Public Abstract

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Title:EXAMINING THE ROLE OF Gbx1 IN SPINAL CORD DEVELOPMENT AND ITS CONTRIBUTION TO MAMMALIAN LOCOMOTION

Transcription factors are genes that serve a variety of functions during embryonic development and throughout the life of an organism. These specialized jobs include, defining the number of cells an organism will produce, determining which type of cell will develop, directing cells to form various parts of the body, and helping cells to perform their respective functions. Ultimately, transcription factors are responsible for telling a cell what to do, how to do it and when to do it.

My graduate dissertation research in Dr. Samuel T. Waters' lab investigated the murine Gbx gene family, which are transcription factors involved in central nervous development. Through studies presented herein, our lab identified a transcription factor required for normal walking, the Gbx1 gene. Having a better understanding of genes that enable us to walk normally will help researchers develop more effective gene therapeutic approaches for humans with perturbed walking gaits due to central nervous system disease or injury.

To examine the function of the Gbx1 gene, we utilized mice with inactivated (non-functional) Gbx1 genes. This genetic manipulation allowed us to observe the consequences of spinal cord development in mice without functional Gbx1 transcription factors. When we examined spinal cord development in these mice, two components of a neural circuit used for walking were found defected. Furthermore, we used mice with inactivated Gbx1 and Gbx2 transcription factors. This allowed us to study the function of the whole Gbx family in spinal cord development. Examination of spinal cord development in these mice revealed the requirement of both family members for the development of unique spinal neurons related to locomotion. These data collectively suggest a shared function for mouse Gbx genes in spinal neuron development.