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Antitumor properties of curcumin loaded polymeric electrospun mats

Spiro M Konstantinov¹, Antonios G X Trochopoulos¹, Maya M Zaharieva³, Theodora N Athanassova¹, Yana Ilieva¹, Gyuldzhan H Yakub², Milena G Ignatova², Iliya B Rashkov², Nevena E Manolova², D Momekova¹ and Hristo M Najdenski³

¹Medical University of Sofia, Faculty of Pharmacy

²Institute of Polymers, Bulgarian Academy of Sciences

³Institute of Microbiology, Bulgarian Academy of Sciences

Malignancies are the second cause for death in humans worldwide. Despite many newly introduced and approved targeted drugs the problem of multidrug resistance and serious side effects remains unsolved and opens the search for effective natural products with fewer side effects. Curcumin is a practically non-toxic compound of plant origin with own antineoplastic and NF- κ B inhibitory activities. Curcumin is one of the most popular drugs derived from Ayurveda traditions. We investigated the cytotoxic activity of curcumin loaded electrospun mats in human hepatic and colon carcinoma cell lines (HEP-G2 and HT-29). Disks with 5 mm diameter of the electrospun mats caused nearly 80% inhibition in HT-29 colorectal cells. The efficacy against the HEP-G2 hepatocellular carcinoma cells was weaker. The mats showed antibacterial features and were found to be biocompatible with human tissues of different origin. The tested polymeric mats increased the accumulation of curcumin inside of the malignant cells as estimated by fluorescent microscopy. One of the polymeric mats represents fully water soluble form of curcumin that may have distinct pharmacokinetic advantages. Taken together our experimental findings indicate that the non-toxic yellow pigment curcumin after inclusion into electrospun polymeric mats can be used for topical treatment of liver lesions (e.g. colorectal cancer metastases) and these results are promising in terms of further clinical application.

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