## OL 2 - Chitosan for Mucosal Delivery in Veterinary Medicine

***S. Senel***[(1)], S. McClure[(2)]

*[(1)]Hacettepe University, Faculty of Pharmacy, Department of Pharmaceutical Technology, 06100-Ankara, Turkey - [(2)]CSIRO Livestock Industries, Armidale NSW, Australia*

Chitosan, which is a biodegradable, bioadhesive and biocompatible biopolymer is currently being used for therapy in veterinary medicine due to its various biological properties. It is capable of activating host defenses to prevent infection and accelerate the wound healing as well as repairing the tissues. Recent studies have indicated that the mucosal surfaces exert advantages over conventional routes in delivery of macromolecular drugs as well as the vaccines, and chitosan-based systems have been proposed very promising for delivery of these compounds across the mucosal routes. Given the restrictions imposed by financial and animal restraint considerations, the veterinary drug delivery areas most likely to benefit from chitosan are the delivery of drugs such as antibiotics, antiparasitics, anaesthetics, painkillers and growth promotants to mucosal epithelium for local or systemic activity, and the delivery of immunomodulatory agents to the mucosal associated lymphoid tissue for induction or modulation of local and systemic immune responses. A major challenge to mucosal immunization is that most antigens are poorly immunogenic. Therefore the choice of an appropriate delivery system becomes important to provide an enhanced immune response besides incorporation with an adjuvant. Particulate mucosal delivery systems have been shown to enhance the immune response. Chitosan has been shown to have immune stimulating activity when administered in particle, powder or solution form. Furthermore, micro- and nanoparticles can easily be prepared which encapsulates larger amounts of antigens without using any solvent.

We have formulated a model antigen, ovalbumin in chitosan gel or sponge, and delivered to accessible mucosal surfaces in sheep to investigate a significant local immunity. Good IgG1 and IgE responses in local mucosae and draining lymph nodes were obtained with both gel and sponge by both nasal and rectal routes. The formulation appeared to affect the induction of IgG2 antibody, with only the gel by nasal or rectal routes giving IgG2 titres. Gel and sponge by intrarectal delivery also gave significant antibody titres in blood plasma and antigen-specific lymphocyte proliferation in mesenteric lymph node. Studies are still continuing on new derivatives of chitosan, which would not only exert new biological activities but also provide a better form for application to the site of effect.