UWM Research Foundation Completes Fifteenth cycle of Catalyst grant Awards

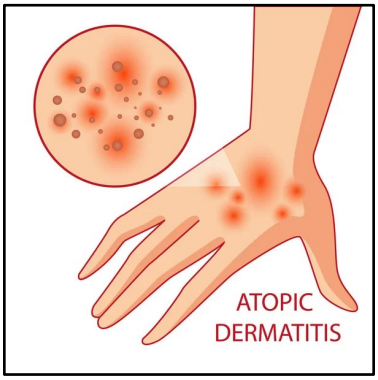
The UWM Research Foundation recently completed awarding Catalyst Grants to four projects. Now in its fifteenth year, the Catalyst Grant Program has awarded over $5.58 million dollars in seed funding for 105 projects. These projects have led to 59 issued patents, 28 license/option agreements, and more than $29.8 million in follow on investments in UWM technologies. A total of $150,000 is being awarded thanks to the support of the Lynde and Harry Bradley Foundation. These grants support promising research and development in areas where UWM has the greatest potential to impact the regional economy through commercialization activities.

The award winners are as follows:

Identification of new therapeutics for inflammatory skin disorders ($33,333)

Alexander Arnold, Ph.D., Professor of Chemistry and Biochemistry; Director, Milwaukee Institute for Drug Discovery

Dr. Arnold's research focuses on the design and synthesis of small molecule drugs that bind specific receptors in the body linked to human disease. The two main receptors studied are the vitamin D receptor and the GABA(A) receptor. The GABA(A) receptor has been studied for decades in the brain, but the Arnold lab and collaborators determined that this receptor is also present in the lung and skin and is a target for asthma treatment and prevention of inflammation.



The widespread need for anti-inflammatory drugs. Chronic allergic/inflammatory disorders decrease patient quality of life with atopic dermatitis (AD) prevalence estimated at up to 20%. Many patients with AD early in life experience a progression of the affliction to asthma. It is estimated that 70% of patients with severe AD develop asthma compared to 20–30% of patients with mild AD and approximately 8% of the general population. Increases in a small protein known as TSLP have been linked to both AD and asthma, and the UWM team has conducted animal studies showing certain GABA(A) receptor targeted compounds can reduce asthmatic inflammation and TSLP in the lung.

Project Objectives. The aims of this proposal, "Identification of GABAA receptor modulators that reduce TSLP production by keratinocytes," are to investigate whether similar anti-inflammatory results can be obtained in skin cells as have been observed in the lung. A library of compounds for the GABA(A) receptor will be screened to find the two best compounds for reducing mouse and human TSLP in cells. Once identified, the lead compounds will be further tested in two known mouse models for AD.

The Pantherics Incorporated team. If this work conducted at UWM proves successful, it will strengthen the license agreement in place between the UWM Research Foundation and Pantherics, Inc.. The company was founded in 2018 by Dr. Arnold and co-inventor Dr. Stafford to focus on drug development of GABA(A) receptor modulators for the treatment of asthma and related lung inflammatory disease. The company merged with BIO33 Degrees, Inc. in 2019, a San Diego based company that was exploring the same receptor in the treatment of atopic dermatitis. This merger brought increased depth of experience through the addition of Dr. Piacquadio a dermatology expert. The company received a $224,756 phase I STTR grant from the NIH in 2019 and a second phase I award of $238,000, starting in June of 2022, to support formulation development and toxicology studies for their lead asthma compound.

The team is developing new oral drugs for inflammatory skin disorders which are linked to the occurance of asthma later in life. By treating skin disorders early, they hope to halt the progression to lung inflammation.

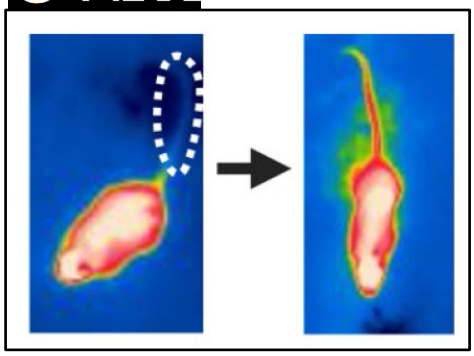
Assessing a new lead compound for alleviating hot flashes and improving memory ($33,334)

Karyn Frick, Ph.D., Distinguished Professor, Psychology

The primary focus of the Frick laboratory is to understand how sex-steroid hormones, aging, and environmental factors affect brain function and memory. Her work is motivated by the rapidly expanding elderly population and the increase in age-related cognitive decline and dementia. She joined forces locally with researchers from Marquette University and Concordia University to develop new drugs that lessen the side effects seen with the loss of estrogen during menopause. Such effects include memory loss, depression, anxiety, and hot flashes. These side effects are also connected to higher rates of dementia in women later in life.

