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Novel tumor-targeted zein-based nanocarriers for co-delivery of anti-cancer drugs in breast cancer therapy

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Zein is a hydrophobic plant protein characterized by a good biodegradability and insoluble characteristics making it a good candidate for the development of biopolymeric nanoparticles for drug delivery. In this study, three types of zein nanocarriers were developed for targeted delivery of poorly soluble anti-cancer drugs. First, zein nanospheres were successfully prepared via phase separation technique for co-delivery of exemestane and luteolin. Second, zein nanocapsules were successfully developed using spontaneous emulsification technique for co-delivery of exemestane and resveratrol. The developed drug-loaded zein nanospheres and nanocapsules demonstrated a suitable particle size (150-250 nm) and a negative zeta potential (above -30 mV) exhibiting a controlled drug release behavior. The surface of zein nanocarriers was successfully decorated with lactoferrin as a tumor-targeting ligand via electrostatic interaction. In the third part of this study, amphiphiliczein-lactoferrin co-polymeric micelles for co-delivery of rapamycin and wogonin were successfully developed. The chemical conjugation via carbodiimide-coupling technique was evidenced by NMR, IR and fluorescence spectroscopy while the core-shell structure of the micelles in aqueous solution was demonstrated by TEM. The drug-loaded self-assembled nanocarriers exhibited a nanometric size (100-250 nm) and a positive zeta potential (around +30 mV) in addition to high drug loading and a sustained release profile. The developed zein nanocarriers showed superior cytotoxicity and cellular uptake against MCF-7 breast cancer cells and powerful *in vivo* anti-tumor efficacy in breast cancer rat model compared to free drugs. Thereby, zein nanocarriers could evoke a new effective tumor-targeted delivery system to breast cancer by passive and active targeting.

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Simultaneous estimation of olmesartan Medoxomil and Indapamide in tablet dosage form by spectroscopic method

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Olmesartan medoxomil and Indapamide combination is used in cardiac disease condition like Hypertension. Sustain release tablet formulation comprising Olmesartan medoxomil and Indapamide. Patent for formulation is patented in china by Ministry of cardiovascular disease institute and patent for treatment for hypertension is patented in Japan. Olmesartan medoxomil was approved in USFDA on April, 2002 at New York and indapamide was approved in Lipha pharmaceutical institute on July 1998. Extensive literature survey related spectroscopy, high performance liquid chromatography, high performance thin layer chromatography, Reverse phase high performance liquid chromatography DAD method for estimation of Olmesartan medoxomil and Indapamide. Here thirteen analytical methods available for olmesartan medoxomil and twenty six analytical methods available for olmesartan medoxomil and its combination. And four analytical methods available for Indapamide, and nine analytical methods available for indapamide and its combination, seven analytical methods available for stability study for olmesartan, three analytical methods available for stability study for indapamide with other combination and no analytical method found for indapamide alone and for combination of olmesartan medoxomil and Indapamide, which indicates the need for analytical method development for Olmesartan medoxomil and Indapamide. Here attempt was made to develop and validate a sensitive, reproducible and specific spectroscopy method for Olmesartan medoxomil and Indapamide combination.

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