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The Potential of Polymers on Intestinal Permeabiligy and PH Sensitivity of Nanoparticles of a Camptothecin Derivative: An *Ex vivo* Study

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SN-38 (7-ethyl-10-hydroxycamptothecin) is a camptothecin derivative is currently being investigated for use in the treatment of metastatic colon cancer. It is potentially cytototoxic but it is insoluble in pharmaceutically acceptable solvents and has low bioavailability. Polymeric nanoparticles can be explored for delivery of SN-38 to colon area for effective treatment of colon cancer. The aim of the present study is to see the effect of biodegradable and non biodegradable polymers on intestinal permeability of drug across colon region and pH sensitivity of nanoparticles. In the present approach chitosan coated PLGA (Poly-lactic-co-glycolicacid) nanoparticles (PCNP) and chitosan coated ES-100 (Eudragit S-100) nanoparticles (ECNP) were prepared by emulsion-solvent evaporation method with modifications. FTIR and DSC depicted the structure, morphology and drug-polymer-excepients interaction. TEM images indicate the formation of polymer coated spherical nanoparticles. The *in vitro* release studies of SN-38 was conducted in simulated gastric fluid (pH 1.2), simulated intestinal fluid (pH 6.8) and simulated intestinal fluid with 4% rat cecal contents (pH ≥7.4) at 37°C. Permeability of ECNP's and PCNP's across female Wistar rat colon was observed by confocal laser scanning microscopy and fluorescent microscopy. SN-38 an anticancer drug was successfully entrapped inside PCNP's and ECNP's as depicted by TEM images with no incompatible reactions seen by DSC and FTIR. *In vitro* release studies under different simulated conditions showed faster release in colonic contents which demonstrated the pH sensitivity of nanoparticles. PCNP showed better permeability than ECNP proving it to be a better and effective candidate for colon cancer.

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