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## INTRODUCTION

Oxidative stress is recognized as one of the primary processes underlying the initiation and progression of inflammation and tissue injury in inflammatory bowel disease. Therefore under physiological conditions, the balance between reactive oxygen species (ROS) generation and ROS scavenging is tightly controlled in intestinal cells. Elevated plasma glucose levels and advanced glycation end products (AGEs), formed during hyperglycemia, generate free radicals resulting in decline of antioxidant defense mechanisms and can cause inflammation and cell damage. Apples contain several polyphenols and other bioactive molecules which exert an antioxidant effect. Aim of the study was to investigate the role of apple extracts on glycooxidation using intestinal Caco-2 cells.

## MATERIALS AND METHODS

Glycooxidation was induced by incubating Caco-2 cells with 25mM glucose (High Glucose, HG) in the absence or in the presence of apple extracts obtained from freeze dried apples. A local apple variety (Mela Del Papa) and a more common variety (Mela Golden delicious) were studied. Apples are characterized by different polyphenol content :

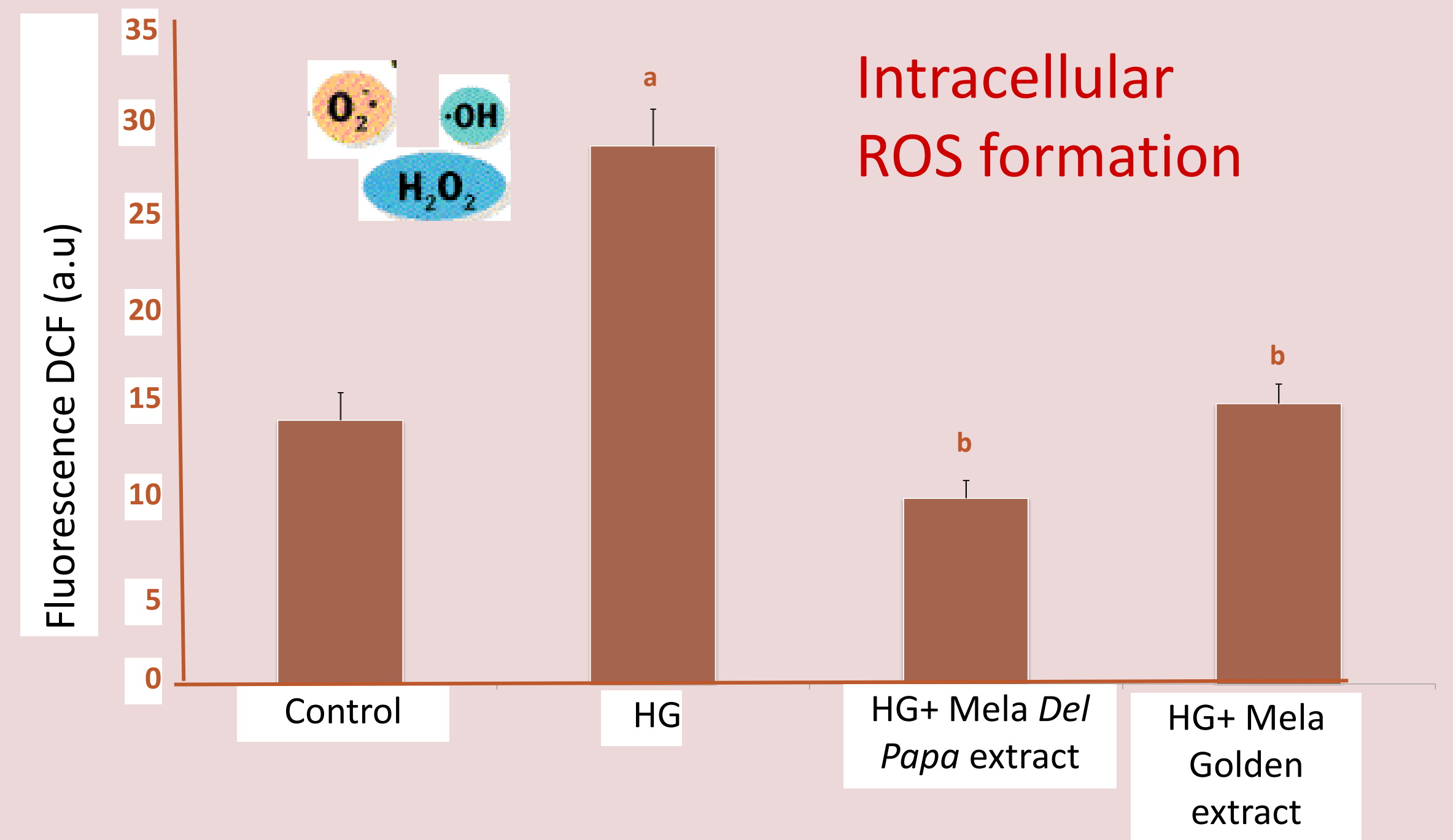
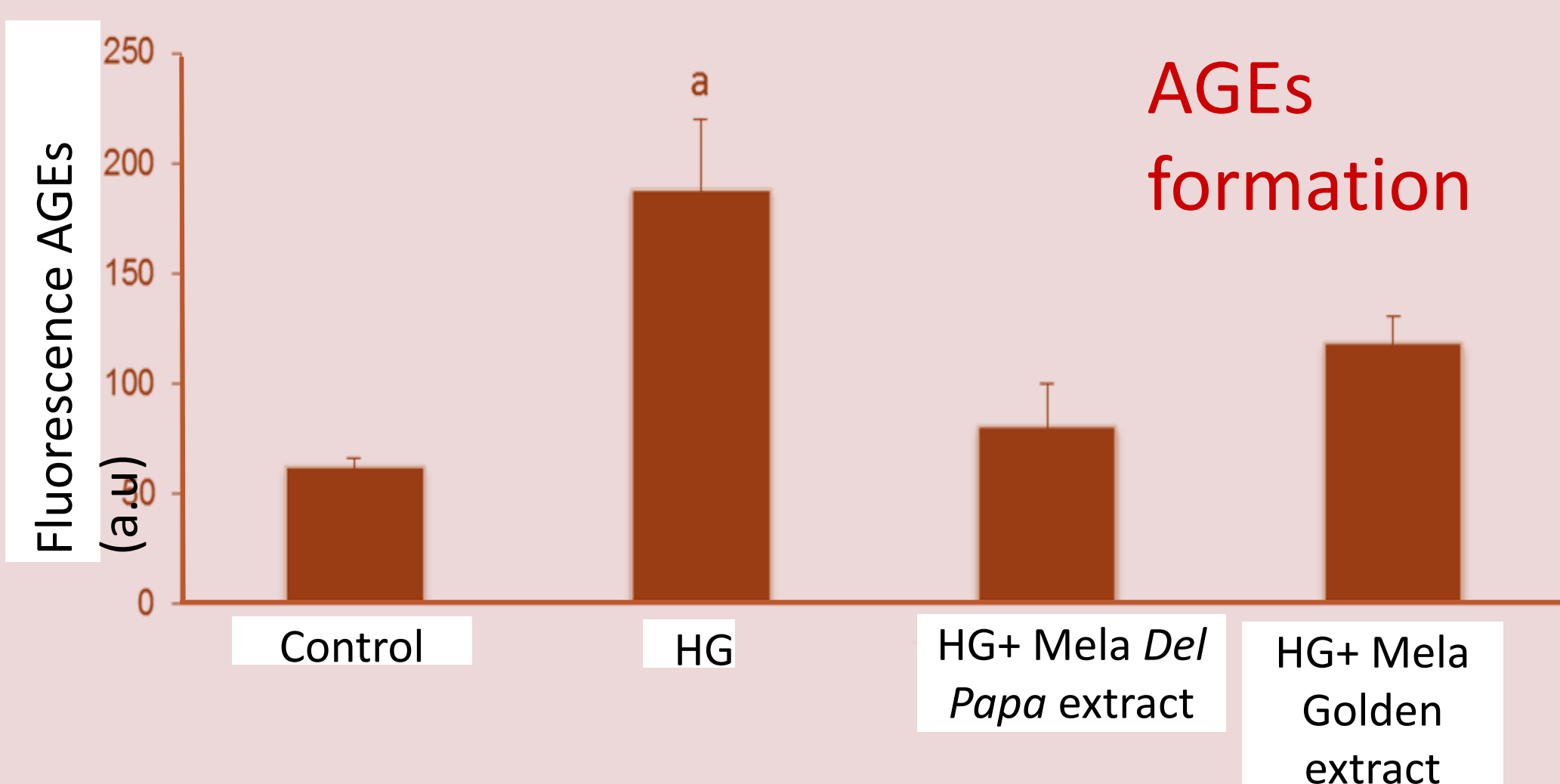
- 60 mg/100 g FW Mela Golden Delicious
- 361 mg /100 g FW Mela Del Papa

In cells treated in different experimental conditions we evaluated :

