

IACUC 參考資料 B

大小鼠疼痛/焦慮評估與常用止痛藥

Animals can experience pain and distress. It is the ethical and legal obligation of all personnel involved with the use of animals in research to reduce or eliminate pain and distress in research animals whenever such actions do not interfere with the research objectives.

動物也會感覺疼痛和焦慮。所有使用動物的研究人員都需有道德和法律責任，在不影響計劃目的下，減少或消除在操作中對動物造成的痛苦和焦慮。

Recognition of Pain and Distress

辨認疼痛與焦慮

Animals should be monitored for pain and distress as appropriate for the condition, procedure and degree of invasiveness. Critical to the assessment of the presence or absence of pain or distress is having the ability to distinguish between normal and abnormal animal behavior. This is especially true when dealing with rodents that often exhibit pain and distress with only subtle changes in their behavior.

應監控動物的疼痛與焦慮來判定侵擾動物的狀況、程序及程度。相關人員需有能力區別正常與異常的動物行為，來評估動物是否處於疼痛或焦慮。在啮齒類實驗動物的行為細微變化非常重要，可真實反應出這些動物的疼痛與焦慮。常見的行為變化如下表：

1) Lethargy 不活潑	reluctance to move 活動力降低
2) Abnormal posture 姿勢異常	Hunched 供背
3) Restlessness 躁動	pacing, constant motion 踱步、持續運動
4) Self-mutilation 自殘	licking, biting, scratching, rubbing 舔，咬，抓，摩擦
5) Vocalization 發出叫聲	squeaking when handled 抓取動物時發出叫聲
6) Aggression 出現攻擊性	biting when handled 抓取動物時咬人
7) Guarding 警覺狀	attempting to move away or protect painful area 試圖逃脫或保護疼痛的區域
8) Lack of Grooming 缺乏理毛	ruffled or greasy fur coat 毛髮粗鋼或油膩
9) Red staining of face 顏面色染	red discharge from eyes or nose (rats) 眼鼻出現紅色分泌物(大鼠)
10) Poor appetite 食慾差	
11) Weight loss 體重降低	loss of >10% of pre-operative body weight

與術前相較，體重降低 10% 以上

USDA Pain Levels

實驗造成之疼痛及焦慮分級表

等級	等級 B Category B	等級 C Category C	等級 D Category D	等級 E Category E
說明	僅繁殖代養 無實驗進行	輕微疼痛 不需用藥緩解	明顯疼痛 有用藥緩解	明顯疼痛 無用藥緩解
實例		1. 保定、秤重 2. 注射、採血 3. 打耳號 4. 人道安樂死 5. 不會造成動物生理狀況明顯改變之動物試驗	1. 穿刺採樣 2. 存活與非存活性手術 3. 眼窩採血 4. 食慾喪失 5. 皮膚創傷 6. 結膜炎 7. 角膜水腫 8. 傳染病誘發	1. 毒性試驗、微生物試驗或腫瘤試驗導致動物重病或瀕死 2. 眼睛或皮膚的刺激性試驗導致嚴重臨床症狀 3. 禁水、禁食時間過長 4. 長時間或重複性電擊 5. 燒傷或大規模皮膚創傷 6. 不人道安樂死
規範	無	無	應遵守麻醉及鎮痛藥品使用規範，正確及時投藥	若必需進行此類實驗，應於動物實驗申請書說明原因及試驗終點之判斷

ACCEPTABLE ANALGESICS FOR ADULT RODENTS

成年齧齒動物可接受的止痛劑

Analgesics can be given at several different time points: prior to general anesthesia, during general anesthesia and once the animal has regained consciousness.

止痛藥可在麻醉之前，麻醉期間，或是動物清醒後給予。

The most efficacious manner in which to use analgesics is **prior** to the “priming” of the central nervous system to the pain. Pre-emptive analgesia entails administering the first dose of analgesia prior to the animal returning to consciousness. The animal’s overall requirements for

analgesia will be reduced as compared to an animal that receives the first analgesic dose once it is fully conscious.

一般來說，在痛覺抵達中樞神經系統前投予止痛藥最有效。動物清醒前投與足量的止痛劑，相較於動物完全清醒後給藥量來的少。

大鼠與小鼠常用止痛劑：

	藥 劑	劑 量	投藥方式	備 註
1	Morphin	1.5-6 mg/kg, q2-4h	SC	
2	Butorphanol tartrate (Torbugesic™)	1-2 mg/kg, q4h 2.5-5 mg/kg, q2h	SC	
3	Buprenorphine(Buprenex™)	0.01-0.05 mg/kg	SC,IP	注射劑不得作為口服藥劑使用
4	Ketorolac	3-5 mg/kg, q12-24h 1 mg/kg, q12-24h	PO IM	
5	Carprofen	5 mg/kg, q12h	SC	
6	Meloxicam	1 mg/kg,q24h	SC,PO	

IV:靜脈注射，IM:肌肉注射，SC:皮下注射，IP:腹腔注射，PO:口服，IH:吸入性，qXh:每 X 小時投藥

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