

Anti-inflammatory compounds for dermatology and chronic inflammation

Tech ID: 21372 / UC Case 2010-329-0

BACKGROUND

While inflammation is a beneficial component of the body's response to harmful stimuli, prolonged or excessive inflammation triggers a wide variety of diseases. Current anti-inflammatory drugs (steroids, NSAIDs and immune selective anti-inflammatory derivatives) have undesirable side effects and for many indications including dermatology, drugs that act by a novel MOA may be more efficacious.

TECHNOLOGY DESCRIPTION

Scientists at Scripps Institute of Oceanography have purified and validated the utility of honaucin A (from the cyanobacteria *Leptolyngbya crossbyana*) for dermatologic indications and other inflammatory conditions. The dual MOA vs. inflammation and bacterial infection make honaucins particularly interesting for diseases that are characterized by features of inflammation and infection. Synthesis of honaucin and numerous analogs enabled SAR analysis, which revealed essential structural features for activities of interest and provided analogs with greater potency in bio-assays that assess inhibition of inflammation.

APPLICATIONS

Applications: Issued claims cover compositions that treat inflammatory and infectious diseases including, but not limited to:

- ▶ Psoriasis and other inflammatory/infection-based dermatologic applications;
- ▶ trauma, including surgical trauma; and
- ▶ autoimmune diseases, such as **rheumatoid arthritis**.

ADVANTAGES

- ▶ An efficient, 2-step synthetic method supports large-scale manufacturing;
- ▶ *In vivo* and *in vitro* bioassays validate potent anti-inflammatory activity with limited cytotoxicity;
- ▶ A unique structure shows dual modes of action via inflammatory and quorum sensing pathways;
- ▶ Cytokine measurements of treated cells reveal an extremely attractive profile for an anti-inflammatory drug; and
- ▶ The NRF2-ARE pathway is activated at lower concentrations than with Tecfidera (FDA approved, dimethyl-fumarate)

STATE OF DEVELOPMENT

- ▶ *In vivo* validation in a murine model of inflammation substantiates *in vitro* studies with regard to dermatologic applications.
- ▶ Identification of the MOA (inhibiting KEAP-1 activates NRF2 (a transcription factor) which activates a number of known anti-inflammatory and cytoprotective genes.
- ▶ Potent inhibition of lipopolysaccharide-stimulated NO₂ production in murine macrophages and of the quorum sensing-dependent phenotype in *Vibrio harveyi* BB120.
- ▶ A decrease in NO₂ production is accompanied by a decrease in the production of several pro-inflammatory cytokines (IL-1, IL-6, TNF-alpha and iNOS).

INTELLECTUAL PROPERTY INFO

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INVENTORS

- ▶ Gerwick, William H.

OTHER INFORMATION

KEYWORDS

dermatology, skin, psoriasis, trauma, inflammation, anti-bacterial, quorum-sensing inhibitor, quorum-sensing, inflammatory, surgical trauma, infection, biofilm, anti-biofilm, plaque, dental, anti-microbial, anti-bacterial, anti-fouling

CATEGORIZED AS

- ▶ **Biotechnology**
 - ▶ Health
 - ▶ Other
- ▶ **Medical**
 - ▶ Disease: Autoimmune and Inflammation
 - ▶ Disease: Dermatology
 - ▶ New Chemical Entities, Drug Leads

RELATED CASES

2010-329-0, 2006-079-0, 2003-248-0, 2010-351-0

US issued patent for “Anti-Inflammatory and Quorum Sensing Inhibition Compounds and Methods of Making and Using Them” available for exclusive licensure.

RELATED MATERIALS

- ▶ Sapkota M, et al. (2015) Bromo-honaucin A inhibits osteoclastogenic differentiation in RAW 264.7 cells via Akt and ERK signaling pathways., Eur J Pharmacol., 769:100-9. - 12/15/2015
- ▶ Choi, H. et al. (2012) Honaucins A-C, potent inhibitors of inflammation and bacterial quorum sensing: synthetic derivatives and structure-activity relationships, Chem Biol. 19(5):589-98. - 05/25/2012
- ▶ See <http://www.marinebiotech.org/gerwick.html>

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,073,884	07/07/2015	2010-329

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ Unique Compound Inhibits Angiogenesis in Cancer and Eye Diseases
- ▶ Marine Natural Product Yields Cancer Therapeutic (NCE)

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