

# Cationic Silyl-Lipids for Enhanced Delivery of Antiviral 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	Туре	Number	Dated	Case
United States Of America	Issued Patent	12,064,512	08/20/2024	2022-551
United States Of America	Published Application	20240108011	12/12/2024	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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# **INVENTORS**

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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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