

Plant-based vaccines to protect piglets from enteric diseases

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Recently, edible plants have been used successfully as production and delivery systems for various antigens. The plant-expressed antigen induces to generate protective antibodies in orally immunized animals. We had expressed a Pilin and FasG of enterotoxigenic *E. coli* K88ac and 987P, and also FljB of *Salmonella choleraesuis* in carrot, and their efficiency as vaccines had been evaluated by applying them to mouse and piglet. The results suggest a possibility of the transgenic carrot as vaccine against enteric diseases. Furthermore, in an attempt to develop the more efficient method of oral immunization applicable in industry, we had tested the passive immunization protecting new born mammals against pathogens prior to development of their immune system. The results indicated that an active immunization of the female parent through oral delivery of vaccine plant could induce a passive immunization of the offsprings. It appears that the antibodies produced in mother are successfully transferred to the newly-born offsprings through lactation. Since cholera toxin shows distinct carrier and adjuvant properties, the gene sequence was fused to the antigen gene after re-designing to optimize its expression in *Daucus carota* L. The gene synthesized via a series of polymerase chain reactions using a pool of overlapping oligonucleotides. The antigens (pilin, fasG, fljB) fused to CTB subunit are being constructed to stimulate strong immune response in orally immunized animals. Subsequently, the multiple antigen vaccine (CTB+pilin+fasG+fljB) will be assembled in pB7m34GW using Multi-site LR clonaseTM reaction.

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