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Polyunsaturated fatty acids promote 8-hydroxy-2-deoxyguanosine formation through lipid peroxidation under the glutamate-induced GSH depletion in rat glioma cells.

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Abstract

It has been reported that glutamate decreased the intracellular glutathione (GSH) concentration and thereby induced cell death in C6 rat glioma cells. Polyunsaturated fatty acids such as arachidonic acid, gamma-linolenic acid, and linoleic acid enhanced lipid peroxidation promoting 8-hydroxy-2'-deoxyguanosine (8-OH-dG) formation under the glutamate-induced GSH-depletion. The enhancement of lipid peroxidation by polyunsaturated fatty acids was species-dependent. Some antioxidants capable of scavenging oxygen and lipid radicals and some iron or copper scavengers inhibited both the lipid peroxidation and the 8-OH-dG formation, consequently protecting against cell death induced by glutamate-induced GSH depletion. These results suggest that GSH depletion caused by glutamate induces lipid peroxidation and consequently 8-OH-dG formation and that polyunsaturated fatty acids enhance lipid peroxidation associated with mediated 8-OH-dG formation through a chain reaction.

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