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Study of the absorption of apocynin, ananti-inflammatory natural product, in rats with ulcerative colitis induced by dextran sodium sulfate (DSS)

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Introduction and objective: Inflammatory bowel disease (IBD) reduces the quality of life of patients and conventional therapia is not totally effective in preventing outbreaks or achieve remission of the disease. IBD sufferers often seek solution in preparations or plant products. The products of plant origin candidates for future antiinflammatory agents include phenolic derivatives. This group are secondary metabolites that are widely distributed in the plant kingdom. Most of them are derivatives of flavones, isoflavones, flavonols, catechins, tocopherols, and phenolic acids. Many of them are antioxidants and anti-inflammatory, and some interact with certain proteins involved in transduction and gene expression, thus reducing the production of proinflammatory mediators through the inhibition of nuclear transcription factor system NF-kB (Rios et al., 2009, Gonzalez et al., 2011, Recio et al 2012). Apocynin, also known as a acetovallinona acetophenone (4-hydroxy-3-methoxyacetophenone), was isolated from the roots of Apocynum cannabium (Canadian hemp L.). It was demonstrated that apocynin is a prodrug that is converted through oxidation of peroxidases in a dimer, the diapocynine, whose activity is known to be superior to that of apocynin (Stefańska and Pawliczak, 2008). However, there are few clinical studies and pharmacokinetic support such use (Pithadia and Jain, 2011). There are not pharmacokinetic data available.

The aim of the study was to assess the influence of ulcerative colitis induced by dextran sulfate sodium (DSS) on the absorption (ka) of apocynin in Wistar rats.

Material and methods: Ulcerative colitis is caused by the administration in the drinking water of 3.4%DSS for 7 days to male Wistar rats. On the eighth day, a group of animals were sacrificed randomized for removal of the colon and the histological study. The rest were used to estimate absorption constant (ka) by in situ perfusion technique Doluisio in small intestine and colon. A control group was also studied.

Results and Discussion: The absorption rate constant of apocynin in the colon of healthy rats is 2.99 ± 0.40 h^{-1}, whereas in diseased rats, a value of 4.24±0.34 h^{-1} is estimated. This result shows a statistical differences because of the illness ($p < 0.05$). In small intestine, DSS treatment causes a significant decrease from 7.94 ± 0.50 h^{-1} in healthy rats to 6.84 ± 0.34 h^{-1} in colitic rats.

Conclusions: There is a change in the absorption pattern in the presence of inflammation induced by the DSS. A decrease is seen in small intestine while an increase is observed in colon. Taking into account the magnitude of the apocynin rate constant determined, an important intestinal absorption cannot be ruled out so that its anti-inflammatory effect in ulcerative colitis can not be considered merely topical.

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