Short-term Exposure to Perfluorooctanoic Acid Induces Oxidative Stress and Necrotic Cell Death in Human HepG2 Hepatocytes

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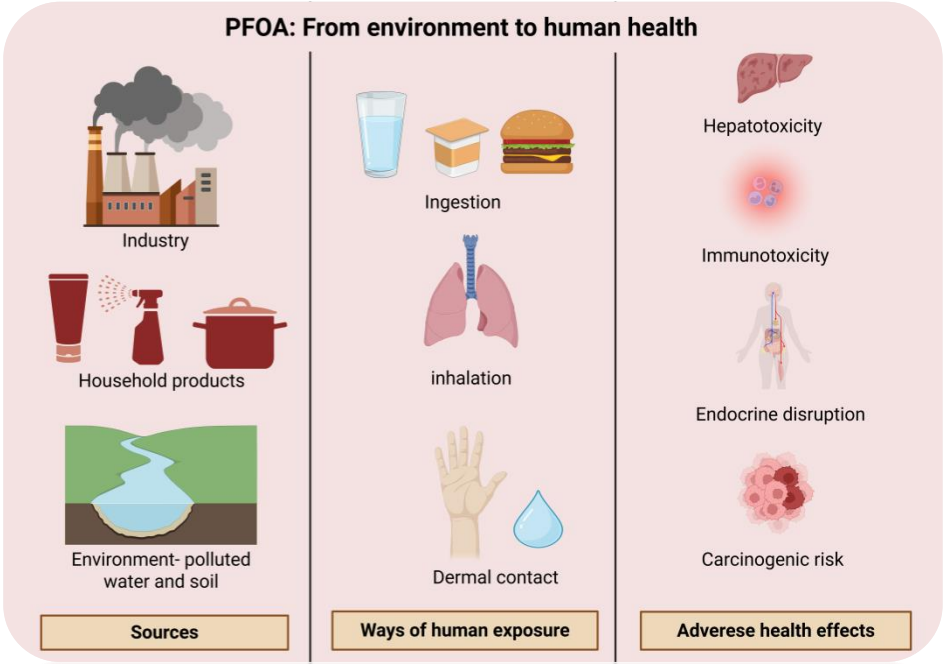
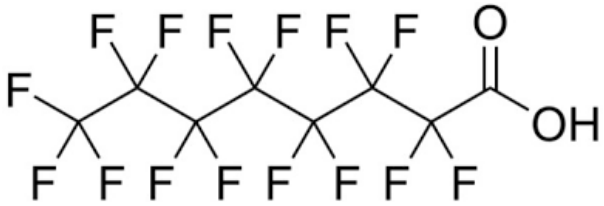
Why look beyond chronic exposure: the case of short-term PFOA exposure

- **Perfluorooctanoic acid (PFOA)** is a synthetic chemical belonging to the class of PFAS, a highly environmentally persistent and bioaccumulative group of substances

