

# **Punicalagin and Ketogenic Amino Acids Loaded Organic Lipid Carriers Enhance the Bioavailability, Mitochondrial $\beta$ -Oxidation, and Ketogenesis in Maturing Adipocytes**

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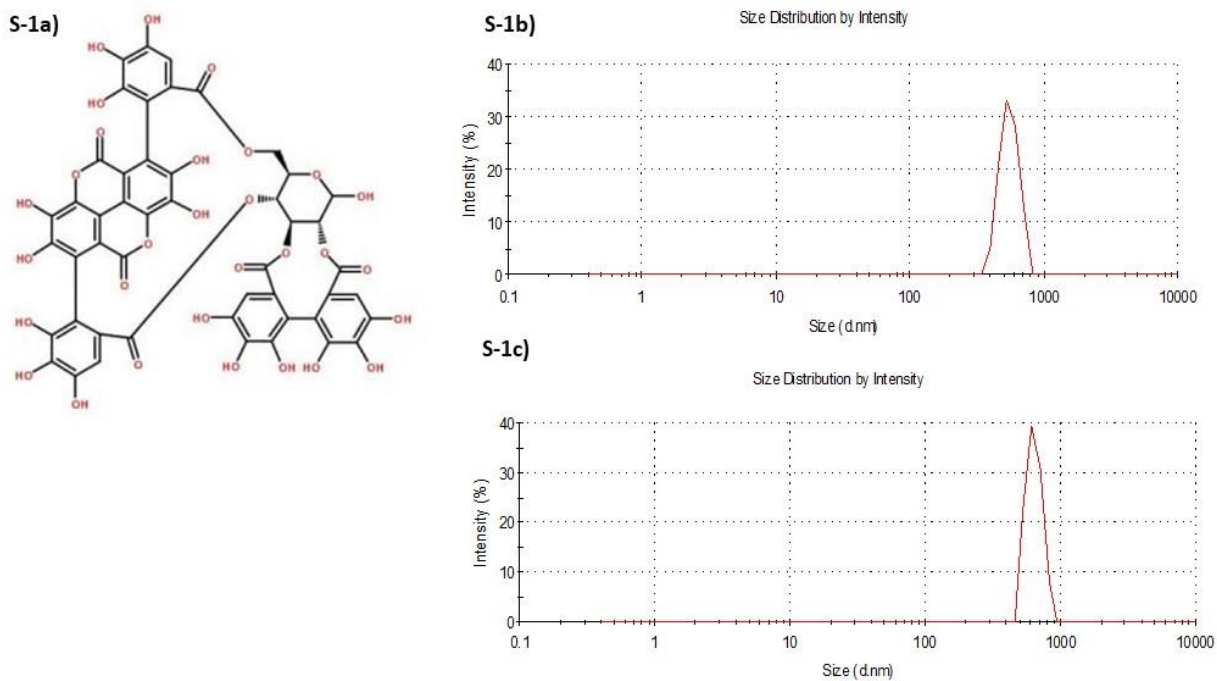


Figure S1. Molecular structure of punicalagin (**a**), Molecular formula-  $C_{48}H_{28}O_{30}$ , MW: 1084.72. Size distribution spectra (particle size) of ketogenic amino acid loaded chia seed phospholipids [NLCs-KAA] (**b**), punicalagin, ketogenic amino acids loaded chia seed phospholipids [NLCs-PUNI-KAA] (**c**) containing nano lipid carriers.

