# Lipotoxicity and oxidative stress induced by palmitate in human muscle cells

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## Introduction

FFA

↗ lipotocxicity leading to skeletal muscle dysfunction

→ Trigger by imbalance between ROS Production and antioxidant response?

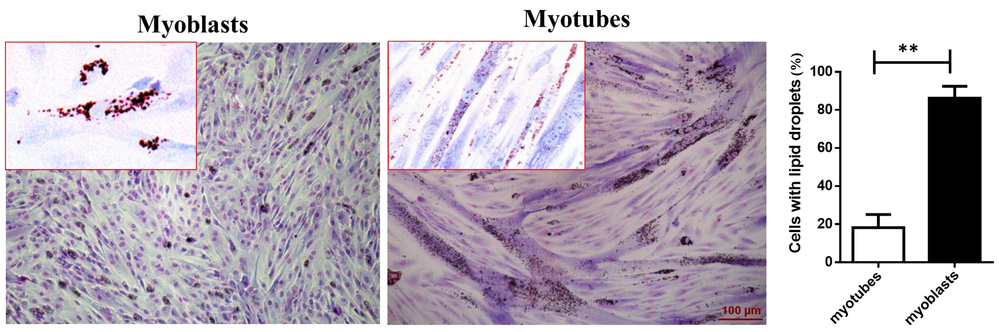
## Methods

**FFA**: Palmitate treatment (PA-300µM-24h) on **human** myoblasts and myotubes (after 4 days of diff.)

Cells were treated with PA complexed to BSA and compared to cells treated with BSA only (control condition)

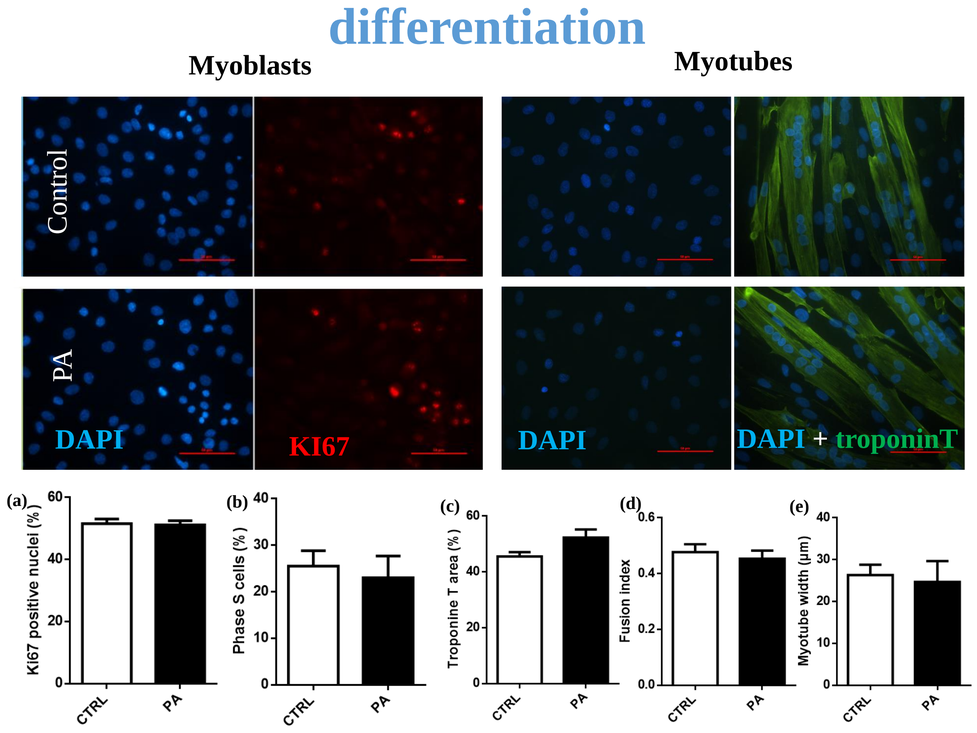
## Results

### 1 Significant accumulation of intramyocellular lipid droplets




**The intramyocellular lipid accumulation was labeled by Oil red O (red) staining while cells were counterstained with GIEMSA. Lipid droplets are present in myoblasts (20 ± 8%) and even more in myotubes (86 ± 8%). No lipid droplet was found in control cells. Graph illustrated Means ± SEM. N=5**

