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## Development of DNA vaccine against anthrax, botulism and smallpox with dual vector system

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Bioterrorism is a major topic in the 21st century, *Bacillus anthracis*, the bacterial pathogen responsible for anthrax, variola virus, the pathogenetic agent of smallpox and *Clostridium botulinum*, the pathogen trigger to botulinum that could be a potential biological weapon. The needs for the development of safe and effective vaccine are emerging against a biological weapon that can be used for bioterrorism. In this study, we would prove the efficacy of advanced DNA vaccine encoding D4, L1R, and HCR with dual vector system. The D4 contains the epitopes necessary for generating protective immunity to *Bacillus anthracis*. The L1R protein is required for vaccinia virus entry into host cells and is a target for neutralizing antibody. The HCR is the heavy chain receptor binding domain of botulinum neurotoxin. We used intramuscular electroporation to improve the cell uptake of dual DNA vector in Balb/c mice, and it showed that two dual DNA vectors (anthrax/botulinum, botulinum/smallpox) induced high immune responses and high antibody titers against each target in mice. But anthrax/smallpox dual DNA vector was shown a low immune response, so we introduced intradermal electroporation using Tweezertrodes, more improved electroporation method. Intradermal electroporation method showed remarkably increased immune responses compare to intramuscular electroporation method. To develop anthrax/smallpox dual targeted DNA vaccine, we compared the dual vector system and mixed single vector system against anthrax/smallpox. The dual DNA vector system revealed relatively low immune response compared to mixed single vector system. We suggest that the dual vector systems can be candidates for the dual-targeted DNA vaccine against anthrax, botulism, and smallpox and in case of anthrax/smallpox, mixed single vector system using intradermal electroporation method is an effective way to develop DNA vaccine.

### Biography

Minhoon Lee is 25 years old and currently M.D. candidate in Seoul National University. He is in laboratory of Molecular Pathology at school of Pharmacy and advised by Professor Youngkee Shin. He is researching into nucleotide vaccines.

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