

Efek kurkumin pada aliran darah koroner, aliran darah aorta, dan tekanan sistolik jantung marmut yang mengalami hipoksia dan reoksigenasi pada model isolated working heart preparation

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Abstrak

Pada organisme aerob, oksigen direduksi sempurna menjadi air di akhir rantai pernafasan di mitokondria yang menyediakan energi untuk menjaga fungsi normal sel. Tetapi di dalam mitokondria ada molekul oksigen yang direduksi sebagian membentuk superoksida. Superoksida adalah radikal bebas, senyawa kimia yang mempunyai elektron tidak berpasangan. Radikal bebas sangat penting untuk banyak proses biologi seperti untuk melawan mikroorganisme yang patogen. Namun radikal bebas dapat merusak bila tidak dikontrol dan menyebabkan stres oksidatif.

Stres oksidatif terjadi pula di jantung saat direoksigenasi setelah hipoksia, cedera yang terjadi disebut reperfusion injury. Jantung akan kehilangan fungsinya terutama kontraktilitasnya.

Penelitian ini bertujuan untuk mengetahui efek kurkumin pada cedera reperfusi. Kurkumin adalah antioksidan yang mempunyai 2 cincin fenol. Kurkumin diduga dapat mencegah cedera reperfusi setelah hipoksia jantung yang dilakukan pada model the isolated working heart. Penelitian ini menggunakan marmut jantan yang terbagi menjadi 3 kelompok, yaitu kelompok kontrol, kelompok kurkumin 0,25 μM , dan kelompok kurkumin 0,5 μM . Efek proteksi kurkumin dilihat dengan mengukur aliran darah koroner, aliran darah aorta, tekanan sistolik dan pengamatan histopatologi jantung.

Aliran darah koroner meningkat selama reoksigenasi setelah 60 menit hipoksia, dengan kurkumin aliran darah koroner cenderung menurun. Aliran darah aorta dan tekanan sistolik menurun selama reoksigenasi setelah hipoksia 60 menit, dan cenderung meningkat setelah pemberian kurkumin. Histopatologi jantung yang direoksigenasi setelah hipoksia 60 menit memperlihatkan perubahan pada sel jantung. Kurkumin dosis 0,25 μM cenderung lebih baik dan pada dosis 0,5 μM dalam memproteksi jantung selama reoksigenasi setelah hipoksia 60 menit.

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The Effect of Curcumin Toward Coronary Flow, Aortic Flow, And Systolic Pressure in Hypoxia and Reoxygenation Isolated Working Heart Guinea Pig In aerobic organisms oxygen is converted to water at the end of the respiratory chain in mitochondria which provide the energy needed to maintain normal body function and metabolism. However, in the same mitochondrial respiratory chain, oxygen is "partially reduced" to form super oxide. Super oxide is a free radical, a chemical species with an unpaired electron. Free radicals are essential for many normal biological processes, i.e., they are essential in the response of tissue to invading microorganisms. However, they can be destructive if they are not tightly controlled.

The oxidative stress also changes the heart in reoxygenation after hypoxia, which is called as reperfusion injury. The heart loses its function, especially contractility.

The present study was conducted to find out the effect of curcumin in reoxygenation injury. Curcumin is an antioxidant, a symmetrical compound with two phenyl rings. It is hypothesized that curcumin is active to reduce reperfusion injury after hypoxia in the heart, assayed by the working guinea pig heart model. Three groups of male guinea pigs were used in this study, consisting of control group, curcumin 0, 25 μ M, and curcumin 0,5 μ M groups. The protective effect of curcumin was investigated by measuring coronary flow, aortic flow and systolic pressure, and by observing the histopathology of the heart.

Reoxygenation of the heart after 60 minutes of hypoxia resulted in increased coronary flow, and curcumin decreased the coronary flow. Aortic flow and systolic pressure decreased during reoxygenation after 60 minutes of hypoxia, and curcumin increased aortic flow and systolic pressure. histopathology of the heart after reoxygenation and 60 minutes of hypoxia showed changes of the myocardium. Curcumin 0,25 μ M was better than curcumin 0,50 μ M as a protective agent during reoxygenation after 60 minutes of hypoxia.