

SYNTHETIC GENES FOR SUCCESSFUL VACCINE & VECTOR DEVELOPMENT

Fields of Application

- Viral, bacterial, parasite and cancer vaccines
- Transgenes and vectors for gene therapy purposes
- Optimized transgene or immunogen expression following DNA or RNA application
- Improvement and efficacy, safety & immunogenicity of DNA & RNA vaccines
- Powerful combination of high-level transgene expression and cytokine genes

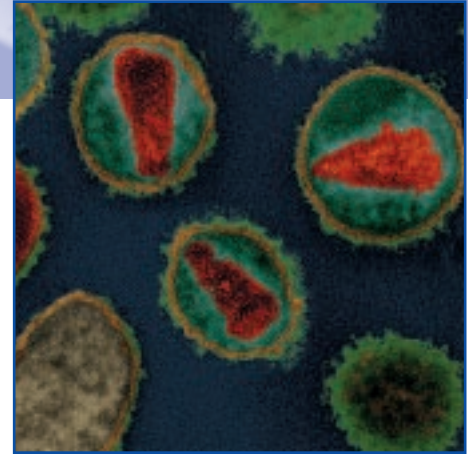
The Problem

Innovative medical approaches such as DNA vaccination or gene therapy rely on both the careful design of transgenes and the choice of the appropriate vector. Plasmid, viral and bacterial vectors must promote an efficient gene transfer and at the same time ensure subsequent high-level expression of the transgene in vitro or in vivo. However, the expression level is not exclusively regulated by vector properties but is also tremendously influenced by the composition and qualities of the transgene. In addition, generating a favorable micro climate, e.g. by

providing selected cytokines and chemokines or by incorporating immune modulating or stabilizing sequence motives into the plasmid backbone usually has a substantial impact on the success of a vaccination or gene therapy approach. Since regulatory authorities demand high safety standards as well as proven efficiency prior to clinical testing, de novo gene synthesis is your unique opportunity to optimize safety profiles and the efficacy of your candidate setting with respect to the vector, the transgene and supporting additives.

The Technical Solution/Our Service

- Increased genetic stability of vector constructs
- RNA and codon optimization
- Facilitated nuclear mRNA export and increased translational efficiency
- Domain shuffling or scrambling of epitope fragments for safe and efficient expression of selected immunogens



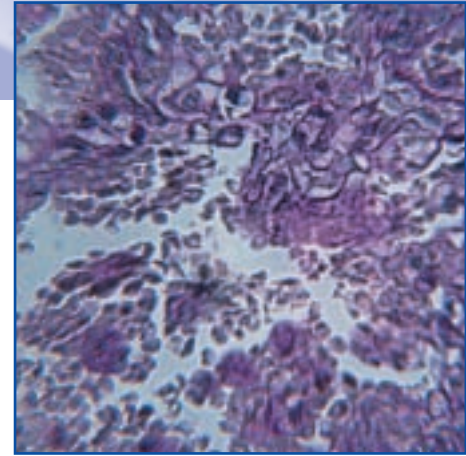
- Precise immune modulation through introduction of immune stimulating sequences in DNA vaccine constructs
- Immune silencing through introduction of immune silencing sequences in gene therapy vectors
- Significantly reduced homology to wild type sequences counteracting the risk of homologous recombination events
- Enhanced efficacy by combining transgenes with a variety of on stock cytokine/chemokine DNA expression constructs (e.g. GM-CSF, IL-15, MIP1a, etc.), available as wild type c-DNA or expression optimized synthetic variants.

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Your Success

GENEART technology and know-how helps you to advance the development of highly effective vaccine constructs and new approaches in terms of immunogenicity and fulfilling maximum safety standards. Gene synthesis helps you to meet the requirements for very precise applications by considering in addition to gene transfer and expression supplementary *in vivo* relevant features like immune responses, RNA- and protein stability, risk of recombination and more.

References

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