 1, 2020.

**FACULTY PROMOTIONS:** No new promotions occurred this fiscal year.

**FACULTY/STAFF DEPARTURES:** Sam Enna, Ph.D. retired on June 30, 2020.

**OTHER FACULTY ACCOMPLISHMENTS:** Numerous members of our department have been serving on review panels from NIH and other agencies. They have also served as editors or on the editorial board of different journals and presented invited lectures at different national and international meetings and seminars at various universities. Approximately 45 peer reviewed original articles were published by our faculty in top research journals and as book chapters.

**GRADUATE PROGRAM AND PHYSIOLOGY SOCIETY:** The student led “Physiology Society” continued functioning well this year. A new president was elected, and a new committee was chosen. The leadership of the Physiology Society is currently:

Rikki Nelson, President
Fatimah Aljubran, Vice-President
Page Hayley, Social Chair
Consuelo Perez Sanchez – Stowers Chair

The graduate students in the department had another active year. In 2019-2020 four new students were recruited to the department. These include students who are working with our affiliate members at Stowers Research Institute and joint appointment faculty at KUMC. Currently, our department has a total of 19 enrolled doctoral students. Several of our students were awarded external fellowships to support their training. Funding came from different sources, including the SELF Fellowship program, the KUMC Biomedical Training Program, National Science Foundation, and National Institute of Health.

The new graduate students that joined the department in the 2019-2020 fiscal year included the following individuals (their respective mentors are listed in parenthesis):

Ananya Nidamangala Srinivasa (Dr. Sarah Zanders)
September Numata (Dr. Gustavo Blanco)
Luke Olsen (Dr. Nicolas Rohner)
Kristen Schwingen (Dr. Gustavo Blanco)
One student completed their Ph.D. degree during the summer of 2019 and one student completed their master’s degree in Spring 2020. Congratulations to all of them and their mentors.

<table>
<thead>
<tr>
<th>Summer 2019</th>
<th>Fall 2019</th>
<th>Spring 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cameron Fox, Ph.D.</td>
<td>No Graduates</td>
<td>Ayushi Vashisht, MS</td>
</tr>
</tbody>
</table>

**Cameron Fox, Ph.D.** (May 13, 2019) received his degree with Dr. Peter Baumann at the Stowers Institute. The title of his dissertation was “Interrogating the Role of N6-Methyladenosine RNA Modification on Telomerase Biology”. Dr. Fox is working on his MD degree at the University of Kansas Medical Center.

**Ayushi Vashisht, MS** (January 10, 2020) received her degree with Dr. Warren Nothnick. The title of her thesis was “Does loss of REST contribute towards progesterone resistance in endometriosis associated infertility?”. Ayushi is currently employed at the Neuroscience Nursing Research Center at University of Texas Southwestern as a clinical data specialist.

Prepared by:

V. Gustavo Blanco, M.D./Ph.D.
Professor and Kathleen M. Osborn Chair
Molecular & Integrative Physiology
Chairs of the Department

E. B. Brown Jr., PhD
Chair (1961-1973)

A. M. Thompson, PhD
Interim Chair (1973-1976)

G. S. Greenwald, PhD
Chair (1976-1993)

J. L. Voogt, PhD
Chair (1993-2001)

P. D. Cheney, PhD
Interim Chair /Chair (2001-2012)
Kathleen M. Osborn Chair (2012-2014)

P. G. Smith, PhD
Interim Chair (2014-2015)

V. G. Blanco, MD/PhD
Interim Chair (2015-2016)
Kathleen M. Osborn Chair (2016-Present)
Molecular & Integrative Physiology
Emeritus Professors

Paul D. Cheney, PhD
Norberto C. Gonzalez, MD
Gilbert S. Greenwald, PhD†
Thomas Imig, PhD
Frederick Eugene Samson Jr., DO, PhD†
Lawrence Sullivan, PhD
Paul F. Terranova, PhD
James L. Voogt, PhD
Joseph S. Tash, PhD
S J. Enna, PhD
In Honor of Physiology Donors and the Continued Impact that their Generosity Provides

Mr. James Osborn (1919 – 2018)

Mr. Osborn’s relationship with our department began through his daughter Kathleen. She developed an interest in science and biology in high school and while attending college at the University of Missouri. During the summers of 1968 and 1969, Kathleen worked in the reproductive physiology lab of Dr. Gilbert Greenwald at the KU School of Medicine. This experience was particularly meaningful to Kathleen and might have motivated her to enter a career in science had she not been taken prematurely in an automobile accident in 1970. At the time of her death, Kathleen was in her junior year at the University of Missouri.

Mr. Osborn and his late wife Marion had such high regard for Dr. Greenwald, who died in 2004, and deep gratitude for Kathleen’s experience, that they made plans to benefit the medical center through KU Endowment. Their generosity started with the Kathleen M. Osborn Lectureship in 1971. This lectureship remains the longest running and most successful lectureship in the history of the medical center. It has attracted a long list of preeminent scientists from around the world and funds from the Kathleen Osborn Lectureship have also supported the annual Gilbert S. Greenwald Symposium.

In 2006, in memory of his beloved wife, Mr. Osborn established the Marion M. Osborn Professorship to support reproductive science within the department. The inaugural and current recipient is Dr. Leslie Heckert.

Mr. Osborn continued his generosity in honor of his daughter in 2012, establishing the Kathleen M. Osborn Chair to support the leadership position of the department. Dr. Paul Cheney was the inaugural recipient and in 2016 Dr. Gustavo Blanco was named the second Kathleen M. Osborn Chair.

This year we are again the thankful beneficiaries of Mr. Osborn’s philanthropy with the establishment of the Kathleen M. Osborn Fellowship in Reproductive Physiology. This fellowship will support graduate students in our department interested particularly in reproductive science.

The first student to receive this great honor was Rikki Nelson. Since then, other four students have been the recipients of this fellowship.

The Kathleen M. Osborn Endowed Chair, the Marion M. Osborn Professorship, and the lectureship in honor of Kathleen M. Osborn have made a great difference to our
department. These funds continue to support the research goals of our department and our students. We immensely appreciate the generous contributions that Mr. Jim Osborn made over the years. They have significantly contributed to our success.

William Biklen Pendleton attended Liberty High School and graduated in 1939 from Shattuck High School in Minnesota. After graduation he attended the University of Kansas and joined the Beta Theta Pi fraternity. William served during World War II in the U.S. Army from 1942-1946 as a Lieutenant in the 593rd engineer boat and shore regiment that was attached to the Australian 6th Division for the invasion of Borneo. Following the war, he resumed his studies at the University of Kansas. He graduated with an AB in economics in 1946. He was hired by the accounting department of Link Belt Company of San Francisco. Later, he moved back to Lawrence and farmed for five years. In 1957 he received his JD from the University of Kansas Law School. During his law practice he was a municipal court judge from 1959-1967, and president of the Douglas County Bar Association in 1981.

In 1958 he married Edith Cottom Livingston and adopted her two children Stephen and Helen. Together, they had a son Martin William Pendleton. Edith and Martin both passed away in 1974 in an automobile accident.

When William retired he remained active in the community. He participated in many clubs including the KU Chancellors Club, Elizabeth M. Watkins Society, the Vestry of Trinity Episcopal Church and was treasurer in the 1960’s, Lawrence Breakfast Optimist Club was Optimist of the Year in 1992 and 1997, the Midland Railway Historical Association where he was a director, and the American Legion. He volunteered at the Heartland Medical Clinic at the Leo Center and Friends of Hidden Valley. When he was not volunteering or participating in clubs William enjoyed collecting one-cylinder antique engines, traveling and riding steam trains around the world, and going on rail excursions in his own Fairmont inspection car.

He passed away at the age of 95 on May 15th, 2015 at Pioneer Ridge Assisted Living in Lawrence, KS. Pendleton donated his body to research.

Pendleton graciously donated to the University of Kansas Endowment Association. He wished for the money to be used in reproductive biology for family planning and birth control research and counseling.
Dr. Louis R. Fletcher (1892 – 1973)

"Life is so precious and exciting, and there is so much to be learned, that I dislike to waste a minute."
Louis R. Fletcher, M.D.

Dr. Louis R. Fletcher left an unforgettable and generous mark on the University of Kansas. Described as a farm boy from Harper, Kansas, Dr. Louis R. Fletcher attended the University of Kansas and Southwestern College for medical school. Hardworking, humble, and adventurous are just a few words to describe the life Dr. Louis R. Fletcher lived. Dr. Fletcher was a modest man who worked extremely hard for his opportunities and income. Throughout college he paid for his expenses by washing dishes, lawn keeping, and working wheat fields. Additionally, he took breaks in his schooling to save money by working in various employment opportunities in Alaska including working in the gold mines, ore processing mills, and as a bridge carpenter. He returned to KU for the 1917-18 school year and then finished his last 2 years of education at Rush Medical College of the University of Chicago where he received his degree in medicine.

He spent much of his professional career (26 years) working for the United Fruit Company in hospitals in Panama, Guatemala, and Honduras. He served his country as a commissioned Lieutenant Commander in the Navy. Additionally, he also served as chief of surgery at the Camp White Naval Hospital in Medford, Oregon. He had a lifelong love of learning. He returned to KU for postgraduate study in anatomy, not for a degree, but for the inner desire to learn.

Dr. Fletcher rarely stayed idle in his work as he then served in many different medical positions. His adventurous spirit served as a driving factor as he traveled and worked in many different countries. He returned to the United Fruit Company for a few years, served at a hospital at Superior, Arizona, worked as the medical superintendent of the Valdez Community Hospital, was the project physician at the Naval Base at Point Barrow, and served as a surgeon for a construction company in the Marshall Islands. Following retirement from the medical profession, Dr. Fletcher spent time traveling to grand places. He began by sailing from New Orleans to South Africa and then continued his travels to Asia, Australia, and New Zealand.

Throughout his life, Dr. Louis R. Fletcher became intrigued with the prospect of being a “millionaire.” Fletcher made this happen through “frugality, skimping, and strict economy.” He invested his money and was very conservative with his spending and lifestyle. He
lived modestly, ate low cost substantial food, and chose to travel by bus instead of train or plane. Dr. Fletcher humbly achieved that goal of a million dollars, in which he then said, “As you know, I have always dreamed of acquiring a million dollars. This has finally been accomplished and today I have given this million dollars to Kansas University, the school that I love so deeply and which has had such a tremendous good influence on my life. I have done this with the greatest of pleasure and satisfaction.” His donation to the Kansas University Endowment Association has provided support for research in physiology, biochemistry, pharmacology, and anatomy at the University of Kansas Medical Center as well as construction of the Dr. Louis R. Fletcher Research Laboratories. The physiology department wants to extend a gracious and continued thank you to Dr. Louis R. Fletcher for the opportunities and support his generosity continues to provide.
Dr. Walter Joseph Meek (1878 – 1963)

Dr. Walter Joseph Meek demonstrated academic excellence throughout his life. Dr. Meek and his family’s generosity is continually valued and honored in the Physiology Department. Walter Joseph Meek was born in Dilllon, KS in 1878. At age eight, Dr. Meek’s father passed away followed by his mother’s passing a few years later. Following their passing, he was raised with his first cousins. From a young age, Dr. Meek showed strong educational aspirations.

