Polydopamine nanoparticles as a potential tool for treating hepatic steatosis

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Hepatic steatosis, being present in approximately 25% of the adult population, represent the world's most common liver disease [1]. The liver is a pivotal player in lipid metabolism, being responsible for the synthesis, redistribution, and utilization of lipids. Liver lipids synthesis is finely tuned by a large variety of enzymes and hormones and an alteration in this process may lead to the onset of liver steatosis [2]. Liver steatosis can lead to liver injury, fibrosis, inflammation, and cardiovascular disease that can even cause the death of the patient [3]. Antioxidant molecules have gained attention as a potential tool to treat hepatic steatosis thanks to their involvement in lipogenesis and regulation of oxidation processes such as lipid peroxidation [4]. Some of the tested compounds include polyphenols, carotenoids, and glucosinolates [4]. Polydopamine nanomaterials and in particular polydopamine nanoparticles (PDNPs) have received attention in recent years mainly due to their high biocompatibility, organic chemical nature that grants them biodegradability, and a relatively high antioxidant capacity granted by the polyphenols rich surface of PDNPs [5]. In this work we tested the possibility to employ PDNPs as a potential therapy for hepatic steatosis. In particular, we tested PDNPs on an in vitro model of hepatic steatosis obtained through the treatment of Hep G2 cells with oleic acid and assessed the ability of PDNPs to act on lipid accumulation and cell viability.

References

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Figures

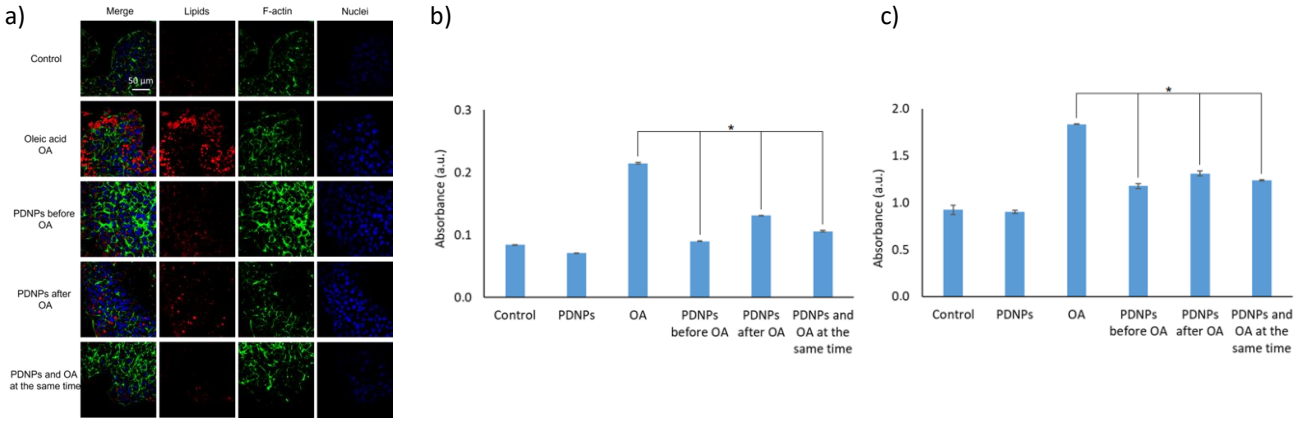

Figure 1: a) Confocal imaging acquisitions of lipid accumulation in Hep G2 cells at various conditions (from left to right merge, in red lipids accumulation, in green F-actin, in blue nuclei); b) & c) respectively, results of Total Cholesterol and Triglyceride assays performed on Hep G2 cells at various conditions.