

# 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 PPAR $\alpha$ -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 PPAR $\alpha$  receptor pathways, supporting anti-inflammatory activity and mitochondrial health.
- ▶ Improves gut barrier integrity by upregulating tight junction proteins such as ZO1.

## CONTACT

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## OTHER INFORMATION

### KEYWORDS

10-hydroxystearic acid,  
 blood-brain barrier,  
 endocannabinoid,  
 ethanolamine  
 conjugation, gut-brain  
 axis, microbial oxylipins,  
 neuroprotection, PPAR $\alpha$   
 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](#)
- ▶ [In plantae production of heterologous proteins using viral amplicons](#)
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