Dr. Meek graduated from the University of Kansas in 1902 where he was senior class president and editor of the school paper. As of 1983, Dr. Meek held the highest-grade point average of a University of Kansas Graduate. He continued his educational pursuits at Penn College and the University of Chicago obtaining his Ph.D. in Physiology in 1909. While pursuing his Ph.D. he taught at Penn College from 1903 – 1908 where he attained the rank of professor of biology. Dr. Meek then began teaching at the University of Wisconsin. He served as instructor in physiology (1908-1910), assistant professor (1910-1912), associate professor (1912-1918), and professor (1918-1948). He then assumed the position of chairman of Physiology Department until his retirement in 1948.

Additional professional accomplishments at the University of Wisconsin include assistant dean of medicine from (1920 – 1942), acting dean (1942 – 1945), and associate dean from 1945 until his retirement. Dr. Walter Joseph Meek also held the commission of major in the Chemical Warfare Service during the World War I. A chemical warfare unit was set up at the University, and Dr. Meek assisted with discovering the biological effects of mustard gas, lewisite, and phosgene.

Dr. Meek married Crescence Eberley on December 26, 1906. Six years later, they had their first child, Joseph Walter Meek, born in 1912. Joseph became a law school professor at the University of New Mexico. Their second child, Mary Crescence Meek, born in 1917, worked as a stewardess for American Airlines. Their third and final son, John Sawyer Meek, was born a year later in 1918. He became a professor of chemistry at the University of Colorado. The Meek family was very adventurous, embarking on many different outdoor endeavors. They visited Switzerland to hike over the high passes and climbed Pikes Peak. They also spent time at Yellowstone and Glacier National Parks. Additionally, Dr. Meek enjoyed side hobbies including photography, gardening, repairing and refinishing antique furniture, and collecting shells and stamps.
Dr. Meek’s contributions to the study of the history of medicine are nothing short of extraordinary. His bibliography consisted of 110 scientific papers and one of his most clinically relevant contributions was the discovery, in collaboration with Maurice H. Seevers and Ralph M. Waters, that catecholamines cause ventricular fibrillation in dogs anesthetized with cyclopropane.

Upon Dr. Meek’s retirement in 1948 he remained at the University of Wisconsin as a research professor for an additional year. He continued to lecture at the University of Texas and served on a committee to establish a medical school in Gainesville, Florida. His death occurred quietly in 1963 at the age of 84. Mrs. Meek passed away in 1973 at the age of 92. His ashes are buried with his wife’s in her family’s burial plot in Pennsylvania. The Physiology Department extends remembrance and sincere gratitude to Dr. Meek and his family for the generosity bestowed upon the Physiology Department. The allocation of funds is still greatly valued and utilized within the Department to continue Dr. Meek’s passion of advancing medicine.
Mr. J. Hambleton Abrahams (1913 – 1996)

Abrahams and his wife, Julie, lived in Topeka, where he was born and raised. Mrs. Abrahams was a KU Endowment Association trustee. He attended Chattuck Military Academy, Northwestern University and graduated from the University of Chicago with a bachelor’s degree in philosophy. In 1978 he received an honorary doctor’s degree in Business from Washburn University. He served during World War II in the U.S. Navy and later in the Naval Reserve as an officer. Abrahams was active throughout the community. Serving as an officer or member on the board of banks, hospitals, the chamber of commerce, the Red Cross, and many other organizations.

Security Benefit is the parent company of the Security Benefit Group of Companies, a financial services organization that maintains more than $13 billion of life insurance in force and has $2 billion in assets under management. After joining the company in 1935 he later held the positions of secretary treasurer, executive vice president, president, and chairman. Abrahams encompassed the leadership skills to grow Security Benefit from a small, midwestern company to one of the largest life insurance companies in the United States.

The Security Benefit Group of Companies headquartered in Topeka, started an annual gift of $7,500 to the KU Endowment Association to fund the J Hambleton Abrahams Lectureship in Physiology at KUMC. The lecture series honors Abrahams’s 50 years with Security Benefit.

According to Gilbert S. Greenwald, Ph.D., chairman of the Physiology Department in KUMC: “the funds will be used to bring annually to the center a person of national and international reputation in one of the physiology subspecialties: cardiovascular physiology, renal physiology, neurophysiology, endocrinology, biophysics or epithelial transport physiology.”

Kathleen M. Osborn Memorial Lectureship

September 23
Carmen Williams, M.D., Ph. D.
Senior Investigator
Reproductive Medicine Group
Reproductive & Developmental Biology Laboratory
NIEHS
“Developmentally programmed tankyrase activity licenses progression of embryonic genome activation”
Funded by the Kathleen M. Osborn Memorial Endowment Fund
Co-Hosted by Dr. Leslie Heckert, Marion M. Osborn Professor for Reproductive Sciences, Physiology, KUMC and Dr. Lane Christenson, Professor, Molecular and Integrative Physiology
**First photo:** Michael W. Wolfe, Ph.D., Kristen Schwingen, September Numata, Leslie L. Heckert, Ph.D., V. Gustavo Blanco, M.D., Ph.D.

**Second Photo:** Lane K. Christenson, Ph.D., Carmen Williams, M.D., Ph. D., Leslie L. Heckert, Ph.D., V. Gustavo Blanco, M.D., Ph.D.
Department of Molecular & Integrative Physiology Faculty
2019-2020

Nehemiah Alvarez, Ph.D., Research Assistant Professor

Pavla Brachova, Ph.D., Research Assistant Professor

V. Gustavo Blanco, M.D., Ph.D., Professor, Kathleen M. Osborn Chair

Vargheese M. Chennathukuzhi, Ph.D., Associate Professor

Lane K. Christenson, Ph.D., Professor

S J. Enna, Ph.D., Professor, Associate Dean for Research and Graduate Education
Paige C. Geiger, Ph.D., Professor

Sumedha Gunewardena, D.Phil., Research Assistant Professor

Leslie L. Heckert, Ph.D., Marion M. Osborn Professor for Reproductive Sciences

Melissa A. Larson, Ph.D., Research Assistant Professor

Steven M. LeVine, Ph.D., Professor

Colin McCoin, Ph.D., Research Assistant Professor
E. Matthew Morris, Ph.D., Assistant Professor

Warren B. Nothnick, Ph.D., H.C.L.D., Professor, Vice Chair

Peter G. Smith, Ph.D., John H. Wineinger, M.D., Professor, Senior Associate Dean for Research

John A. Stanford, Ph.D., Professor

John P. Thyfault, Ph.D., FACSM, FTOS, Professor

Ning Wang, Ph.D., Assistant Professor

Michael W. Wolfe, Ph.D., Associate Professor
Department of Molecular & Integrative Physiology Graduate Students

2019 – 2020

Fatimah Aljubran

Ashley Cloud

Kelly Fuller

Page Hayley

Carolyn Kaufman

Preethi Kunchala
Adrianna Maurer

Rikki Nelson (Kathleen M. Osborn Fellowship in Reproductive Physiology)

September Numata (Kathleen M. Osborn Fellowship in Reproductive Physiology)

Luke Olsen

Younshim Park

Consuelo Perez Sanchez
Alex Von Schulze (Self Graduate Fellow)

Kristen Schwingen (Kathleen M. Osborn/ Crescence E. Meek Fellowship in Reproductive Physiology)

Elizabeth Thoenen

Ananya Nidamangala Srinivasa

Jianzheng Wu
DEPARTMENT ROSTER  
July 1, 2019 – June 30, 2020

a. Faculty  
Primary Appointment in Physiology  
V. Gustavo Blanco, M.D., Ph.D., Professor & Kathleen M. Osborn Chair  
Vargheese M. Chennathukuzhi, Ph.D., Associate Professor  
Lane K. Christenson, Ph.D., Professor  
Salvatore J. Enna, Ph.D., Professor and Associate Dean for Research and Graduate Education  
Paige C. Geiger, Ph.D., Professor  
Lane K. Christenson, Ph.D., Marion M. Osborn Professor for Reproductive Sciences  
Steven M. LeVine, Ph.D., Professor  
Warren Nothnich, Ph.D., Professor and department Vice Chair  
Peter G. Smith, Ph.D., John H. Wineinger, M.D. Professor, Senior Associate Dean for Research  
John A. Stanford, Ph.D., Professor  
John P. Thyfault, Ph.D., Professor  
Ning Wang, Ph.D., Assistant Professor  
Michael W. Wolfe, Ph.D., Associate Professor  
John G. Wood, Ph.D., Professor and Director of Educational Programs  

Emeritus  
Paul D. Cheney, Ph.D., Professor  
S J. Enna, Ph.D., Professor (Effective 7/1/2020)  
Noberto C. Gonzalez, M.D., Professor  
Thomas J. Imig, Ph.D., Professor  
Lawrence P. Sullivan, Ph.D., Professor  
Joseph S. Tash, Ph.D., Professor  
Paul F. Terranova, Ph.D., Professor  
James L. Voogt, Ph.D., Professor  

Stowers Affiliates  
Ariel Bazzini, Ph.D., Assistant Professor  
Randal Halfmann, Ph.D., Assistant Professor  
Scott Hawley, Ph.D., Professor  
Sue Jaspersen, Ph.D., Associate Professor  
Nicolas Rohner, Ph.D., Assistant Professor  
Kausik Si, Ph.D., Professor  
Sarah Zanders, Ph.D., Assistant Professor  

Research Track Faculty  
Nehemiah Alvarez, Ph.D., Research Assistant Professor  
Pavla Brachova, Ph.D., Research Assistant Professor  
Sumedha Gunewardena, D.Phil., Research Assistant Professor  
Melissa Larson, Ph.D., Research Assistant Professor
E. Matthew Morris, Ph.D., Research Assistant Professor

