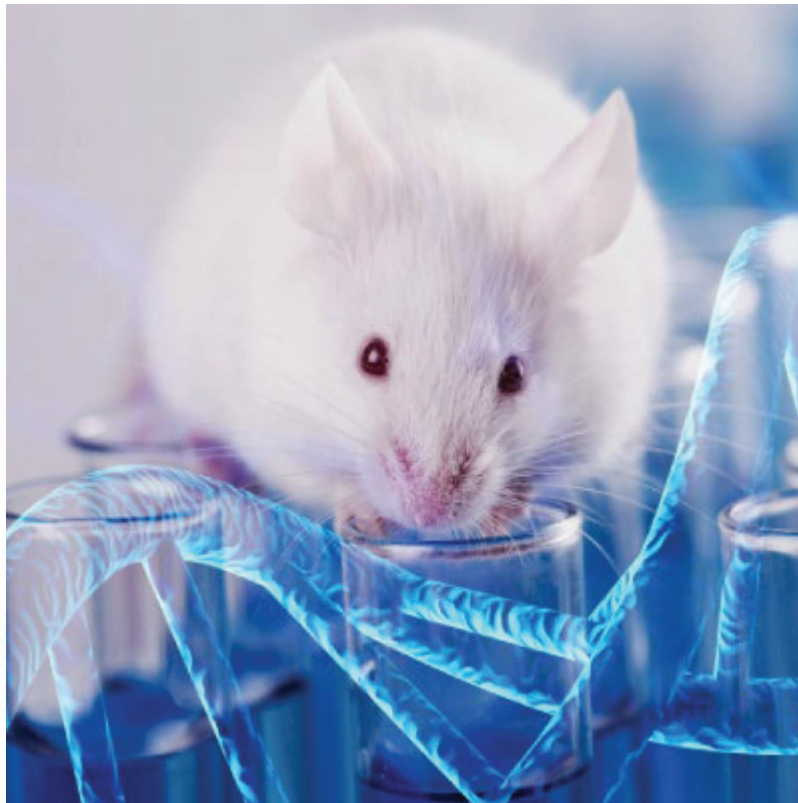




Insights from the Chronic Constriction Injury (CCI) Model

Overview

The Chronic Constriction Injury (CCI) model is a well-established and reproducible rodent system for studying neuropathic pain resulting from peripheral nerve injury. By loosely ligating the sciatic nerve, the model induces partial nerve damage, inflammation, and altered axonal transport leading to symptoms that closely resemble human neuropathic pain.

The CCI model reproduces both peripheral and central sensitisation, enabling detailed exploration of pain mechanisms and serving as a tool for assessing the efficacy of potential analgesic agents.

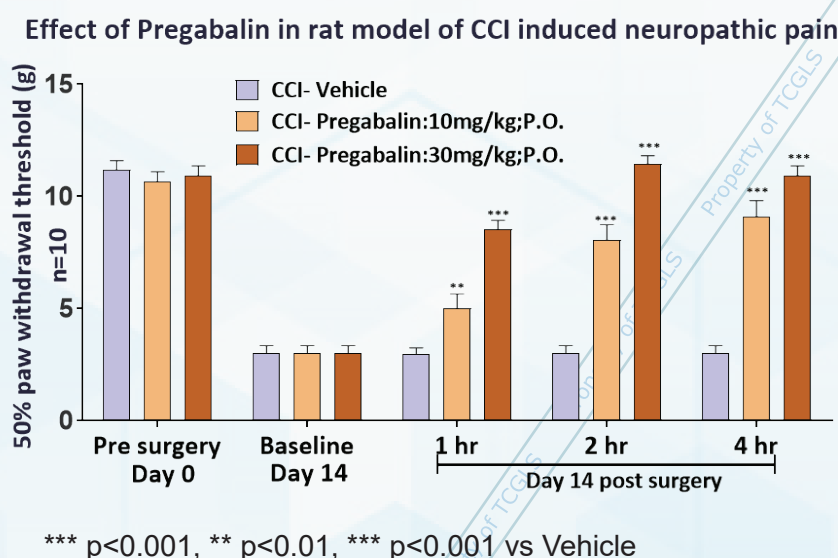
Experimental Outline

Model Description

Parameter	Description
Animal Species	Male Sprague Dawley rats
Induction Method	Four loose ligatures around the sciatic nerve
Endpoint	Mechanical allodynia measured using von Frey filaments

Following surgical induction, animals were monitored for pain-related behavioural changes. Mechanical sensitivity was assessed using von Frey filaments.

Validation Findings



Statistical analysis: Two-way ANOVA followed by Bonferroni posttests

The CCI model produced consistent and measurable development of mechanical allodynia following nerve injury. Compared with vehicle-treated controls, treatment groups showed statistically significant differences in pain thresholds ($p < 0.05$, $p < 0.01$, $p < 0.001$), confirming the robustness of the model.

Broader Implications

The Chronic Constriction Injury (CCI) model continues to play a pivotal role in preclinical pain research by replicating the fundamental neurobiological processes of human neuropathy. Its capacity to induce both peripheral nerve damage and central sensitisation makes it a valuable framework for investigating molecular pathways of pain and testing candidate therapeutics.

Through the generation of reproducible and quantifiable endpoints, this model supports a deeper understanding of pain modulation and contributes to the rational design of new treatments for chronic neuropathic conditions.