

Guidelines – Definitions of Pain, Distress, and Alternative Techniques

Version 1.1

I. Definition of Potential Pain

Most authorities agree that pain is a perception, not a physical entity, and the perception of pain depends on a functioning cerebral cortex.

The strength at which stimulation is perceived by a human as pain is referred to as the **pain detection threshold**. The strongest intensity of noxious stimulation that a human being will permit an experimenter to deliver is called the **tolerance threshold**. Experimental evidence indicates that uniform pain detection thresholds for a given stimulus are experienced by a wide range of species of animals and man. However, the pain tolerance threshold for a given stimulus is more variable and is often species dependent.

In animal experimentation, it is more humane to consider pain detection thresholds when discussing all potentially painful stimuli, including extreme behavioral/psychological stress. For the purpose of protocol review, pain detection thresholds may be assumed under the following circumstances:

1. When the application of the noxious stimuli is sufficient to damage or destroy tissue.
2. When an animal indicates that it has perceived pain by:
 - a. Escape behavior or vocalization, in excess of that caused by normal handling, resulting from the noxious stimulus;
 - b. Deviation of physiological parameters from species baseline values, in direct response to the noxious stimulus;
 - c. When the potentially noxious stimulus is tried on the scientist him/herself with his/her resultant perception of pain.

II. Definition of Distress

Distress is a state in which animals are unable to adapt to an altered environment or to altered internal stimuli; prolonged or excessive distress may result in harmful physiological and behavior responses.

III. Definition of Alternative Techniques

The UIC Animal Care Committee has defined alternative techniques as “those techniques which **replace** the actual use of animals, **reduce** the numbers used and/or **refine** the techniques used to minimize the potential for the animals to experience pain or distress”.

The definition is based on the original concept of the “**3 R’s**” proposed by Russell and Burch in 1959 which defines the 3 R’s as follows:

Replacement means the substitution for conscious living higher animals with insentient material.

Reduction means reduction in the numbers of animals used to obtain information of a given amount and precision.

Refinement means any decrease in the incidence of severity of inhumane procedures applied to those animals which still have to be used.”

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