Conjugates That Combine HDAC Inhibitors and Retinoids into Disease Preventatives/Treatments

Tech ID: 32536 / UC Case 2019-783-0

ABSTRACT

Researchers at the University of California, Davis have developed methods for creating compositions with the potential to prevent or treat cancer or metabolic diseases. These compositions combine conjugates with covalently linked HDAC inhibitors and retinoids.

FULL DESCRIPTION

Despite steady therapy advances, cancer remains a prominent global disease. Furthermore, metabolic diseases such as diabetes, obesity, non-alcoholic steatohepatitis (NASH) and non-alcoholic fatty liver disease (NAFLD) also pose prominent threats to health worldwide. Thus, there is a need for new treatments for both cancer and various metabolic diseases. Previous research has shown that the combination of histone deacetylase (HDAC) inhibitors and retinoids can be effective treatments for cancer and metabolic diseases. However, synthetic HDAC inhibitors such as suberanilohydroxamic acid (SAHA) have toxicity concerns, and natural gut bacteria-generated HDAC inhibitors such as butyrate have low bioavailability due to their rapid metabolism and clearance.

Researchers at the University of California, Davis have developed compositions comprising conjugates with a polymeric backbone and covalently linked HDAC inhibitors and retinoids. These compositions have documented benefits in the treatment or prevention of cancer or metabolic diseases, particularly in colon and liver tissue. In contrast to the therapeutic shortcomings of individual drugs such as butyrate and retinoic acid (RA), the conjugates developed assemble into nanomicelles and release HDAC inhibitors and retinoids through slow hydrolysis, resulting in long-lasting efficacy. Moreover, the conjugates are orally deliverable, which is preferred by patients and much more cost-effective in low-resource settings (oral administration saves dispending and administration costs). The present formulations are effective in both the colon and the liver, and thus can be used for both colon and liver cancer, as well as metabolic disease associated with both organs.

APPLICATIONS

- Potential treatments for cancer or metabolic diseases

FEATURES/BENEFITS

- Orally deliverable and non-odorous
- Therapeutics are released simultaneously to have interactive effects
- Retain individual as well as combined effects of retinoic acid and HDAC inhibitors
- Based on the pathology or disease, the molar ratio of RA to short-chain fatty acids can be altered to optimize the desired clinical effects

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20220241227	08/04/2022	2019-783
Patent Cooperation Treaty	Published Application	WO 2020/232399	11/19/2020	2019-783

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OTHER INFORMATION

KEYWORDS

HDACi, HDAC, retinoids, NASH, NAFLD, conjugate, cancer, liver, colon

CATEGORIZED AS

- **Biotechnology**
  - Health
- **Medical**
  - Disease: Cancer
  - Disease: Metabolic/Endocrinology
  - New Chemical Entities, Drug Leads
  - Therapeutics

RELATED CASES

2019-783-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Novel Solid Tumor Chemodrug LLS2
- Affinity Peptides for Diagnosis and Treatment of Severe Acute Respiratory Syndrome Coronavirus 2 and Zika Virus Infections
- Nanoparticles for Drug Delivery, Tissue Targeting and Imaging Analysis
- A Novel RGD-Containing Cyclic Peptide for use in Cancer Imaging and as a Targeted-Therapy Ligand
- Site-Specific Ligation and Compound Conjugation to Existing Antibodies
- Functional Illumination in Living Cells

- Multifunctional Porphyrin-Based Nanomedicine Platform
- A Two-step Drug Delivery System Based on Click Chemistry
- Transformable Smart Peptides as Cancer Therapeutics
- Engineered Biomaterial to Prevent Endothelial Inflammation
- Programmable Peptide Nucleic Acid-Based Nanoplatform for Customizable Drug Delivery
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- Proteoglycan Mimetics For Enhanced Wound Healing Angiogenesis And Vascular Repair
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