Rodent Analgesia

Amy L. Miller, PhD[a,b], Claire A. Richardson, BVM&S, MRCVS[a,b,*]

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• Rodent • Analgesia • Mice • Rats • Guinea pigs • Chinchillas

Rodents of all species are frequently kept as companion animals, with increasing client expectations for the care of their animals. Fortunately, specialist veterinary interest and information is now available for treatment of rodents. In the field of rodent analgesia particularly, much can be learned from the methods developed for preventing and alleviating pain in animals undergoing research studies in laboratories throughout the world. This article reviews advances in pain detection techniques in rodents and makes recommendations on analgesic agents that are available for the alleviation of pain.

RECOGNIZING PAIN

To effectively alleviate pain in animals we must first be able to recognize it. Recognition of pain and its intensity allows assessment of employed analgesic regimens to ensure that the treatments are both effective and appropriate. As animals cannot report the intensity of their pain, alternative methods of pain assessment must be used. Although this remains a challenge in veterinary practice, an awareness of ongoing research in pain assessment in animals can help us to detect and alleviate pain in pet rodents.

Objective Indicators of Pain in Animals

Objective methods of assessing pain are essential to ensure appropriate pain relief is provided. These methods often include monitoring food and water consumption along with any changes in body weight. Although pain is often associated with weight loss due to anorexia and a decrease in fluid consumption, these measures must be obtained retrospectively and therefore cannot be used to improve the analgesic therapy for that particular animal. However, information can be obtained with respect to specific procedures in that species, which can aid in the treatment of future animals.

Heart rate and respiratory rate have been used as an indirect measure of pain, with increases in both thought to accompany pain states[1]; however such measures should

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[a] Institute of Neuroscience, Medical School, Newcastle University, Framlington Place, Newcastle upon Tyne, Tyne and Wear, NE2 4HH, UK
[b] Comparative Biology Centre, Medical School, Newcastle University, Framlington Place, Newcastle upon Tyne, Tyne and Wear, NE2 4HH, UK
* Corresponding author. Institute of Neuroscience, Medical School, Newcastle University, Framlington Place, Newcastle upon Tyne, Tyne and Wear, NE2 4HH, UK.
E-mail address: claire.richardson@ncl.ac.uk

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be interpreted with caution, as many other factors can influence these parameters. Any stress or excitement, even handing the animal, will increase both heart rate and respiratory rate.[2] Obtaining heart rate and respiratory rates is not only difficult in awake rodents; resting heart rates may be too high to assess by auscultation or palpation of the pulse (eg, >300–400 beats/min).

Clinical Impression of the Animal

In practice the decision to administer an analgesic is often based largely on the veterinarian's clinical impression of an animal. Although not specific, an observation of a change in appearance or behavior in an animal following surgery or in painful conditions often indicates the presence of pain. As the response to pain varies considerably both between species and between individual animals, it is important that pain assessment is performed by clinicians with a comprehensive knowledge of the normal behavior and appearance of the species and animal concerned. These individuals will be the most likely to detect deviations from normal appearance and behavior in the animal. Monitoring at regular intervals is also imperative to ensure continued effective management of pain, particularly in the immediate hours following surgery or injury. Because different assessors may evaluate differently whether an animal is in pain, successive observations by a single observer are likely to provide the best insight into the improvement of an animal over time.

Although the use of pain-scoring scales has not been validated in rodents, it is likely that the use of these systems is preferable to simple observation. Descriptive, numerical, and visual analog (VAS) scales could all be used, but current opinion suggests that VAS may be the most useful in both animals and human infants.[3]

The presence of an observer may also affect the behavior of the animal; for example, many rabbits and guinea pigs often remain immobile.[4] This behavior may be a particular problem when the animal is observed by an unfamiliar person in an unfamiliar environment. It may therefore be beneficial to initially observe such animals from behind a viewing panel or via a video link. A simple web-cam provides an inexpensive means of making these observations.

In summary, while not specific, changes in general appearance and behavior in situations when pain is likely to occur are often indicative of pain. The administration of an analgesic and subsequent prevention or reversal of these behavioral changes can aid in the confirmation of pain. Unfortunately this can be challenging, because analgesics have been shown to influence the behavior of normal animals; for example, administration of buprenorphine leads to increased activity in normal mice.[5] These nonspecific analgesic effects on behavior must be taken into account when assessing the effectiveness of an analgesic.

Behavior-Based Pain-Scoring Systems

Behavior-based pain-scoring systems have been used successfully to study pain in many species. Behaviors such as lip licking, cage circling, and "flank gazing" have been observed in dogs after ovariohysterectomy accompanied by an increase in plasma cortisol, and have been attributed to the presence of pain.[6,7] Similarly, in combination with physiologic measures such as changes in plasma cortisol, specific behavioral responses have been observed in lambs and calves following castration and tail docking.[8,9] Behavior-based pain-scoring systems are now available for many species.[10]

Assessment of Rodents

Rodents do exhibit some signs of pain that are similar to those shown by other animals, including reflex withdrawal responses and vocalizations,[11] yet their specific