Joint Appointments in Physiology
Sandra Billinger, PT, Ph.D., FAHA (Physical Therapy and Rehabilitation Science)
William (Bill) Brooks, Ph.D., (Neurology)
Jeffrey Burns, M.D., M.S., (Neurology)
Shawn Frost, Ph.D., (Physical Therapy and Rehabilitation Science)
Tomoo Iwakuma, M.D., Ph.D., (Cancer Biology)
Joshua Mammen, M.D., (Physical Medicine and Rehabilitation)
Courtney Marsh, M.D., M.P.H., (Obstetrics and Gynecology, Reproductive Endocrinology and Infertility Division)
Jill Morris, Ph.D., (Neurology)
Randolph Nudo, Ph.D., (Physical Medicine and Rehabilitation)
Janet Pierce, Ph.D., ARNP, CCRN, (Nursing)
Adam G. Rouse, M.D., Ph.D., (Neurosurgery)
William (Zhiming) Suo, M.D. (Neurology)
Russell H. Swerdlow, M. D., (Neurology)
Olivia Veatch, Ph.D., (Psychiatry and Behavioral Sciences)
Carl Weiner, M.D., MBA, (OB/GYN)
Alan Yu, M.B., B.Chir., (Internal Medicine, Nephrology Division)

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Joined Physiology</th>
<th>Prelims</th>
<th>Candidate</th>
<th>Requirements Fulfilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatimah Aljubran</td>
<td>8/17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ashley Cloud</td>
<td>8/18</td>
<td>11/18</td>
<td>Ph.D.</td>
<td></td>
</tr>
<tr>
<td>Kelly Fuller</td>
<td>6/18</td>
<td></td>
<td>Ph.D.</td>
<td></td>
</tr>
<tr>
<td>Page Hayley</td>
<td>8/17</td>
<td>11/18</td>
<td>Ph.D.</td>
<td></td>
</tr>
<tr>
<td>Carolyn Kauffman</td>
<td>1/19</td>
<td></td>
<td>M.D./Ph.D.</td>
<td></td>
</tr>
<tr>
<td>Preethi Kunchala</td>
<td>8/18</td>
<td></td>
<td>Ph.D.</td>
<td></td>
</tr>
<tr>
<td>Bradley Lamb</td>
<td>8/18</td>
<td></td>
<td>Ph.D.</td>
<td></td>
</tr>
<tr>
<td>Adrianna Maurer</td>
<td>8/17</td>
<td></td>
<td>Ph.D.</td>
<td></td>
</tr>
<tr>
<td>Rikki Nelson</td>
<td>9/17</td>
<td></td>
<td>Ph.D.</td>
<td></td>
</tr>
<tr>
<td>September Numata</td>
<td>8/19</td>
<td></td>
<td>Ph.D.</td>
<td></td>
</tr>
<tr>
<td>Luke Olsen</td>
<td>8/19</td>
<td></td>
<td>Ph.D.</td>
<td></td>
</tr>
<tr>
<td>Younshim Park</td>
<td>8/15</td>
<td>5/16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consuelo Perez Sanchez</td>
<td>8/17</td>
<td>4/19</td>
<td>Ph.D.</td>
<td></td>
</tr>
<tr>
<td>Alex Von Schulze</td>
<td>8/17</td>
<td>8/17</td>
<td>Ph.D.</td>
<td></td>
</tr>
<tr>
<td>Kristen Schwingen</td>
<td>8/19</td>
<td></td>
<td>Ph.D.</td>
<td></td>
</tr>
<tr>
<td>Ananya Nidamangala Srinivasa</td>
<td>8/19</td>
<td></td>
<td>Ph.D.</td>
<td></td>
</tr>
<tr>
<td>Elizabeth Thoenen</td>
<td>8/17</td>
<td>11/18</td>
<td>Ph.D.</td>
<td></td>
</tr>
<tr>
<td>Ayushi Vashist</td>
<td>8/18</td>
<td></td>
<td>Ph.D.</td>
<td></td>
</tr>
<tr>
<td>Jianzheng Wu</td>
<td>8/16</td>
<td>5/18</td>
<td>Ph.D.</td>
<td></td>
</tr>
</tbody>
</table>
c. Postdoctoral Fellows
Jane Yang, Ph.D.
Xiaoyu Zhang

e. Research Staff
Sindhuia Giridharan, M.D. – Lab Technician
Xiaoyu Zhang, Ph.D. – Postdoctoral Fellow
Michael Ponte – Research Technician
Gladis Sanchez, M.D. – Research Associate
Jeffrey McDermott – Senior Research Associate
Julie Allen – Lab Manager
Xiaoman Hong, M.D. – Senior Research Associate
Anuradha Chakrabarty, Ph.D. – Senior Scientist
Fengyan Deng – Research Assistant
Julia Draper – Research Associate
Clara Amat Fernandez – Clinical Research Coordinator
Fnu Sornakala Ganeshkumar – Research Assistant
Amanda Graham – Research Associate
Anamika Ratri – Research Technician (part-time)
Kimberly Stanford – Research Associate
Illya Bronshteyn – Research Associate
Bailey Bye – Research Assistant
Amanda Graham – Research Associate
Ritra Amrita – Research Assistant
Fu-Chen (Jane) Yang – Senior Research Associate

f. Support Staff
Liam Higgins – Assistant Director of Operations
Shari Standiferd – Director of Operations
Lynn LeCount – Managing Editor
Jennifer Wallace – Senior Coordinator – Accountant
Jennifer McNichols – Editorial Coordinator
Fernie Bahena – Administrative Program Manager
Christine Younker – Student Assistant

Activities of Graduate Students

Ashley Cloud

Presentations


Seminars


Meetings Attended

- Society for the Study of Reproduction. San Jose, CA. July 2019
- Greenwald Symposium. Kansas City, KS. November 2019/

Honors/Awards

- Trainee travel Award – SSR
- Trainee Elevator pitch People’s choice award – Greenwald Symposium

Other:

- Graduate Student Council President
- Student Governing Council Senator
- Campus Management Co – chair

Kelly Fuller

Publications

Kelly Fuller (continued)

Presentations

Meetings Attended

Honors/Awards
American Heart Association Predoctoral Fellowship
Physiology Society President, 2020
Physiology Society Travel Award

Page Hayley

Presentations
Milighetti, S., Sterzi, S., Fregni, F., Hanlon, C.A., Hayley, P., Murphy, M.D., Nudo, R.J., Guggemos, D.J. Effects of tDCS on Spontaneous Spike Activity in a Health Ambulatory Rat Model. Primary Poster presenter at the 49th meeting of the Society for Neuroscience. Chicago, IL. October 18 – 23, 2019

Seminars
Hayley, P. Department of Molecular and Integrative Physiology Seminar. The contribution of interhemispheric crosstalk to recovery after stroke. University of Kansas Medical Center, Kansas City, KS. January 6th, 2020

Honors/Awards
Biomedical Research Training Program

Carolyn Kaufman

Publications

Carolyn Kaufman (continued)


Presentations

Kaufman CS, et al. Self-reported omega-3 supplement use is associated with lower brain amyloid deposition and higher cerebrovascular conductance in non-demented older adults. Presented at the 2019 Alzheimer’s Association International Conference (Los Angeles, CA, USA).


Seminars

Kaufman CS. Alzheimer’s disease risk and the cerebrovascular response to exercise. 2020 Cerebral Blood Flow Virtual Seminar Series. (Virtual international seminar series.)

Kaufman CS. Aerobic exercise improves hippocampal blood flow for hypertensive APOE4 carriers. 2020 35th National MD-PhD Student Conference. (Aurora, Colorado, USA; virtual due to COVID-19.)

Meetings Attended

2020 Alzheimer’s Association International Conference, July 2020 (virtual, would have been Amsterdam)

2020 35th National MD-PhD Student Conference, Sept. 2020 (virtual, would have been Aurora, Colorado)
Preethi Kunchala

Meetings Attended
- ASCB Washington D.C. December 2019
- The social distant centromere meeting; Virtual; May – June 2020

Adrianna Maurer

Publications

Presentations
- The Obesity Society: Poster Presentation. Las Vegas, NV. November 3 – 8th 2019

Meetings Attended
- The Obesity Society. Las Vegas, NV. November 3 – 8th 2019

Honors/Awards
- Physiology Society Travel Award, University of Kansas Medical Center, Fall 2019

September Numata

Presentations
- Greenwald Symposium on Reproduction and Perinatal Research. Poster Presentation. University of Kansas Medical Center, Kansas City, KS. November 7 – 8, 2019

Meetings Attended
- Greenwald Symposium on Reproduction and Perinatal Research. 2019

Honors/Awards
- Kathleen M. Osborn Fellowship

Luke Olsen

Publications
Luke Olsen (continued)


Abstracts

Honors/Awards
Stowers Institute Travel Award

Kristen Schwingen

Publications

Presentations
Greenwald Symposium on Reproduction, Poster Presentation, KUMC, November 2019

Meetings Attended
Greenwald Symposium on Reproduction, KUMC. November 2019

Honors/Awards
Kathleen M. Osborn Fellowship in Reproductive Physiology
Physiology Travel Awardee
**Elizabeth Thoenen**

**Publications**


**Presentations**


**Meetings Attended**

University of Kansas Center Symposium. University of Kansas Edwards Campus. November 8th, 2019

KUCC Cancer Biology Program Meeting. Zoom virtual meeting. May 28, 2020

**Alex Von Schulze**

**Abstracts**


**Presentations**

COURSES TAUGHT

Medical Curriculum Core Courses
Cardiopulmonary Block. Dr. Blanco, Dr. Geiger, and Dr. Smith

Gastrointestinal Tract and Renal Block. Dr. LeVine and Dr. Blanco

Reproduction and Sexuality Block. Dr. Wolfe, Dr. Chennathukuzhi, Dr. Christenson, Dr. Nothnick, and Dr. Blanco

Muscle and Movement Block. Dr. LeVine and Dr. Stanford

Departmental Graduate Courses
PHSL 800 – Medical Physiology. Dr. Smith

PHSL 834 – Reproductive Physiology. Dr. Chennathukuzhi

PHSL 835 – Integrative Physiology of Exercise. Dr. Geiger and Dr. Thyfault

PHSL 842 – Comprehensive Human Physiology. Dr. Wolfe, Dr. Blanco, Dr. Christenson, Dr. Chennathukuzhi, Dr. Geiger, Dr. LeVine, Dr. Heckert and Dr. Nothnick

PHSL 843 – Physiology of Disease. Dr. LeVine, Dr. Nothnick, Dr. Christenson, Dr. Chennathukuzhi, Dr. Morris, Dr. Thyfault, Dr. Wolfe, Dr. Stanford, Dr. Heckert, Dr. Geiger, and Dr. Blanco

PHSL 846 – Advanced Neuroscience. Dr. Stanford

PHSL 848 – Molecular Mechanisms of Neurological Disorders. Dr. LeVine and Dr. Stanford

PHSL 851 – Seminar Course. Dr. Christenson

IGPBS Courses
GSMC 851 – Molecular Genetics. Dr. Chennathukuzhi, Dr. Christenson

GSMC 853 – Cellular Structure. Dr. Blanco

GSMC 854 – Cell Communication. Dr. Nothnick

GSMC 852 – Introduction to Biomedical Research. Dr. Christenson

GSMC 856 – Introduction to Research Ethics. Dr. Wolfe
DEPARTMENT SEMINARS

The Department Seminar program was directed by Dr. Sam Enna. Twenty-seven speakers made presentations, six of which were from outside the university. In addition to support from the department, the J. Hambleton Abrahams Lectureship in Physiology Endowment Fund, Kathleen M. Osborn Memorial Lectureship in Physiology Endowment Fund, the Office of the Dean of the School of Medicine, the KIDDRC, Landon Center of Aging and the Center for Reproductive Sciences, Dr. Louis R. Fletcher Endowment Physiology Fund, and the School of Medicine Bohan Visiting Professor Program made important financial contributions to our program.