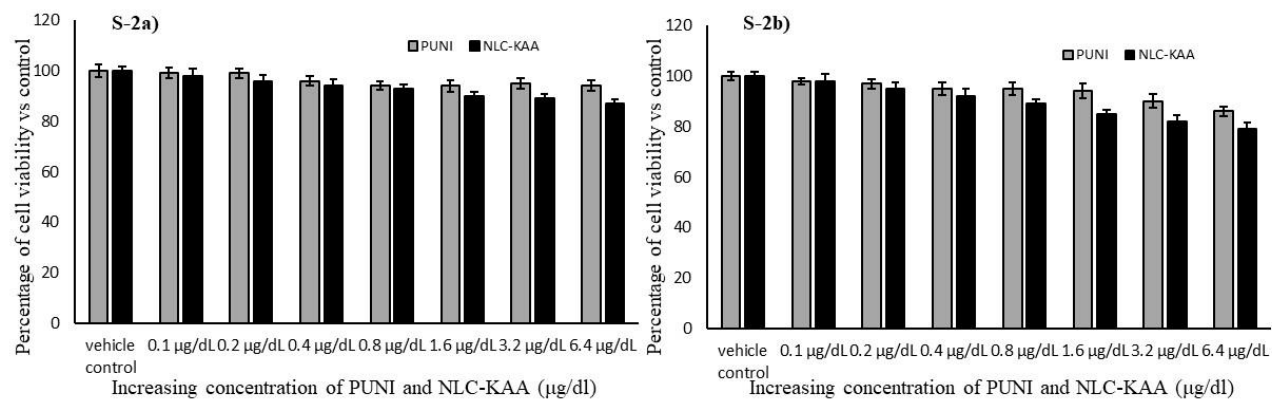


Figure S2. In vitro cytotoxicity of vehicle control, PUNI and NLCs-KAA on human mesenchymal stem cells (a) and adipocytes (b) after 48 h. Each values are means  $\pm$  SD (n = 6).

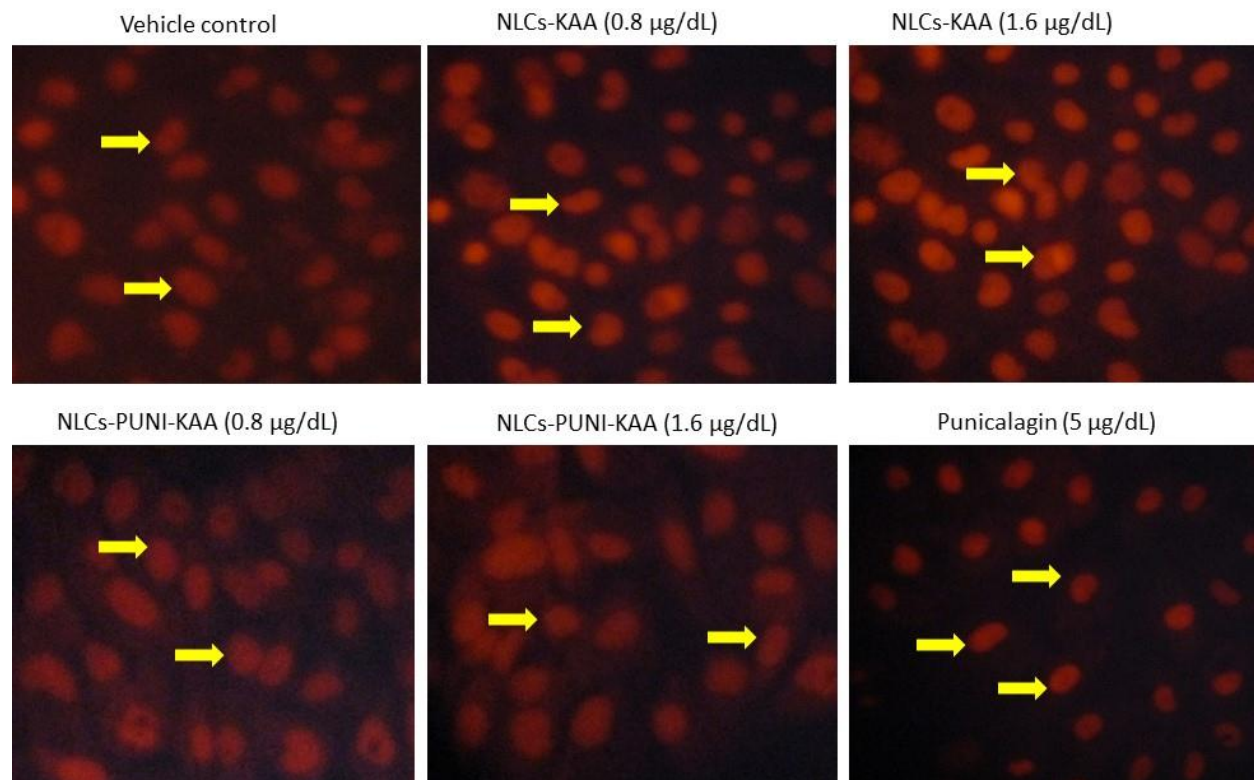


Figure S3. Fluorescence microscopic images of propidium iodide stained vehicle control, NLC-KAA, NLC-PUNI-KAA and PUNI treated human mesenchymal stem cells after 48 h. In PI staining, the hMSCs nucleus appeared normal in all the groups; there are no signs of shrunken, pyknosis, or apoptotic nucleus in NLCs-PUNI-KAA.

In propidium iodide staining, vehicle control showing normal appearance with circular shaped nucleus. NLCs-PUNI-KAA or NLCs-KAA of PUNI treated hMSCs nucleus also appeared to be normal, there are no signs of shrunken, pyknosis or apoptotic nucleus.