Mohammed Aldebasi, J Diabetes Metab 2016, 7:11 (Suppl)
http://dx.doi.org/10.4172/2155-6156.C1.060



## Novel drug delivery technologies in pancreatic cancer

**Mohammed Aldebasi**
Imam Muhammad bin Saud Islamic University, Saudi Arabia

**Background:** Pancreatic cancer is the fourth leading cause of cancer deaths in UK 2014[1]. Pancreatic cancer cells can become resistant to cytotoxic drugs like Gemcitabine in various ways. Iron oxide-gold hybrid nanoparticles (HNP's) are core-shell nanoparticle structures which comprised of an iron oxide core and a gold coating. The gold coating confers HNP's with their surface plasmon resonance properties, that converts absorbed near infrared radiation into heat. The iron oxide cores provide magnetic properties to the HNP's structure allowing them to be externally guided and visualized using MRI. A thermally-labile linker (Thiol) has been developed to attach drug molecules to HNP surface using Diels Alder chemistry which facilitate the release of drug.

**Methods:** Magnetic Iron Oxide Nano particles (Fe3O4) cores were synthesized by simple precipitation followed by polyethylene glycol (PEG) electrostatic attached. Gold seeds (2 nm) were also attached with subsequent reduction of Chloroauric acid (HAuCl4) onto the particles forming a shell. The surface charge and size of the HNPs were analyzed by zeta potential measurement and photon correlation spectroscopy (PCS). Drug loading was achieved by stirring the drug and linker in aqueous solution with the HNPs, drug loading was quantified by high performance liquid chromatography (HPLC). Drug release studies were carried out at varied pH (7 and 7.4) and temperatures (20, 37 and 44). Formulations were pipetted into dialysis membrane and submerged into cell culture media. Adjustment of the pH was by Sodium hydroxide (NaOH), Drug release was measured using HPLC at varied time intervals.

**Results:** At 37oC, the releasing of the drug in non-PEG samples was ≈20% higher than the PEG samples after 5 minutes of heating. The maximum drug release was achieved at 44oC. At 20oC there is a slight releasing of the drug. We found out that if heat increases, the release increases too. Although, PEG has a better release but it is not significant.

**Conclusion:** The formulation is reacting in a thermoresponsive way in which the releasing of the drug increases as the temperature rises. Further work is on-going in order to achieve the balance between temperature, pH and drug releasing in vitro.

addebasi@gmail.com

**Notes:**