**Abstract Title**

Thermoresponsive copolymer: (HPMA-CO-(APMA-R))-co-PEG polymer synthesis and physiochemical characterization

**Abstract (main text)**

**INTRODUCTION**

A limitation associated with cancer treatment arises from the problems in directing highly cytotoxic agents to the diseased tissues, low solubility in aqueous media and poor bioavailability. Many drug delivery systems have been devised to address this problem, including thermoresponsive polymers. Thermoresponsive polymers are a class of smart polymers that respond to change in temperature. This property makes this type of polymers are useful materials in a wide range of applications specially, in the field of drug delivery. In this study, a novel HPMA-CO- AMPA-R thermoresponsive copolymer has been prepared, which has the potential to act both drug delivery system and enhance the solubility of some poor water-soluble drugs.

**METHODS**

Hydrophobic groups were grafted onto the primary amine group of APMA monomers using palmitoyl, dansyl, cholesteryl and oxadiazole to incorporate into the HPMA copolymer at varied molar ratio. Block copolymer was preparing from these derivatives via copolymerize it’s with PEG to improve the thermo-responsibility behaviour of the polymer. The polymers were characterized by analytical methods, including FTIR, NMR and zeta sizer. Propofol, griseofulvin and prednisolone were loaded into these derivatives.Solubilising capacity and in vitro drug release were analysed by HPLC.

**RESULTS**

The result illustrate that all the HPMA derivatives were able to improve the solubility of these hydrophobic drugs. The PEG part addition shows a significant effect on the *in vitro* release behaviour in different temperatures.

**CONCLUSION**

These preliminary findings indicate that this polymer may have potential as a stimuli responsive polymer in heat initiated drug delivery. A second generation polymer is now being developed with metallic hybrid iron oxide-gold nanoparticles incorporated into the intrinsic structure to act as a seed for heat initiated drug release as well as conferring imaging capability.