Trainee Expansion Program

AWARDEES SPRING 2017

We are pleased to present the awardees of the TEP Travel Funds, who each received up to USD 10'000 to advance in their academic career.

**ADRIANA GAITAN**
Endocannabinoid metabolome of breast milk  
TFF Awardee 2017

**KOZETA MILIKU**
HMO analysis in the CHILD cohort  
TFF Awardee 2017

**SARAH BOOTHMAN**
Global breastfeeding promotion and protection policy  
TFF Awardee 2017

**CLARISA MEDINA POELINIZ**
Tight junction closure in overweight and obese women  
TFF Awardee 2017

**LARISSE MELO**
B-vitamins in human milk  
TFF Awardee 2017

**SARAH REYES**
Bacterial communities of human milk pumped and stored at home  
TFF Awardee 2017
Endocannabinoids, endogenous lipid mediators, play a role in establishing the suckling response of the newborn by activating the cannabinoid receptor type 1 in the infant’s brain, in turn activating the oral-motor musculature needed for milk suckling. The established suckling response in turn supports maternal-infant bonding and maintains infant feeding behavior. The mechanism of actions and the role of the endocannabinoid metabolome in breast milk (BM) are not fully understood. Pregnancy complications such as gestational diabetes mellitus can modify the endocannabinoid metabolome of BM; however the resulting effect on infants’ development remains to be defined. BM samples were collected from an underserved population in the highlands of Guatemala and will be analyzed for fatty acids, their derived endocannabinoids, and related signaling lipids using state of the art methodology, liquid chromatography-mass spectrometry. This analysis will set the stage for developing hypotheses for future studies that will help to elucidate how this biological system modulates infant health and development. Moving forward, I plan to collect BM samples in Baton Rouge, Louisiana, USA to evaluate the fatty acids and endocannabinoid metabolome in a population that has one of the highest rates of over nutrition among pregnant and breastfeeding women in the United States. In this regard, we will be able to evaluate how maternal nutritional status can affect the fatty acids and endocannabinoid metabolome of BM.

Adriana Gaitán is originally from Guatemala in Central America. She has a bachelor degree in food science from the Zamorano Pan-American Agricultural School, a master in human nutrition, and is working on her PhD in human nutrition at Louisiana State University, USA under the direction of Dr. Carol Lammi-Keefe. Her research has been focused on maternal and infant health, specifically evaluating the benefits of omega-3 fatty acids during pregnancy and infant outcomes. Ms. Gaitán will study the endocannabinoid metabolome in different populations to gain a better understanding of its role in the quality of breast milk for the developing infant. After completing her PhD, she plans to work in a research group (industry or academic) as part of a multidisciplinary group of scientists that generate research in this field.
Overweight (BMI ≥ 25) and obese (BMI ≥ 30) mothers are more likely to experience delayed onset of lactation and suboptimal breastfeeding rates than are non-overweight and obese mothers. These clinical findings suggest that the normal process of tight junction (TJ) closure in the mammary gland is impaired. Although patterns of TJ closure have been described for healthy populations, no previous research has examined this patterning for overweight and obese mothers. This research will enroll 20 overweight and obese breast pump dependent mothers of infants hospitalized in the neonatal intensive care unit (NICU), and collect serial 12-hourly human milk (HM) specimens from these women during the first 14 days post-birth. All pumped HM volume will be weighed (nearest 0.1 gram) and mothers will record the timing of their “milk coming in”. HM specimens will be analyzed by Ms. Medina Poeliniz under the supervision of basic science colleagues at the University of Western Australia. Statistical analyses will focus on patterning of 5 HM biological markers (lactose, protein, sodium, potassium, citrate) and determining their relationship to standard clinical measures of secretory activation and coming to volume that occur in the early postpartum period.

Clarisa Medina Poeliniz is pediatric nurse practitioner who has been working in maternal-child health for the past 17 years. The overall goal of her research is to understand the biologic mechanisms of maternal overweight and obesity on lactation outcomes and to design diagnostics and/or interventions for this population. She is currently pursuing her PhD in nursing science at Rush University under the direction of Drs. Paula Meier and Aloka Patel. Her research focus is patterning of TJ closure using HM biologic markers for breast-pump dependent mothers of NICU infants with a pre-pregnancy BMI ≥ 25. She will examine the relationship between these patterns and measured HM volume and sensations of “milk coming in”. Clarisa is excited to travel to the University of Western Australia and work alongside Dr. Donna Geddes and her team.
Overweight, obesity and cardiovascular disease are major public health problems in both Western and non-Western countries. Breastfeeding can reduce the risk of childhood obesity and high blood pressure, although the evidence is not consistent. A key bioactive component of human milk are human milk oligosaccharides (HMO), however their role in the development of childhood obesity and cardiovascular health is still unexplored. It is suggested that certain HMO are associated with infant body composition, but their effect on childhood obesity and blood pressure has not been studied and the maternal factors that influence HMO production are mostly unknown. The objective of this study is to characterize the integrated roles of maternal factors and HMO in the developmental origins of childhood obesity and cardiovascular health, uniting the unique Canadian Healthy Infant Longitudinal Development (CHILD) cohort with new high-throughput methods for HMO analysis.

