Regulation of Developmental Timing and Cell-Fate Determination by MAB-10 and LIN-29

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For the proper development of a multicellular organism, appropriate cell-fate decisions must occur with spatial and temporal specificity. To reveal fundamental mechanisms that control cell fate decisions, we are studying the heterochronic pathway of *C. elegans*. This evolutionarily conserved pathway controls the temporal progression of development by regulating the activities or gene-product levels of a succession of genes. Many components of this pathway have mammalian homologs that play critical roles in stem cell maintenance and differentiation and are emerging as central to a variety of basic problems in biology such as carcinogenesis and aging. Although some of the key regulators have been identified, the mechanisms through which they act are not well understood.

For example, the mechanisms of action and regulation of the conserved heterochronic genes *mab-10* and *lin-29* have yet to be identified. *mab-10* was discovered in our laboratory to encode the *C. elegans* NGFI-A-binding protein (NAB) transcriptional co-factor; MAB-10 is involved in the terminal differentiation of the hypodermal stem-like seam cells and more generally in the larval-to-adult transition (Harris & Horvitz, *Development* 138, 4051, 2011). LIN-29, the master regulator of the larval-to-adult transition, was shown to be an early growth response (EGR) protein that acts together with MAB-10 to control the expression of genes that regulate the onset of adulthood and terminal differentiation in the hypoderm. MAB-10/NAB and LIN-29/EGR are critical to the control of developmental timing in *C. elegans*, and understanding the function and regulation of MAB-10 and LIN-29 should provide important insights concerning development in mammals. To this end, we are analyzing the mechanisms by which MAB-10 and LIN-29 exert their functions and are screening for factors that enhance or suppress the *mab-10* and *lin-29* mutant phenotypes.

Poster presentation
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