PAC1 Receptor Agonists for Treatment of Obesity, Diabetes, and Fatty Liver Disease

Tech ID: 27501 / UC Case 2016-99H-0

SUMMARY

UCLA researchers have developed novel PAC1 receptor agonists (MAXCAPs) that specifically bind and activate PAC1 receptors to induce satiety and treat multiple metabolic diseases.

BACKGROUND

UCLA researchers discovered compounds that specifically binding and activating pituitary adenylate cyclase receptor 1 (PAC1) significantly increase satiety and lean mass while suppressing appetite, fat accumulation and blood glucose levels. One of the endogenous ligands for PAC1 is pituitary adenylate cyclase activating polypeptide (PACAP) which has 68% sequence homology to its closest hormone relative vasoactive intestinal peptide (VIP) and binds with 1000-fold greater affinity to the PAC1 receptor than to the VIP specific receptors VPAC1 and VPAC2 that have opposite metabolic effects relative to PAC1.

PACAP itself is not metabolically stable, as it is rapidly proteolyzed, so the UCLA team is developing new proteolytically stable compounds (MAXCAP's) that specifically activate PAC1. The lead compound is a 28 residue peptide that has been validated in pre-clinical animal models to demonstrate that it:

Suppresses appetite and food intake and induces satiety through suppression of gastric ghrelin release.
Switches animals to a ketosis state, burning fat mass.Reduces body weight and fat mass and increases lean mass.
Normalizes blood glucose levels.
Significantly decreased hepatic fat accumulation contributing to a nonalcoholic steatohepatitis (NASH), non-alcoholic steatohepatitis (NAFLD) diagnosis.

APPLICATIONS

MAXCAPs have been shown to reduce appetite and food intake, to switch metabolism to a fat burning (ketosis state), and to treat obesity, insulin resistance, pre-diabetic syndrome and type 2 diabetes. They also have activity in treating hepatosteatosis (fatty liver disease). Currently there are no effective methods or pharmacological targets to treat this disorder.

ADVANTAGES

- This invention is the first to report novel compounds that bind specifically to PAC1 but not to VPAC1 or VPAC2 receptors thus targeting a new pathway for control of appetite/satiety, metabolism, glucose homeostasis and adipogenesis that have more potent and long term effects than any current pharmacological target in literature.
- MAXCAP compounds bind to PAC1 receptor with high specificity. These peptides are more resistant to DPP-IV protease degradation than the native PACAP1-27 and PACAP1-38 and thus have a longer half-life.

STATE OF DEVELOPMENT

The inventors have synthesized MAXCAP compounds and tested them extensively *in vivo* and *in vitro* using cell culture and mouse models.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12,049,486	07/30/2024	2016-99H
Switzerland	Issued Patent	3565573	08/23/2023	2016-99H
Germany	Issued Patent	602018055930.2	08/23/2023	2016-99H
European Patent Office	Issued Patent	3565573	08/23/2023	2016-99H
France	Issued Patent	3565573	08/23/2023	2016-99H

CONTACT

UCLA Technology Development Group
ncd@tdg.ucla.edu
tel: 310.794.0558.

INTRODUCING
UC TechAlerts
New technology matches delivered to your email at your preferred schedule
SEARCH SAVE SEARCH
Learn More

INVENTORS

- Pisegna, Joseph R.
- Pisegna, Joseph R.

OTHER INFORMATION

KEYWORDS

PAC1 receptor, MAXCAP, satiety, appetite, metabolic syndrome, insulin resistance, prediabetic syndrome, diabetes, obesity, chronic inflammation, fatty liver disease, NASH, NAFLD

CATEGORIZED AS

- **Medical**
  - Disease: Digestive System
  - Disease: Metabolic/Endocrinology
  - New Chemical Entities, Drug Leads
  - Therapeutics

RELATED CASES

2016-99H-0

United Kingdom	Issued Patent	3565573	08/23/2023	2016-99H
Italy	Issued Patent	502023000060474	08/23/2023	2016-99H
Sweden	Issued Patent	3565573	08/23/2023	2016-99H
Japan	Issued Patent	7183164	11/25/2022	2016-99H
United States Of America	Issued Patent	11,186,622	11/30/2021	2016-99H

UCLA Technology Development Group

10889 Wilshire Blvd., Suite 920,Los Angeles,CA 90095

https://tdg.ucla.edu

Tel: 310.794.0558 | Fax: 310.794.0638 | ncd@tdg.ucla.edu

© 2017 - 2024, The Regents of the University of California

Terms of use

Privacy Notice