

The Pregnancy Foundation 2014 Garite Mini-Sabbatical Recipient

“Preterm Birth Mouse Model”

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Mentor:

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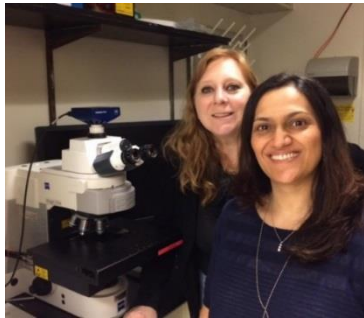
Recipient Statement and Summary:

Preterm birth is a substantial cause of neonatal morbidity and mortality. It is associated with a number of disorders spanning into childhood such as neurological disability, bronchopulmonary dysplasia, necrotizing enterocolitis, blindness and deafness. Despite advances in treatment of the conditions that predispose to preterm birth, a significant number of these women deliver before 32 weeks gestation. Presently available treatment modalities such as progesterone, cerclage placement and antibiotics appear to be only partial solutions to this problem. For this reason, I was interested in studying novel modalities such as the omega-3 fatty acid derivative, Resolvin D1 for preterm birth prevention in the setting of established intrauterine inflammation. One of the ways to study this is to use translational mouse modeling for inflammation-associated preterm birth. Dr. Irina Burd at Johns Hopkins University is a leading expert in animal models of preterm birth and perinatal brain injury. A major advantage of her model is that it allows for evaluation of the effect of potential therapeutic agents on preterm delivery itself, as well as associated perinatal brain injury. The mini-sabbatical allowed me to work in Dr. Burd’s lab and learn how to establish this preterm delivery mouse model. In addition, I learned many ancillary laboratory techniques that will allow me to evaluate the histologic and molecular effects of the novel therapeutic agents I am studying on the cervix, uterus, and the neonatal brain.

Dr. Burd’s lab is a melting pot of multicultural and multiethnic research and basic science professionals as well as learners working together to advance science. I was fortunate to be able to be a part of Dr. Burd’s team. The lab is simply the best in the world! It is fully equipped with all tools and machinery needed to conduct translational research. The lab personnel were both helpful and eager to impart their knowledge to me. Within a few days of working there, I felt comfortable approaching them with my questions. I learnt that basic scientists not only need an inquisitive mind but also must be able to wear various hats in order to design and conduct successful experiments. From engineers to architects and electricians to plumbers, these basic scientists continuously adapt into the role that is required to do the job properly.

During the first part of my two-month long sabbatical in the spring of 2015, I received training in performing survival animal surgery under Dr. Burd. My first day in the lab was spent in reviewing basic immunology with Jason Rosenzweig, the post-doc fellow in her lab. I shadowed Dr. Burd as she performed her weekly animal surgeries. Each time I watched her in action, my level of understanding improved.

Within three weeks, I was practicing and performing animal surgeries confidently. After the surgeries, I would observe the mice for evidence of preterm birth. I would write a daily account of all my findings including percentage of mice that delivered preterm. Eventually, Dr. Burd signed-off on my animal surgery skills, and I was set to begin my experiments.



In the second part of my sabbatical, I started testing Resolvin D1, my drug of interest to evaluate its efficacy in preventing preterm birth in the mouse model. Under the guidance of Mike McLane, Dr. Burd's lab manager, Jason and Jun Lei, PhD, I learned to harvest and preserve animal tissues. My experience in the lab encompassed not only learning the animal surgeries, but also various lab techniques such as ELISA, Western Blot analysis, PCR and Immunohistochemistry. Learning PCR analysis seemed like a daunting task when I started but as I continued to practice, it definitely became easier. I also learned to perform animal behavioral studies. I discussed the experimental design each week with Dr. Burd and her team, who would then make recommendations and suggestions to improve the experiment. Every time I would say 'I don't know if doing XYZ is a good idea in the experiment, Dr. Burd would respond: 'Try it out and see what happens....that's why it's called research'. Her support and mentoring throughout the process was very invaluable. Her energy and work ethic was contagious, and I thoroughly enjoyed each day of my time I spent in her lab!

Every week, I also was able to participate in didactics alongside the MFM fellows at Johns Hopkins. I attended OBGYN Grand rounds weekly as well as guest lectures given by Drs. Tracy Mannuck and Mala Mahendroo. Hence, I did not miss out on any fellow educational requirements. During weekly lab meetings and Journal clubs we discussed cutting-edge research in the arena of preterm birth and perinatal brain injury and reviewed manuscripts and articles. The lab meetings were indeed very educational and inspiring. As an active participant, I presented two papers on Autophagy at the Journal club. I was able to attend 'The Placenta Project' meeting at the National Institutes of Health, Bethesda, Maryland along with Dr. Burd.

A much rewarding experience during my sabbatical was troubleshooting the ex vivo placental perfusion model that Dr. Burd's lab was working on. I was able to use my surgical skills and experience to guide and successfully cannulate the umbilical vessels ex vivo.

This sabbatical allowed me to advance my professional and personal goals, and I am grateful to The Pregnancy Foundation for this wonderful opportunity. The mini-sabbatical experience has improved my MFM career in several ways:

1. The training gained from this experience will empower me to work with the existing basic science and translational research faculty at UNM to establish this animal model here. Demonstrated expertise with this model will strengthen my applications for intramural and extramural funding. In this manner, I will be able to continue to study the DHA derivatives of my interest in prevention and treatment of preterm birth.
2. I have established relationships with Dr. Burd and her team that will continue to provide mentorship in the future. This collaboration will allow me to continue the research I started during my sabbatical. At least one abstract will be submitted for the SMFM Annual Meeting in 2016 as a result of the research conducted during this sabbatical.
3. This sabbatical has equipped me with training that will enable me to launch my career as an academic MFM specialist with specific experience in translational research.