

## Development of edible vaccine against anthrax by using edema factor gene of *Bacillus anthracis*

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Anthrax is an epizootic disease mainly affecting cattle, caused by the spore-forming bacterium *Bacillus anthracis*. It produces three toxin components, protective antigen (PA), lethal factor (LF) and edema factor (EF). Lethal toxin (LF+PA) and edema toxin (EF+PA) are known to cause lethality in anthrax infected animal models. The recent bioterrorism attack and the revival of the disease enforce an urgent need for effective prophylactic measures and therapeutic formulations to combat the disease. The currently used PA based anthrax vaccine is associated with several side effects due to its potential reactogenicity and also requires protracted and complicated dosages schedule. Since the expression of hepatitis B surface antigen in model plant tobacco, a number of antigenic proteins have been expressed in different plant systems. These plant based vaccines are especially attractive as plants are free of human or animal diseases, reducing screening and purification costs. Also, they offer a palatable oral delivery system that stimulates both systemic and mucosal immune response. Attempts are being made to develop improved anthrax vaccines using antigens other than PA. Several immunization studies have proved that LF and EF alone, produce substantial amount of antibodies and in combination with PA, strengthen PA mediated immunoprotection. Studies have also highlighted the need of using mutants of anthrax toxin components in vaccine preparations. We have successfully cloned normal and mutated EF gene in a plant expression vector and Indian mustard plant *Brassica juncea* was transformed via *Agrobacterium* mediated transformation. Molecular and immunological studies have shown the stable integration and expression of EF gene in the plants.

### Biography

Perna Chaudhary is a Ph.D. student at School of Life Sciences, Jawaharlal Nehru University, New Delhi. Currently, she is working on edible vaccine against anthrax and recently communicated a paper on PA based edible vaccine.

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