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Effects of a garlic-derived principle (ajoene) on aggregation and arachidonic acid metabolism in human blood platelets.

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Abstract

When garlic cloves are chopped or crushed several dialkyl thiosulfinates are rapidly formed by the action of the enzyme alliin lyase or alliinase (EC 4.4.1.4) on S(+)-alkyl-L-cysteine sulfoxides. Allicin (diallyl thiosulfinate or allyl 2-propene thiosulfinate) is the dominant thiosulfinate released. A variety of sulfur containing compounds are formed from allicin and other thiosulfinates depending on the way in which garlic is handled. One such compound identified recently is ajoene which has been reported to possess antithrombotic properties. We present here data on the antiplatelet properties of ajoene together with its effects on the metabolism of arachidonic acid (AA) in intact platelets. Thus, ajoene was found to inhibit platelet aggregation induced by AA, adrenaline, collagen, adenosine diphosphate (ADP) and calcium ionophore A23187; the nature of the inhibition was irreversible. In washed platelets stimulated by labelled arachidonate, ajoene inhibited the formation of thromboxane A2; 12-lipoxygenase product(s) were reduced at higher ajoene concentrations. This garlic-derived substance inhibited the incorporation of labelled AA into platelet phospholipids at higher concentration. In labelled platelets, on stimulation with either calcium ionophore A23187 or collagen, reduced amounts of thromboxane and 12-HETE (12-hydroxyeicosatetraenoic acid) were produced in ajoene-treated platelets compared to control platelets. This substance had no effect on the deacylation of platelet phospholipids. The results suggest that at least one of the mechanisms by which ajoene shows antiplatelet effects could be related to altered metabolism of AA.

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