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New drug delivery polymer to treat cancer

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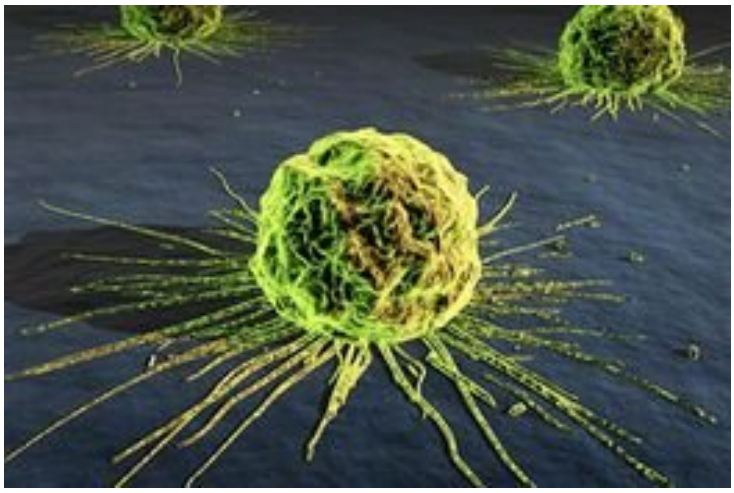

Singapore: Dr Lingxue Kong and research colleagues at Deakin University in Melbourne, Australia, have combined two polymers to provide a less painful oral method of administering cancer-fighting drugs. The newly developed system also enables controlled and sustained release of the drug, 5-fluorouracil, and reduced side-effects from the drugs. The researchers reported their results in the Journal of Applied Polymer Science.

The polymer delivery system must go through three different acidity levels of the stomach, duodenum and small intestine (pH 1.2, 4.5 and 6.8, respectively) before releasing at pH 7.4 in the colon and rectum.

Creation of the polymer delivery system starts with a water-in-oil-in-water multiple emulsion and solvent evaporation technique to first load the drug into polylactic-coglycolic acid (PLGA) nanoparticles. One technique to optimize the process is to adjust the pH value of the outer water phase to the isoelectric point of the drug. The loaded nanoparticles are then coated with an anionic polymer called Eudragit S100 that is based on methacrylic acid and methyl methacrylate. The researchers report that this polymer is insoluble in aqueous solutions of pH 7 or less, an important factor in reaching the colorectal area.

Drug delivery systems developed earlier failed due to premature release of the drug from the nanoparticles or failure of the microspheres. Professor Kong has a broad research interest in micro and nanofabrications and systems and has won a JIPA Award for the Best Invention in Biotechnology. He has also worked on development of chitosan nanoparticles as combination drug delivery systems of 5-fluorouracil and leucovorin.