{\it wingless\/} signaling in development of the {\it Drosophila\/} optic ganglia

Xiwei Wang, *University of Massachusetts - Amherst*

Abstract

At the late third instar the target neuropils, the lamina and medulla neuropils, wrap around the lobula primordium, a cylinder structure called the central plug which contains a group of lobula neurons near the lateral surface and the lobula complex deep inside. We have shown in this study that the central plug begins to form from the inner proliferation center long before photoreceptor axon innervation and is independent on axon innervation. Evidence is presented here that ωg signaling is among the intrinsic mechanisms of pattern formation in the central plug: two clusters of ωg-expressing cells are present posteriorly adjacent to the central plug; the putative ωg receptor, Drosophila frizzled2, and one of the target genes of the ωg signaling in the leg, Distal-less (D11), are expressed in the central plug. Loss of ωg activity leads to collapse of the central plug and diminish D11 expression, while ectopic ωg expression induces expansion of the central plug and ectopic D11 expression. Consistent with its expression at the joints of the three proliferation centers which are the precursors of the three ganglia, ωg is shown to be required for cell proliferation in the inner proliferation center, the precursor cells for the lobula. Finally we show that ωg and dpp are both required for development of the central plug. A model is proposed to explain the roles of ωg and dpp in development of the optic ganglia.^ In the second part of my dissertation I have described evidence suggesting that $\omega g\sp{IL114}$ and porcupine mutations block Wg secretion by acting at different steps of post-translational events of Wg protein. Analysis of Wg glycosylation defects, and the abnormal cytoplasmic localization of Wg in porcupine animals indicate that Porcupine acts in an early step in the Wg secretory pathway. ^

Subject Area