Department of Molecular and Cellular Biology

Graduate Seminar MCB*6500

Friday, March 24, 2017 in SSC 1511 @ 12:45 p.m.

presented by:

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Investigating the Effects of Dlx5 upon Cellular Proliferation and Differentiation

The highly-regulated process of embryonic development is dependant on a plethora of genes which control a range of cellular processes. While the earliest stages of embryonic development are characterized by rapid cellular proliferation, the later stages are dependent upon cellular differentiation for the determination of cell fate. These processes are thought to be incompatible, and pro-differentiative signalling is associated with a marked decrease in cellular proliferation. Throughout development, this proliferation/differentiation dichotomy is tightly regulated, as its dysregulation can lead to a variety of conditions including split-hand/split-foot malformation (SHFM). The mammalian distal-less (Dlx) genes represent a family of transcription factors critical for embryonic development. Indeed, one such member of the family, Dlx5, has been shown to regulate the formation of the mandibular arch, while also playing a critical role in bone ossification in mice. Indeed, Dlx5/6 knockout mice exhibit an SHFM-like phenotype. Recent studies have demonstrated that the expression of Dlx5 in human embryonic cell lines (HEK293) results in a marked decrease in proliferation and that, furthermore, this decrease in proliferation results in an increase of cells remaining in the G1 phase of the cell cycle. Therefore, it is apparent that Dlx5 may be regulating cellular proliferation and differentiation in part by regulating the restriction point, thereby preventing these cells from entering the S-phase of the cell cycle. Here, we propose a means to investigate the effects of Dlx5 expression upon the restriction point in order to better understand the mechanisms by which Dlx5 controls the proliferation/differentiation dichotomy throughout embryonic development.