

Pain and distress in laboratory rodent and lagomorphs  
Report of the Federation of European Laboratory Animal Science  
Associations (FELASA) Working Group on Pain and Distress  
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The problem of pain, distress and suffering in laboratory animals is a constantly burning question to people working in the field of experimental sciences. The concepts are, however, difficult to define properly, and, furthermore, the definitions are not necessarily the same in e.g. the regulatory instructions of different European countries. For this reason a Working Group, formed by Dr. V. Baumans (convenor), Utrecht (NVP), Prof. P. F. Brain (secretary), Swansea (LASA), Prof. H. Brugère, Maison-Alfort (SFEA), Dr. P. Clausing, Jena (GV-SOLAS), Dr. T. Jeneskog, Umeå (Scand-LAS) and Dr. G. Perretta, Rome (AISAL), was created by the Federation of European Laboratory Animal Science Associations (FELASA) 1991 to produce recommendations which might be used jointly by the member-countries.

The report, published in *Laboratory Animals*, includes nine sections dealing with different aspects of the subject. The first section, on Definitions, emphasizes that pain, distress and suffering are terms that basically describe states of the human mind, i.e. human perceptions and experiences. However, the terms are used also to describe what is supposed to be equivalent states in animals. Regarding *experience*, physiology and psychology suggest that this implies that the animal (at least mammals) is conscious, i.e. has a functioning, alert cerebral cortex. As animals cannot verbally communicate its experience it is important, when judging whether an animal is in pain, that it shows a *pain response* by some change in behaviour. Distress is a state where the animal has to put substantial effort or resources to the adaptive response to challenges emanating from the environment, including the behaviour of researchers and technical staff.

Anxiety, frustration and depression are included in the definition of distress, as well as discomfort if considered as being a mild form. It is noted that, in assessing the level of pain or distress, it is not only a question of "stimulus intensity", but also a function of the animal's ability and opportunity to cope with the situation at hand. Suffering, finally, is a specific "state of mind" which is *not* identical to, but may be a consequence of, pain and/or distress. Pain or distress become a state of suffering when the intensity and/or duration of the perception/experience makes it intolerable to the animal, as shown by e.g. retarded growth, impaired breeding, abnormal behaviours and inadequate body care.

The section on mechanisms of pain describes shortly the neuroanatomy and neurophysiology from the peripheral receptors, via the dorsal horn of the spinal cord and the ascending pathways transmitting nociceptive signals to the brainstem and the cerebral cortex. It is noted that the frontal cortical lobes and the underlying parts of the higher brainstem, i.e. the areas supposed to deal with the motivational-affective (emotional) aspects of sensory, including nociceptive, information are those that have developed most conspicuously during vertebrate evolution. Hence, it is plausible that the capacity for interpretation of a nociceptive message is increasing, and possibly different, as we move up the evolutionary ladder. However, our basis for appropriate action should be the assumption that all mammals, in their own way, are able perceive and experience pain and distress, and also to remember situations associated with these sensations.

The following sections describe some assay methods used in rodents to test the efficacy

of putative analgesic compounds, and furthermore stresses the importance of different environmental factors that might influence pain sensitivity, and, hence, the outcome of analgesia tests. Concerning the sensitivity to nociceptive stimuli of different tissues and organs in the body, it is concluded that for practical purposes it is more important to evaluate the overall sensitivity of an animal to the experimental procedure performed than to classify tissue sensitivity. Pain and distress may, furthermore, make the interpretation of research data less reliable because of their influence on circulatory, respiratory, gastro-intestinal and other bodily functions as a result of "stress" reactions of an acute or chronic nature.

The sixth section, on Legal obligations, summarizes a survey of current European animal protection legislations, which showed that all countries have at least one of the terms "pain", 'distress' or 'suffering' included in their texts. A specific demand as to grading of severity is much less common, as is a demand for a cost-benefit evaluation of experimental procedures used.

We are reminded of the fact that different operational features, such as transport, physical macro-environmental and micro-environmental factors, as well as factors associated with the experimental procedures themselves, might be important potential sources of pain or distress to the animals.

The last two sections, on Signs of pain and distress and Grading of severity, describe quite extensively, different signs associated with pain and distress, and emphasize again that we have to rely on behavioural modifications of the animal to assess these unwanted states. To be able to do that, it is of course a prerequisite to be aware of the normal behavioural repertoire not only of the

species in question, but often also the particular stock or strain. The measurement of hormones (e.g. glucocorticoids) for the assessment of lasting pain or distress is discussed, but it is noted that many hormones are involved and interact in a complex way which makes definite conclusion as to the degree of pain or distress difficult. Recent literature on the problems of scoring pain or distress is summarized, and it is concluded that discomfort can be assessed in a qualitative and, more or less, also in a quantitative way mainly relying on detected deviations from the normal behavioural repertoire of the animals in question. A tentative list has been included in this section, of different behavioural signs which have been graded in the categories of 'mild', 'moderate' or 'severe'. Such a list has to be used with caution, of course, so as to arrive at an overall valid assessment, and not to over-emphasize any separate parameter of detected abnormal behaviour.

Finally, as a summary I would like to quote the last paragraph of the concluding remarks: "It is essential to recognize the variations between species (and even strain of the same species) and for workers to avoid anthropocentrism where possible. Legislators and scientists also have a duty to warn the general public about the dangers of too rapidly applying human values to other species. Action based on human values is not always helpful to animals and can actually prove deleterious."

The report is a valuable update for all concerned with the welfare of animals used in scientific activities, and is easily recommended. Another recent contribution to this field is the special issue on Prevention of Pain and Suffering, which appeared in this Journal in 1991 (Vol. 18, No. 4, 121-164).

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