Problems with Current Estrogen Therapies. While there are several estrogen replacement therapies on the market, many have been linked to harmful side effects such as cancer and heart disease. There are two estrogen receptors in the body, ERα and ERβ, but only ERα is linked to such diseases. The team has focused on creating new molecules that selectively bind to ERβ to avoid the detrimental side effects. 80% of women will experience physical or psychological symptoms of menopause, but 55% do nothing to treat these due to perceived or family risks of cancer or stroke, and lack of physician training in managing menopause.

The team is developing drug candidates that are safer, more specific, and more effective than current hormone treatments on the market for menopause symptoms.



Estrigenix Therapeutics. The collaborators founded Estrigenix Therapeutics in 2018 and co-founder Dr. William Donaldson, a former chemistry professor at Marquette University, has retired and is now full time CEO. The team has participated two times in the Milwaukee I-corps program which led them to pivot towards treatment of hot flashes as a primary concern of doctors and patients. The team recently received $150,000 from the Concordia Angel Network and are likely to receive their first SBIR grant from the NIH this summer. The company has a licenses agreement in place with the UWM Research Foundation. The Frick laboratory at UWM will conduct the work which can help strengthen the existing portfolio of intellectual property licensed to the company.

Catalyst Grant Goals. The Frick laboratory will utilize Bradley Catalyst funding to determine whether EGX854 or EGX358 should be their lead compound to enter clinical trials. The initial studies with EGX358 are promising in animal studies, but the new EGX854 has demonstrated greater selectivity and 4-fold better potency. It also shows potential for better brain penetration. This means it may be a better lead compound for human use, therefore animal studies must be conducted to look at the efficacy in models of hot flashes, memory, anxiety, and depressive behaviors.

Leveraging anti-cancer drug for bone healing ($50,000)

Priya Premnath, Ph.D., Assistant Professor, Biomedical Engineering

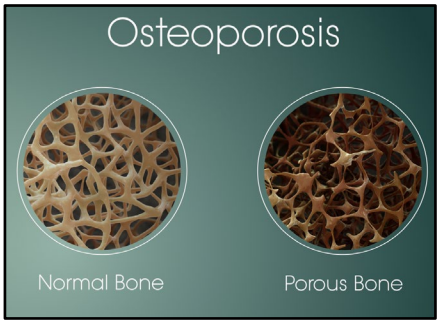
Dr. Premnath joined UWM in 2019 to grow her research program focused on bone biology, biomechanics and mechanobiology of bone growth, creation of bone formation-mimicking functional biomaterials, and development of long-lasting treatments for injury and disease based on regenerative medicine approaches.

Aging and Bone Healing. In older adults, bone healing is often hampered and delayed, leading to complications and poorer quality of life. In addition, those with osteoporosis are even more prone to bone breaks and may alter their lifestyle to avoid chances of fractures, potentially leading to a more sedentary lifestyle. Studies have shown that mesenchymal stem cells (MSCs) play a significant role in the bone healing process, but in advanced age, MSCs are not as functional. Current treatment strategies focusing on activating MSCs have shown limited success.

Premnath seeks to improve the speed and quality of bone healing in the elderly, those with osteoperosis, children, and pets using an existing small molecule originally developed for cancer treatment.

Project Objective. Preliminary studies by the Premnath lab have shown that mice lacking the p21 gene and protein show accelerated bone healing after injury. Another study demonstrated that p21 expression is higher in aged mice compared to young mice. The hypothesis is that suppression of p21 in aged mice will improve bone healing by reviving the MSCs and their bone regeneration capacity. UC2288 is a molecule known to suppress the levels of p21 in MSCs, therefore the team will use this compound at various concentrations to try to optimize the reversal of aged MSCs to act like young MSCs. The funding would further support characterization of the drug treated MSCs and their ability to support bone regeneration as well as analyze fracture healing in an aged mouse model.

