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To cite this version:

Isabelle Niot, P Clouet, C Brunold, F Pacot, J Gresti, et al.. Enzymatic properties and cholesterol content of mitochondrial outer membranes in liver of obese and lean Zucker rats. Reproduction Nutrition Development, 1992, 32 (5-6), pp.506-506. hal-00899562

HAL Id: hal-00899562

https://hal.science/hal-00899562v1

Submitted on 11 May 2020

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Enzymatic properties and cholesterol content of mitochondrial outer membranes in liver of obese and lean Zucker rats. I Niot, P Clouet, C Brunold, F Pacot, J Gresti, J Bezard *(Université de Bourgogne, Faculté Mirande, Laboratoire de Nutrition Cellulaire et Métabolique, 21004 Dijon Cedex, France)*

Mitochondrial fractions isolated by differential centrifugation are usually contaminated by microsomes. Mitochondrial outer membranes prepared according to the procedure of Parsons *et al* (1967) were purified on sucrose gradient and collected in the layer with the greatest monoamine oxidase activity, but which still displayed a significant microsomal activity. To remove this contamination, the original mitochondrial fractions were purified on Percoll gradient (Zammit *et al,* 1989), that eliminated > 75% of the microsomal activity. Outer membrane fractions prepared from Percoll-purified mitochondria displayed very high monoamine oxidase activity, but non-negligible microsomal activity still persisted, particularly in the obese. A milk papain treatment of mitochondria reduced but did not suppress the microsomal presence. Results therefore suggest the existence of fairly strong links between outer membranes and microsomes.

Simultaneously microsomes were shown to be richer in cholesterol than mitochondrial outer membranes. By correcting the microsomal contamination on the basis of enzymatic marker activities, it was determined that outer membranes are extremely poor in cholesterol, far richer in total fatty acids than microsomes, but with a fatty acid composition which is very similar. This leads to the conclusion that endoplasmic reticulum may (owing to links occurring between both particles and according to the physiological state of the animals) influence the lipid composition of mitochondrial outer membranes. However, these exchanges do not concern cholesterol, probably because of a lack of protein and/or lipid structures necessary to its binding. It is possible that the association of mitochondrial and microsomal membranes, which seems to be influenced by physiological state, may modulate cell activities related to mitochondria and endoplasmic reticulum.

References

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