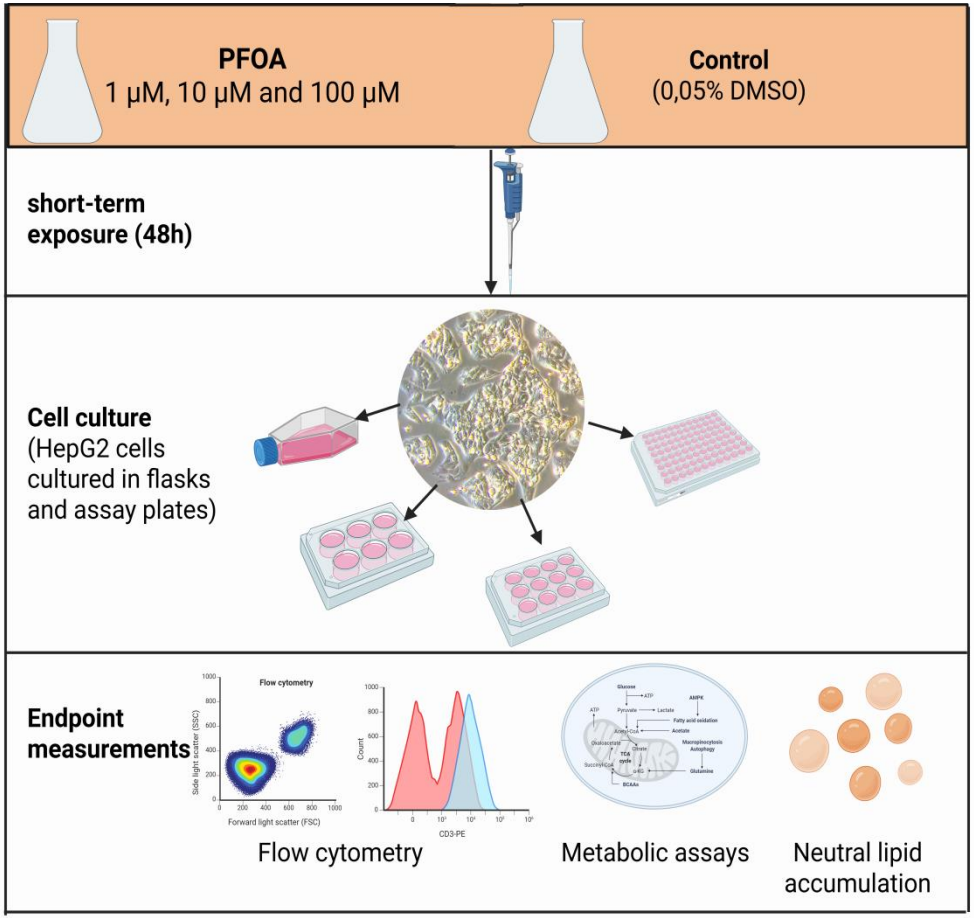




Structure of perfluorooctanoic acid (PFOA)

- Resistant to degradation, accumulates in human tissues
- Linked to immunotoxicity, hepatotoxicity, endocrine disruption, and carcinogenic risk
- Acute cellular effects remain unclear

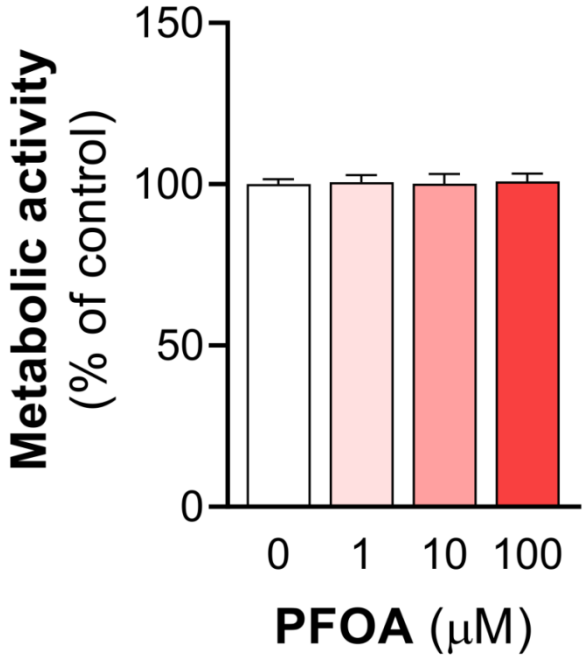
The Pipeline



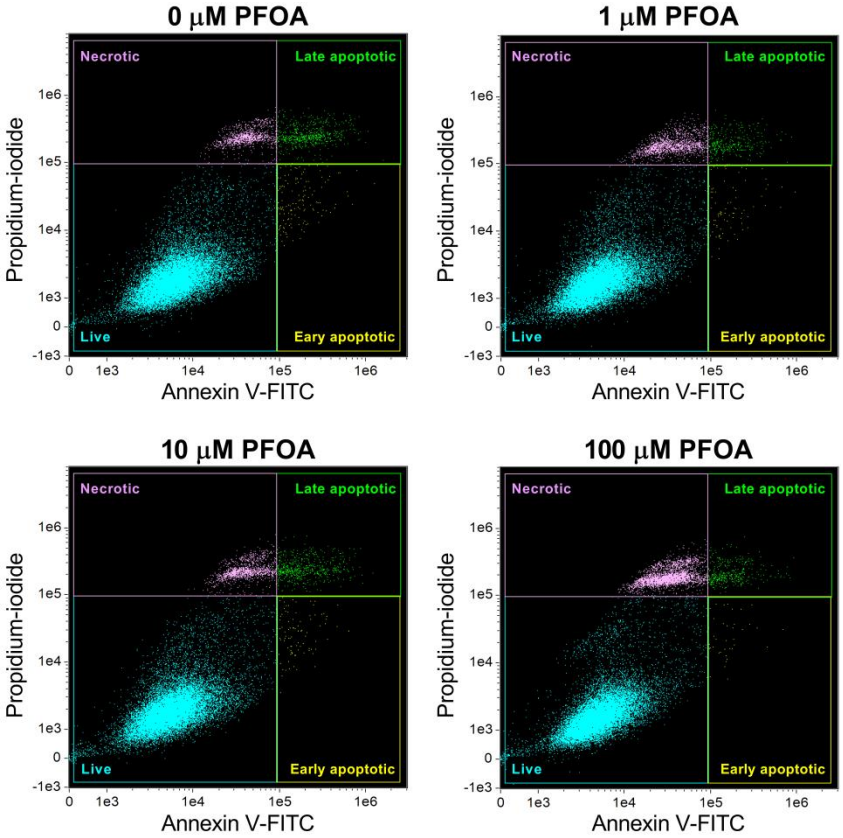
Assessed endpoints:

