Generation of Novel Biotherapeutic (UCD3R) to Repair, Restore and Regenerate Epithelial and Neuronal Systems

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ABSTRACT

Researchers at the University of California, Davis have developed a novel hybrid microbial-derived oxylipin and endocannabinoid-like molecule designed to enhance gut and brain health by improving barrier integrity, reducing inflammation, and providing neuroprotection.

FULL DESCRIPTION

This technology centers on 10-hydroxystearoylethanolamide (UCD3R), a synthesized compound combining the microbial oxylipin 10-hydroxystearic acid (10-HSA) with an ethanolamine moiety, inspired by the endocannabinoid-like oleoylethanolamide (OEA). This structural modification enhances lipophilicity, absorption, systemic bioavailability, and blood-brain barrier permeability while preserving and amplifying PPARα-mediated beneficial effects. UCD3R promotes gut epithelial repair, strengthens tight junction protein expression, induces epigenetic modifications linked to mitochondrial function, and offers neuroprotective effects outperforming its precursor 10-HSA in inflamed neuronal models. By bridging microbial bioactive lipid signaling with endocannabinoid pathways, UCD3R targets gut-brain axis restoration for a range of disorders related to inflammation, metabolic dysfunction, cognitive decline, and neurodegeneration.

APPLICATIONS

- Treatment of inflammatory bowel diseases and gut barrier dysfunction.
- Therapies for neurodegenerative diseases and cognitive decline involving neuroinflammation.
- Metabolic disorder management including obesity and insulin resistance.
- Adjunctive therapies for mood disorders, addiction, and behavioral health conditions via gut-brain axis modulation.
- Development of nutritional supplements and pharmaceuticals leveraging bioactive dietary fatty acids.
- Supportive treatments for viral gut inflammation and associated immune dysfunction.

FEATURES/BENEFITS

- Enhances intestinal absorption and systemic bioavailability compared to traditional microbial oxylipins like 10-HSA.
- Crosses the blood-brain barrier to provide direct neuroprotective effects.
- Potently activates PPARα receptor pathways, supporting anti-inflammatory activity and mitochondrial health.
- Improves gut barrier integrity by upregulating tight junction proteins such as ZO1.

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OTHER INFORMATION

KEYWORDS

10-hydroxystearic acid, blood-brain barrier, endocannabinoid, ethanolamine conjugation, gut-brain axis, microbial oxylipins, neuroprotection, PPARa activation, tight junction protein, UCD3R

CATEGORIZED AS

- **Medical**
  - Disease: Autoimmune and Inflammation

- Exerts epigenetic effects via histone crotonylation for sustained gene regulation.
- Simultaneously targets gut and brain tissues, supporting holistic treatment of gut-brain axis disorders.
- Derived from natural bioactive fatty acids, ensuring biocompatibility.
- Overcomes poor absorption and limited blood-brain barrier penetration of prior bioactive compounds.
- Alleviates gut barrier damage, inflammation, neuroinflammation, and neuronal injury in systemic and neurological diseases.
- Expands therapeutic strategies by providing options that target both gut and brain dysfunction at once.

- Disease: Central Nervous System
- Disease: Digestive System
- New Chemical Entities, Drug Leads
- Therapeutics

RELATED CASES

2026-420-0

PATENT STATUS

Patent Pending

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Cucumber Mosaic Virus Inducible Viral Amplicon (CMViva) Expression System
- Methods for Disrupting HIV Latency Using Anti-HIV Latency Agents
- Plants as Platform for the Biosynthesis of Melanin
- Molecule for Repairing Leaky Gut And Restoring Energy Metabolism
- Advanced Combination Therapy for HIV using Bioactive Lipids with ART

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