Effects of high fat diet intake and a mitochondrial antioxidant (MitoQ) on liver mitochondrial activity and cardiolipin content in rats
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Effects of high fat diet intake and a mitochondrial antioxidant (MitoQ) on liver mitochondrial activity and cardiolipin content in rats

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A-Introduction
Excessive intake of dietary fat is one of the major cause of appearance and progression of metabolic syndrome features, such as liver steatosis. These features are associated with structural and functional alterations of mitochondria. Recent studies indicate that some of these alterations are related to the content and quality of cardiolipin (CL), a phospholipid that occurs mainly in the inner membrane of mitochondria and is involved in the organization and functioning of the mitochondrial respiratory chain complexes [1].

B-Protocol and methods

1-Characterisation of rats
- Oral glucose tolerance test (OGTT) was completed 4 days before rat sacrifice.
- Plasma insulin was quantified with ELISA kits (Merck Millipore, Almere, Nl).
- Liver TG levels were quantified by enzymatic methods (TG PAP kit, Biomerieux, Fr)

2-Characteristics of the rats

<table>
<thead>
<tr>
<th>Body weight (g)</th>
<th>OGTT</th>
<th>PI insulin</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>30</td>
<td>40</td>
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Liver histology

3-Fatty acid composition of mitochondrial PL

- MitoQ increased 18.2n-6 (linoleic acid) percent in the mitochondrial phospholipids.

4-Liver mitochondrial characteristics

- CL content is positively correlated with ATP synthase activity, mitochondrial membrane fluidity, membrane potential, respiration and negatively correlated with mitochondrial ROS production.

acknowledgments

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C-Results

2-Liver mitochondrial caridiolipin content

![Scan of TLC plate](image)

- MitoQ both increased CL content of liver mitochondria in the mitochondrial phospholipids and CL synthase gene expression by comparison to the HFD.

D-Conlusion

- Our studies show that the high fat diets impair liver mitochondrial functions and modify membrane structure and characteristics. MitoQ ameliorates some metabolic syndrome features, and in particular increases mitochondrial cardiolipin content. Antioxidant-independent mechanisms of MitoQ may be involved in addition to its own antioxidant action.