

# Environment-responsive nanoparticles carrying chemotherapy and microRNA for suppressing cancer

使用環境應答型奈米粒攜帶化療藥物及微小 RNA 以抑制癌症

陳彥均 莊雅茵 張誌顯 駱雨利 (Yu-Li Lo) \*

國立陽明大學藥理學研究所藥劑組

\*Correspondence: 駱雨利教授 (Prof. Yu-Li Lo), 陽明藥理所藥劑組, yulilo@ym.edu.tw

Abstract:

Colorectal cancer (CRC) remains one of the major causes of morbidity and mortality all over the world. Among various treatment regimen, chemotherapy such as 5-fluorouracil (5-FU) and leucovorin provides one of the treatment regimen for CRC. In addition, miR-c has been proved to induce apoptosis and inhibit proliferation of cancer cells. Thus, the aim of this study is to develop environment-responsive nanoparticles for miR-c and chemotherapy delivery to provide a novel and potential way for colorectal cancer treatment. Our results indicated that these pH-sensitive and peptide-modified nanoparticles showed spherical shape with homogenous morphology. The cellular uptake of these nanoparticles into colon cells was enhanced at the pH value of 6.0. In addition, all formulations showed no cytotoxicity to non-cancerous cells and didn't cause hemolysis. Transfection efficiency of miR-c in nanoparticles on colon cells was greater than other commercial transfection reagents. Colon cells treated with these nanoparticles showed increases in apoptosis percentage, suggesting that the apoptosis of HCT116 cells were triggered. Our findings demonstrate for the first time that miR-c and chemotherapy in pH-sensitive and peptide-modified nanoparticles caused cell death in human colorectal cancer cells through MDR suppression and activation of the multiple pathways of apoptosis. Thus, this novel delivery system has the potential to enhance the activity of a broad range of cancer chemotherapeutics with the advantage of reducing adverse effects.