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Managing pain in traumatic brain injury studies

Traumatic brain injury (TBI) comprises a serious health epidemic in the US. Animal models have been designed to parallel the pathological processes that occur in humans suffering from TBI and are powerful tools for evaluating morbidities and for testing therapeutic interventions after injury. Valid modeling of TBI requires accurate replication of both the mechanical forces that cause the primary injury and the conditions that lead to secondary injuries observed in human patients. Although pain and distress should be minimized through the use of anesthetic and analgesic agents, administration of such drugs can interfere with post-injury processes and functional outcomes, threatening the validity of the research. Rowe *et al.* present evidence for the influence of anesthetics and analgesics on the natural course of brain injury in animal models of TBI and suggest that drugs be selected on the basis of IACUC-approved experimental objectives.
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Evaluating pain-related behavioral depression

Effective treatment of pain in both human and veterinary medicine begins with accurate diagnosis. Behaviors used to diagnose pain in nonverbal organisms are identified as those elicited by noxious stimuli. Preclinical studies of pharmacological compounds to treat pain require reliable, accurate assays of pain-related behavior to evaluate the analgesic potential of new drugs. In some such assays, pain is indicated by depression of a target behavior, and analgesia is indicated by recovery of the target behavior. Operant conditioning procedures can be used to train subjects to express a target behavior (e.g., pressing a lever for food), and expression of that behavior is then used to assess pain states or analgesic effects of candidate drugs. Negus reviews recent research on assays of pain-depressed behavior that use intracranial self-stimulation (ICSS), a type of operant conditioning procedure, to evaluate the expression and pharmacological modulation of pain-related behavioral depression in rats.
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