September 9, 2019
John Thyfault, Ph.D.
Professor
Molecular and Integrative Physiology
KUMC

“Sexual dimorphism impacts hepatic responses to high fat diet and exercise”

September 16, 2019
Steven M. LeVine, Ph.D.
Professor
Molecular and Integrative Physiology
KUMC

“Experimental Therapies for Krabbe Disease”

September 23, 2019
Carmen Williams, M.D., Ph.D.
Senior Investigator
Reproductive Medicine Group
Reproductive & Developmental Biology Laboratory
NIEHS

Kathleen M. Osborn Memorial Lectureship
Funded by the Kathleen M. Osborn Memorial Endowment Fund
Co-Hosted by Dr. Leslie Heckert, Marion M. Osborn Professor for Reproductive Sciences, Physiology, KUMC and Dr. Lane Christenson, Professor, Molecular and Integrative Physiology

“Developmentally programmed tankyrase activity progression of embryonic genome activation”

September 30, 2019
E. Matthew Morris, Ph.D.
Research Assistant Professor
Molecular and Integrative Physiology
KUMC

“Tissue and Systematic Energy Metabolism as Mediators of Diet-Induced Weight Gain and Adiposity”
October 7, 2019
P. Jeremy Wang, M.D., Ph.D.
Professor, Department of Biomedical Sciences
Director, Center for Animal Transgenesis & Germ Cell Research
School of Veterinary Medicine
University of Pennsylvania
School of Medicine Bohan Distinguished Lecturer
Partially Sponsored by the Bohan Visiting Professor Program & by the J. Hambleton Abrahams Lectureship in Physiology Endowment Fund
Hosted by Dr. Ning Wang, Assistant Professor, Molecular and Integrative Physiology
KUMC

“A New Model of Directed Growth Cone Migration in Axon Guidance”

October 14, 2019
Russell H. Swerdlow, M.D.
Gene and Marge Sweeney Professor
Department of Neurology
Director, KU Alzheimer’s Disease Center
KUMC

“Mitochondria and Mitochondrial Cascades in Alzheimer’s Disease”

October 21, 2019
Dean, Joan C. Edwards School of Medicine
Professor, Internal Medicine
Marshall University
Huntington, West Virginia
School of Medicine Bohan Distinguished Lecturer
Partially Sponsored by the Bohan Visiting Professor Program & the J. Hambleton Abrahams Lectureship in Physiology Endowment Fund
Hosted by Dr. V. Gustavo Blanco, Professor and Kathleen M. Osborn Chair, Molecular and Integrative Physiology
KUMC

“Oxidant Stress in Adipocytes; A Key Factor in the Development of Uremic Cardiomyopathy”
October 28, 2019
Janice Evans, Ph.D.
Biochemistry and Molecular Biology
Purdue University
West Lafayette, Indiana
School of Medicine Bohan
Distinguished Lecturer
Sponsored by the KU School of Medicine Bohan Visiting Professor and J. Hambleton Abrahams Lectureship in Physiology Endowment Fund
Hosted by Abrahams Lectureship in Physiology Endowment Fund
Hosted by Dr. Lane Christenson, Professor, Molecular and Integrative Physiology
KUMC

“The oocyte’s progression through meiosis: Challenges in space and time”

November 4, 2019
Chad Swanson, Ph.D.
Associate Professor
Biochemistry and Molecular Biology
KUMC

“Using Multi-omic Approaches to Understand the Function of the O-ClcNAc Rheostat”

November 18, 2019
Ken McCarson, Ph.D.
Professor
Pharmacology, Toxicology and Therapeutics
KUMC
Director, KUMC/KIDDRC Rodent Behavior Facility

“Assessing Complex Movement Behaviors in Models of Neurological Disorders in the KUMC Rodent Behavior Facility”

December 2, 2019
Warren Nothnick, Ph.D.
Professor and Vice-Chair
Molecular and Integrative Physiology
Director, Center for Reproductive Sciences
Scientific Advisor, Laboratory Animal Resources
KUMC

“Deciphering the role of miRNAs in endometriosis pathophysiology using mouse models”
December 5, 2019
Harrison Stierwalt, M.S.
Doctoral Student
Translational Metabolism Research Laboratory
Oregon State University

“Regulation of skeletal muscle insulin action and fatty acid trafficking with obesity and exercise”

December 9, 2019
Ashley Cloud
Graduate Student
Molecular and Integrative Physiology
KUMC

“The Role of REST in the Regulation of Steroid Hormone Response”

December 16, 2019 – Canceled
John A. Stanford, Ph.D.
Graduate Student
Molecular and Integrative Physiology
KUMC

“Investigating Self-assembly of Amyloid Beta at Single Cell Resolution”

January 6, 2020
Page Hayley
Graduate Student
Molecular and Integrative Physiology
KUMC

“The contribution of interhemispheric cross-talk to recovery after stroke”

January 13, 2020
Adam G. Rouse, M.D., Ph.D.
Assistant Professor
Director of Basic Research
Precision Neural Dynamics Lab
Department of Neurosurgery
KUMC

“Neural encoding of the arm and hand during coordinated and precise movements”

January 27, 2020
Consuelo Perez Sanchez
Graduate Student
Molecular and Integrative Physiology
KUMC

“Neuronal basis of liking and remembering in Drosophila”
February 3, 2020
Liskin Swint- Kruse, Ph.D.
Professor and Chair
Biochemistry and Molecular Biology
KUMC

February 10
Lane Christenson, Ph.D.
Professor
Molecular and Integrative Physiology
KUMC

February 17, 2020
John A. Stanford, Ph.D.
Professor
Molecular and Integrative Physiology
KUMC

February 24, 2020
Jingxin Wang, Ph.D.
Assistant Professor
Department of Medicinal Chemistry
Structural Biology Center
KU- Lawrence

March 2, 2020
Soumen Paul, Ph.D.
Pathology and Laboratory Medicine
KUMC

March 9, 2020
Kyle Baumbauer, Ph.D.
Assistant Professor
Anatomy and Cell Biology
KUMC

“Rheostat and Toggles Switches for Modulating Protein Function”

“A-to-I RNA editing and its role in oocyte and ovarian function”

“Translatable Resistance exercise Interventions for Rat Models of Neuromuscular Function”

“Mechanistic studies of small-molecule modulators in gene splicing”

“Regulation of early mammalian development: importance of the extraembryonic trophoblast lineage”

“Nociceptor dysfunction during the acute phase of spinal cord injury (SCI): Implications for the development and management of chronic SCI- induced pain.”
March 12, 2020
KUMC Liver Center- Research in Progress Seminar Series
John Thyfault, Ph.D.
Molecular and Integrative Physiology
Additional support provided by the Department of Internal Medicine, KUMC

March 16, 2020- Canceled
Stephen J. Guyenet, Ph.D.
Author of The Hungry Brain
Founder and Director of Red Pen Reviews
Seattle, WA
Funded by the Abrahams J. Hambleton Lectureship in Physiology Endowment Fund
Hosted by the Physiology Society, Department of Molecular and Integrative Physiology, KUMC

March 23, 2020- Canceled
Vargheese Chennathukuzhi, Ph.D.
Associate Professor
Molecular and Integrative Physiology
KUMC

March 30, 2020- Canceled
Sushanta K. Banjaree, Ph.D.
Research Scientist
VA Medical Center, Kansas City, MO
Research Director, Cancer Research Unit, VAMC
Professor, Pathology and Laboratory Medicine
KUMC

April and May seminars canceled due to COVID-19

“Exercise, fitness, and protection against hepatic steatosis”

“Seduction and satiety: Under the hood of brain circuits that drive us to overeat”

“The Role of REST in uterine fibroid pathophysiology”

“CCN5 Therapy to Brake Triple Negative Breast Cancer Progression”
PUBLICATIONS

a. Peer Reviewed


applied physiology (Bethesda, Md.: 1985), 128(5), 1251- 1261. PMC7272752, 32240015


**b. Peer Reviewed in Press**


c. Abstracts

RESEARCH SUPPORT


**Sumedha S. A. Gunewardena:** NIH: “Hedgehog Signaling as a Potential Therapeutic Target for Cystic Kidney Disease” April 2015 – April 2020. Annual Direct Costs: $234,611

**Melissa A Larson:** K-INBRE: “Molecular Regulation of Cell Development and Differentiation” July 2017- June 2022.


Investigator Assistance Program University of Kansas School of Medicine – “Biotin and Progressive Multiple Sclerosis/ Improving mitochondrial function relative to progressive multiple sclerosis” July 1, 2019 – June 30, 2021. Annual Direct Costs: $34,800


NIH/NIGMS: “Reduced liver metabolism modulates neural development impacting obesity risk” May 1028 – April 2020.

**Colin S. McCoin:** KUMC Alzheimer’s Disease Center: “Cholinesterase inhibition, exercise, and maintenance of skeletal muscle and brain metabolism” 2020 – Present.


NIH – “Characterization of Sedentary Patterns and Cardiovascular Disease Risk Markers in Hispanics/Latinos” July 2019 – July 2024.

NIH – “Metabolism, appetite, and physical activity in adolescents” August 2019 – August 2024.


