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Regulated Delayed Attenuation and Expression of Protective Antigen Synthesis to Enhance Vaccine Immunogenicity

AzTE Case # M07-011

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Intellectual Property Status:

Patent Pending

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Invention Description

High-level expression of genes encoding protective antigens produced by recombinant attenuated *Salmonella* vaccine strains is desirable to maximize antibody responses to the protective antigen(s). However, high-level expression of protective antigens that are of no benefit to the recombinant attenuated *Salmonella* vaccine strain causes the strain to grow more slowly and be less robust in withstanding stresses encountered after oral delivery to an immunized individual. This can be overcome by administering higher doses but that is costly and results in vaccinating fewer individuals. Similarly, display of attenuation can often lessen the ability of vaccine strains to withstand host imposed stresses and natural defenses to also lessen immune effectiveness.

Investigators at the Biodesign Institute of Arizona State University have developed technologies to preclude synthesis of protective antigens by recombinant attenuated *Salmonella* vaccine until they arrive to the lymphoid tissues. Thus, the attenuated *Salmonella* vaccine exhibits a regulated delayed expression in synthesis of protective antigens. They have also designed strains with regulated delayed attenuation that is only manifest in vivo after successful colonization of lymphoid tissues. Both strategies yield more immunogenic vaccines effective at lower doses.

Potential Applications

- **The technology can be used for the development of numerous types of vaccines to protect agriculturally important animals and humans against a diversity of pathogens causing infectious diseases in those individuals.**

- **There is also a potential for developing vaccines to immunize companion animals and wildlife populations to eliminate the spread of zoonotic pathogens that have the potential for transmission to agriculturally important animals and/or to humans.**

Benefits and Advantages

- **Economical to manufacture, distribute and administer**
- **More effective vaccines at lower doses**