Novel Inhibitor of neuropathic pain

This novel neutralising antibody-based approach offers an innovative and valuable therapeutic strategy for patients with neuropathic pain.

Proposed use

Neuropathic pain is a chronic pain condition initiated or caused by a primary lesion or dysfunction of the nervous system. The prevalence of neuropathic pain is estimated to be 6-8% in the adult population and accounts for up to 25% of all individuals with chronic pain.

Problem addressed

A major reason for the failure to develop effective drug therapy for neuropathic pain has been the difficulty to identify targets that were truly related to neuropathic pain. The novel approach developed by Dr Okuse and Prof. Rice, disrupting TLPQ-21/ gC1qR interaction by neutralising antibodies, may have promise as a drug target for controlling neuropathic pain.

Technology overview

The team identified gC1qR as the receptor of TLQP-21, a VGF-derived neuropeptide, and found that their direct interaction induces an increase of intracellular calcium in rat macrophages which finally lead to mechanical hypersensitivity in rats. The team then used blocking antibodies against gC1qR which successfully inhibited the response of macrophages to TLPQ-21 and resulted in a delayed onset of nerve injury-associated mechanical hypersensitivity in vivo.

Benefits

- Our approach focuses on activation of macrophages, previously not studied in the context of neuropathic pain
- VGF has been shown to be upregulated in almost all neuropathic pain models, thus it is the key molecule in neuropathic pain development, unlike many other molecules involved in a specific type of neuropathic pain
- This approach is effective on two points, blocking 1) infiltration of macrophages to sensory nerves and 2) activation of macrophages which leads to secretion of a specific cytokine and hypersensitisation of nociceptive sensory neurons
- Antibodies are specific to targets and tend to show less side effects compared to small molecules

Dr. Stuart Sims

Industry Partnerships and Commercialisation Executive

Faculty of Natural Sciences

e: s.sims@imperial.ac.uk

t: +44 (0)207 594 3461

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Imperial College London

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Inventor information

Dr Kenji Okuse, Professor Andrew Rice, and team