Novel protein targets for 15-deoxy-$\Delta^{12,14}$-prostaglandin J_2 were identified in neuronal plasma membranes

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15-deoxy-$\Delta^{12,14}$-prostaglandin J_2 (15d-PGJ_2) is one of factors contributed to the neurotoxicity of amyloid β, a causative protein of Alzheimer's disease. A proteomic approach with biotinylated 15d-PGJ_2 was used to identify its targets in the plasma membrane of rat cortical neurons. Previously, we have identified plasmalemmal targets as biotin-positive spots and classified into three functional proteins: glycolytic enzymes (enolase 1, enolase 2, pyruvate kinase isozymes M1/M2 and glyceraldehyde 3-phosphate dehydrogenase), molecular chaperones (heat shock protein A8 and T-complex protein 1 subunit α), cytoskeletal proteins (Actin β, F-actin-capping protein, tublin β, internexin α and glial fibrillary acidic protein). In the present study, we identified anion channel and adaptor proteins as membrane targets of 15d-PGJ_2. These novel targets are known as mitochondrial or cytosolic proteins, suggesting their ectopic localization. 15d-PGJ_2 possesses opposite functions as a neuroprotectant at low concentrations and a neurotoxicant at high concentrations in the brain. Its nuclear receptor, peroxysome proliferator-activated receptor-γ, contributes to the neuroprotective effect of 15d-PGJ_2, but not to the neurotoxic effect. Its membrane receptor, chemoattractant receptor-homologous molecule expressed on T-helper type 2 cells , is not also involved in the neurotoxicity. Thus, we discussed how 15d-PGJ_2 could inhibit neurite outgrowth and induce neuronal apoptosis via these novel targets.