

Pharma Middle East

November 02-04, 2015 Dubai, UAE

Evidence for the potential therapeutic usefulness of the multi-component herbal preparation, STW5, in protecting against radiation-induced intestinal mucositis

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Intestinal mucositis is a common adverse effect in patients undergoing radiotherapy and constitutes a treatment-limiting condition. Since no agents are yet known that can adequately guard against its development, the search continues to find safe and effective measures that could prevent this serious side-effect of radiation without affecting its anti-tumor activity. The present study was intended to investigate whether the herbal preparation, STW 5, could offer a potentially effective agent in this respect. STW5 is a multi-target herbal preparation consisting of standardized extracts of bitter candytuft (*Iberis amara*), lemon balm (*Melissa officinalis*), chamomile (*Matricaria recutita*), caraway fruit (*Carum carvi*), peppermint leaf (*Mentha piperita*), Angelica root (*Angelica archangelica*), milk thistle (*Silybum marianum*), celandine herb (*Chelidonium majus*), and liquorice root (*Glycyrrhiza glabra*). The preparation is of proven clinical efficacy in functional dyspepsia and irritable bowel syndrome. Intestinal mucositis was induced in rats by exposing them to different exposure levels of whole body gamma-irradiation. According to these results, a level of 6 Gy was used in later experiments. Rats were treated orally with STW 5 (5 or 10 ml/kg) for five days before and two days after irradiation. One day later, rats were sacrificed and segments of small intestine were examined histologically to assess mucosal integrity. Intestinal homogenates and serum samples were used to assess relevant parameters for mucosal functional activity, such as the brush border enzymes sucrase and alkaline phosphatase, citrulline and cholecystokinin, as well as different markers for inflammation, oxidative stress and apoptotic changes. Exposure to radiation produced dose-dependent extents of intestinal injury associated with changes in functional activity and apoptotic parameters with high radiation levels. Apoptosis was associated with an increase in cytosolic calcium, depletion of mitochondrial cytochrome c, B-cell lymphoma-2 and complex I. Oxidative stress parameters (reduced glutathione, thiobarbituric acid reactive substance and total nitrate/nitrite) were deranged. Inflammation markers (tumor necrosis factor and myeloperoxidase) and indices of intestinal damage (serum diamine oxidase) were increased. STW 5 protected to a large extent against histological changes and counteracted the deranged parameters indicative of apoptosis and of functional integrity. The findings provide strong experimental evidence for the potential therapeutic usefulness of STW5 in protecting against the development of radiation-induced intestinal mucositis and in preserving the functional activity of the small intestine in the face of radiation exposure.

Biography

Mohamed T Khayyal is an emeritus Professor of Pharmacology, Faculty of Pharmacy, Cairo University, Egypt. He obtained his BPharm degree in 1958 from Alexandria University and his PhD from London University (UK) in 1964. He is presently President of the Egyptian Society of Pharmacology and is a member of many scientific societies, including the German Pharmacological and Pharmaceutical Societies, the American Gastroenterology Association, the German Society of Neurogastroenterology, and served as Councillor to the International Union of Pharmacology (2002-2010). He obtained Fellowships from Alexander von Humboldt Foundation, (1978), and Fulbright Foundation (1987). He has nearly 100 scientific publications in national and international journals. His main interests lie in the field of inflammatory and gastrointestinal disorders, herbal medicine and the effects of radiation exposure. He is fluent in both spoken and written English, German, and French apart from his native tongue, Arabic.

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