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Evaluation of protein nanocage encapsulated doxorubicin for colorectal cancer therapy

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Cancer therapy is popularly filed in recently years. Doxorubicin is mainly chemotherapy drug that has effective in cancer treatment, including breast cancer, lung cancer and colorectal cancer. Although the patients have been cured but these chemotherapy drug can cause severe side effect, such as cardiac toxicity and myelosuppression. Nanoparticles are available to eliminate side effect because it has the enhanced permeability and retention effect that could accumulate nanoparticles in the tumor site. Nanoparticles are composed of liposome, carbon nanotube, gold nanoshell and protein nanocage. Protein nanocage is a promising nanocarrier since it has biological compatibility and biodegradability. In this study, we utilized apoferritin nanocage to encapsulate hydrophilic drug doxorubicin to treat colorectal cancer. We demonstrated that apoferritin were pH sensitive protein that could disassemble in lower pH and reassemble in neutral pH conditions. The hydrophilic drug doxorubicin had high encapsulated efficiency approximately 48%. The apoferritin could also encapsulate similar physical properties chemical agent and released out of nanocage in lower pH conditions. In cytotoxicity, we used colorectal cancer cell. The cancer cell had successful killed in 24 hours in a dose-dependent manner and more severe cytotoxicity in 48 hours. In the future, it is a promise drug delivery platform to load chemotherapy drug.

Biography:

Chun-Yen Lin is studying in Institute of Biomedical Engineering National Taiwan University. The advisor is Dr. Shieh. In our lab, we investigate the application of nanoparticles for cancer treatment, such as micelle, carbon nanotube, gold nanoparticles and protein nanocage. By using these nanoparticles, we can encapsulate hydrophilic drug or hydrophobic drug and modify the surface of carrier. When loading photosensitivity drug, we also apply additional light to nanoparticles for phototherapy. He mainly use protein nanoparticles, especially ferritin nanocage, to encapsulate chemotherapy drug. He is interested in the ferritin chemical and physical properties. I hope my research can provide a new protein nanocarrier platform.