Masonic Medical Research Institute Expands Research Portfolio

Right now, Masonic Medical Research Institute (MMRI), in Utica, NY, is diversifying and expanding its research portfolio. Scientists seek to understand mechanisms of disease in an effort to discover treatments and cures for patients with heart disease, diabetes, lupus and autism. It is MMRI's mission to improve the health and quality of life for all humankind. With a growing collaborative team, we have introduced new technologies and raised the bar on our capabilities and competitiveness, both nationally and internationally.

Dr. Maria Kontaridis, Director of Research, shared “The coming years at the MMRI will be transformative; we are on a quest to unravel the mechanisms underpinning the causes of disease.”

Graph depicts MMRI's current research interests.

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Electrophysiology – Focus has been placed on the fundamental mechanisms underlying both congenital heart disease and end-stage heart failure, and the processes that lead to abnormal development, aberrant signaling and disease onset. By focusing on the effects of specific ailments, MMRI can have a better understanding of the electrophysiology of the heart and better interpret ECG by clinicians as well as working on understanding excitation-contraction coupling (EC coupling) and the molecular and cellular processes responsible for transducing the electrical impulse in the heart.

Cardiac Hypertrophy – MMRI is focusing on understanding molecular genetics and epigenetic changes controlling cardiac hypertrophy and heart failure which remain a significant cause of death worldwide. The goal is to understand mechanisms that are leading to heart failure and to finding a cure for end stage heart disease.

Pulmonary Embolism – Currently the best treatments available are blood thinners or anticoagulants (warfarin), thrombolytic medications (“clot busters”), or in extreme cases, surgery. However thrombolytic therapies still do not outweigh the risk of major bleeding events, which has not improved over the years. Through team collaboration, MMRI has leveraged state-of-the-art imaging instrumentation to follow the biological mechanisms that are causal to Pulmonary Embolisms. With resolution and identification markers, we are developing new treatments and imaging strategies for better and more accurate detection, therapy and prognosis.

Metabolism and Diabetes – Research is aimed at dissecting the molecular mechanisms regulating cardiac growth. The goal is to advance the field of metabolism and heart development at MMRI, with the treatment of diabetes and obesity related heart disease, at a molecular level. A research program is being developed to allow the dissecting of roles for fat tissue to control obesity by targeting the tissue with gene therapy approaches.

Lupus – MMRI is focused on studying the effects of elevated protein activity in patients with lupus. We believe that an increased protein activity in one particular enzyme called SHP2 may cause lupus progression and associated organ damage. One of the most important elements of our project is to develop targeted drugs for the treatment of Systemic Lupus Erythematosus (SLE). MMRI hopes to create a drug that targets disease onset, thereby preventing lupus pathology.

Autism – Research at MMRI is focused on identifying new genes in families with autism. Through DNA sequencing for rare transmitted undiscovered genes, we will seek to understand the cause of this disease. Use of inducible pluripotent stem cells (iPSCs) from patients with these genetic mutations will be differentiated into neuronal cells. MMRI plans to identify potential therapeutics that may target the signaling molecules aberrantly regulated by the genetic mutations in an effort to reverse or slow the severity of Autism.

By expanding the scope of our research efforts, MMRI will be able to raise the bar and generate the knowledge necessary to develop innovative solutions to medical challenges. Thanks to the support of the Freemasons, the National Institutes of Health, government grants, and partnerships with other academic institutions, MMRI will continue to save lives and improve the quality of life for generations to come.

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Stress is a killer. While that saying has been around for decades, only now are scientists starting to understand exactly how stress leads to conditions from depression to heart failure. Dr. Coralie Poizat, Research Associate Professor at MMRI is focusing on understanding molecular genetic and epigenetic changes controlling cardiac hypertrophy and heart failure, which remain a major cause of death worldwide.

Heart disease and heart failure have an extremely high economic cost in the United States and globally. According to the American Heart Association’s (AHA) 2018 statistics, heart disease accounts for 1 in 7 deaths in the United States. AHA also states that cardiovascular disease accounted for more than 17.9 million deaths per year in 2015, making it the leading global cause of death. That number is expected to increase to more than 23.6 million by the year 2030.