Kozeta Miliku is a medical doctor from Albania, currently finishing her PhD at the Generation R Study in the Netherlands. Her doctoral research is focused on identifying early life determinants that affect growth, and development in children, mainly kidney development. Her interest is exploring human milk components, specifically human milk oligosaccharides role on obesity and high blood pressure in children. Kozeta, is defending her doctorate thesis later this spring and plans on moving abroad to enrich her experience in the field of human milk and lactation and developmental origins of health and disease.
There are several information gaps regarding the nutrient content in human milk, especially concerning vitamins. It should be treated as a research priority since human milk represents the main connection between the mother and child nutritional status. Little is known about the acceptable concentrations of vitamins in breast milk, and much less is known about how to improve it. The USDA Western Human Nutrition Research Center (WHNRC) has worked towards developing and applying methods for the efficient and accurate analysis of nutrients in human milk, aiming to establish global reference values for human milk composition. My background experience is in analyzing fat-soluble vitamins in breast milk, and with this project I aim to expand my knowledge on the methodological approaches involved in the analysis of B-vitamins in human milk.

Larisse Melo graduated from the Federal University of Rio Grande do Norte (Natal, Brazil) with a BSc degree in Human Nutrition. Still in her first undergraduate year, Larisse joined a research group as an Undergraduate Research Assistant, wherein she worked for four years with projects assessing vitamins A and E in breast milk of low-income mothers in Brazil, as well as their dietary intake and the effect of supplementation on milk vitamin concentrations. Larisse has recently started her MSc in Nutrition at the University of British Columbia (Vancouver, Canada), and her main goal is building a career in academic research for contributing to the development of public policies and recommendations associated with the health of pregnant and lactating women.
Navigating the interface between laboratory science and public policy provides a bridge in making changes that will truly benefit maternal, child and infant health. Using scientific results and translating them to inform development of public policy is one thing in which I hope to gain experience during an internship at the World Health Organization. To advance understanding of how our ever-evolving, evidence-based knowledge related to human milk composition and lactation are applied to breastfeeding on a global scale, this project is designed to develop a more thorough understanding of the legal and policy aspects involved in world-wide promotion of breastfeeding and application of research in human milk and lactation. This internship will help equip me to more seamlessly cross disciplinary boundaries. I hope to gain hands-on experience working with programs relating to international breastfeeding promotion and protection, with a focus on national and international policy.

Sarah Boothman is a PhD graduate student in the School of Biological Sciences at Washington State University. Sarah is looking forward to participating in a project that will allow her to combine her interests in human nutrition, law and public health within the context of her current studies in biology, focusing on human milk. Sarah completed her undergraduate degree in human nutrition at Washington State University, and received her Juris Doctor from the University of Idaho College of Law. Prior to her graduate studies, Sarah spent several years as a health educator at a community hospital in a rural, underserved region, where she had the opportunity to get to know many wonderful people and was motivated to continue on to law school and later graduate school to be better equipped with skills and experience to advocate for whatever community she finds herself in.
Many women rely on pumping and feeding their milk from a bottle to meet their breastfeeding goals. How storage and handling of human milk (HM) in at-home conditions influence its microbial ecology, which is likely important for colonization of the infant’s gastrointestinal tract and risk of infant illness, is poorly studied. Given that the American Academy of Pediatrics recommends HM-feeding without the distinction of how HM is fed (breast or bottle), it is important to fill these gaps in knowledge. We will characterize the bacterial community of HM pumped and stored at home. To do this, we will conduct a randomized trial in Ithaca, NY in which women will pump their HM on two consecutive pumping sessions using either their own pump or a hospital-grade pump. Randomization will be used to determine which pump each woman uses first. HM from both pumps will be stored at home and sampled on days 0, 2, and 30 after expression. Samples will be shipped to the University of Idaho where next-generation sequencing of the 16S rRNA gene will be conducted. The results of this research will provide information about the effect of pump type and storage under “real-life” conditions on the bacterial communities of HM, which can be used to inform evidence-based recommendations for handling and storing HM.

Sarah Reyes, MS is a doctoral candidate in the Division of Nutritional Sciences at Cornell University. Ms. Reyes’s dissertation, guided by Kathleen Rasmussen, ScD, focuses on the microbial exposures infants receive when they are fed their mothers’ milk from a bottle instead of being fed at the breast as well as the relevance of this exposure to the bacterial communities in the infant gastrointestinal tract and infant health outcomes. Ms. Reyes’s doctoral research combines training in biological science, epidemiology, and public health nutrition. Ms. Reyes’s work is supported by an NIH-sponsored training grant in nutrition, which focuses on training in translational research. Ms. Reyes’s long-term career goal is to gain an academic/research position in which she can use her training to advance the science and public health goals of maternal and child nutrition, particularly in the field of human milk and lactation.