containing insulin in rats and dogs showed reduction in blood glucose levels (Moupti et al., 1980; Patel et al., 1982).

Peppas et al. investigated oral insulin delivery using hydrogels of poly (methacrylic acid-g-ethylene-glycol). A hypoglycemic effect combined with insulin absorption was observed in rats using a closed loop absorption method. 25IU/kg of human recombinant insulin was incorporated into the polymer and infused in an isolated illeal segment; the bioavailability of insulin was shown to increase to 6.2% compared to the control (Nakamura et al, 2004).

A wide range of biodegradable and conventional polymers has been investigated as possible oral insulin delivery systems (Guo & Gao, 2007; Nakamura et al., 2008; Badwan et al., 2009). These systems should protect the insulin as it passes through the stomach, and were design to release their insulin and successfully transport it across the gastrointestinal lining. Most systems developed to this point either protect the insulin while in transit or aided in the transport of insulin across the cell layer of the upper part of small intestine, none have accomplished both.

It was demonstrated that lectin modified solid lipid nanoparticles containing insulin orally administrated to rats resulted in relative bioavailabilities of between 4.99% and 7.11% (Zhang et al., 2006). Another group successfully maintained plasma glucose level at pre-diabetic levels for 11 hours after oral administration of chitosan and insulin nanoparticles to diabetic rats (Ma et al., 2005). In addition, microparticles composed of poly(methacrylic acid) and poly(ethylene glycol)(PEG) and containing insulin that were orally administrated to type 1 diabetic rats resulted in suppressed post-prandial blood glucose levels (Morishita et al., 2006). The production and characterization of PEG-coated silica nanoparticles (SiNP-PEG) containing insulin for