While heart disease as a chronic condition is largely understood by the public, what is less well known is the mechanism contributing to the disease. Most people have a basic knowledge of what DNA is and what it does, such as how it stores genetic information in our chromosomes. What is less well-known among people is that there is another level of organization in the genome that can control gene expression – it is called the epigenome. To provide a more precise example, epigenetics are changes that are due to the environment, what you eat, what chemicals you are exposed, and stress. These environmental factors will influence gene expression without changing the DNA sequence itself.

All of these affect chromatin, which is composed of DNA and of specialized proteins that the DNA is wrapped around. Chromatin stores our genetic information, and when chromatin conformation is altered and dysregulated due to epigenetic processes, chromatin can be switched to “open” or “closed” states, which can turn genes “on” or “off”. When the chromatin conformation is altered, it can lead to diseases such as heart failure. The goal of Dr. Poizat’s research is to understand the epigenetic processes that are important to maintain proper chromatin architecture critical for healthy heart function.

“My research interest is to understand mechanisms that are leading to heart failure”, said Dr. Poizat. “We want to develop new treatments for heart failure. It’s a major problem and it’s also on the rise because our population is aging. We know that heart failure can be managed with drugs, but there is no cure. So we need to find new treatments and more customized treatments.”

As part of her studies, Dr. Poizat has formed a collaboration with her MMRI colleague, Dr. Jason McCarthy, Associate Professor of Cardiovascular Medicine, Scientific Operations Manager. Dr. McCarthy has developed a technology where he can deliver nanoparticles to very specific organs. Dr. Poizat and Dr. McCarthy plan to use this technology to test the effect of an inhibitor of chromatin by using the nanoparticle to exclusively target cardiac cells. The collaboration allows the study of the inhibitor to be much more precise. Different cells respond in different ways to epigenetic processes. Since the cardiac cells remodel differently than lung cells or neuro cells, it is important to be able to exclusively target the cardiac cells to get a

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more precise understanding of where and why the chromatin conformation is dysregulated.

One of the benefits Dr. Poizat has seen by coming to MMRI is the new group of collaborators she gets to work with. Now that many researchers have joined MMRI and are neighbors, it allows them to work together in real time and develop their research much more quickly and effectively than if they were at different institutions. For example, Dr. McCarthy is now also a co-investigator on the grant application Dr. Poizat has submitted to National Institutes of Health (NIH).

Along with the help of nanoparticles, Dr. Poizat is combining several other methodologies as well by using cellular models, genetically modified mice, models of heart failure in mice, and a library of human hearts from patients who have undergone heart transplants. With the mice, she and her team are able to surgically induce cardiac stress by, for example, ligating the aorta that would put pressure on the ventricle, which would be the equivalent of patients that have hypertension. They can then interrogate the proteins that are dysregulated in response to the stress and compare the affected heart with a healthy heart. Once they have identified the protein differences in the mice, they can use similar interrogative methods to study the affected hearts harvested from transplants.

While heart failure is on the rise, Dr. Poizat is hopeful that her research will lead the ability to develop precision medicine to prevent or block the effect of gene mutations or chromatin dysregulations that ultimately cause heart failure.

For more information on Dr. Poizat and her research visit www.mmri.edu

To support Dr. Poizat’s research contact Alex Simon, Director of Development at alex@mmri.edu or 315-624-7483.

**MMRI Receives a Major Gift**

Brother Duff Melvin Neely, Jr. was raised to the sublime degree of Master Mason on November 28, 1989 in Hendrick Hudson Lodge in the town of Red Hook, New York. While he never reached the Master’s station, his time and experiences while being a Brother were clearly meaningful to him.

