

involves studying the effects on behaviour of compromising or removing neural tissue) with transcranial magnetic stimulation (TMS) is detailed. The latter technique replaces the need for permanent, surgical interference of brain tissue and has been used successfully to study the timing of information transfer between human cortical areas, and changes in brain function due to learning.

This guide is aimed at scientists new to research involving animals and to the debate surrounding animal use. For those requiring more detailed information, a list of organisations that are active in these issues is included. Appendices contain details of current UK legislation and a statement of the Royal Society's position on this topic.

**The use of non-human animals in research: a guide for scientists** (2004). 28 pp A5 paperback (ISBN 0 85403 598 2). Produced and published by The Royal Society and available free of charge from Science Advice Section, The Royal Society, 6-9 Carlton House Terrace, London SW1Y 5AG, UK. Also available at: <http://www.royalsoc.ac.uk/news>

### **Welfare of animals during transport**

In March 2002, the European Commission adopted a report by its Scientific Committee on Animal Health and Welfare (SCAHAW) on the welfare of animals during transport, which covered horses, pigs, sheep and cattle. A subcommittee of SCAHAW then set to work, under the chairmanship of Professor Donald Broom, to produce a further document covering the welfare of other species that are transported commonly. The resulting work (see details below) was adopted by the Commission on 31st March 2004 and has been published by the European Food Standards Authority. This report covers broilers, laying hens, turkeys, ducks, geese, pigeons, quails, ostriches and other ratite birds, deer, reindeer, rabbits, dogs, cats, rodents, primates, fish, reptiles and amphibians for the pet market, wild animals for translocation, invertebrates, and circus animals. In defining the task for the working group, SCAHAW requested that the group should address, in particular, loading densities, traveling times, resting times, watering and feeding intervals and interactions of these and other factors.

The report discusses general principles relevant to achieving good standards of welfare for transported animals and provides specific recommendations about transport on a species by species basis. Regarding the general principles, there are chapters on welfare assessment during transport, inspection, training of personnel, and on infectious disease aspects which include: effects of transport stress on susceptibility to infection, increased shedding of infection during transport, and the effects of transport on transmission and disease.

The species-specific sections vary in layout because very much more is known about the transport of, and the effects of transport on, some of the species covered than others. In most cases there is discussion of relevant aspects of the biology of the animals and the potential stresses of transport on them. This is followed by sections that cover pre-transport preparation and handling, journey management, feeding and watering, stocking density, thermal environment, and, for some species, transport times and post-transport treatment.

This is a valuable review and summary of the extensive scientific literature on this subject: the list of references includes some 700 publications. Some species are covered in very much greater depth than others (eg there are 24 pages on chickens but only one on primates). As the authors point out, "*the amount of scientific work about welfare during transport of animals varies from substantial to about zero*". Their aim, given that transport has to occur, has been to present "*the best possible basis for recommendations and legislation*". A few sections, for example that on ornamental fish, are so brief that it is hard to see how they could be used in this way but, in general, this is a substantial contribution that will be very useful to all those involved or interested in transporting animals.

**The welfare of animals during transport** (March 2004). Scientific Report of the Scientific Panel on Animal Health and Welfare on a request from the Commission related to the welfare of animals during transport (Question No. EFSA-Q-2003-094). 183 pp A4 paperback. Published by the European Food Standards Authority. Available at: [http://www.efsa.eu.int/science/ahaw/ahaw\\_opinions/424\\_en.html](http://www.efsa.eu.int/science/ahaw/ahaw_opinions/424_en.html)

### **Animal pain: the need for a cross-species approach**

In September 2002, 29 experts in animal and human pain (including veterinarians, biomedical researchers, and ethicists) gathered for an international workshop in Virginia, USA, in an effort to encourage cross-disciplinary communication and collaboration in the study of animal pain and to raise awareness of key areas where knowledge is lacking. A report on the workshop has recently been published in the *Journal of the American Veterinary Medical Association*, in which the participants state that "*animals feel pain and that although it is unclear... at what taxonomic level nociception is associated with pain and whether all species, including humans, feel pain with the same qualities and intensities, operationally, vertebrates and some invertebrates experience pain.*"

The report begins by discussing the debate concerning nociception versus pain, concluding that animals can experience pain although they cannot verbally express the emotional component of it. There follows a short discussion on taxonomic differences in the complexity of the CNS anatomy as one progresses up the phylogenetic tree, including whether pain perception differs from one species to the next. The report states that "*although higher degrees of encephalization imply greater self-awareness... and potential for mental distress, this may have minimal effect on the immediate, acute perception of and response to pain.*"

The next section highlights a number of gaps in our current knowledge of animal pain and analgesia, many of which relate to a lack of data on molecular biology, cell signalling, genomics, proteomics, and other basic mechanisms of pain. In order to address this issue, the report calls for a collaborative effort to form a new understanding of animal pain. Areas of particular concern include the large variability in the amount of species-specific information (especially related to analgesia), limited formal training in animal analgesia