In mammals, only 2-5% of the genome contains exon sequences. Conversely, nearly 50% of the genome is composed of transposable elements. Transposable element sequences are derived from viral infections that were captured by the host genome. Integration of transposable events can have an important impact on the genome and on organismal physiology. In some cases, integration of transposable elements may cause DNA damage and mutagenesis, but it may also result in the introduction of sequences that can recruit transcription factors and result in the rewiring of transcriptional networks. Integration events can also occur within protein coding exons, generating proteins of altered function. Lastly, integration of transposable elements can result in the preservation of the viral open reading frames, resulting in the expression of full-length viral proteins. This is a particularly important point, because transposable element encoded proteins have the potential to retain many of the multifunctional roles of their viral cousins. These include modulation of signal transduction pathways, attenuation of innate immune signals, and altering translation efficiencies. In most tissues, transposable elements are transcriptionally silenced. Dysregulation of transposable element expression drives inflammatory states, and during pregnancy, inflammation is associated with adverse outcomes. Paradoxically, during pregnancy trophoblast cells are permissive for the expression of transposable elements. Trophoblast lineage differentiation is required for the survival and development of embryos during pregnancy. Defects in trophoblast development can lead to failed pregnancies and other pregnancy related disorders. My research focuses on understanding how proteins encoded by transposable elements function in trophoblast cells during normal and pathological conditions.

Editorial or Grant Reviews

Ad Hoc Reviewer, Biology of Reproduction
Ad Hoc Reviewer, Journal of Assisted Reproduction
Our laboratory studies the role of ion-transport proteins of the plasma membrane in cell function. Research is focused on the Na, K-ATPase, a plasma membrane enzyme system that uses the energy from ATP to establish and maintain the high internal K+ and low internal Na+ concentrations characteristic of most animal cells. Specific research projects include:

1. Function, regulation and role of the testes-specific isoform of the Na,K-ATPase in sperm function.

Several years ago, we discovered a novel molecular form of the Na,K-ATPase, an ion transporter that exchanges sodium for potassium across the cell plasma membrane. This isoform, named Na,K-ATPase α4 is specifically expressed in the testis and is abundant in spermatozoa. Our research is currently directed to understand the role, mechanisms of action and regulation of the α4 polypeptide in sperm function. Our main findings show that the α4 isoform is expressed in male germ cells of the testis after meiosis and is localized to the mid-piece of the sperm flagellum. The α4 isoform has functional properties that are different from all other Na,K-ATPases. It is required for sperm motility and is essential for sperm fertility. Activity of α4 is up-regulated with sperm capacitation and it plays an important role in maintaining cell pH, membrane potential and motility of spermatozoa. Because of the importance of α4 in sperm physiology, it represents a possible marker for male fertility and an attractive target for male contraception. An important component of our research project is devoted to find specific inhibitors of the α4 isoform, with the idea of using them as male contraceptives. Overall, this project is important to understand sperm physiology, male fertility and contraception.

2. Role of the Na,K-ATPase in autosomal dominant polycystic kidney disease (ADPKD).

We are investigating the role of the Na,K-ATPase in cyst generation and progression in the kidney in ADPKD. This is being performed in rodent models of autosomal dominant polycystic kidney disease, and in primary cultures of kidney epithelial cells from patients with ADPKD. Our main findings show that in ADPKD, the Na,K-ATPase exhibits an abnormally increased sensitivity to ouabain, a hormone released by the adrenal glands. At physiological concentrations, ouabain induces proliferation of ADPKD cells. Simultaneously, ouabain favors fluid accumulation in the cysts. Both cell proliferation and fluid secretion are important factors involved in formation and enlargement of the cysts in ADPKD. Therefore, our findings identified ouabain as a novel circulating factor that can positively contribute to progression of the disease. We are currently studying the intracellular pathways involved in ouabain effects and the mechanisms of action of ouabain in ADPKD cells, with the idea to use this information to pharmacologically interfere with the pro-cystogenic actions of ouabain. This work will be important in understanding the role of the hormone ouabain and its receptor, the Na,K-ATPase in ADPKD, the molecular basis of cystogenesis in the kidney, as well as approaches to treat the disease.
Dr. Blanco (continued)

For both Projects, we are using a combination of molecular, biochemical, immunochemical and cell biology methods. We use different expression systems for the Na,K-ATPase in mammalian cells and in insect cells. Also, we have developed animal models, using transgenic and knock out mice.

Committee Activities

KUMC
- Member, Committee member for the organization of the Greenwald Symposium in Reproduction
- Member, K-INBRE Incentive and Awards Committee

Student Service Committee
- Member, Advisory and Dissertation Committee, Kristen Schwingen, Medical Student, Ph.D.
- Member, Advisory and Dissertation Committee, September Numata, Medical Student, Ph.D.
- Member, Advisory and Dissertation Committee, Marco Correa-Pessoa, Medical Student, Ph.D.

Editorial and Grant Reviews
- Grant Review, K – INBRE research grants
- Editorial Board, American Society of Physiology
- Editorial Board, Journal of Assisted Reproduction and Genetics

Teaching Activities
- Frontiers in Reproduction – Reproductive Biology
  - 2 – 2 Hour Sessions
- PHSL 843 – Human Pathophysiology
  - 1 – 6 Hour Session

Research Personnel
- Jeff McDermott, Senior Research Associate
- Amrita Mitra, Research Assistant
- Gladis Sanchez de Blanco, Research Associate
Pavla Brachova, Ph.D., Research Assistant Professor

Our recent work in mouse GV oocytes and MII eggs shows that inosine RNA edits are a common RNA modification. We discovered inosine RNA editing occurs in gene coding regions and is enriched at the codon wobble position. This is an important observation that has not been reported before.

Presentations

Teaching Activities
PHSL 843 – Physiology of Disease
1 Session, Guest Lecture

Meetings Attended
July 2019 – Society for the Study of Reproduction, San Jose, CA, United States

Editorial and Grant Reviews
Ad Hoc Reviewer, Biology of Reproduction
Vargheese M. Chennathukuzhi, Ph.D., Associate Professor

Uterine fibroids are the most common tumors of the female reproductive tract, clinically relevant in 20-40% of reproductive aged women, occurring in up to 70% of white and 80% of black women by the age of 50 years. Uterine fibroids account for over 200,000 hysterectomies annually in the United States alone. Currently there is no approved drug for the long-term medical therapy of fibroids. One of our research interests is to understand the biology of an aberrantly expressed G protein-coupled receptor that contributes to the fibroids tumor growth. We utilize genetically modified animal models as well as primary human fibroids cells to study the etiology of uterine leiomyomas. Our goal is to develop small molecule and peptidomimetic drugs for the treatment of uterine fibroids.

My laboratory also studies the biology of a sperm-specific sodium-proton exchanger that regulates intracellular pH and motility of the sperm. In addition, we are interested in novel cancer testis antigens and development of targeted cancer therapies.

Other Teaching Activities
- Student – Wei-Ting Hung
- Student – Saieed Safer
- Student – Ashley Ward
- Student – Younshim Park
- Student – Zahraa Alali
- Student – Brittany Jack
- Student – Ayushi Vashisht
- Student – Preethi Kunchala
- Student – Rikki Nelson

Research Personnel
- Fnu Sornakala Ganeshkumar, Research Assistant
Lane K. Christenson, Ph.D., Professor

My research is focused on understanding the molecular processes of reproduction in order to enhance and inhibit fertility. My primary interest has been focused on understanding how post-transcriptional gene regulatory mechanisms (i.e., microRNA-mediated, RNA editing) facilitate ovulation and luteinization of the ovarian follicle following the LH surge. More recently, my laboratory has focused on another aspect of post-transcriptional gene regulation, A-to-I RNA editing, this exciting work (NIH-RO1 funded) is implicated in mitochondrial dysfunction within the oocyte, we are also simultaneously pursuing its role in ovarian somatic cell function. My laboratory is also funded by NASA to investigate the effects of microgravity on female fertility. Our work in miRNA within the follicle also led to our studies looking at the role extracellular vesicles (exosomes and microvesicles) in this dynamic tissue and to develop a murine in vivo tissue specific extracellular vesicle tracking system. My laboratory has also partnered with Dr. Paige Geiger's laboratory to investigate the role of extracellular vesicles in mediating the protective effects of exercise in Alzheimer's patients (NIH-R21).

Seminars/Invited Presentations
July 2019 – Christenson, L., K. A – to – I RNA editing and ovarian function, Northwest Regional Reproduction Symposium. Astoria, OR
February 2020 – Christenson, L., K. A – to I RNA editing and ovarian function, Molecular and Integrative Physiology Seminar Series. KUMC
March 2020 – Christenson, L., K. RNA editing in Ovarian Follicles and Oocytes, Center for Reproductive Sciences Seminar Series. Philadelphia, PA

Committee Activities
Departmental
Early Development Theme Leader, KIDDRC
Member, Departmental Finance Committee

University
Early Developmental Theme Leader, KIDDRC
Committee Member, Advisory Committee for the Genomics Facility
Committee Member, Postdoctoral Advisory Council

Student Service Committee
Chair, Master's Thesis Committee Chair, Rikki Nelson, Physiology, M.S.
Member, Advisory and Dissertation Committee, Fatimah Aljubran, Physiology, Ph.D.
Member, Advisory and Dissertation Committee, Jianzheng Wu, Physiology, Ph.D. University of Texas San Antonio
Member, Advisory and Dissertation Committee, Elizabeth Thoenen, Ph.D., University of Missouri
Dr. Christenson (continued)

Member, Advisory and Dissertation Committee, Hope Waisner, Microbiology, Ph.D.
Member, Advisory and Dissertation Committee, William Crawford, Medical Student, Ph.D.
Member, Advisory and Dissertation Committee, Shivani Patel, Medical Student, Ph.D.
Member, Advisory and Dissertation Committee, Jacob Cushing, Medical Student, Ph.D.
Member, Advisory and Dissertation Committee, Christos Dogrammatzis, Microbiology, Ph.D.
Member, Advisory and Dissertation Committee, Preethi Kunchala, Physiology, Ph.D.
Mentor, Avanelle Stoltz, High School Student

Editorial and Grant Reviews
Topic Associate Editor, Co – Editor, Reviewing Editorial Board or Reproductive Endocrinology, Editorial Board Member, Review manuscripts end decide acceptance, Frontiers in Endocrinology
Editorial Board Member, Review manuscripts, Journal of Assisted Reproduction and Genetics
Associate Editor, Biology of Reproduction
Reviewer, Study Section, NIH – Reproduction, Andrology and Gynecology

Teaching Activities
IGPBS (GSMC) 851 – Post-Transcriptional Gene Regulation
1 – 6 Hour Session
Physiology of Disease (PHSL 843) – Polycystic Ovarian Syndrome
1 – 2 Hour Session
Seminar (PHSL 851)
1 – 2 Hour Session
Christenson Lab – Journal Club
1 Session

Research Personnel
Xiaoman Hong, Senior Research Associate
Anamika Ratri, Research Technician
Salvatore J. Enna, Ph.D., Professor, Associate Dean for Research and Graduate Education

“Neurotransmitters and neurotransmitter receptors, with emphasis on the structure, function and pharmacology of GABA receptors.”