Potential Markets. The global bone regeneration materials market was estimated to be valued at $2.3 billion in 2020 and the U.S. is leading the global market for anti-osteoporosis treatment and fracture healing, with revenues estimated to exceed $6.3 billion by 2030. In addition to the elderly and patients with osteoporosis, Dr. Premnath identified the military as a potential customer for critical fracture healing. One hypothesis is that an increased rate of bone healing will allow injured officers to return to duty quicker. Army medics are not necessarily doctors and are often given only basic training in the event of injuries. A drug that could improve outcomes after injury may be of interest to the department of defense and would be a potential funding agency for this work. UC2288 could also be of use in the veterinary space for better/faster bone healing in pets, thus avoiding excessive visits and reducing stress on the animals.



Prototyping and evaluating a new tool to improve maternal health ($33,333)

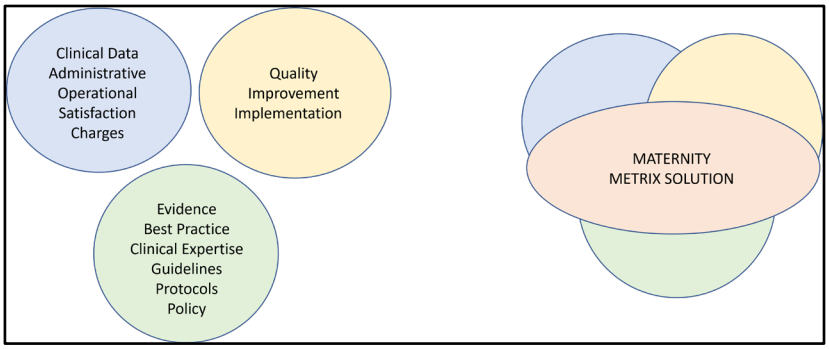
AkkeNeel Talsma, Ph.D., Associate Professor, Nursing

Dr. Talsma's laboratory focuses on research related to quality/safety related outcomes, clinical informatics, electronic health records, point of care measures, implementation science, quality and safety measures during surgery, and maternal/child outcomes. She is the founder and CEO of Melius Outcomes, a company creating software solutions for hospitals and surgical centers to capture data from electronic health records for identification of poor patient outcomes. Their services help customers to cut expenses, improve hospital reputation, maximize reimbursements, and increase patient and staff satisfaction. This gap fund proposal builds upon previous Bradley Catalyst Grant funds in 2019 to build MaternityMetrix which specifically focuses on patient outcomes for mothers and infants during pregnancy and after delivery.

The proposed startup, MaternityMetrix™ qualifies as a healthIT firm (SaaS), using "big data" to highlight trends and patterns in outcomes for patients at risk of complications, integrated with expert clinical guidance to optimize outcomes.

Problems with Maternity Treatment. Pregnancy related health complications cost $17.4B per year, an indication of both the high volume of cases and the elevated risk for costly complications and adverse outcomes. Many of those complications relate to c-sections and subsequent complications. MaternityMetrix™ is a webapp for clinicians with current clinical guidance to manage comorbidities during pregnancies, deliveries, and postpartum. Clinicians can use MaternityMetrix™ for clinical decision making to access timely evidence, best protocols, and benchmarking. Currently, clinicians draw insights about practices and quality/safety performance from dated materials and reports. Front line practitioners lack integrated, accessible, and timely clinical guidance and for use with their patients.

The MaternityMetrix Solution. MaternityMetrix™ is a webapp that healthcare workers access via their health system, practice, or personal account. Topics are searchable, such as hypertension or pre-eclampsia and linked with relevant professional protocols, clinical expertise, and best practices. The return on investment for health systems includes a significant reduction in time spent creating reports about performance and benchmarking. Talsma confirmed that managers spend upwards of 40 hour per month to prepare quality and outcomes data. Evidence based practices, workflows, and protocols are quickly outdated, and time consuming to access professional literature.



Catalyst Grant Aims. The aims of the Gap funding are: 1) integrate demo (wireframe) feedback from focus groups into the prototype design, 2) develop the MaternityMetrix™ prototype, 3) validate the prototype with nurses and healthcare workers, and 4) licensing, marketing, formation, and funding development. The aims build on previous work from the Bradley Catalyst grant; the Gap funding will focus Pradeep Rohatgi - Novel covetic materials for high conductivity and high strength applications, $60,000