**Synthesis and characterisation of ciprofloxacin conjugated gold nanoparticles for treatment of *Pseudomonas aeruginosa* biofilm**

Wei Qing Hong1, Wing-Hin Lee1,2 andChing-Yee Loo1.

1Faculty of Pharmacy and Health Sciences, Royal College of Medicine Perak, Universiti Kuala Lumpur (RCMP UniKL), 30450 Ipoh, Perak, Malaysia. 2Centre for Product Development and Toxicity Testing, Royal College of Medicine Perak, Universiti Kuala Lumpur (UniKL RCMP), 30450, Ipoh, Perak, Malaysia.

**Background and aims.** Respiratory infections such as pneumonia are the number one cause of transmissible death worldwide, and most often, it is complicated by the presence of bacterial biofilm [1]. *Pseudomonas aeruginosa*, an opportunistic pathogen, is most commonly isolated in patients with respiratory infections and could develop life-threatening drug-resistant biofilm. This study aims to investigate the potential of gold nanoparticles (AuNPs) to induce the dispersal biofilm into planktonic and restore the susceptibility of *P. aeruginosa* to ciprofloxacin.

**Methods.** Stable, negatively charged AuNPs (–42 mV) with an average size of 17 nm were synthesised through chemical reduction method using trisodium citrate as the reducing agent. Ciprofloxacin-conjugated AuNPs (Cipro-AuNPs) were obtained using physical conjugation method. The AuNPs were then physically conjugated with ciprofloxacin (Cipro-AuNPs). The ability of Cipro-AuNPs to eradicate existing pre-formed P. aeruginosa biofilm was compared against AuNPs and ciprofloxacin.

**Results.** Physical conjugation of ciprofloxacin (Cipro) onto AuNPs has shifted the zeta potential towards a positive value at 29.19 mV, owing to the interactions between the –COOH groups of Cipro and AuNPs. Anti-biofilm studies showed that Cipro-AuNPs were able to disperse and eradicate the biofilm of P*. aeruginosa* whereby AuNPs function as the dispersal agent but did not exhibit any killing effect. Although ciprofloxacin could eradicate and kill bacterial cells, its activity was not as strong as Cipro-AuNPs. **Conclusion/Discussion.** The results showed that AuNPs dispersed the *P. aeruginosa* biofilm into antibiotic-susceptible planktonic cells that could be readily killed by ciprofloxacin for Cipro-AuNPs-treated groups.