Attenuated Viruses Useful for Vaccines

A newly developed technique that generates attenuated live viruses with hundreds or thousands of small defects can prevent the frequency of reversion to wild-type virulence. This breakthrough provides promise for the fast and efficient manufacture of a new generation of safer live, attenuated virus vaccines.

Background:
An attenuated live vaccine comprises a virus that has been subjected to mutations that render it less virulent and usable for immunization. Live, attenuated viruses are often easy, fast and cheap to manufacture, as well as easy to administer; all advantages that are particularly important in an emergency when a vaccine is rapidly needed.
This invention describes a method to attenuate virus containing nucleotide substitutions engineered in multiple locations in the genome thus increasing density of deoptimized codon pairs. Because of the large number of defects involved, the attenuated virus provides a means of producing stably attenuated live vaccines against a wide variety of viral diseases.

Technology Description:
A research team led by Eckard Wimmer, Ph.D., distinguished professor in the Department of Molecular Genetics and Microbiology at Stony Brook University, has developed Synthetic Attenuated Virus Engineering (SAVE), a systematic approach for generating attenuated live viruses with hundreds or thousands of small defects that prevent reversion. This method is broadly applicable to a wide range of viruses and provides an effective approach for producing a wide variety of anti-viral vaccines.

Advantages
Fast, efficient and safe method of manufacturing a life vaccine
The virus to be attenuated can be any viral pathogen
Attenuated viral pathogens will be significantly weakened by their defects and will not revert back their virulence

Applications
For anti-viral vaccine design

Patents / Publications:
• Patent Pending
• Virus Attenuation by Genome-Scale Changes in Codon Pair Bias. Coleman et al. Science 27
  June 2008: Vol. 320. no. 5884, pp. 1784 - 1787

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Codon optimization by recombinant methods (to bring a gene’s synonymous codon use into correspondence with the host cell’s codon bias) is widely used to improve cross-species expression. Deoptimized synonymous codons introduced into a viral genome may adversely affect protein translation and thereby provide a method for producing attenuated viruses for use in making vaccines against viral diseases.