Meetings Attended
October 29 – November 3, 2019 – Court Testimony, Servier Case, Paris, France
November 5 – 7, 2019 – PhRMA Foundation Grant Review Meeting, Washington, D.C.
November 11 – 12, 2019 – Chinese Pharmacological Society Conference, Beijing, China
March 2 – 5, 2020 – Training Course in Neurotherapeutics Discovery and Development for Academic Scientists, Bethesda, Maryland

Committee Activities
Departmental
  Chair, Departmental Appointments, Promotions, and Tenure Committee Coordinator, Departmental Seminar Program
KUMC
  Associate Dean, Research and Graduate Education
  Internal Advisory Committee (Co – Chair), Kansas University Training Program in Neurological and Rehabilitation Sciences
  Member, Executive Research Committee
  Member, Faculty Activity Collaborative Tool (FACT) Committee
  Member, Medical School Extended Dean’s Committee

National
  Chair, Nebraska-INBRE External Advisory Committee
  Member, PhRMA Foundation Pharmacology/Toxicology Advisory Panel
  Member, GABA-B Nomenclature Database Committee

International
  Past – President, International Union of Basic and Clinical Pharmacology (IUPHAR)
  Member, International Union of Basic and Clinical Pharmacology (IUPHAR) Executive Committee
  Member, British Pharmacological Society International Advisory Group
Dr. Enna (continued)

Editorials and Grant Reviews
PhRMA Foundation Pharmacology/Toxicology Grant Review Committee
CNS Drug Review Editorial Advisory Board
Current Opinion in Pharmacology Editorial Advisory Board
Chinese Medicine Editorial Advisory Board
Pharmacology International Editorial Advisory Board

Editorial Boards of Scientific Journals
Editor – in – Chief, *Biochemical Pharmacology*
Editor – in – Chief, *Pharmacology & Therapeutics*
Co-Editor – in – Chief, *Current Protocols in Pharmacology*
Series Editor, *Advances in Pharmacology*
Guest Editor, *Biological and Pharmaceutical Bulletin*
Section Head, Neuropharmacology and Psychopharmacology, *Faculty of 1000*

Invited Presentations
November 9th, 2019 – Plenary Lecture, Chinese Pharmacological Society Conference, Beijing China
November 9th, 2019 – Manuscript Preparation Lecture, Chinese Pharmacological Society Conference, Beijing, China
March 2nd – 5th, 2020 – Alternative Approaches to Lead Generation, Training Course in Neurotherapeutics Discovery and Development for Academic Scientists, Bethesda, Maryland

Teaching Activities
Medical Education
CBCL – Multi- Infarct Dementia (Year – 02)
  1 – 2 Hour Group Session
CBCL – Male Infertility (Year – 02)
  1 – 2 Hour Group Session
CBCL – Female Infertility (Year – 02)
  1 – 2 Hour Group Session
CBCL – Adult Urinary Incontinence (Year – 02)
  1 – 2 Hour Group Session
CBCL – Transgender Case (Year – 01)

Support Staff
Ms. Lynn LeCount, Managing Editor, *Biochemical Pharmacology; Pharmacology & Therapeutics; Pharmacology International, and Advances in Pharmacology*
Ms. Jennifer McNichols, Editorial Coordinator, *Biochemical Pharmacology; Pharmacology & Therapeutics, Pharmacology International*
Dr. Enna (continued)

Honors/Awards
   Appointed Foreign Honorary Member, Chinese Pharmacological Society, November 2019
   Received the 2020 Otto Krayer Award from the American Society for Pharmacology and Experimental Therapeutics (ASPET), April 2020

Other Activities
   Consultant and Expert Witness, Simmons & Simmons, Paris France, and New York, New York
My research focus is on the cellular mechanisms leading to the development of insulin resistance and type 2 diabetes. My laboratory examines insulin signaling pathways and the regulation of glucose uptake and mitochondrial function in skeletal muscle in response to obesity-inducing high fat diets as well as exercise training and heat treatment. In the past 12 years, my research has focused on the therapeutic role of heat shock proteins (HSPs) in obesity and type 2 diabetes. HSPs are a highly conserved family of proteins best identified for their role as molecular chaperones. They play a critical role in maintaining cellular function via regulation of protein folding and degradation, and changes in their expression profile and cellular location have been linked to numerous disease states. In 2009, only one other publication had demonstrated the ability of heat treatment and/or HSP induction to regulate glucose metabolism and mitigate the effects of a high fat diet. Findings from my lab expanded on this discovery by demonstrating the ability of heat treatment to prevent high fat diet-induced insulin resistance in skeletal muscle (Gupte AA, Bomhoff GL, Swerdlow RH, Geiger PC. Diabetes 2009). Additional research from our laboratory demonstrated the ability of HSPs to increase insulin sensitivity in aging skeletal muscle and in skeletal muscles from high fat-fed rats, and demonstrated for the first time that HSP expression correlates with oxidative capacity in different white adipose tissue depots. Our latest research indicates that a deficiency in the HSP response could be a major factor in the development of metabolic disease with diet or aging. We examined the impact of an acute high fat diet on a rat model selectively bred for high and low aerobic capacity (High Capacity Runners and Low Capacity Runners, HCR and LCR, respectively, Rogers et al. Diabetes, 2016). HCR and LCR rats have decreased expression of heat shock proteins in skeletal muscle making them susceptible to insulin resistance with even a short metabolic insult (3 day high fat diet). Our research to date has greatly contributed to an understanding of HSPs in metabolic disease with implications for future treatment of diabetes and neurodegenerative diseases.

Meetings Attended
- September 2019 – Seminar, Fort Hood, TX, United States
- October 2019 – Workshop, Scottsdale, AZ, United States
- April 2020 – Experimental Biology Annual Meeting Featured Symposium.* Meeting cancelled due to Co-vid19., San Diego, CA, United States
- May 2020 – Seminar, Kansas City, MO, United States

Invited Presentations
- September 2019 – Geiger P., C. Heat therapy: molecular targets and metabolic disease prevention (Invited Speaker), Seminar. Fort Hood, TX, United States
- October 2019 – Geiger P., C. Exercise-induced extracellular vesicle crosstalk in Alzheimer’s Disease prevention (Invited Speaker), Workshop. Scottsdale, AZ, United States
**Dr. Geiger (continued)**


May 2020 – Geiger P., C. Exercise metabolism and the molecular regulation of skeletal muscle adaptation (Invited Speaker), Seminar. Kansas City, MO, United States

Committee Activities

- **Departmental**
  - Member, Graduate Student Affairs Committee
  - Member, Kathleen M. Osborn Fellowship Committee
  - Member, Faculty Search Committee

- **University**
  - Founder and Faculty Advisor, Exercise is Medicine student organization
  - Board Member, KU Cray Diabetes Center Board
  - Board Member, KUMC Student Union Corporation Board
  - Facility Co-Director, Metabolic and Obesity Research Phenotyping Facility
  - Faculty Advisor, American Medical Women’s Association student group
  - Founding Member, KUMC Women in Medicine and Science
  - Member, KUMC Childcare Center Task Force
  - Member, Orr Academic Society

- **Student Service Committee**
  - Dissertation Committee Chair, Alex Von Schulze
  - Mentor – Daniel Elliot
  - Mentor – Adrianna Mueller
  - Mentor – Carolyn Kauffman
  - Mentor – Kelly Elliot
  - Mentor – Jenna Frick

- **Other student contact:**
  - Summer undergraduate research rotation, Danielle Rehor
  - KINBRE Summer Scholar, Janee Bates
  - KUMC MD/PhD student rotation, Chelsea Johnson

- **Editorial Boards of Scientific Journals**
  - Insight, Consulting Editor, *Journal of Clinical Investigation*

- **Teaching Activities**
  - ACE Curriculum, Muscles and Movement Block
    - 1 – 1 Hour session
  - ACE Curriculum, Respiration and Circulation
    - 3 – 1 Hour Sessions
Dr. Geiger (continued)

PHSL 836 – Physiology of Disease
   12 – 1 Hour Sessions
PHSL 838 – Integrative Physiology of Exercise
   56 – 1 Hour Sessions
PHSL 842 – Comprehensive Human Physiology
   11 – 1 Hour Sessions

Research Personnel
   Fengyan Deng, Research Assistant
   Alex Von Schulze, Graduate Student
Sumedha Gunewardena, Ph.D., Research Assistant Professor

Bioinformatics and computational genomics: modeling protein-DNA interactions, biological sequence analysis, microarray data analysis, biological pathways and network analysis, development of computational tools and databases.

Publications


Dr. Gunewardena (continued)


Liu, J., Gunewardena, S., Yue Cui, J., Klaassen, C. D, Chorley, B. N, Corton, J. C (2020). Transplacental arsenic exposure produced 5-methylcytosine methylation changes and aberrant microRNA expressions in livers of male fetal mice. Toxicology, 435, 152409. 32068019

Our laboratory is studying the molecular mechanisms that regulate cellular differentiation and organ development of the reproductive system. We are interested in the transcriptional and cell-signaling processes involved in activating and regulating genes important for the development and function of the testis and their implications in sex determination. In particular, we are studying the processes that control testis- or gonad-specific expression of three genes that are critical for proper fetal development and/or gonad function. These are: 1) doublesex and mab-3 related transcription factor 1, an evolutionarily conserved protein that is required for testis differentiation, 2) steroidogenic factor 1, a protein that is required for the formation of adrenal glands and gonads, and 3) follicle stimulating hormone receptor, a protein expressed only in somatic cells of the gonads and is required for endocrine regulation of the testis and ovary. My laboratory employs a variety of experimental approaches that include cell culture, molecular biology, and transgenic and knockout mice. Through these studies, we hope to provide insight into the genetic events necessary for formation and function of the gonads, thus expanding our understanding of the biological requirements for organ development and reproduction.
Melissa A. Larson, Ph.D., Research Assistant Professor

The TCIF is a fee-for-service facility supporting the research efforts of investigators at the KUMC and the surrounding research community. In this capacity, we are providing the services of generation of transgenic and chimeric mice, targeting of embryonic stem cells, genotyping, sperm and embryo cryopreservation, rederivation by embryo transfer and in vitro fertilization. We also provide consultation, demonstration and training on construct generation, embryo handling and mouse surgeries and will be adding the service on intracytoplasmic sperm injection. We welcome the opportunity to research new projects, and we are developing new techniques and services to offer to investigators. My lab is also investigating the in vivo function of a novel recombinase for use in genetic engineering.