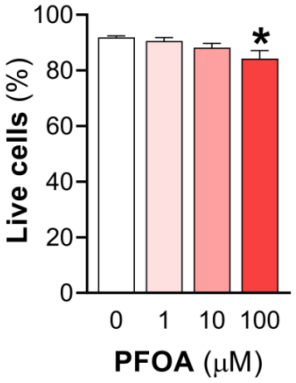
- **Metabolic activity** – alamarBlue™ assay
- **Cell death pathways** – Annexin V/propidium iodide flow cytometry
- **Cell cycle distribution** – Propidium iodide flow cytometry
- **Intracellular reactive oxygen species** (ROS) – Dichlorofluorescein fluorescence
- **Lipid peroxidation** – Thiobarbituric acid reactive substances (TBARS) assay
- **Neutral lipid accumulation** – Oil Red O staining

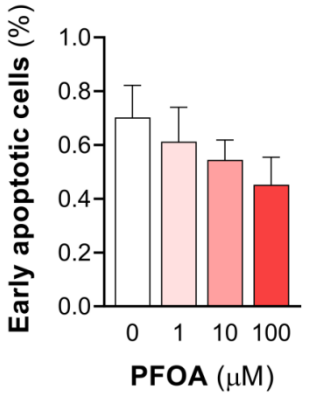
Short-term PFOA exposure does not affect metabolic activity in HepG2 cells

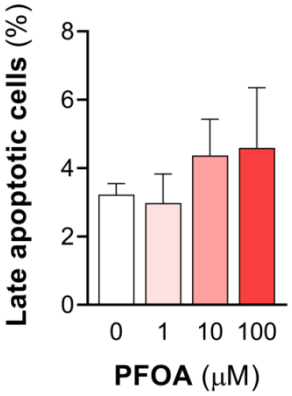


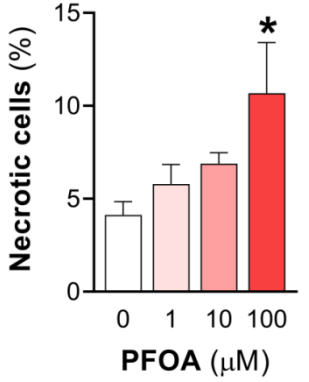
Short-term PFOA exposure reduces cell viability and promotes necrosis in HepG2 cells



