The monoterpene perillyl alcohol (POH) is used in phase II clinical trials as a chemotherapeutic agent for several tumors, including gliomas. In our recent studies, POH showed a significant inhibitory effect on Na/K-ATPase activity. Na/K-ATPase is an enzyme involved in physiological functions and in signal transduction mechanisms. The present work was undertaken to determine the ability of POH in modulating the activity of mitogen activated protein kinase (MAPK) – in particular, JNK1/2 - in culture of human glioblastoma cell line (U87). Cells were exposed to POH 0.1; 0.5 and 1.5 mM for 30 minutes. JNK1/2 activation was analyzed by western blotting. Additionally, cell viability (POH 0.5; 1.5; 2.5 and 4 mM for 30 minutes and 24h) was analyzed by measurement of lactate dehydrogenase (LDH) activity in cell supernatants. We showed that 1.5 mM POH treatment for 30 minutes induced a significant stimulation in JNK1/2 phosphorylation. Moreover, our data indicated that a treatment with 4 mM POH for 30 minutes can be cytotoxic, causing impairment on cell viability, as measured by LDH leakage. The present study showed an initial result of activation of intracellular signaling pathways in human glioblastoma cell line (U87) by POH. Since ouabain, a specific Na/K-ATPase inhibitor, also activates this same protein, we are now comparing other members of the signaling cascade triggered by this glycoside in order to compare with the response obtained when POH is used in place of ouabain.

Keywords: Na/K-ATPase, perillyl alcohol, anticancer drugs, U87 glioma cells, JNK1/2

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