

## Oxidative Stress Amelioration Effects of Ingredient of PHYTOCEE®: *Emblica officinalis*

### OBJECTIVE

To investigate the effects of water extract of Amla (*Emblica officinalis*) fruits on oxidative stress amelioration.

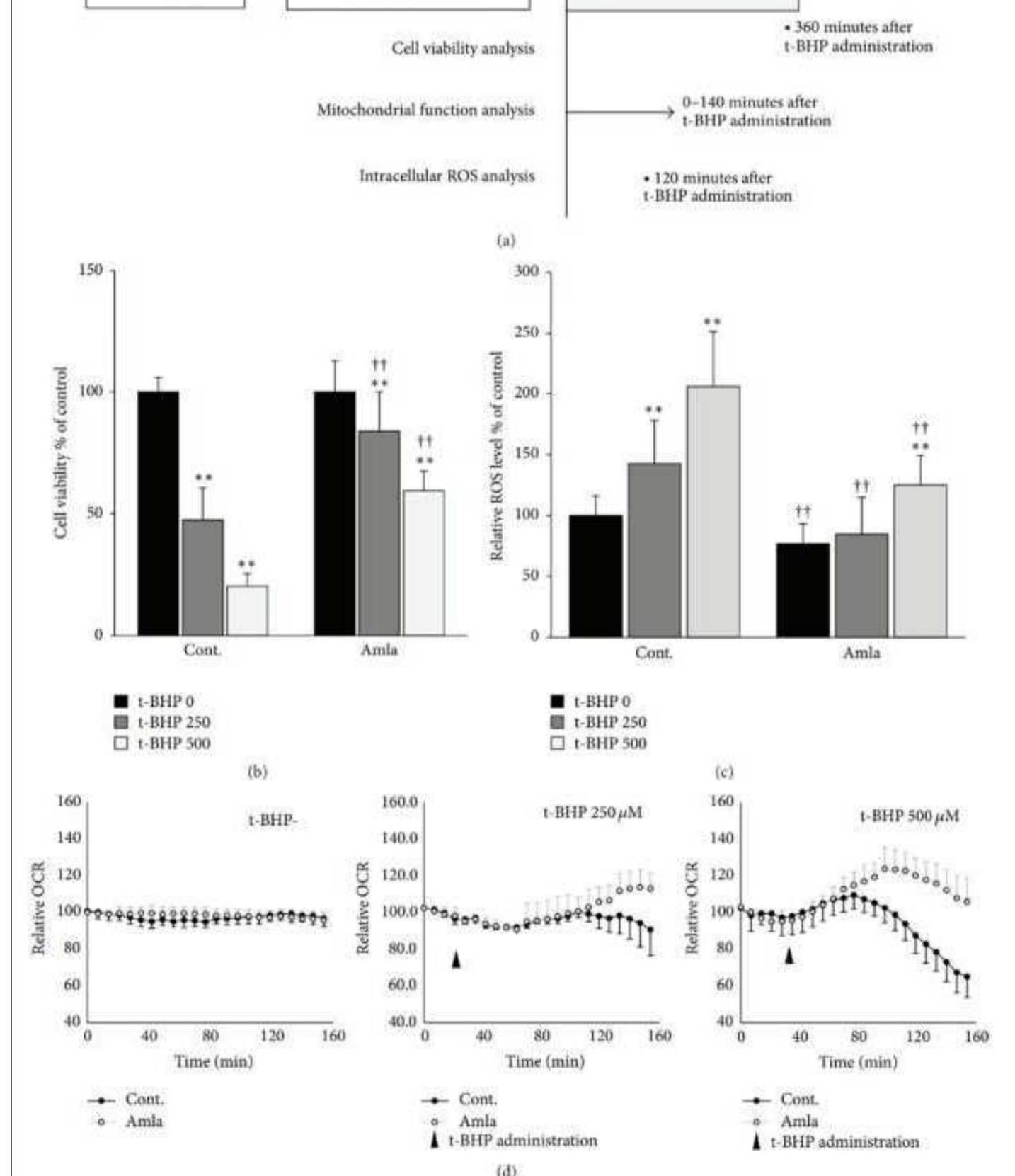
### MATERIALS AND METHODS

C2C12 myoblasts cell culture was used. For Amla treatment, Amla stock solution was diluted to final concentrations of 100 g/mL and 200 g/mL. The MTT measurements of cell viability under oxidative stress, reactive oxygen species (ROS) measurement, and oxygen consumption analysis in response to oxidative stress were performed using standardized cell line assay protocols and analytical techniques.

### RESULTS

Amla treatment exhibited a cytoprotective effect against oxidative stress and concomitantly increased oxygen consumption.

C2C12 myotubes were pretreated with Amla (200  $\mu$ M) for 48 h and then treated with t-BHP (250  $\mu$ M or 500  $\mu$ M). (a) Schematic showing the time points for three experiments performed to evaluate the cytoprotective effects of Amla treatment. (b) Cell viability was analyzed by MTT assay at 6 h after tBHP treatment. \*\* $p$  < 0.01 versus tBHP-untreated cells; †† $p$  < 0.01 versus Amla-untreated cells treated with each t-BHP concentration;  $n$  = 20. (c) Relative ROS levels in cells were analyzed at 2 h after t-BHP stimulation. \*\* $p$  < 0.01 versus t-BHPuntreated cells; †† $p$  < 0.01 versus Amla-untreated cells treated with each t-BHP concentration;  $n$  = 12. (d) OCR after t-BHP stimulation was analyzed following t-BHP injection after three basal OCR measurements. OCR was measured every 8 min for a total of 160 min. Data are represented as relative-OCR values divided by the basal OCR values measured prior to t-BHP treatment ( $n$  = 10).



OCR, oxygen consumption ratio (pmol/min); t-BHP, tert-butyl hydroperoxide

### CONCLUSIONS

This study results depicted that Amla treatment exhibited cytoprotective effects and lowered reactive oxygen species (ROS) levels in cells subjected to t-BHP-induced oxidative stress.

### OUTCOME

Furthermore, these effects were accompanied by increased oxygen consumption, suggesting that Amla protected cells against oxidative stress by using enhanced spare respiratory capacity to produce more energy.

### Reference:

Yamamoto H, Morino K, Mengistu L et al. Amla Enhances Mitochondrial Spare Respiratory Capacity by Increasing Mitochondrial Biogenesis and Antioxidant Systems in a Murine Skeletal Muscle Cell Line. *Oxid Med Cell Longev*. 2016;2016:1735841.