Publications

Editorial and Grant Reviews
Reviewer – Tissue and Cell, Journal Article, Manuscript review.
Methods in Molecular Biology, Transgenic Mouse, Editor, Book, Editor.

Committee Activities
University
Member, Institutional Animal Care and Use Committee
Member, IACUC Programmatic Sub-Committee

Research Personnel
Illya Bronshteyn, Research Associate
Julia Draper, Research Associate
**Steven M. LeVine, Ph.D., Professor**

*We study two demyelinating diseases of the central nervous system, multiple sclerosis and Krabbe’s disease. We examine pathogenic mechanisms and test experimental interventions in animal models of these diseases. The goal of our studies is to improve treatment options for patients afflicted with these conditions.*

**Seminars**
- Experimental Therapies for Krabbe Disease. Department of Molecular and Integrative Physiology. University of Kansas Medical Center. September 16th, 2019

**Committee Activities**
- **Departmental**
  - Member, Graduate Student Advisory Committee
  - Member, Departmental Promotions and Tenure Committee
  - KUMC

**Teaching Activities**
- **CBCL**
  - 13 – 2 Hour Sessions
- **PHSL 842 – Comprehensive Human Physiology**
  - 1 – 1 Hour Session
  - 5 – 1 Hours Session
- **PHSL 843 – Physiology of Disease**
  - 8 – 2 Hour Sessions
  - 9 – 1.5 Hour Sessions
  - 2 – 1.5 Hour Sessions
  - *mentored students for lecture preparation and attended/graded twelve additional student presentations*

**Gastrointestinal – Renal – GI Physiology I, II, III, IV**
- 4 – 1 Hour Sessions

**Gastrointestinal-Renal – Constipation (assisted)**
- 1 – 1 Hour Session

**Muscle and Movement – Multiple Sclerosis**
- 1 – 1 Hour Session

**Capstone – Perforated Bowel; Multiple**
- 2 – 1 Hour Sessions

**Research Personnel**
- Sindhuja Giridharan, MD (technician)

**Other Activities**
- Multiple Sclerosis Research Group at KUMC – Member
- CBCL on Multiple Sclerosis – Muscle and Movement block – Lead Author
Colin S. McCoin, Ph.D., Research Assistant Professor

My major research interests lie in field of mitochondrial physiology with a current focus on two research projects. First, examining how statin therapy impacts tissue mitochondrial function in children. Second, researching how physical activity impacts tissue mitochondrial health and dynamics.

Meetings Attended
December 2019 – Center for Children’s Healthy Lifestyles & Nutrition Scientific Advisory Board

Editorial and Grant Reviews
Reviewer, KUMC Biomedical Research Training Program, Grant Application Reviewer
Ad Hoc Reviewer, Experimental Physiology
Ad Hoc Reviewer, Journal of Applied Physiology
Ad Hoc Reviewer, Medicine & Science in Sports & Exercise
Ad Hoc Reviewer, Applied Physiology, Nutrition, and Metabolism
Ad Hoc Reviewer, Molecular Metabolism
Ad Hoc Reviewer, Physiology and Behavior
Ad Hoc Reviewer, Free Radical Biology and Medicine

Invited Presentations

Teaching Activities
PHSL 843 – Physiology of Disease – NAFLD
1 – 1.5 Hour Session
E. Matthew Morris, Ph.D., Assistant Professor

Dr. Morris’ research interests center around the regulatory mechanisms of energy homeostasis through modulation of tissue-specific and systemic energy metabolism, and how these mechanisms fail or are overwhelmed leading to weight gain and, ultimately, obesity. This starts by studying how the function of the primary energy producing cellular bodies, mitochondria, can impact tissue function and systemic health. Currently, the lab is investigating: 1) how liver mitochondrial function can, through peripheral neural pathways to the homeostatic control regions of the brain, influence sex differences in high fat diet-induced weight, 2) how systemic energy expenditure and sex differences interact to regulate diet-induced weight gain, changes in adiposity, and adaptation of energy metabolism, and finally, 3) whether transcriptional control of mitochondrial lipid metabolism in the ventromedial hypothalamus is necessary for alterations in energy metabolism resulting in susceptibility to diet-induced weight gain.

Committee Activities
Student Service Committee
Member, Advisory and Dissertation Committee, Alex Von Schulze, M.S., Physiology
Member, Advisory and Dissertation Committee, Luke Olsen, Ph.D., Physiology
Member, Advisory and Dissertation Committee, Jenna Frick, Ph.D., Anatomy

Editorial and Grant Reviews
Reviewer, Grant Proposal, Pre – Application Diabetes peer review panel,
Department of Defense, Congressionally Directed Medical Research Programs
Reviewer, Grant Proposal, University of Missouri State
Reviewer, Grant Proposal, University of Kansas Medical Center
Reviewer, Journal of Applied Physiology
Reviewer, Experimental Physiology
Reviewer, Applied Physiology, Nutrition, and Metabolism
Reviewer, Diabetes
Reviewer, Diabetes Care
Reviewer, Physiology & Behavior
Reviewer, Physiology Genomics
Reviewer, American Journal of Physiology – Endocrinology & Metabolism
Reviewer, Molecular and Cellular Endocrinology
Reviewer, Endocrinology
Reviewer, Scientific Reports
Reviewer, American Journal of Physiology – Regulatory, Integrative, & Comparative Physiology
Reviewer, Molecular and Cellular Biochemistry
Reviewer, Liver International
Dr. Morris (continued)

Reviewer, *The Obesity Society*
Reviewer, *American Journal of Physiology – Renal Physiology*

Teaching Activities
- PHSL 843 – Physiology of Disease – Obesity
  2 – 2 Hour Sessions
- PHSL 836 – Advanced Neuroscience – Homeostatic Regulation of Ingestive Behavior
  2 Sessions
- ANAT 849 – Mitochondria
  1 – 2 Hour Session

Research Personnel
- Michael Ponte, Research Technician
Warren B. Nothnick, Ph.D., H.C.L.D., Professor and Vice-Chair

The research in the Nothnick Laboratory focuses on the physiology and pathophysiology of the uterus/endometrium with the primary focusing being endometriosis. Endometriosis is a chronic disease in which endometrial tissue grows ectopically, is characterized by pelvic pain and infertility and affects over 70 million women world-wide. One of the reasons for its high prevalence is that the disease is usually diagnosed only after it has established. An additional clinical shortcoming is that the majority of treatments for the disease rely on the induction of a hypo-estrogenic state which is associated with unwanted side effects and negative impacts on bone health. Clearly, both better diagnostic tools and treatment options are warranted.

Committee Activities

Departmental
Vice – Chair, Department of Molecular and Integrative Physiology, University of Kansas Medical Center
Chair, Department of Molecular & Integrative Physiology, University of Kansas Medical Center, Finance Committee
Member, Department of Molecular & Integrative Physiology, University of Kansas Medical Center, Departmental Promotion and Tenure Committee

KUMC
Director, Center for Reproductive Health Sciences
Director, Division of Laboratory Animal Resources
Member, Diverse Faculty Recruitment Committee, School of Medicine
Member, Advisory Committee for the University of Kansas Medical Center Institutional Official

Service on Student Committees
Member, Doctoral Candidate, Department of Microbiology, Molecular, Genetics, and Immunology – Sachith Polpitiya Arachige
Member, Doctoral Candidate, Department of Microbiology, Molecular, Genetics, and Immunology – Wyatt Henke
Member, Doctoral Candidate, Department of Molecular and Integrative Physiology – Fatimah Aljubran
Member, (Oral Comprehensive Committee) Doctoral Candidate, Department of Molecular and Integrative Physiology – Alex Von Schulze
Member, (Oral Comprehensive Committee) Doctoral Candidate, Department of Molecular and Integrative Physiology – Elizabeth Thoenen
Member, (Oral Comprehensive Committee) Doctoral Candidate, Department of Molecular and Integrative Physiology – Adrianna Maurer
Member, (Oral Comprehensive Committee) Doctoral Candidate, Department of Molecular and Integrative Physiology – Bradley Lamb
Dr. Nothnick (continued)

Member, (Oral Comprehensive Committee) Doctoral Candidate, Department of Molecular and Integrative Physiology – Ayushi Vashisht

Member, (Oral Comprehensive Committee) Doctoral Candidate, Department of Molecular and Integrative Physiology – Fatimah Aljubran

Editorial and Grant Reviews
Editorial Board Member, Scientific Reports
Reviewer, NIH Study Sections, ICER: Gynecology, Reproduction, and Andrology
Reviewer, Society for the Study of Reproduction
Reviewer, American Society of Reproductive Medicine
Reviewer, Society for Reproductive Investigation

Teaching Activities
ACE BLOCK 5 GI/RENAL – Exocrine Pancreas
1 – 1 Hour Session
ACE BLOCL 8 RDS
1 – 1 Hour Session
BLOCK 5 ACE – GI/RENAL – Diarrhea
1 – 1 Hour Session
IGPBS (GSMC 854) – Cell Communication
1 – 6 Hour Session
PHSL 834 – Reproductive Physiology
1 – 6 Hour Session
PHSL 842 – Comprehensive Human Physiology, Uterine biology, Pregnancy, Infertility
1 – 4 Hour Session
CBCL teaching Community Group Leader, M1. Active, Competency – based, and Excellence (ACE)
7 contact hours
CBCL Teaching Community Group Leader, M2. Active, Competency – based, and Excellence (ACE)
6 contact hours

Other Activities
Society for the Study of Reproduction, Moderator, Annual Meeting
Ambassador – World Endometriosis Society
Moderator – World Congress on Endometriosis
Judged posters at the Society for Reproductive Investigation Annual Meeting

Research Personal
Amanda Graham, Research Associate
Fatimah Aljubran, Graduate Student
Peter G. Smith, Ph.D., John H. Wineinger, M.D. Professor, Senior Associate Dean

Autonomic neurobiology, peripheral sensory axon growth, pain targets, neuroplasticity and regeneration; developmental disabilities.

