MUCOSAL VACCINE ADJUVANTS USING ANTIGEN-TARGETING STRATEGY TO M CELLS IN MUCOSAL IMMUNE COMPARTMENTS

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Abstract- Mucosa-associated lymphoid tissue (MALT) is defined as solitary organized mucosa-associated lymphoid follicles and is subdivided by anatomical region. MALT is characterized as lacking afferent lymphatics, therefore only taking up exogenous antigens through its follicle-associated epithelium, which contains enterocytes, goblet cells, and microfold (M) cells. Among the mucosa-associated lymphoid tissues, the gastrointestinal mucosa maintains a tolerogenic microenvironment to protect the body from unwanted induction of the immune response to continuously exposed commensal microorganisms and food antigens. Considering that 90% of infections occur in mucosal areas, it is conceivable that using mucosal vaccination to establish protective immunity in this frontline of pathogen infection could offer great advantages in current vaccination strategy. However, the number of currently available oral vaccines is very limited compared to the number of parenteral vaccines. This limited availability of oral mucosal vaccines is closely related with the lack of an effective antigen delivery system and a strong adjuvant to stimulate immunity due to the intrinsic nature of the mucosal immune system, which has a low efficiency in antigen delivery into the inductive site and a tendency to induce oral tolerance. We have concentrated our efforts to elaborate efficient antigen delivery system to M cells to establish the strategy for effective oral mucosal vaccine development. Initially, peptide ligands capable of targeting conjugated model antigen into M cells were selected from phage display library panning against in vitro human M-like culture model. We also identified the antigen-targeting ability and mucosal immune-modulating activity of human cathelicidin anti-microbial peptide LL-37. (This study was supported by the research fund from Korea Research Institute of Chemical Technology, CEVI-2016-3-1.)

Index Terms- Adjuvant, Cathelicidin, Mucosal immunity, Vaccine