

# LIPID DROPLETS AND CELLULAR STRESS: IMPLICATIONS IN CANCER

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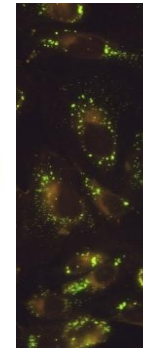
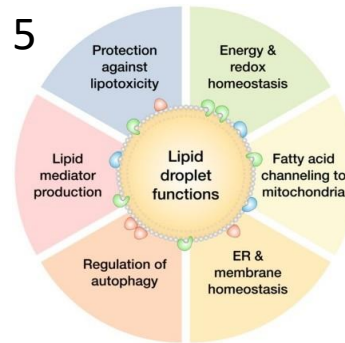
## Objective

The objective of this work is to review the role of lipid droplets during cellular stress and how cancer cells exploit lipid droplets to allow tumor progression. Novel targets that lipid droplets offer in anti-cancer therapy are also discussed.

## Methodology

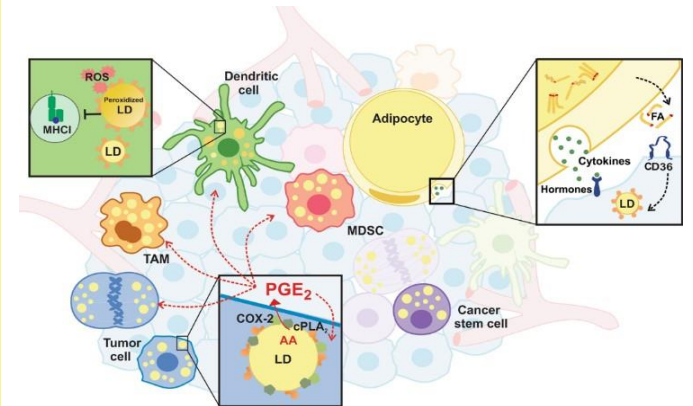
This work is a bibliographic review of 36 up-to-date scientific papers about lipid droplets and their relationship with cellular stress and cancer development. All reviews and research articles come from the most relevant biomedical databases: PubMed, Scopus, Nature and the Directory of Open Access Journals (DOAJ).

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## 1 Lipid droplets and cellular stress

Far from inert lipid depots, lipid droplets are dynamic organelles found in many eukaryotic cells that, aside from regulating cellular energetics, have been found to be essential during stress conditions. Lipid droplets synthesis is upregulated downstream of many stress-sensing pathways, such as during endoplasmic reticulum stress, hypoxia, lipotoxic stress, nutrient deprivation or oxidative stress, and help alleviate these cellular conditions through different mechanisms.

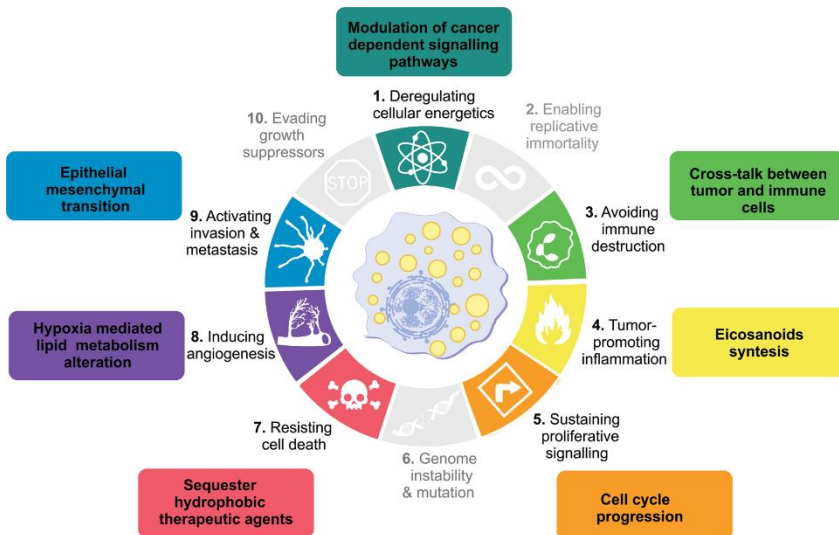


## 3 Lipid droplets and tumor progression

Aside from regulating cellular energetics and promoting survival of cancer cells, lipid droplets are exploited in other cells from the tumor microenvironment, such in adipocytes to supply lipids to cancer cells and in dendritic cells or tumor-associated macrophages to promote inflammation and immunosuppression. Targeting lipid droplet biosynthesis and function is therefore a practical approach to hinder tumor progression and shows promising results in chemotherapy.

## 2 Lipid droplets guardians of the hallmarks of cancer

Lipid droplets are increasingly being linked with tumor development and progression, as aside from alleviating cell stress and promoting survival, they are able to modulate many of the hallmarks of cancer. For example, in cancer lipid droplets promote inflammation, epithelial-mesenchymal transition or tumor immunosuppression through the modulation of lipid metabolism, which is central in cancer cells.



## TAKE-HOME MESSAGE

Lipid droplets have an important role in most tumors as guardians of the hallmarks of cancer, and therefore offer unique targeting strategies for anticancer therapy.

## Relevant bibliography:

Cruz, A.L.S. *et al.* Lipid droplets: platforms with multiple functions in cancer hallmarks ; Petan, T. *et al.* Lipid droplets in cancer: guardians of fat in a stressful world ; Guo, Y *et al.* Lipid droplets at a glance.