Novel drug candidate for therapy of arthritis of the temporomandibular joint

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Clinical Need

Temporomandibular joint disorders (TMJDs) are a multifaceted group of chronic pain disorders characterized by pain and/or stiffness in the jaw, limited jaw mobility, and pain when opening or closing the mouth. TMJDs are relatively common, with incidence rates in the range of 5–12%, with nearly twice as many women as men being affected. No disease-modifying drugs are currently available for TMJD.

Solution

Our group discovered new class of small molecules – modulators of gp130 receptor signaling – and showed that this drug can significantly delay degenerative changes and promote regeneration in several models of arthritis as well as TMJD.

Competitive Advantage

Currently no disease-modifying agents are available for TMJD. Our drug represents a first-in-class therapeutic solution for this disease.

Target Market

According to NIH the annual cost of TMJ treatment in the US is $4B. The facts indicate a large unmet need in addressing the chronic debilitation suffered by those with TMJD, the payers who facilitate their treatment, and the physicians who provide care. The same drug is also being developed for osteoarthritis, a major medical condition affecting tens of millions of people in the USA with a market value >$100B per year.

Regulatory Pathway

Small molecule drug. IND with FDA

Intellectual Property

A PCT covering the discovery and testing of the compound was filed by USC on February 28, 2019 (US/2019/020058). In March of 2019, the USC patent was licensed to CarthroniX, a Los Angeles-based biotech startup co-founded by Dr. Evseenko. CarthroniX has also licensed the technology from UCLA that Dr. Evseenko invented and is launching their first product, a direct-to-consumer skincare line (Heraux) based on this intellectual property in May 2019. Their corporate strategy is to use the revenue from this product line to fund the development of the technology described here.

Related Publications

Flores A, Schell J, Krall A, et al. (2017) Lactate dehydrogenase activity drives hair follicle stem cell activation. Nat Cell Biol 19(9):1017–1026. / Alam MP, Bilousova T, Spilman P, et al. (2018) A small molecule mimetic of the humanin peptide as a candidate for modulating NMDA-induced neurotoxicity. ACS Chem Neurosci 9(3):462–468. / Shkhyan R, Van Handel B, Bogdanov J, et al. (2018) Drug-induced modulation of gp130 signaling prevents articular cartilage degeneration. Ann Rheum Dis 77(5):760–769. / Ferguson G B, Handel BV, Bay M, et al. (2018) Mapping molecular landmarks of human skeletal ontogeny and pluripotent stem cell-derived articular chondrocytes. Nat Comm 9(1):3634.