

Category E Explanation

1. **Registration Number:** 34-R-0017
2. **Number of animals used in these studies:** 12
3. **Species (common name) of animals used in the study:** Grasshopper Mouse
4. **Explain the procedure producing pain and/or distress:**

Standard test for pain-related behavior in rodents: intra plantar injection/hind paw licking test. Grasshopper mice (genus *Onychomys*), also known as scorpion mice, are desert-dwelling mice that feed on bark scorpions. During predatory interactions with bark scorpions, grasshopper mice are routinely stung, but show no physiological response to the toxins. Broadly, the goals of this study are to determine the molecular genetic and physiological bases of venom resistance in both species of grasshopper mice, understand how grasshopper mice evolved resistance to toxins, and investigate the role of sensory and motor adaptations in shaping predatory behavior. Mice will be injected intraplantar/hind paw with toxin to study the mechanism of resistance.

5. **Provide an explanation with the reason(s) for why anesthetics, analgesics and tranquilizers could not be used:**

This study documents pain-related paw licking behavior in grasshopper mice in response to the venom of one of their prey items, tarantulas. Analgesics would prevent, block or mask the pain related behavior. We are studying the molecular and physiological modifications of the sensory system that make a wild population of mice resistant to the chemical defenses of their prey. Understanding the structure and function of sodium channels that regulate pain signals in the sensory system has implications for identifying targets for therapeutic pain drugs.