

## Scholarly Activities:

Development of the head and face is an extraordinarily complex process that requires the precise temporal and spatial orchestration of cell growth, death, differentiation, and migration through the modulation of numerous signaling pathways. Genetic and environmental insults can disrupt this fine-tuned process and lead to structural defects, such as clefts of the lip and palate, a frequent birth defect that can have lifelong consequences. Our research program is singularly focused on unraveling the mechanisms by which clefts of the lip and palate occur with the ultimate goal of prevention or early interventions to ameliorate the morbidity associated with these defects. Over the past two years we have made significant advances in understanding the roles of several key genes, such as *Prdm16*, in craniofacial development and signaling pathways, such as those regulated by TGF $\beta$  and Wnts. More recently, we have been actively seeking to identify microRNAs that are important for both lip and palate development. MicroRNAs are small, non-coding RNAs that regulate the expression of messenger RNAs and have emerged as an important level of epigenetic regulation. A comprehensive analysis of this class of epigenetic regulators is an important advance in our understanding of lip and palate development and may lead to development of diagnostic and preventative measures to reduce the incidence of this frequent birth defect.

## Publications (2013-2014):

Seelan RS, Appana SN, Mukhopadhyay P, **Warner DR**, Brock GN, Pisano MM, Greene RM. Developmental profiles of the murine palatal methylome. *Birth Def. Res. A Clin. Mol. Teratol.* 97:171-186 (2013).

Seelan RS, Mukhopadhyay P, **Warner DR**, Webb CL, Pisano MM, Greene RM. Epigenetic regulation of *Sox4* during palate development. *Epigenomics* 5:131-146 (2013).

Gu Z, Chhabra, Alard P, **Warner DR**, Kosiewicz MM. FcgRI is required for TGF $\beta$ 2-treated macrophage-induced tolerance. *Immunobiology* 218:1200-1206 (2013).

Seelan RS, **Warner DR**, Mukhopadhyay P, Andres SA, Smolenkova IA, Wittliff JL, Pisano MM, Greene RM. Epigenetic analysis of laser capture microdissected fetal epithelia. *Analytical Biochemistry* 442:68-74 (2013).

**Warner DR**, Mukhopadhyay P, Brock G, Webb CL, Pisano MM, Greene RM. MicroRNA expression profiling of the developing murine upper lip. *Development Growth and Differentiation* (2014).

**Warner DR**, Greene RM, Pisano RM. PRDM16 in development and disease. *Human Genetics and Embryology*. 4:1-4 (2014).

Jin J-Z, **Warner DR**, Lu Q, Pisano MM, Greene RM, Ding J. Deciphering TGF- $\beta$ 3 function in medial edge epithelium specification and fusion during mouse secondary palate development. *Developmental Dynamics*. 243:1536-1543 (2014).

Jin J-Z, **Warner DR**, Ding J. Regional specification of palate medial edge epithelium along the anterior to posterior axis. *International Journal of Developmental Biology* (2014).

## External Professional Activities (2013-2014):

Ad hoc manuscript reviewer:

Developmental Dynamics  
Journal of Cellular Physiology  
Journal of Cellular Biochemistry  
International Journal of Developmental Biology  
In Vitro, Cellular, and Developmental Biology-Animal  
Orthodontics and Craniofacial Research  
Birth Defects Research Part A: Clinical and Molecular Teratology  
PloS One

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