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Liver Nuclear Lipid Droplets are a dynamic nuclear domain

Autores: Lagrutta, LC1; Layerenza, JP1; Montero Villegas, SM1; Sisti, MS1; García de Bravo, MM1; Ves-Losada;

Resumen

The cell nucleus (N) is a highly compartmentalized organelle characterized by several dynamic domains. In the laboratory it was shown for the first time that nuclear lipid droplets (nLD) are a new class of subnuclear bodies and a nuclear domain where neutral lipids are stored and organized. These droplets would be built up around a hydrophobic core of TAG and CE enriched in oleic acid and surrounded by a monolayer of polar lipids along with C and associated proteins. nLD components represent an exceedingly small proportions of the total cell components. The nLD could be involved in nuclear-lipid homeostasis and serve as an endonuclear buffering system that can rapidly provides or incorporates lipids involved in signaling paths as well as transcription factors. The aim of this work was to determine if nLD are a dynamic domain as the other nuclear domains (nucleolus, Nuclear Speckles, Cajal Body among others) as well as cLD (cytosolic lipid droplets). With this purpose HepG2 cells and primary culture of rat hepatocytes were incubated with 18:1n-9 as an external stimulus since it is well documented that it increases cellular cLD number and size. Both LD type (c and n) were stained with BODIPY493/503 and nucleus with DAPI. Viability and cell proliferation were determined by trypan-blueâ€“dye-exclusion cell and by the MTT assay. Due to 18:1n-9 treatment cellular shape was modified in both experimental models, and both cLD and nLD increased (number and size). If 18:1n-9 was excluded from the incubation mixture, LD increments were reverted. Under all conditions tested, nLD corresponded to a small pool (3-5%) with respect to total cellular LD (nLD + cLD). Under these culture conditions, oleic acid did not cause any toxicity. From the abovementioned results, we can concluded that nLD are a dynamic nuclear domain as cLD, since the size and number of both LD can vary in response to external signals that influence TAG pools by a reversible mechanism.

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