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Modified virus provides defense against bacteria

A new virus-based vaccine could offer protection for patients at risk for infection by the insidious bacterium *Pseudomonas aeruginosa*.

The scourge of many hospitals, *P. aeruginosa* is a hardy and potentially antibiotic-resistant pathogen that is associated with opportunistic infections in patients who are immunocompromised or suffer from cystic fibrosis. No vaccine is currently available, although research indicates that antigens from this bacterium are capable of triggering a protective humoral response.

A new study by researchers at GenVec, Inc. (Bethesda, MD) and the Weill Medical College of Cornell University (New York, NY) explores a promising avenue for vaccine design, a modified adenovirus that expresses peptide epitopes derived from the *P. aeruginosa* membrane protein OprF (*J. Clin. Invest.*, online 1 April, doi:10.1172/JCI200523135). The natural immunogenicity of the viral surface proteins boosts the host response; an initial vaccination with adenovirus expressing one OprF-derived epitope, Epi8, generated a strong antibacterial titer and allowed between 60 and 80% of vaccinated mice to survive beyond 2 weeks after infection with lethal doses of various *P. aeruginosa* strains, whereas all mock-vaccinated mice died within 2 days.

Additional boosts seem to enhance the protection conferred by the vaccine, and the authors indicate that this strategy could provide a valuable defense against this and other pathogens.

New weapon against cat dander—nothing to sneeze at

By fusing a portion of a human antibody with the allergy-causing protein from cats, researchers were able to block allergic symptoms in mice, offering the hope of relief for millions of people with cat allergies.

In cat-allergic people, exposure to the Fel d1 protein present in cat saliva and dander initiates an immune response that results in the release of histamine, which causes sneezing, itchy and watery eyes, and in some cases asthma. Now, a research team led by Andrew Saxon of the UCLA School of Medicine (Los Angeles, CA) report that they used the human-cat fusion protein, which they call GFD, to successfully block this allergic reaction in mice that had been bred to be allergic to cats, as well as in human cells *in vitro* (*Nat. Med.*, April). The cat allergen end of the molecule binds to the anti-Fel d1 IgE antibodies that would normally trigger an immune response, but the presence of the IgG prevents immune cells from releasing histamine.

This technique holds promise not only for cat-allergic people but also for those with other serious allergies. In theory, replacing Fel d1 with other allergy-causing proteins could prevent allergic reactions to nuts and other foreign proteins.

The new model army

On 1 March, the National Human Genome Research Institute (NHGRI) announced the launch of several major new sequencing initiatives, including the assembly of complete genomic sequences for a dozen new organisms.

Two of these new research programs are focused on mammalian models: the sequencing of the marmoset (*Callithrix jacchus*) genome, and the characterization of genetic variations in eight commonly used strains of laboratory rat. The marmoset is in common use in neurobiological research. Its genome, when sequenced, will represent the most distantly related nonhuman primate sequence yet completed.

The remaining projects involve the sequencing of 11 nonmammalian genomes, representing a broad range of organisms with potential relevance to biomedical and disease research. Among the new species being sequenced are the small skate (*Raja erinacea*), one of the first species to emerge with an adaptive immune system and a closed, pressurized circulatory system, and the sea slug (*Aplysia californica*), a valuable research model for learning and memory.

The resulting data should prove a considerable boon to the research community by providing detailed genomic information for species that represent key points in the evolutionary tree, shedding new light on the ancestry and evolution of important structural and functional elements of the human genome.