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## Polysialylation increases lateral mobility of Neural Cell Adhesion molecule (NCAM) in the cell membrane.

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Polysialic acid (PSA) is a long, linear  $\alpha$ 2-8 linked carbohydrate of N-acetylneuraminic acid residues, added post-translationally to the Neural Cell Adhesion Molecule (NCAM), the prototype of a large family of cell surface Immunoglobulin-like Super-Family (IgSFs) expressed in the nervous system. Polysialylation of NCAM is thought to facilitate cell migration and plasticity by inhibiting cell adhesion and interactions with extracellular matrix as a result of the large excluded volume of the PSA polymer. Here, using real time live cell imaging techniques (i.e. Time lapse, Fluorescence Correlation Spectroscopy and Fluorescence Recovery After Photobleaching) we uncovered an action of PSA in regulating specifically the tune of NCAM lateral diffusion. PSA increases the rate of lateral diffusion of NCAM mobile fraction in the cell membrane without affecting the proportion of the mobile fraction or the nature of NCAM's diffusion. These findings reveal a new molecular mechanism by which polysialylation regulates NCAM dynamics.

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