Example of refining (Project 71-00, Arras)

Does a mouse feel pain?
Behavioural studies to reveal mild pain in mice

Researchers are keen to deal promptly and effectively with the smallest pain that can be felt by mice during animal experimentation. It is difficult if not impossible, however, to identify mild pain and stress in mice solely by observing their outward appearance and instinctive behaviour.

Margarete Arras' research group at the University of Zurich Institute of Laboratory Animal Sciences succeeded in developing a method for recognising mild to medium pain and stress which is suitable for practical use. Using telemetry, they determined the duration of post-operative pain and the effectiveness of analgesics, and correlated the data obtained with observations of behaviour. The mice were offered nest-building material or a tube filled with material and then it was noted how they cleared the material from the tube as well as the appearance of the nest they built. This provided reliable information about the welfare and the effectiveness of treatment with analgesics in animals used in laboratory experiments.

Laboratory mice used in experiments are closely monitored in order for stress and pain to be rapidly recognised and treated or for criteria governing the point of abandonment of an experiment to be applied. In this way, marked stress and impairment can be quickly identified on the basis of the animal's appearance. In the case of mild pain or stress, this method cannot be used. The aim of the studies carried out by Margarete Arras' research group at the University of Zurich Institute of Laboratory Animal Sciences was to develop methods for recognising mild to medium pain and stress that could be used in the laboratory in order to optimise the treatment and reduction of pain.

Using telemetry, they measured various parameters unbeknownst to the mice and without their being disturbed by the presence of humans. In this way it was possible to determine the duration of post-operative pain and the effectiveness of analgesics. The telemetric data were correlated with observations of the mice's behaviour, which was documented with long film recordings using infrared-sensitive cameras, special attention being paid to changes in the spontaneous, natural behaviour of the mice. Such behaviour included tunnelling and the urge to build nests.

This was the reason for providing fresh material for nest-building, such as pressed cotton pads, and subsequently observing the animals' behaviour. After a few hours, the time it took the mice to build a nest and the degree of neatness of the nest provided a reliable indication as to the well-being of the animals and the effectiveness of the analgesics used. The same principle applied to tunnelling, the mice being presented with a tube filled with cubes: even mice that had lived in the laboratory for generations started almost immediately to empty the tube. It was possible to demonstrate a low level of post-operative pain and the effectiveness of analgesics by observing the urge to dig tunnels.

The reliability of the test was demonstrated through a genetically induced intestinal disease. The test can easily be put into practice. For the first time methods are now available for de-

termining objectively the degree of pain suffered by rodents, and at the same time for testing the effectiveness of an analgesic. In the future, this method will help researchers optimise the treatment of pain in mice.

http://www.forschung3r.ch/en/projects/pr_71_00.html

margarete.arras@usz.ch 20 November 2012

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