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Mangiferin nanoparticles protects against Multiple Organ Dysfunction Syndrome induced by intestinal ischemia/reperfusion through Muscarinic receptors not Nicotinic receptors

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Aim: Mangiferin (MF), a xanthone found in Mangifera Indica, has antioxidant, immunomodulatory. However, its protective effect against Multiple Organ Dysfunction Syndrome (MODS) has not been fully clarified. The study was planned to elucidate the possible protective mechanisms of MF20 and its nano-formulation (NMF10) against mesenteric I/R-induced MODS.

Methodology: Male Wister rats were allocated into 2 sets. In the first set, animals were treated with MF (20 mg/kg, i.p) or NMF (10 mg/kg, i.p), or the vehicle for 3 days before I/R, which was induced by clamping the superior mesenteric artery for 30 minutes followed by declamping for 60 minutes. In the second set, animals were treated with NMF (10 mg/kg, i.p or MLA and NMF or atropine and NMF or the vehicle for 3 days before I/R.

Results: MF20 and NMF10 antioxidant effect was evidenced by increasing contents of TAC and normalizing that of MDA while NMF10 elevated m-RNA levels of NRF-2 and HO-1 as well as GST. The mechanistic studies revealed that both forms protected the 3 organs studied, viz., liver, kidney and intestine partly via increasing the content of β-catenin along with decreasing that of GSK-3β, whereas NMF10 decreased the phosphorylated NF- κB-p65 along with increasing PPAR-g. Regarding the anti-inflammatory effect, MF20 and NMF10 reduced IL-1β, effect that were mirrored on the tissue contents of MPO, IL-6 and MMP-9. Moreover, NMF10 possessed anti-apoptotic character evidenced by elevating Bcl-2 content and reducing that of caspase-3. In the serum, intestinal I/R increased the activity of ALT, AST, and CK. In all the measured parameters, NMF10 showed promise over MF20, however, these protective effects were deterred by the presence of atropine but not MLA.

Conclusion: The intimated protective mechanisms of MF20 and NMF10 against MODS progression are mediated via the involvement of Wnt/β-catenin/NF-κβ/ PPAR-γ and Nrf-2/HO-1 signaling pathways with contribution of muscarinic receptors.

Biography

Shorouk M El-Sayyad was graduated from the faculty of pharmacy; October 6 university (O6U), with high honors. Her high scores enabled her to become one of the university stuff. During the first few years of her academic career, she commenced a Masters of Pharmaceutical Science specialising in Pharmacology with Al-Azhar University. She is the first candidate that did acute mesenteric ischemia in rats.

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