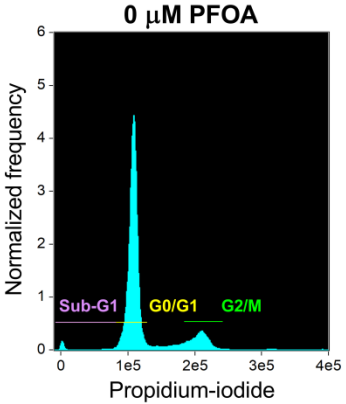


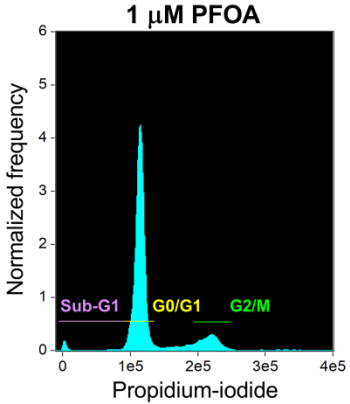


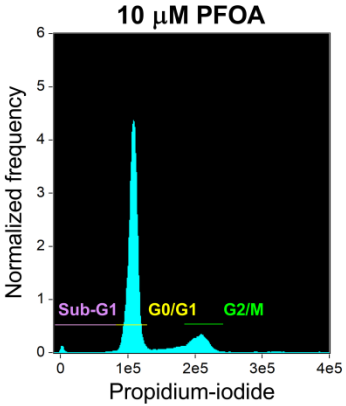


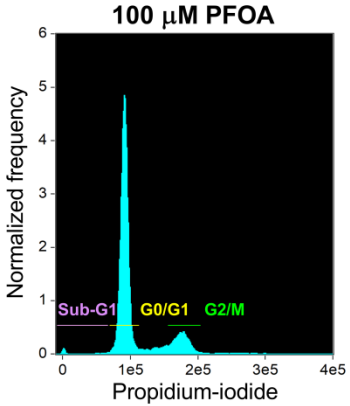


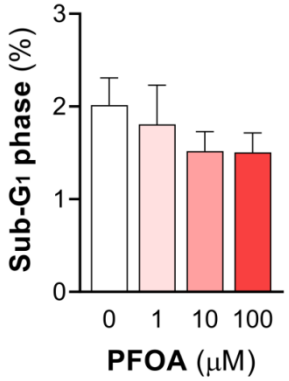
Short-term PFOA exposure does not affect cell cycle progression in HepG2 cells