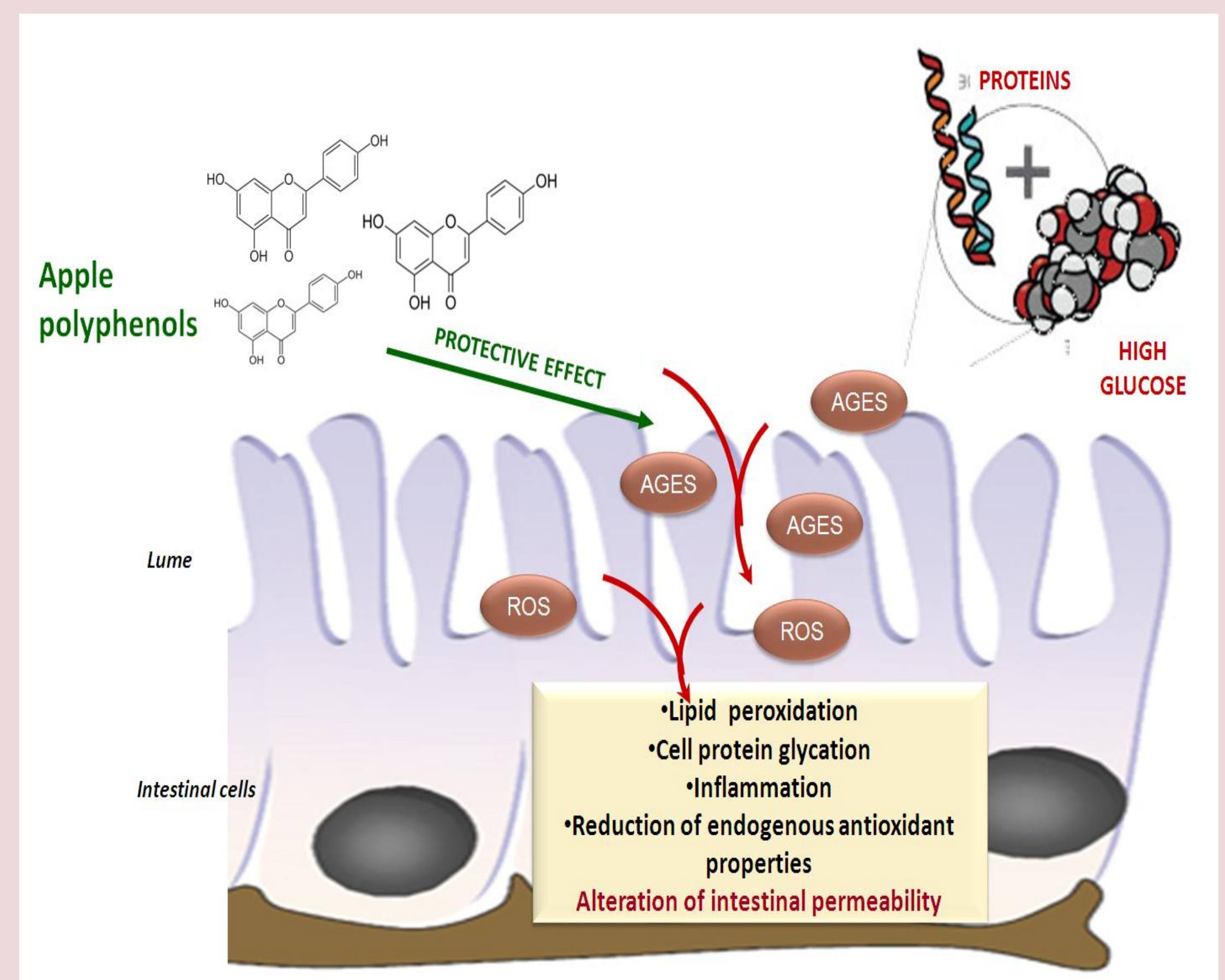
- 1) Intracellular ROS levels by flow cytometry using carboxy-H<sub>2</sub>DCFDA
- 2) Levels of malondialdehyde (MDA) as marker of lipid peroxidation by T-BARS assay
- 3) AGEs production by measuring AGE-specific fluorescence ( $\lambda_{ex}$  370 nm/  $\lambda_{em}$  440 nm).

## RESULTS

Incubation of Caco-2 cells with apple extract reduced the increase of intracellular ROS formation and AGEs formation induced by high glucose treatment. The protective effect was dependent on the concentration of polyphenolic compounds in apple extracts.



The intestine is highly vulnerable to glycooxidative damage due to its constant exposure to aerobic metabolism, high glucose concentration or oxidants and advanced glycation end products from dietary foods. A diet rich in apple antioxidants might prevent or delay the progression of intestinal diseases characterized by oxidative stress and inflammation, especially because antioxidants reach higher concentrations in the gut than in other tissues.



Physiopathological relevance of glyco-oxidation : protective role of polyphenols



*Di chi sarà' il mondo di domani?  
Di chi oggi canta in coro.*

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IL Di.S.C.O. SI RACCONTA