Duff laid down his working tools on February 28, 2018 in Naples, Florida at the age of 77. In spring 2018 the Masonic Medical Research Institute learned it would be the residual benefactor of his estate. “We are truly grateful and deeply honored by Brother Duff’s bequest to the MMRI,” says R. W. Alvaro Quiroga, President of the MMRI Board of Directors. “As an unrestricted gift we will follow Duff’s wishes by putting the funds to the best use in supporting and enhancing our scientific research for the benefit of all humankind.”

Duff spent his career at the International Business Machines (IBM) research facility in Fishkill, Puerto Rico.

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INSPIRE OTHERS TO SUPPORT MMRI WHILE REDUCING YOUR 2019 TAXES

- Leave your legacy to be remembered.
- Invest in research that will benefit future generations.
- Utilize financial planning strategies that are tax beneficial.

For more information:
Bro. Alex Simon
Director of Development
alex@mmri.edu
(315) 624-7483
IRA Charitable Rollover: Reduce income subject to tax

- Avoid taxes on direct transfers from your IRA to MMRI.
- Satisfy your required minimum distribution (RMD) for the year.
- Reduce your taxable income, even if you do not itemize deductions.
- Make a gift that is not subject to the deduction limits on charitable giving.

Gift of securities: Realize capital gains tax savings

- Includes stocks, bonds, mutual funds, real property.
- Receive the immediate advantage of an income tax reduction.
- Avoid capital gains taxes.

Charitable Bequests: Retain control, leave lasting impact

- In your will or other estate plans, you can name MMRI as the beneficiary of a portion of your estate, or of particular assets in your estate. Many of the most powerful gifts with an enduring impact have been bequests, including Brother Duff M. Neely, Jr. and Brother Franklin O.L. Steinberg whose generous bequest helped transform the second and third-floor laboratory spaces.

Life Insurance: Designate MMRI as a beneficiary

- You may consider giving a paid-up policy to MMRI by transferring the ownership of your policy and receive a charitable income tax deduction equal to the policy's cost basis.

Not-For-Profit Corporation
Tax Exempt Under 501(c)(3) of the IRS Code
Federal Tax ID 13-5648611
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New York where he was a computer programmer. He later retired to the sunny state of Florida all while being a Brother in good standing in the Grand Lodge of New York for 28 years.

Duff was predeceased by his wife Linda and had no other survivors. “Duff and Linda lived a very simple life so that they could give so much more to the world after they left this earth. They were kind, loving extraordinary people,” said Gloria Driscoll, family friend and executor of his estate.

Br. Alex Simon, Director of Development at the MMRI and Dutchess district celebrated and memorialized Duff and Linda last fall in Red Hook, New York. Br. Duff’s name and legacy live on at the MMRI where he is honored in perpetuity on our “Vine of Life,” statue in Utica, NY.

The faculty, administration, and Board of Directors are eternally grateful for Brother Duff Melvin Neely’s transformational gift.

In the Community: 2019 Mohawk Valley Walk for Autism

On Saturday, May 4, MMRI teamed up to create better acceptance and awareness of autism by walking with the 2019 Mohawk Valley Walk for Autism. Every year, more than 3,000 individuals come together to help support the families at the Kelberman Center. Fundraising efforts allow the center to provide a number of critical programs and services at little to no cost. Services include family support consults and events, awareness generation, policy advocacy, trainings and conferences, social groups, recreation activities and scholarships, and community based programs for all ages.

At MMRI, preliminary research of autism is crucial to helping continue the generous efforts of the Kelberman Center, the Cerebral Palsy Foundation, the ADHD & Autism Psychological Services and Advocacy and the Resource Center for Independent Living.

To support Dr. Ercan-Sencicek’s research contact Alex Simon, Director of Development at simon@mmri.edu or 315-624-7483.

