



Endocytosis and Signaling: Development, Cell Biology and Biophysics

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Morphogens such as Decapentaplegic (Dpp) and Wingless (Wg) are secreted from distinct sources and spread in the target tissues of the wing imaginal disc of *Drosophila* to form gradients of concentration which lay out the positional information landscape. While Dpp forms a long-range gradient, the Wg gradient is shorter. In order to understand what determines the different shape of gradients, we established a FRAP (Fluorescence Recovery After Photobleaching) assay to measure the four key kinetic parameters governing the spreading of morphogens: the production rate, the effective diffusion coefficient, the degradation rate and the immobile fraction. The FRAP experiments show that the differences in the ranges of Dpp and Wg are due to differences in their degradation rates and their diffusion coefficients. In addition, while most Wg molecules move in the tissue, a large proportion of the Dpp molecules are immobile. We also show that while Dpp diffusion coefficient and degradation depend on Dynamin-dependent endocytosis, Wg is independent of Dynamin. Our data indicate that the cellular mechanisms of Dpp and Wingless gradient formation are different and that Dpp spreading requires endocytic, intracellular trafficking.

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