

Fluorescent Measurement of Hypercholesterolemia-induced Changes in Mitochondria

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The mitochondrion is a membrane-enclosed organelle found in most eukaryotic cells. Mitochondria are involved in a range of processes, such as supply of cellular energy, signalling, cellular differentiation, or cell death. Therefore, they are also likely to play a role in several human diseases. In the present contribution we study mitochondrial alterations induced by hypercholesterolemia and its treatment by atorvastatin.

Mitochondria were isolated from livers of healthy and hypercholesterolemic adult male Wistar rats. Mitochondria from four groups of animals were studied: (i) healthy animals; (control group), (ii) hypercholesterolemic animals; (iii) and (iv): hypercholesterolemic animals treated by two doses of atorvastatin, 10 and 80 mg/kg/day.

Alterations in mitochondria were studied with the Thiadicarbocyanine tribromide (TCBr) fluorescence probe purchased from Genolite Biotek. Using fluorescence spectroscopy, intensity changes at the 667 nm fluorescence peak of the probe with excitation at 630 nm. Fluorescence intensities were measured at $22 \pm 1^\circ\text{C}$ with a Perkin Elmer LS 45 luminometer. The probe was incubated with a suspension of mitochondria for 30 minutes ($c(\text{mit}) = 20 \text{ g/l}$, $c(\text{TCBr}) = 5 \text{ }\mu\text{mol/l}$).

We found significant differences between controls and the three hypercholesterolemic groups. The differences are an indication of a mitochondrial dysfunction or disorder in hypercholesterolemia, and are removed by atorvastatin treatment.

Our findings offer a new insight into hypercholesterolemia-induced alterations in mitochondria.

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