

## Self-assembled dynamics and encapsulation optimization of Camptothecin using amphiphilic Carboxymethyl-hexanoyl chitosan

**Meng-Hsuan Hsiao and Dean-Mo Liu**  
National Chiao Tung University, Taiwan

Self assembly has been considered as a dynamic process where molecules possessed both hydrophobic and hydrophilic segments (amphiphilicity) undergo natural aggregation as a result of intra-/inter-molecular hydrophobic-hydrophilic balance in aqueous media. In the field of nanomedicine and nanopharmaceutics, the use of self-assembly mechanism over a given amphiphilic molecule to encapsulating therapeutic or active substances has been extensively reported. However, there are limited investigations addressed the dynamic property of self-assembly for those amphiphilic molecules or polymers, and its effect on encapsulation optimization (i.e., max. efficiency). Therefore, in this study, a modified amphiphilic chitosan (carboxymethyl-hexanoyl chitosan, termed as CHC), developed from this lab, was employed to investigate its self-assembly dynamics on drug encapsulation, where Camptothecin (CPT), a hydrophobic anticancer drug, was used as model molecule. The encapsulation behavior of CHC at different time intervals was monitored in terms of drug load efficiency and corresponding colloidal properties of the developing CHC nanoparticles. The dynamic behavior of the CHC assembly can be optimized in terms of encapsulation efficiency, which renders synthetic parameters to be optimally determined. This work permits potential design criteria to be exercised from the understanding of assembly dynamics to practical nanotherapeutic strategy.

qqw1220@gmail.com