Novel Small Molecule Drug for the Treatment of Constipation and Oxalate Kidney Stones

Tech ID: 29564 / UC Case 2018-155-0

CONTACT

Todd M. Pazdera
todd.pazdera@ucsf.edu
tel: 415-502-1636.

INVENTORS

- Cil, Onur
- Haggie, Peter M.
- Verkman, Alan S.

OTHER INFORMATION

KEYWORDS

Constipation, Irritable Bowel Syndrome (IBS), Calcium Oxalate Kidney Stone, Small Molecule Drug, Anion Exchanger

CATEGORIZED AS

- **Medical**
  - Disease: Digestive System
  - Disease: Kidneys and Genito-Urinary System
  - Therapeutics

RELATED CASES

2018-155-0

INVENTION NOVELTY

UCSF researchers have developed a novel small molecule drug that specifically targets and inhibits SLC26A3 (DRA), an anion exchanger whose inhibition is expected to have therapeutic benefit in constipation and oxalate kidney stone disease.

VALUE PROPOSITION

Chronic constipation and kidney stone disease are exceedingly common diseases in the U.S and around the world, with a high recurrence rate. Each year in the U.S., chronic constipation leads to around 2.5 million doctor visits and medication costs of millions of dollars, making it one of the most expensive digestive disorders to treat. The incidence of kidney stones in the United States is between 7-13% and has been steadily rising over time. Calcium oxalate stones are the most common type of kidney stone. Most available medications for chronic constipation have limited efficacy. There are currently no drugs to treat kidney stones, which can require expensive and invasive procedures to treat. This invention describes a first-in-class inhibitor of SLC26A3, a major anion exchanger responsible for facilitating intestinal fluid and oxalate absorption.

This new class of small molecule drugs provides the following advantages:

- **Higher efficacy** than any available therapies for constipation: **IC_{50} ~ 0.2 µM**
- **Highly selective** inhibitor of SLC26A3.
- Scaffolds amenable to **facile synthesis** of targeted analogs.
- Can be **used in combination with current constipation therapies** to treat constipation refractory to monotherapies.
- **First-in-class drug** for effective prevention of the most common kind of kidney stone - oxalate kidney stones.

TECHNOLOGY DESCRIPTION

Researchers at University of California, San Francisco have identified a novel small molecule inhibitor of SLC26A3, an intestinal anion exchanger that regulates fluid and oxalate absorption in the colon. This drug selectively inhibits SLC26A3 with high potency, without affecting related proteins. Oral administration of drug in mice effectively reduced signs of constipation, with increased efficacy in combination with other drugs.

LOOKING FOR PARTNERS

To develop and commercialize this technology as a therapy for constipation and oxalate kidney stone disease.

APPLICATION

Therapy for chronic idiopathic constipation, irritable bowel syndrome (IBS) with constipation, and calcium oxalate kidney stone disease.

STAGE OF DEVELOPMENT

Preclinical

DATA AVAILABILITY

Under NDA/CDA

PATENT STATUS

Country	Type	Number	Dated	Case
Japan	Issued Patent	7442824	02/26/2024	2018-155
United States Of America	Issued Patent	11,591,304	02/28/2023	2018-155
European Patent Office	Published Application	3,784,229	03/03/2021	2018-155

Additional Patents Pending

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- CFTR potentiators and correctors and bifunctional (corrector/potentiator) compounds for treatment of Cystic Fibrosis
- SALT-SPARING UREA TRANSPORT INHIBITOR DIURETICS FOR TREATMENT OF CARDIOVASCULAR AND RENAL DISORDERS
- Potent TMEM16A Small Molecule Treatment for Inflammatory and Reactive Airway Diseases, Asthma, Hypertension, Pain and Cancer
- Small Molecule Pendrin Inhibitors for Treatment of Inflammatory Airway Diseases and Diuretic Resistance
- Immunotherapy for Treatment of Neuromyelitis Optica (NMO)

ADDRESS

UCSF

Innovation Ventures

600 16th St, Genentech Hall, S-272,

San Francisco,CA 94158

CONTACT

Tel:

innovation@ucsf.edu

https://innovation.ucsf.edu

Fax:

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