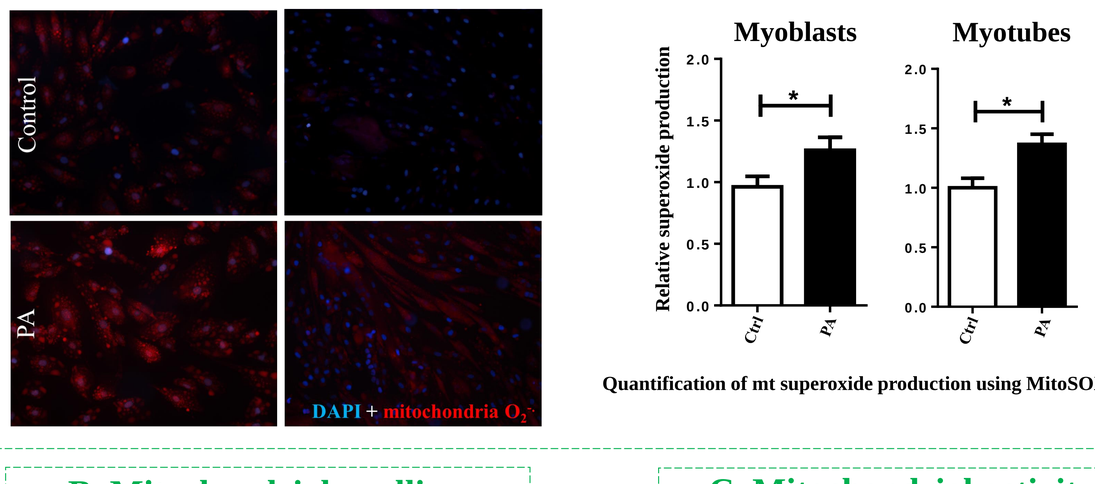
### No impact of PA on cell proliferation and differentiation




**Data did not show any difference in proliferation and differentiation processes of human skeletal cells after 300 µM PA treatment. Bar graphs represent Means ± SEM. N=5**

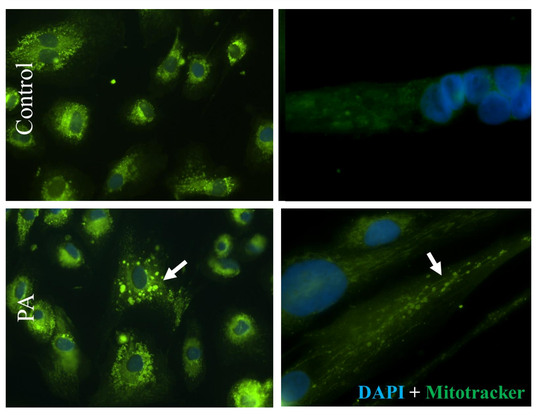
### 2 Mitochondrial dysfunction in myoblasts and myotubes

