TECHNOLOGY TRANSFER OFFICE
UNIVERSITY OF COLORADO

Breakthrough Therapies for Neuropathic Pain and Neurological Disorders

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IP Status:

Patents pending; available for exclusive licensing

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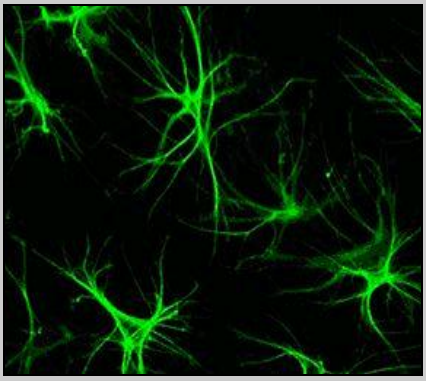
Background: Neuropathic Pain

Opioid drugs — morphine, oxycodone and hydrocodone are the most common — have long been used to treat acute pain such as that resulting form injury or after surgery; these drugs are now being prescribed frequently for non-acute, chronic pain, especially cancer-related and neuropathic pain (a $4 billion market in 2006). These drugs are powerful pain-killers, but tolerance, dependence and addiction are major concerns, leading physicians to under-prescribe, nurses to under-administer, and patients to become non-compliant for fear of addiction. Side effects such as respiratory depression also limit dosing.

Dr. Linda Watkins: Glial Cells and Neuropathic Pain



Dr. Linda Watkins' lab at the University of Colorado (Boulder) studies how to treat chronic pain and increase the efficacy of analgesic drugs while decreasing their negative side effects. While all currently available therapies for acute and chronic pain target neurons, the focus of the Watkins lab is radically different; namely, a type of non-neuronal cells called glia. Glia outnumber neurons 10 to 1, but have been completely ignored in the development of therapeutics aimed at treating chronic pain. Dr. Watkins' work has shown that glial activation can compromise the ability of analgesics to suppress pain, contribute to the development of tolerance (wherein more and more drug is required to obtain pain relief), and contribute to the development of dependence (an increasing issue with pain meds). Her work has shown that variants of known opioids, as well as drugs targeting Toll-Like Receptor 4 (TLR4), can suppress glia activation and thereby treat chronic pain as stand-alone therapies; they can also increase analgesic efficacy while decreasing analgesic tolerance, dependence, and reward, and other negative side effects.

Applications: New Compounds, New Uses

CU's portfolio of candidate therapeutics can be used in multiple ways, primarily falling into two approaches: as stand-alone treatments for neuropathic pain; or to increase the efficacy of known opioid analgesics. These same compounds can also be used to treat the pain aspects of sepsis, cardiovascular disease, diabetes, arthritis, and other autoimmune diseases. Furthermore, Dr. Watkins' research is introducing a way to prevent opioid tolerance, dependence, and withdrawal by preventing glial activation. Dr. Watkins' current research collaborations include the development of novel compositions to target the TLR4 pathway.

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Data Update: New Uses in PTE and PTSD

CU researcher Dan Barth has added to the growing list of potential clinical uses for CU's proprietary TLR4 antagonists. TLR4 antagonists have shown in vivo efficacy in models of traumatic brain injury (TBI), post-traumatic stress disorder (PTSD) and post-traumatic epilepsy (PTE).

Assets of Watkins lab:

- Game-changing science around the role of glial cells in pain and neurological disease
- Solid IP around novel compounds, and new use of known compounds
- Internationally recognized leader in emerging research field
- Highly productive research/pharmacology lab, rat models routine

Key publication:

The "Toll" of Opioid-Induced Glial Activation: Improving the Clinical Efficacy of Opioids by Targeting Glia. Trends Pharmacol Science. September 15, 2009.

Patent applications:

(+)-Opioids and Methods of Use (10/30/2008)
TLR Modulators and Methods for Using the Same (10/30/2008)
Tricyclic Compounds and Methods for Using the Same (10/30/2008)
Toll-like Receptor Modulators and Uses Thereof (9/23/2009)