Editorial and Grant Reviews
Reviewer, National Institutes of Health, Study Sections
Reviewer, Nature Reviews, Journal Article, Reviewed manuscript for Nature Reviews Disease Primers
Reviewer, National Institutes of Health, Study Section, Somatosensory and Pain Systems Study Section
Associate Editor, Editorial Board - Autonomic Neuroscience: Basic and Clinical, International Society of Autonomic Neuroscience

Teaching Activities
Prematriculation – Autonomic Nervous System & Neural Control of Circulation
1 – 2 Hour Session
Respiration & Circulation – Autonomic Nervous System & Neural Control of Circulation
1 – 2 Hour Session

Committee Activities
Student Contact
Aritra Battacherjee

Research Personnel
Anuradha Chackrabarty – Senior Research Scientist
Dora Agbas – Senior Research Scientist

Other Activities
National Institutes of Health, Chairperson, Shared Instrumentation for Genomics Research Study Section.
My research is focused on diseases and conditions that affect motor function, such as Parkinson's disease, Amyotrophic Lateral Sclerosis (ALS), neonatal jaundice, and aging. My approach is best described as a systems neuroscience approach using operant behavioral methods in rodent models. I have a longstanding interest in determining mechanisms that underlie, and potential treatments to ameliorate, orolingual motor deficits in aging and in ALS. Recent efforts in my lab have focused on the effects of isometric strength training on disease progression in rat models of aging and ALS. I am also involved in research into determining the short- and long-term neurological effects of hyperbilirubinemia in rodent models of neonatal jaundice. Finally, I remain interested in the effects of metabolic challenges on neural function to understand the co-morbidity between obesity and neurodegenerative diseases.

Seminars/ Invited Presentations
October 2019 – Stanford, J., A. Translatable Resistance Exercise Interventions for Rat Models of Neuromuscular Function, Department of Neuroscience Seminar Series. Lexington, KY, United States

Committee Activities
National
Councilor – Society Council, American Society for Neural Therapy & Repair
Member – Program Committee, American Society for Neural Therapy & Repair
Student Committee Service
Graduate/Student Advisory Committee – Chunkai Zhou
Graduate/Student Advisory Committee – Jason Flor Sistante
Graduate/Student Advisory Committee – Matthew Stroh
Graduate/Student Advisory Committee – Sha Neisha Williams
Graduate/Student Advisory Committee – Sidrah Sheik

Editorial and Grant Reviews
Editorial Board, Brain Research Bulletin
Reviewer, Brain Research Bulletin
Reviewer, Brain Stimulation
Reviewer, Neurochemistry International
Reviewer, Journal of Applied Physiology
Reviewer, Neurobiology of Disease
Reviewer, Stem Cells Translational Medicine
Reviewer, Brain Communications
Reviewer, PLOS One
Reviewer, NIH MFSR Study Section
Dr. Stanford (continued)

Teaching Activities
PHSL 842
7 – 2 Hour Sessions
PHSL 843
2 – 2 Hour Sessions
ACE Block 7 – Brain, Mind, and Behavior
2 – 1 Hour Sessions

Research Personnel
Kimberly Stanford, Research Associate
Fu-Chen (Jane) Yang, Senior Research Associate
Chronic physical inactivity, sedentary behavior, and low aerobic fitness are linked to the development of chronic disease conditions including obesity, insulin resistance, fatty liver disease, type 2 diabetes, and cardiovascular disease. In contrast, daily physical activity and maintenance of aerobic fitness throughout the lifespan are associated with protection against chronic disease(s). The mechanism(s) underlying the development of these diseases and the role that activity and fitness status play in altering susceptibility remain largely unknown and are the focus of our research. We utilize integrative (multi-tissue and whole body), translational (cells, rodents, humans) approaches to perform studies in these areas with a focus on clinical or human relevance.

The specific projects ongoing right now are focused on four primary areas:

1. Links between fatty liver, hepatic mitochondrial dysfunction, and low aerobic fitness and the role that hepatic PGC-1a may be playing in this process
2. Role of hepatic mitochondrial function to impact systemic metabolism and regulation of energy intake and physical activity
3. Role of physical activity and inactivity to modulate insulin action and glycemic control
4. Impact of statins to negatively impact the ability of exercise training to improve skeletal muscle mitochondrial content and aerobic fitness

Meetings Attended
October 2019 – Seminar Series, Harold Hamm Diabetes Center
February 2020 – Seminar Series, Nutrition and Exercise Physiology
March 2020 – New Insights in Biology of Exercise Keystone Symposium

Committee Activities
KUMC
Facility Director – Metabolic and Obesity Research Phenotyping (MORPH) Facility

National
Member – NIH Nutrition and Obesity Research Center at the University of Colorado – Anschutz Medical Campus National, External Advisory Committee
Chair – Pennington Biomedical Research Center – Obesity COBRE National, External Advisory Committee

Editorial and Grant Reviews
Consulting Editor – Insight – Journal of Clinical Investigation
External Reviewer – Grant Proposal – Study Section – Integrative Physiology of Obesity and Diabetes (IPOD), NIH
External Reviewer – Grant Proposal – Biotechnology and Biological Sciences Research Council Grant
Dr. Thyfault (continued)

External Reviewer – Grant Proposal – Health Research Board
External Reviewer – Grant Proposal – Organization for Health Research and Development (ZonMw)
Editorial Board, American Journal of Physiology
Editor, Journal of Applied Physiology
Reviewer, NIH Study Section
Reviewer, Aging Cell
Reviewer, AJP – Cell, - Comp, Reg, Int. Physiology, - Gastroenterology, - Endocrinology and Metabolism
Reviewer, British Journal of Sports Medicine
Reviewer, Diabetes
Reviewer, Diabetologia
Reviewer, European Journal of Applied Physiology
Reviewer, Exercise and Sports Science Reviews
Reviewer, Hepatology
Reviewer, JAMA
Reviewer, Journal of Applied Physiology
Reviewer, Journal of Clinical Endocrinology & Metabolism
Reviewer, JCI
Reviewer, Journal of Hepatology
Reviewer, Journal of Lipid Research
Reviewer, Journal of Physiology
Reviewer, Lancet
Reviewer, Medicine and Sciences in Sports and Exercise
Reviewer, Metabolism
Reviewer, Molecular and Cellular Endocrinology
Reviewer, Molecular Genetics and Metabolism
Reviewer, Neurobiology of Aging
Reviewer, Obesity
Reviewer, Plos One
Reviewer, Physiological Genomics

Invited Presentations:
October 2019 – Harold Hamm Diabetes Center Seminar Series “Hepatic fitness and susceptibility for metabolic disease” University of Oklahoma Health Sciences and Harold Hamm Diabetes Center
February 2020 – Nutrition and Exercise Physiology Seminar Series “Aerobic capacity and Health” University of Missouri Department of Nutrition and Exercise Physiology
Dr. Thyfault (continued)

Courses Taught
IGPBS
1 – 9 Hour Session

Research Personnel
Julie Allen – Lab Manager
Dr. E. Matthew Morris – Research Assistant Professor: Role of hepatic mitochondrial function to impact weight gain
Dr. Colin McCoin – Post – Doctoral Fellow: Statins and mitochondrial function
Adrianna Maurer, IGPBS Ph.D. Student: Bile acids and fitness Alex Von Schulze, IGPBS Ph.D. Student: Hepatic mitochondrial function, eat shock proteins, and mitophagy
Kelly Fuller, Graduate Student: Statins and mitochondrial function
Robin Schook – Research Associate

Honors/Awards
Impact Award – American Physiological Society – Environmental and Exercise Physiology Interest Group Mid-Career Award for Excellence in Research Related to Exercise Physiology
Male fertility relies on a rare population of spermatogonial stem cells (SSCs) in testes. In mice, SSCs, making up only ~0.03% of all germ cells, produce ~40 million sperm per gram of tissue per day by way of mitosis and meiosis. Proper maintenance of this small pool of SSCs is essential to sustain lifelong production of sperm. We have established a transgenic mouse line, in which the Stra8 promoter, whose activation is probably one of the earliest events during GSC differentiation of both sexes, drives GFP reporter expression (Stra8-GFP). We recently reported that, by using cell surface markers for undifferentiated and differentiating spermatogonia in Stra8-GFP mice, we are able to separate spermatogonia into six populations at consecutive differentiation stages (Figure 1; Xiong et al, Cell Cycle, 2015).

Thus, we are using this unique system to: 1) Characterize novel phenotypical markers of the primitive spermatogonial stem cells; 2) Investigate the mechanisms governing stem cell maintenance and differentiation.

In addition to SSCs, we are currently investigating how spermatogonial cells commit meiosis. Meiotic initiation is a key feature of sexual reproduction that launches an intricate chromosomal program involving DNA double strand breaks (DSBs), homolog pairing, cohesion, synapsis, and recombination. Vertebrate gene Stra8 is an essential gatekeeper of meiotic initiation. However, the molecular role of STRA8 and its target genes remain elusive. Using mouse spermatogenesis as a model, we recently reported that STRA8 suppresses autophagy by repressing the transcription of a nuclear hormone receptor gene Nr1d1, and in turn, silencing the expression of Ulk1, a gene essential for autophagy initiation (Figure 2; Ferder et al, PLoS Genetics, 2018). Given that autophagy is critical for protein and cellular organelle recycling and for preventing genomic instability, our study suggests that this newly demonstrated function of STRA8, as a suppressor of autophagy, may be an important mechanistic feature of its role in meiotic initiation. Currently, we are using a combination of molecular, cellular, and genetic approaches to investigate autophagic regulation of meiotic initiation during germline development.

Editorial and Grant Reviews
   Reviewer, Biology of Reproduction
   Ad Hoc Reviewer, Stem Cells and Development

Research Personnel
   Bailey Bye, Research Assistant
   Xiaoyu Zhang, Ph.D., Postdoctoral Fellow
Michael W. Wolfe, Ph.D., Associate Professor

Regulation of the hypothalamic-pituitary-gonadal axis; Differentiation and function of placenta trophoblasts.

Meetings Attended
August 2019 – PI Bootcamp, Kansas City, KS, United States
February 2020 – PI Bootcamp, Kansas City, KS, United States

Committee Activities
KUMC
IGPBS Advisory Board
SOM Phase 1 Committee
Graduate Council
Outside KUMC
Frontiers Training Center Advisory Committee

Invited Presentations
August 2019 – Wolfe, M., W. Responsible conduct of research, PI Bootcamp. Kansas City, KS. U.S.
February 2020 – Wolfe, M., W. Responsible conduct of research, PI Bootcamp. Kansas City, KS. U.S.

Courses Taught

Medical Courses
ACED 805 Molecular and Cellular Medicine
1 – 50-60 – minute lecture
ACED 825 Muscles and Movement
3 Lectures
ACED 835 Reproduction, Development, and Sexuality
5 Lectures
ACED 840 Capstone
1 Lecture

Graduate Courses
GSMC 856
Introduction to Ethics
12 contact hours

PHSL 842
Comprehensive Human Physiology
7 hours

PHSL 843
Physiology of Disease
1.5 hours

Honors/Awards
Student Voice Award – M1 outstanding lecturer for excellence in teaching