

## Antigenotoxicity of *Ginkgo biloba* extract in colonocytes D. Oliveira<sup>1,\*</sup>, L. Cadilhe<sup>1</sup>, C. Latimer<sup>3</sup>, P. Parpot<sup>2</sup>, C. Gill<sup>3</sup>, R. Oliveira<sup>1</sup>

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Plants have been used over centuries in traditional medicine for the treatment of human diseases. In the last decades the interest in medicinal plants has increased significantly owing to the antioxidant effect found in their natural extracts which is responsible for many therapeutic effects. The *Ginkgo biloba* leaf extract (GBE), widely used in traditional Chinese medicine, is nowadays intensively studied and sold all over the world due to its many health benefits, being used for the treatment of human pathologies such as neurodegenerative and cardiovascular diseases, and also to delay the ageing process. Although the antioxidant properties of GBE are well documented [1-3], studies on the antigenotoxic activity of GBE are still scarce.

The colonic environment is continuously exposed to a large diversity of dietary compounds, some of them potentially carcinogenic, that may affect DNA integrity (e.g.: DNA oxidation and strand breaks) and alter cell genetic information, contributing to the development of colorectal cancer (CRC). Diets that are mainly composed of fruits and vegetables are rich in polyphenols and have been associated with CRC prevention [4]. Medicinal plant extracts may also be rich in polyphenols and can be used to prevent or reduce DNA damage.

The chemical analysis of the ethanolic GBE allowed the identification of some *G. biloba* characteristic compounds, being mainly composed of one type of polyphenols designed as flavonoids, which are known for having strong antioxidant activity. Owing to this property, GBE could be a potential chemopreventive agent against CRC. Thus, GBE was subjected to simulated *in vitro* human digestion of the upper tract, originating a product (DGBE) that represents the extract when it reaches the colon during human digestion. GBE and DGBE demonstrated *in vitro* antioxidant activity and were tested in human colorectal adenocarcinoma cell line for their cytotoxicity (MTT assay) and antigenotoxicity (comet assay), where cells were pre-treated with each extract and subsequently challenged with H<sub>2</sub>O<sub>2</sub>. Both forms of the extract did not affect cell viability and decreased the level of DNA damage induced by oxidative stress. GBE and DGBE seem to be protecting DNA from damage, which could be the result of the stimulation of antioxidant defence mechanisms (such as the induction of antioxidant enzymatic activity or non-enzymatic defences) and DNA repair, or the extracts might be inducing moderate stress in cells, causing cell adaption when exposed to H<sub>2</sub>O<sub>2</sub>. Therefore, GBE shows a potential antigenotoxic effect, that seems to be retained after the digestive process, and might be the result of the antioxidant properties provided by the flavonoid fraction of the extract.

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