NANOSTRUCTURES FOR GENE DELIVERY

Tech ID: 34091 / UC Case 2025-157-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

Nucleic acid therapies hold vast therapeutic potential. FDA approved therapies include mRNA vaccines against SARS-COV2 and CRISPR/CAS9 treatment to treat sickle cell. Both therapies use non-viral methods to deliver designer nucleic acid therapies to cells. However, a limitation of these approaches is the lack of organ and cell-specific delivery.

Controlling gene delivery and expression in various cell subsets is challenging. UC Berkeley researchers have shown that the nanoscale topology of CpG oligodeoxynucleotide (CpG-ODN) motifs can be used to stimulate various immune cell subsets and alter gene expression from exogenously delivered mRNA in distinct immune cell subsets. CpG-ODNs of different classes are known to induce different inflammatory profiles in immune cells based on the structure and nanoscale topology of the short DNA strand. The researchers have found novel nanostructures which can be used to present or deliver CpGs to various cell subsets and regulate gene expression in these subsets.

SUGGESTED USES

» Gene therapy: Delivering DNA, RNA, and other nucleic acids to target cells and modulating expression

» Vaccines: Directing vaccine antigens to specific types of immune cells

» Drug Delivery: Allowing for more targeted delivery of small-molecule or protein therapies

» Research & Development: Enabling testing of delivery of different types of molecules to specific immune cells

ADVANTAGES

» Versatility: CpG-ODNs can be used to deliver a wide variety of gene therapies

» Control: CpG-ODNs target specific immune cell types and allow for precise control of gene expression of the delivered therapy

» Diverse Application: CpG-ODNs may be used in a wide range of fields including gene therapy, drug delivery, and vaccine development.

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

▶ Cell Expansion Platform

▶ Cell Culture System With Altered Cellular Microgravity And Shear Stress

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

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» Genomics

» Health

» **Medical**

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» Research Tools

» **Veterinary**

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