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Objectives/background: Recurrent alteration of metabolism in the postprandial phase due to high food intake or unbalanced diet has been identified as a risk factor for cardiometabolic diseases. Among the physiological modifications occurring after a meal, the postprandial release of extracellular vesicles (EVs) has been poorly investigated. EVs are shed membrane particles of less than 1µm in diameter that convey proteins, nucleic acids and lipids. These structures constitute a hot topic in biology as potential health biomarkers and as actors of cell-to-cell communication. Some rare studies have demonstrated that dietary polyphenols lowered the release of EVs associated to vascular disorders. However, nothing is yet known about the impact of polyphenols on the secretion, the content and the biological function of postprandial EVs. The objective of the present work was to investigate the impact of flavanone metabolites on postprandial endothelial EVs and their miRNA content.

Materials/Methods: EVs were isolated from medium of human aortic endothelial cells incubated in basal condition or post-prandial-like condition including or not a physiologically relevant mix of hesperidin metabolites. EVs were characterized (size, concentration) by a tunable resistive pulse sensing method and phenotyped by immuno-staining coupled with electronic microscopy. EV miRNA content was assessed by microarray.

Results/Findings: The physiologically relevant mix of hesperidin metabolites decreased the release of endothelial EVs associated to the postprandial stimulation, without any change of EV size distribution. EV miRNA content differed intensively between basal and post-prandial-like conditions. We observed that hesperidin metabolites mix reversed miRNA profile changes produced by the postprandial stimulation. The computational enrichment analysis of these EV miRNA profiles suggest huge potential biological functions for these vesicles.

Conclusion: These data demonstrate that flavanone metabolites modulate the secretion and the miRNA content of stimulated postprandial endothelial EVs. This support the capacity of flavanone metabolites to counteract EV-mediated detrimental effects of a postprandial.

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