Protective effects of grape seed proanthocyanidins and selected antioxidants against TPA-induced hepatic and brain lipid peroxidation and DNA fragmentation, and peritoneal macrophage activation in mice.

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Abstract

1. The comparative protective abilities of a grape seed proanthocyanidin extract (GSPE) (25-100 mg/kg), vitamin C (100 mg/kg), vitamin E succinate (VES) (100 mg/kg) and beta-carotene (50 mg/kg) on 12-O-tetradecanoylphorbol-13-acetate (TPA)-induced lipid peroxidation and DNA fragmentation in the hepatic and brain tissues, as well as production of reactive oxygen species by peritoneal macrophages, were assessed. 2. Treatment of mice with GSPE (100 mg/kg), vitamin C, VES and beta-carotene decreased TPA-induced production of reactive oxygen species, as evidenced by decreases in the chemiluminescence response in peritoneal macrophages by approximately 70%, 18%, 47% and 16%, respectively, and cytochrome c reduction by approximately 65%, 15%, 37% and 19%, respectively, compared with controls. 3. GSPE, vitamin C, VES and beta-carotene decreased TPA-induced DNA fragmentation by approximately 47%, 10%, 30% and 11%, respectively, in the hepatic tissues, and 50%, 14%, 31% and 11%, respectively, in the brain tissues, at the doses that were used. Similar results were observed with respect to lipid peroxidation in hepatic mitochondria and microsomes and in brain homogenates. 4. GSPE exhibited a dose-dependent inhibition of TPA-induced lipid peroxidation and DNA fragmentation in liver and brain, as well as a dose-dependent inhibition of TPA-induced reactive oxygen species production in peritoneal macrophages. 5. GSPE and other antioxidants provided significant protection against TPA-induced oxidative damage, with GSPE providing better protection than did other antioxidants at the doses that were employed.

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