Nell-1 As An Anti-Osteoinflammatory, Disease-Modifying Anti-Arthritis Agent

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SUMMARY

UCLA researchers in the Department of Plastic Surgery and the School of Dentistry have developed a novel anti-osteoinflammatory agent for the prevention and suppression of arthritis disease progression.

BACKGROUND

Arthritis is an inflammatory condition that describes over 100 types of disease phenotypes, all of which manifest in pain and stiffness of joints that worsens over time. Over 54.4 million people of all age, sex, and race have doctor-diagnosed arthritis in the United States. Yet, arthritis patients must rely on managing symptoms rather than direct disease treatment, as no simple cure for arthritis currently exists. Increased understanding of osteoarthritis progression as well as identification of disease specific genetic markers will lead to more effective therapeutics. In human arthritis articular cartilage, decreased neural EGFL like 1 (NELL-1) expression is associated with increased inflammation. Therefore, NELL-1 is an intriguing target for further studies as an arthritis therapeutic.

INNOVATION

UCLA researchers have identified NELL-1 as a promising anti-inflammation and pro-chondrogenesis therapeutic to prevent the progression of osteoarthritis. Mouse models harboring loss-of-function Nell-1 mutations have accelerated and aggravated osteoarthritis development, with increased expression of inflammatory markers. Upon NELL-1 administration, inflammatory reaction and articular cartilage damages were reduced in vivo. Typical symptoms associated with arthritis, including ‘lame-walking’ and ‘fear-to-walk’, were also significantly recovered by NELL-1 supplementation in the mouse model. This invention provides a novel clinical application of NELL-1 as an anti-osteoinflammatory therapeutic agent, which is in contrast to its previous application to promote cartilage formation or repair.

APPLICATIONS

- Anti-arthritis therapeutic
- Anti-osteoinflammatory therapeutic

ADVANTAGES

- Injectable, anti-osteoinflammatory, pro-chondrogenesis agent
- Prevention of arthritis-related damage to cartilage
- Recovery of typical arthritis symptoms in a mouse model

STATE OF DEVELOPMENT

NELL-1 supplementation has demonstrated benefits in Nell-1-haploinsufficient (Nell-1+/6R) mice, including reduced inflammatory reaction and articular cartilage damages in vivo. The invention has also been successfully tested in human arthritis cartilage samples.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20210401937	12/30/2021	2019-042

RELATED MATERIALS

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OTHER INFORMATION

KEYWORDS

Nell-1, neural EGFL like 1, arthritis, osteoarthritis, inflammatory disease, anti-inflammatory

CATEGORIZED AS

- **Medical**
  - New Chemical Entities, Drug Leads
  - Therapeutics

RELATED CASES

2019-042-0

▶ James, A.W., Shen, J., Zhang, X., Asatrain, G., Goyal, R., Kwak, J.H., Jiang, L., Bengs, B., Culiar, C.T., Turner, A.S., Seim, H.B., Wu, B.M., Lyons, K., Adams, J.S., Ting, K., & Soo, C. NELL-1 in the treatment of osteoporotic bone loss. Nat Comm 6(7362) 1-14 (2015).

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

▶ Chemically Modified Nell-1 and Methods of Making and Using the Same

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