研究 POU 蛋白 IMB 於果蠅神經細胞的分布

Localization of the POU protein IMB in Drosophila neurons

中文摘要

果蠅的 Immobile (IMB) 蛋白含有兩個 DNA 結合區域，分別為 POU 特定的功能區和 homeobox 功能區。為了瞭解 IMB 座落的位置為何，我利用果蠅 GAL4/UAS 系統，在果蠅的神經細胞株 BG3-C2 中，表達全長或不同區域的 IMB 片段，而觀察其座落的位置。全長的 IMB 主要表達於細胞核內，但在細胞質和神經突也有分佈；當表達 IMB C 端兩個 DNA 結合區域時，其蛋白質片段的座落範圍只限於細胞核內；而表達 N 端未含 DNA 結合區域的 IMB 片段則會表現在細胞質及神經突裡。有趣地是，表達全長的 IMB 會呈現圓圈狀，中空甜甜圈狀的構造，散佈在細胞各處。 更進一步，利用果蠅的中央腦區作為生物體模式表達含有全長或不同區域的 IMB，觀察其蛋白質的分布型態。全長的 IMB 及只含有 C 端的 IMB 片段主要座落於細胞核內，而表達 N 端未含 DNA 結合區域的 IMB 片段則會表現在細胞核及神經突裡。 綜合在果蠅細胞株內和果蠅神經系統中過度表達的實驗結果，推測轉錄因子 IMB 可能在細胞質中扮演著一個未知的角色。

英文摘要

The Drosophila Immobile (IMB) protein is a putative transcription factor that contains two DNA binding domains, a POU-specific domain and a homeobox domain. To characterize the localization of IMB, the Drosophila GAL4/UAS system was used to express different truncated forms of IMB and expression patterns of IMB constructs were observed in the Drosophila neuronal cell line, BG3-C2. Full-length IMB was predominantly localized in nuclei but was also observed in the cytoplasm and neurites. While the IMB C-terminal fragment with the two DNA binding domains located in nuclei, the IMB N-terminus without the DNA binding domains had preference to localize in the cytoplasm and neurites. Interestingly, full-length IMB displayed circular, donut-like structures spreading in whole cells. Furthermore, Drosophila central brain was used as an in vivo system to examine the expression patterns of these truncated IMB proteins. While the full-length and the C-terminal fragment of IMB localized mainly in nuclei, the N-terminus of IMB could be located in nuclei as well as axonal termini. Taken together, based on ectopic expression in cell lines and in Drosophila nervous systems, it is assumed that the transcriptional factor IMB may play a novel role in the cytoplasm.