Cationic Silyl-Lipids for Enhanced Delivery of Anti-viral Therapeutics

Tech ID: 34363 / UC Case 2022-551-0

ABSTRACT

Researchers at the University of California, Davis have developed an advancement in the field of healthcare technology, specifically in the development and application of silyl lipids for RNA vaccines.

FULL DESCRIPTION

This technology pertains to the innovative use of silyl lipids, which substitutes one or more carbon-to-carbon double bonds in the lipophilic portion with a silicon-containing group. These silyl lipids are then incorporated into lipid nanoparticles (LNPs) which can be formulated as carriers of pharmaceutical agents. This technology presents a significant contribution to the field of nucleic acid therapy, such as the preparation and administration of RNA vaccines for protection against viruses, such as COVID-19.

APPLICATIONS

- Drug delivery, particularly for RNA-based therapeutics.
- Formulation of sensitive RNA-based therapeutics, including mRNA Sar-COV-2 vaccine.
- Design of new chemical space for biomedical research and nanomaterials applications.

FEATURES/BENEFITS

- Improved liposome formation and silyl-LNP formulation.
- Improved stability and reduced chance of oxidation or cis-trans isomerization.
- Ability to control LNP size, zeta potential, encapsulation efficiency and transfection efficiency.
- Innovative design for better drug delivery efficiency.
- Increased conformational flexibility of novel silyl-containing lipids.
- No inherent toxicity of silicon-containing compounds.
- Addresses issues with incumbent lipid vectors such as instability and susceptibility to oxidation due to unsaturation.
- Creation of novel cationic lipid vectors using catalytic hydrosilylation methods for improved efficacy.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12,396,949	08/26/2025	2022-551
United States Of America	Issued Patent	12,064,512	08/20/2024	2022-551
United States Of America	Published Application	20230301912	09/28/2023	2022-551
Patent Cooperation Treaty	Published Application	WO 2023/183082	09/28/2023	2022-551

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OTHER INFORMATION

KEYWORDS

antiviral therapeutics, cationic lipids, covid-19, drug delivery, lipid nanoparticles, mRNA vaccine, nucleic acid therapy, RNA therapeutics, silyl lipids, vaccine formulation

CATEGORIZED AS

- **Biotechnology**
  - Health
- **Materials & Chemicals**
  - Chemicals
- **Medical**

- Delivery Systems
- Therapeutics
- Vaccines

RELATED CASES

2022-551-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Silyl-lipid Cannabinoids with Enhanced Biological Activity
- Silyl-lipid N-acyl L-homoserine Lactones (AHLs) as Quorum Sensing Molecules (for Biofilms)

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