The prevention of curcumin against rat liver mitochondria! swelling induced by tert-butylhydroperoxide

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Abstrak

Penyakit hati merupakan masalah kesehatan yang sulit diobati. Adanya masalah dalam pengobatan penyakit ini sebagian disebabkan karena tidak tersedianya obat yang terbukti herkhasiat. Kurkumin, senyawa aktif dalam ke keluarga tanaman curcuma telah diteliti dalam berbagai peyakit termasuk penyakit hati. Efek terapi kurkramin diduga berdasarkan efek antioksidatifnya. Dalam penelitian ini, kami menyelidiki efek kurkumin lerhadap swelling mitochondria yang diinduksi oleh tert-butilhidroperoksida (t-BuOOH) Mitokondria hali diisolasi secara homogen dari tikus Sprague-Dawley (relative specific activity suksinat dehidrogenase adalah 35.73 ±2.78). Pemberian 90 }M t-BuOOH menyebabkan swelling 2 fase yang khas pada mitokondria. Pola swelling dipengaruhi oleh berbagai faktor seperti komposisi bufer, kadar t-BuOOH, jumlah bufer isolasi dan protein mitokondria serta temperatur inkubasi. Swelling dapat dihambat sebesar 85 ±3% oleh kurkumin 2.50 jjM. Pada kadar rendah (1.25 //MJ dan tinggi (5.00 fiM), efek proteksi kurkumin terhadap swelling berkurang (bertitrut-turut 41 ±3% and 77+6%). Swelling dapat terjadi akibat terbukanya mitochondrial transition pore dan dapat mempakan petunjuk awal dan proses kematian sel. Efek inhibisi kurkumin terhadap swelling mitokondria yang diindukxi oleh t-BuOOH diduga disebabkan karena efek antioksidannya. (MedJ Indones 2006; 15:131-6)

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Liver diseases have been a medical problem which is difficult to manage. Some of the problems in the treatment of these diseases lie in the lack of reliable drug available. Curcumin, an active ingredient of the rhizomes of plant Curcuma has been investigated in the treatment of various disorders incuding liver diseases. The therapeutic effects of curcumin on liver diseases have been thought to be associated to its antioxidative properties. In the present study, we investigated the effects of curcumin on mitochondrial swelling in vitro induced by tert-butylhydroperoxide (t-BuOOH). Liver mitochondria were homogeneously isolated from Sprague-Dawley rats (the relative specific activity of succinate dehydrogenase was 35.73 ±2.78). Addition of 90 fj.M oft-BuOOHcauseda typical 2-phase swelling of the mitochondria. The pattern of swelling was influenced by various factors such as buffer composition, concentrations of t-BuOOH, amount of isolation buffer and mitochondrial proteins and incubation temperature.The swelling could be reduced by as much as 85 ±3% by 2.50 uM of curcumin. At lower (1.25 ^M) or higher (5.00 fjM) concentrations, the protection against swelling by curcumin were less effective (respectively were 41 ±3% and 77 ±6%). Swelling might occur due to the opening of mitochondrial transition pore and could be an initial indication in the cascade process leading to cell death. The inhibition of t-BuOOH-induced mitochondrial swelling by curcumin might be because of the antioxidant effects of the compound. (Med JIndones 2006; 15:131-6).