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Photoreceptor Topography of the Hamster Retina

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We report on quantitative analysis of cone and rod photoreceptors in hamster retina. Differential interference contrast optics after staining of cone photoreceptors with peroxidase-labeled peanut lectin was used. The average cone density was 9,307 cells/mm^2, giving a total number of cones of 293,060 cells/retina. The peak density of cone cells (12,857 cells/mm^2) was found at 0.3 mm from the optic disk of the nasal retina. The average rod density was 300,082 cells/mm^2, giving a total number of rods of 9,448,150 cells. The peak density of rod cells (340,000 cells/mm^2) was found at 0.3 mm from the optic disk of the dorsal retina. On average, the total populations of rods were 96.99%and cones were 3.01% of all the photoreceptors. The mean ratio of rod : cone was 32.24 : 1. The present results suggest that the hamster retina is strongly rod-dominated. As photoreceptors play a crucial role in mapping the visual images, the present results should be importantly applicable to a better understanding of the visual processing in hamster visual system.

Key words: cones, rods, density, retinal mosaic, photoreceptors

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Valproic acid-Mediated Transcriptional Activation of the Human CMP-NeuAc:GM3 α2,8 Sialyltransferase (hST8Sia I) Gene in Human Neuroblastoma Cells

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To elucidate the mechanism underlying the regulation of human CMP-NeuAc:GM3 α2,8 sialyltransferase (hST8Sia I) gene expression in VPA-stimulated SK-N-BE(2)-C cells, we characterized the promoter region of the hST8Sia I gene. Functional analysis of the 5′-flanking region of the hST8Sia I gene by the transient expression method showed that the -1146 to -646 region, which contains putative binding sites for transcription factors c-Ets-1, CREB, AP-1 and NF-kB. Site-directed mutagenesis and EMSA indicated that the NF-kB binding site at -731 to -722 is crucial for the VPA-induced expression of the hST8Sia I in SK-N-BE(2)-C cells. In addition, the transcriptional activity of hST8Sia I induced by VPA in SK-N-BE(2)-C cells was strongly inhibited by SP600125, c-Jun N-ternimal kinase (JNK) inhibitor, and GÖ6976, protein kinase C (PKC) inhibitor, as determined by RT-PCR and luciferase assay of hST8Sia I promoter containing the -1146 to -646 regions. These results suggest that VPA markedly modulates transcriptional regulation of hST8Sia I gene expression through PKC/JNK signal pathways in SK-N-BE(2)-C cells.

Key words: Valproic acid; hST8Sia I; SK-N-BE(2)-C; transcription factor