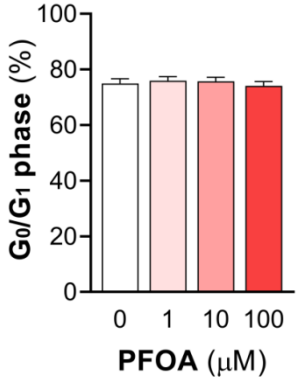


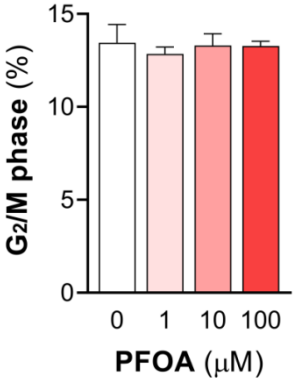


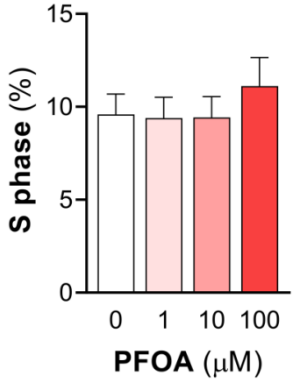




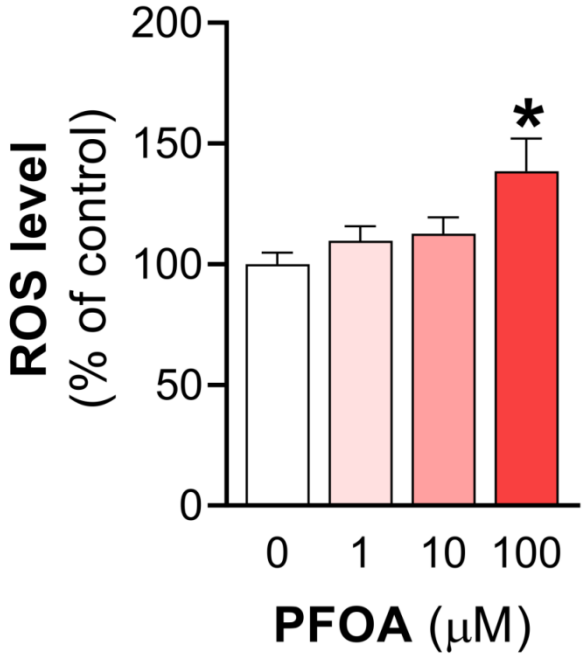




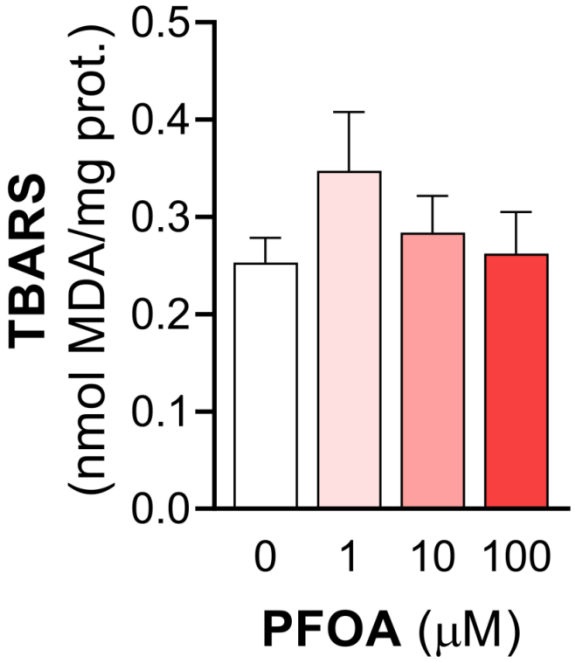




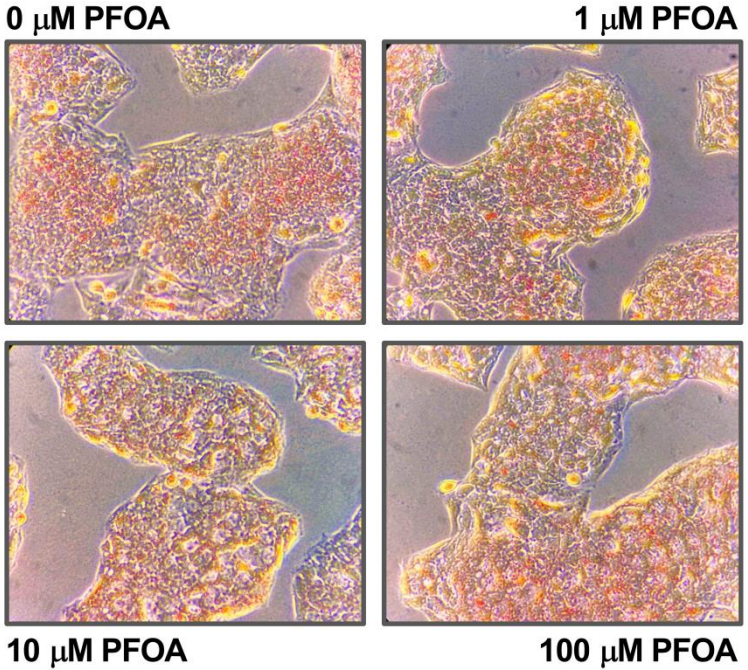
Short-term PFOA exposure elevates intracellular ROS levels in HepG2 cells

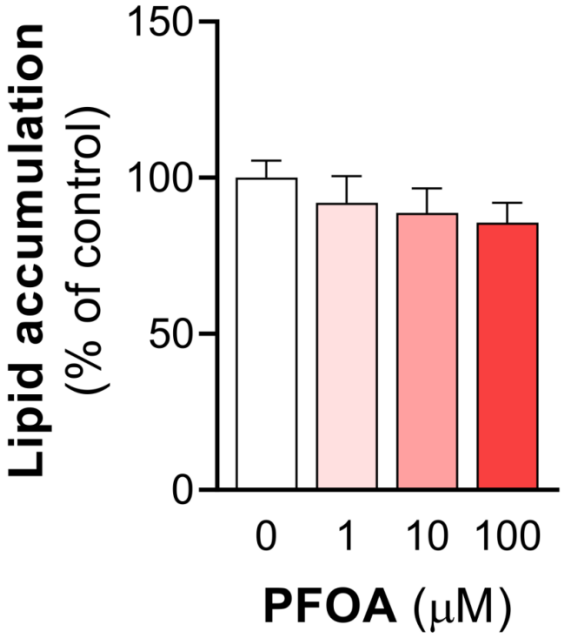


Short-term PFOA exposure does not increase lipid peroxidation in HepG2 cells



Short-term PFOA exposure does not affect neutral lipid accumulation in HepG2 cells





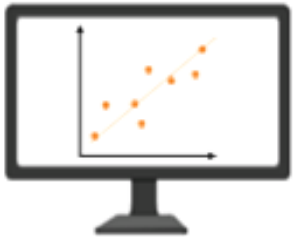
Key Findings

Short-term PFOA exposure induces oxidative stress

ROS

Cell fate shifts toward necrosis rather than apoptosis

No immediate disruption of lipid metabolism or proliferation observed



Provides a snapshot of acute toxicity and baseline for future long-term studies

Ackwnoledgements:

ENDOS Laboratory

Dunja Kokai
Bojana Stanic
Nebojsa Andric

This study was supported by Science Fund of the Republic of Serbia, #7010, Integration of Biological Responses and PBTK Modeling in Chemical Toxicity Assessment: A Case Study of Perfluorooctanoic Acid (PFOA) – **ToxIN**

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