#### A. Mitochondrial superoxide overproduction



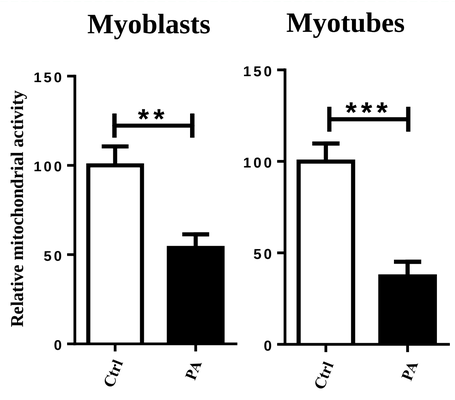

**Quantification of mt superoxide production using MitoSOX™ Red.**

#### B. Mitochondrial swelling




**Swelling of mt was observed using the Mitotracker.**

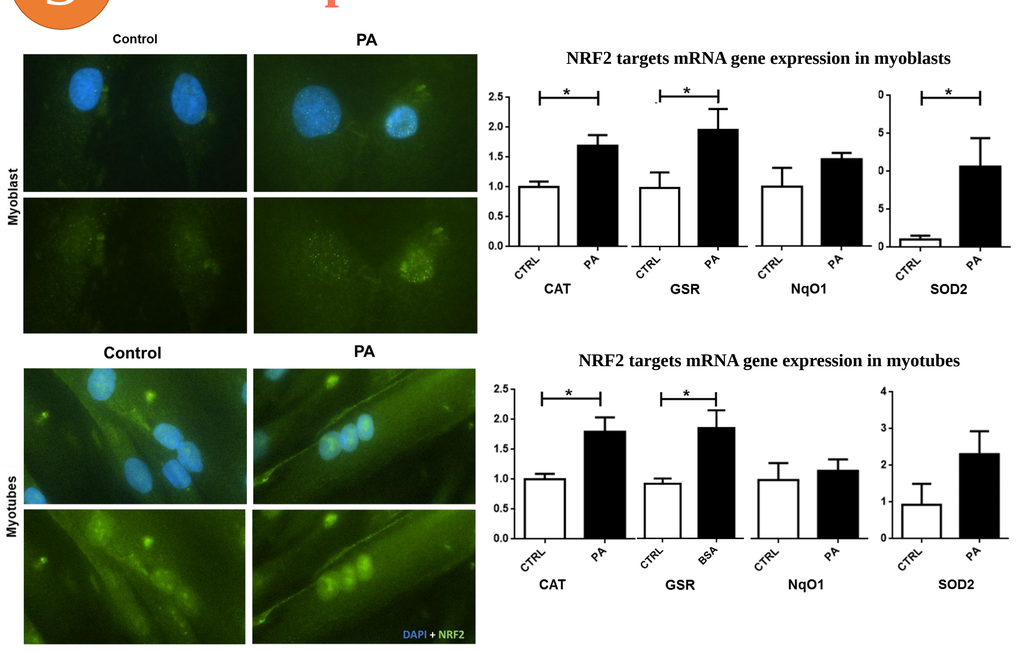
#### C. Mitochondrial activity




**MTT Cell Assay was used to measure the mt complex II activity.**

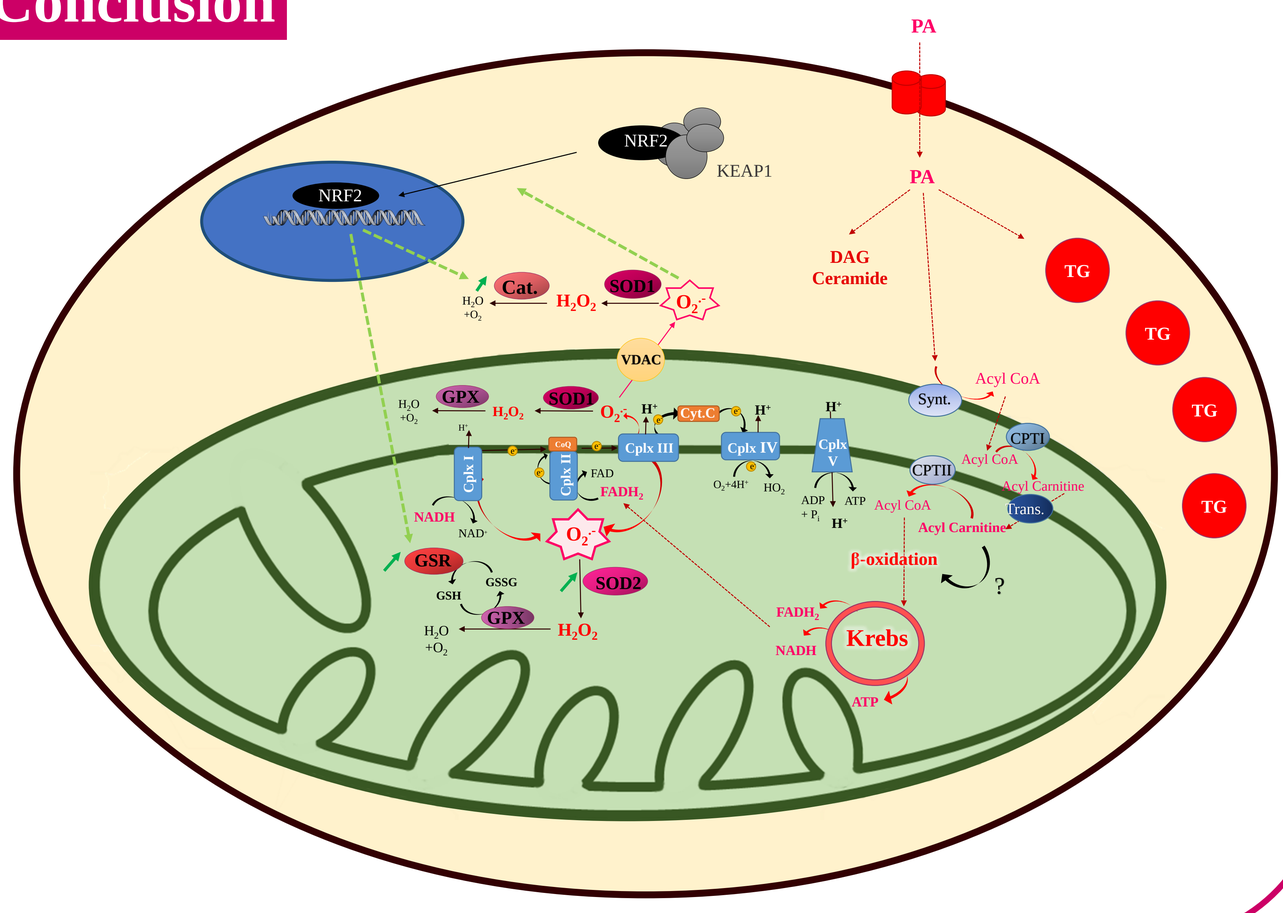
**=> PA treatment induces an important alteration of mitochondrial activity along with increased production of mitochondrial $O_2^{\cdot-}$ and mitochondrial swelling.**

### 3 NRF2 expression & Antioxidant balance




**NRF2 translocation was observed after PA treatment along with antioxidant response in myoblasts and myotubes as attested by activation of NRF2 targeted genes.**

## Conclusion

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