PsychoGenics
Transforming CNS Discovery

Acute Pain Models

Acute pain refers to pain in response to an acute noxious stimulus (e.g. heat, pinch). This type of pain is not associated with any pathological condition and serves an important role in protection from injury. The hot plate test is a commonly used test to measure acute noxious heat sensitivity in rodents. Rodents are placed on a hot plate instrument set to a noxious temperature (52 - 58^{o} C) and the latency to the first response involving either a hind paw lick or jump is defined at the hot plate response latency. Since the behavioral endpoint in the hot plate test is either a hind paw lick or jump response, the responses measured in this test involve both spinal and supraspinal processing.

Hot Plate Test of Acute Noxious Heat Sensitivity

Morphine Increases Hot Plate Response Latencies in SD rats

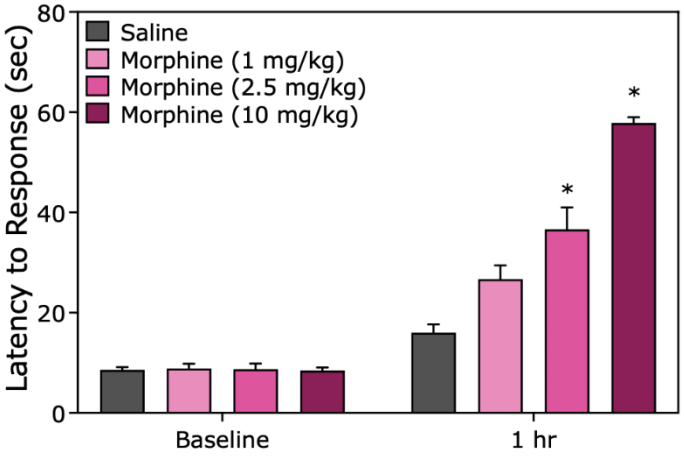

Figure 1: *SD rats are placed on a hot plate instrument (52 ^{o}C) and the latency to the first hind paw lick or jump is defined as the hot plate response latency (sec). Administration of morphine (1 - 10 mg/kg, SC) dose-dependently increases hot plate responses 1- hour post-dosing relative to vehicle indicating reduced sensitivity to noxious heat.*
** p < 0.05*

Morphine Increases Hot Plate Response Latencies in CD1 Mice: Block by Naloxone

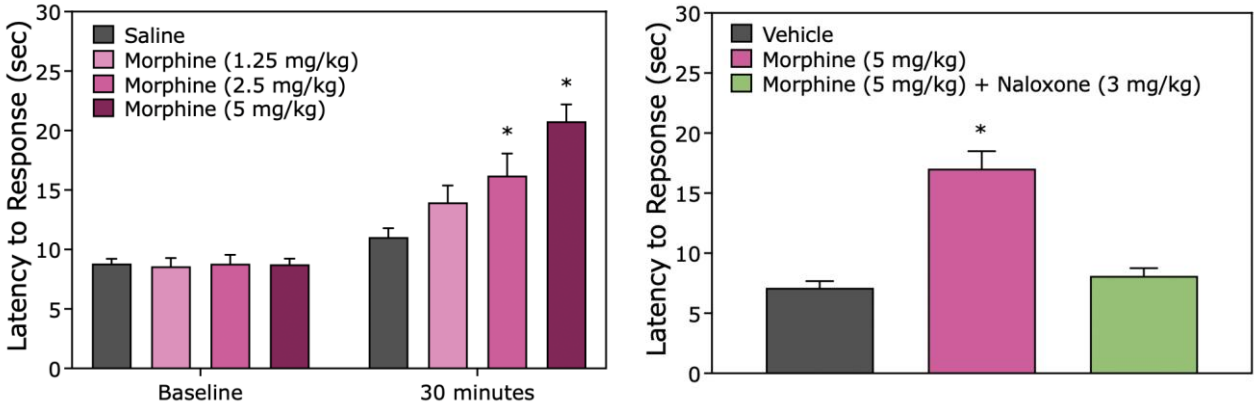

Figure 2: ***(left)*** *CD1 mice are placed on a hot plate instrument (55.5 ^{o}C) and the latency to the first hind paw lick or jump is defined as the hot plate response latency (sec). Administration of morphine (1.25 - 5 mg/kg, SC) dose-dependently increases hot plate responses 30 minutes post-dosing relative to vehicle indicating reduced sensitivity to noxious heat.* ***(right)*** *Administration of the mu-opioid receptor antagonist naloxone (3 mg/kg, SC) blocks the increased hot plate response latencies produced by morphine (5 mg/kg, SC) supporting a mu-opioid receptor-mediated effect.* p<0.05*

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Tail Flick Test of Acute Noxious Heat Sensitivity

The tail flick test is a commonly used test to measure acute noxious heat sensitivity in rodents. An infrared heat source is applied to the distal end of the rodents tail, and the latency to remove the tail away from the heat source is defined as the tail flick latency (seconds). The tail flick response is a spinally-mediated reflex which is organized at the level of the spinal cord and does not involve supraspinal processing.

Morphine and Hydrocodone Increase Tail Flick Response Latencies in CD1 Mice: Block by Naloxone

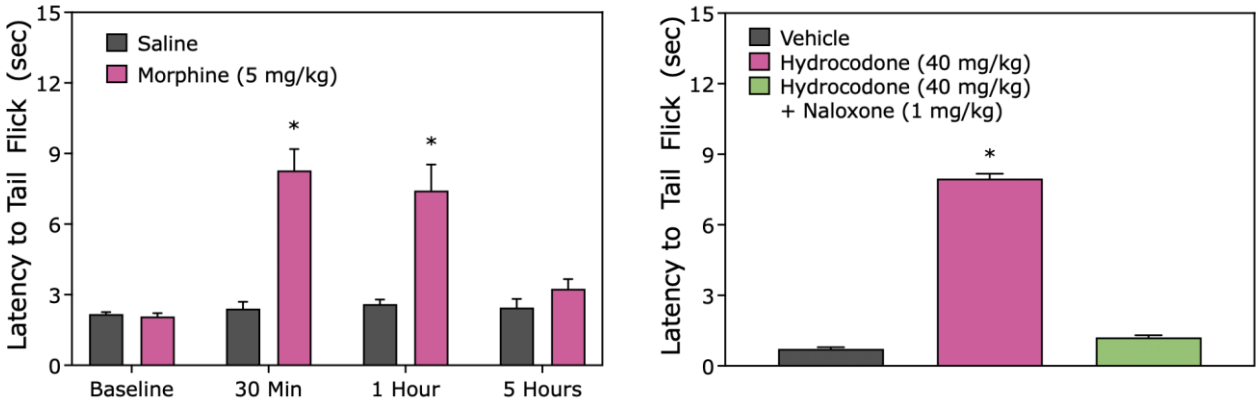

Figure 3: *Tail flick latencies in response to infrared heat applied to the distal tail in CD1 mice.* ***(left)*** *Administration of morphine (5 mg/kg, SC) increases tail flick latencies in CD1 mice relative to vehicle.* ***(right)*** *Administration of hydrocodone (40 mg/kg, SC) increases tail flick latencies in CD1 mice which is blocked by administration of the mu opioid receptor antagonist naloxone (1 mg/kg) supporting a mu opioid receptor-mediated effect.*
** p< 0.05*