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# LIPIDS: from Membrane Dynamics to Signaling



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## Lipidomic studies involving steatosis induction using palmitic and linoleic fatty acids on HepG2 cells

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Lipid metabolism pathways as  $\beta$ -oxidation, lipolysis and lipogenesis are mainly associated to normal liver function. Steatosis is a growing concerning pathology mainly caused by the accumulation of lipids in hepatic cells due to increased lipogenesis, dysregulated lipid metabolism and/or reduced lipolysis (1). Hence, lipidomic analysis can be an effective tool to identify biomarkers to bring new insights involving hepatic diseases (2). Thus, it has been found that palmitic acid (PA) accumulates preferentially in such conditions (3). Accordingly, this investigation hypothesises that saturated fatty acids will accumulate over polyunsaturated *in vitro*. Thus, HepG2 cells were exposed to different concentrations of a fatty acid mixture containing linoleic acid (LA) and PA. Five different ratios of LA:PA (3:0; 2:1; 1:1; 1:2; 0:3) were prepared to study the lipid accumulation using the lipophilic dye Oil Red O at 510 nm. Lipidomic assessments were carried out after lipid isolation (i.e., methyl tertiary-butyl ether and methanol) by UHPLC-ESI-TOF and HPLC-ELSD. Results revealed a different accumulation pattern than expected since LA accumulated in larger extent when compared to PA. This may point to a higher LA permeation susceptibility in hepatocytes. The lipidomic analysis showed an alteration of the lipid profile after LA:PA exposure leading to an increased triglycerides synthesis when compared to the control cells.

### References

1. M. ten Hove et al., *Adv. Drug Deliv. Rev.* **159**, 180–197 (2020).
2. M. R. Pergande, F. Serna-Perez, S. B. Mohsin, J. Hanek, S. M. Cologna, *Proteomics*. **19**, 1800285 (2019).
3. K. Yamada et al., *Liver Int.* **35**, 582–590 (2015).