University of Notre Dame IACUC Policy on Animal Pain and Distress

Background and Definitions

Responsible use of animals requires that attention be given to animal well-being. Health problems, pain and distress may introduce unwanted variables that can invalidate study results. Concern for animals also reflects a fundamental ethical principle that animals, regardless of species, should not undergo unnecessary pain or distress.

As signs of pain may vary between species or even between individuals, the operational definition of **pain** described in the U.S. Government Principles for the Utilization of and Care of Vertebrate Animals Used in Testing, Research and Training is useful. This definition states, "Unless the contrary is established, investigators should consider that procedures that cause pain or distress in human beings may cause pain and distress in other animals." In defining animal **stress**, one must distinguish between "stress" and "distress". The National Research Council appropriately defines stress as "an aversive state in which an animal is unable to adapt completely to stressors" In contrast, **distress** has been defined as "an aversive state in which an animal is unable to adapt completely to stressors and the resulting stress and shows maladaptive behaviors." Examples of potential **stressors** include pain, dehydration, starvation, fear, anxiety, boredom, separation, restraint, noise, poor environment, and chemical exposures.

Signs of persistent pain include[1]:

Sign	Explanation
Guarding	The animal alters its posture to avoid moving or causing contact to a body part, or to avoid the handling of that body area.
Abnormal appearance	Different species show different changes in their external appearance, but obvious lack of grooming resulting in ruffled fur coat or unkempt appearance, changed posture (a tucked abdomen), and a changed profile of the body are all observable signs. Rats may have accumulation of red porphyrin pigment around the eyes or nose when in pain or stressed. In species capable of some degree of facial expression, the normal expression may be altered (Squinting of eyes with cheek bulges in mice/rats).
Altered behavior	Behavior may be depressed, lethargic, with a decreased level of alertness; or may also exhibit restlessness (e.g., stretching and arching of the back, frequent repositioning by short, jumping motions (rat), lying down and getting up, shifting weight, circling, or pacing) or disturbed sleeping patterns. Animals in pain may also show altered social interactions with others in their group.
Vocalization	An animal may vocalize when approached or handled or when a specific body area is touched or palpated. It may also vocalize when moving to avoid being handled.
Mutilation	Animals may lick, bite, scratch, shake, or rub a painful area.
Salivation	Excessive salivation is often associated with some types of pain.
Ambulation	Limping or abnormal carriage of limb indicative of pain. Some animals may remain immobile, reluctant to stand or move even when disturbed.
Inappetence	Animals in pain frequently stop eating and drinking, or markedly reduce their intake, resulting in rapid weight loss.

Any of the above could, either alone or in combination, represent severe pain/distress, though such determinations are best made based upon the sound clinical judgment of the FLSC veterinary staff. When

uncertainty exists, the animal should be granted the benefit of the doubt, and measures implemented to decrease the pain or distress.

Examples of maladaptive behavior include:

-Self-trauma (scratching, chewing)
-Repeated flipping (mice)
-Rejection/cannibalization of neonates
-Circling or stereotyped pacing

It is the University of Notre Dame IACUC policy that a reasonable attempt is made to minimize, reduce, or eliminate pain and stress/distress experienced by animals used in research, teaching and testing at the University. In this regard:

1. A thorough search of the literature must be conducted to identify any methods that would replace the use of animals or that would refine the use of animals in such a way that pain and stress/distress would be minimized. This search should be current and use relevant search logic.
2. Analgesics must be used to relieve more than momentary pain resulting from experimental procedures. Use of analgesic compounds can be excluded if justified on scientific or clinical grounds. For example, if an investigator can demonstrate experimentally or through a literature search that analgesics would obscure a key experimental change, omission of analgesia would be justified; similarly, if chronic, low-grade pain were expected, such as might occur with a mild to moderate tumor burden, omission of analgesics might be justifiable. Specific analgesics, dosages and routes of administration must be approved by the FLSC Attending Veterinarian. Exceptions to this requirement must be approved by the IACUC.
3. Euthanasia must be performed on animals in severe pain or stress/distress and for which analgesia or other treatment is not practical for either scientific or clinical reasons. Rare exceptions must be strongly justified and approved by the IACUC. Euthanasia must be performed in a manner consistent with the FLSC Policy on Euthanasia and the AVMA Guidelines on Euthanasia.
4. Enrichment of the environment should be provided for all animals unless otherwise dictated by scientific or clinical requirements. Enrichment may take the form of group housing, novel food items, opportunities for foraging, items providing shelter or burrowing material, or other means which do not pose risk to the animals or personnel caring for the animals. Exceptions to this requirement must be approved by the IACUC.
5. Training must be undertaken by investigators and research personnel using animals to assure that methods and approaches to animal research are consistent with minimization of pain and stress/distress. Training and qualifications must be documented with the FLSC.

1. Recognition and Alleviation of Pain in Laboratory Animals. National Research Council (US) Committee on Recognition and Alleviation of Pain in Laboratory Animals. Washington (DC): National Academies Press (US); 2009.

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