From L-R: Adife “Gulhan” Ercan-Sencicek, Ph.D.; Dr. Michael Kelberman of the Kelberman Center in Utica, NY
**MMRI Welcomes New Staff**

Chris Stedman  
*Research Associate*

Chris Stedman, Research Associate in Maria Kontaridis’ lab, relocated back to Rome from Boston. Chris obtained his Bachelor of Arts degree in Zoology from SUNY Oswego. Chris comes to the MMRI from Abbvie Inc. where he was a Toxicologist. His research will focus on the effect of Long Term Membrane Potential (Vmem) Modulation on RASopathies in different strains of mice. Stedman also served in the United State Air Force as a Survival Training Instructor with the rank of E5. He was also granted the Researcher of the Year Award.

Saravanakkumar “Kumar” Chennappan, Ph.D.  
*Postdoctoral Fellow*

Kumar Chennappan joined MMRI in March as a Postdoctoral Fellow in the Kontaridis Lab. He was previously a Guest Scientist at Leibniz Institute on Aging (FLI) in Jena, Germany. Kumar holds a BT in Biotechnology from Bharathidasan University’s School of Engineering and Technology, an MS in Developmental Cell Biology from University of Sussex, an Elite Masters in Experimental and Clinical Neurosciences from the University of Regensburg, and he defended his doctoral dissertation in November 2018 at Friedrich Schiller University. Kumar is also certified in FELASA-B for animal handling.

Lisa Ingerham  
*Faculty Administrative Assistant*

Lisa Ingerham joined the MMRI in February as the Faculty Administrative Assistant. She graduated from SUNY Poly with a Bachelors of Science in Business Administration and is pursuing her M.B.A. Before joining the MMRI Science team, Lisa held the position of Assistant to the Provost at Herkimer College for 12 years. Lisa smoothly transitioned into her new role and is very excited to be a part of the Institute and it is vision under Dr. Kontaridis’ leadership.

Damian Bohler  
*Animal Facilities Manager*

Damian Bohler recently joined the MMRI as our Animal Research Facilities Manager. He graduated from SUNY Delhi with an Associates in Applied Science degree in Veterinary Science Technology. Previously Damian worked in South Carolina before relocating to Utica. In his role he provides outstanding research support to the scientists and their lab members, allowing them to perform 100% science at hand.
Zi “Flora” Yang,  
Technician II

Zi (Flora) Yang joined Gary Aistrup’s lab in January 2019 as a Lab Technician II. Flora graduated from Northwestern University with a Masters Degree in Biotechnology. Currently, Flora is working on deriving cardiomyocytes from human induced pluripotent stem cells (hiPSC-CM). It is a promising source for cells based on cardiac regeneration therapy for heart diseases, which is one of the leading causes of adult and childhood mortality.

Shangyu Hong is a visiting scholar in Dr. Zhiqiang Lin’s lab and is from Fudan University in Shanghai, China where he is a Principal Investigator. He received his Ph.D. from Shanghai Institute of Biochemistry and Cell Biology, Chinese Academy of Sciences. Shangyu's post-doctoral training was at Harvard Medical School. His research consists of trying to determine how nutrients we consume will affect our physiology, and particularly metabolic status.

**Upcoming Invited Speakers Series**

**September 12, 2019**  
Walter (Wally) J. Koch, Ph.D.  
Temple University  
Professor and Chair, Pharmacology

**October 10, 2019**  
Samuel C. Dudley, M.D., Ph.D.  
University of Minnesota  
Fred C. and Katherine B. Andersen Chair-Adult Cardiology  
Professor and Chief of Cardiology

**Science Publications**

*Generation of an induced pluripotent stem cell line (TRNDi003-A) from a Noonan syndrome with multiple lentigines (NSML) patient carrying a p.Q510P mutation in the PTPN11 gene.*  

*Synchronization of Triggered Waves in Atrial Tissue.*  
Shiferaw Y, Aistrup GL, Wasserstrom JA.

*Interventricular differences in sodium current and its potential role in Brugada syndrome.*  
Calloe K, Aistrup GL, Di Diego JM, Goodrow RJ, Treat JA, Cordeiro JM.

*VGLL4 plays a critical role in heart valve development and homeostasis.*  
To subscribe to our e-newsletter and updates, go to www.mmri.edu, insert your email address under e-newsletter and click “sign up” on our home page

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