



## **A Reference Source for the Recognition & Alleviation of Pain & Distress in Animals**

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## **PREFACE**

The Animal Welfare Information Center was established under the 1985 amendments to the Animal Welfare Act (Sect. 13(e)) and is required to provide specific information to the research community. One of these requirements deals with providing information

which would minimize pain and distress to animals used in research.

It is hoped that his publication will be useful to those involved with animal research and that it will provide guidance and information which is useful in further reducing pain and distress in research animals. Science, and humanity, owe a great deal to these animals and they should be provided with conditions as free of pain and distress as possible, both for the welfare and well- being of the animal, and for better scientific results.

## INTRODUCTION

One of the requirements of the Animal Welfare Act is that procedures are to be taken to ensure that pain and distress in research animals are minimized. This includes adequate veterinary care and the appropriate use of anesthetics, analgesics and tranquilizing drugs or euthanasia (Sect. 13(a)(3)(A)). In order to minimize pain or distress to an animal one must first be able to recognize when an animal is in, or likely to be in, pain or distress. Steps can then be taken to alleviate that pain or distress so far as allowed by the approved research protocol.

This publication provides a list of published reference sources on the recognition and alleviation of pain and distress in animals. It has been developed to provide a source of information and guidance to those using animals in research so that they may better recognize when an animal is suffering pain or distress, or may be likely to suffer pain or distress, and how that pain or distress may be minimized. This publication is not meant to be a complete resource on this subject but to provide a starting point for those concerned about the welfare and humane care of animals used in research. For additional, and more complete, information and resources we suggest you consult the following web site on the compilation of scientific literature on the assessment of animal welfare:

**Literature on the Assessment of Animal Welfare.**

**<http://www.vetinfo.demon.nl/aw/flist.html>**

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### GENERAL

Adams, D.B., (1988), **An approach to pain in research animals.** *Alternatives to Laboratory Animals* (ATLA). Nottingham: Fund for the Replacement of Animals in

Medical Experiments. Dec 1988, v. 16 (2), p. 145-154. ISSN: 0261-1929

NAL Call no: Z7994.L3A5

Descriptors: laboratory animals, animal experiments, pain, anesthesia, ethics, diagnosis, treatment, animal welfare.

Association of Veterinary Teachers & Research Workers, (1989), *Guidelines for the recognition & assessment of pain in animals*. Potters Bar, Herts: Universities Federation for Animal Welfare, c1989, 24p. ISBN: 0900767561  
NAL Call no: HV4708.G85  
Descriptors: animal experimentation, animal welfare.

Australian College of Veterinary Scientists. Chapter of *Anaesthetics & Intensive Care*, (1994), **Animal pain and its control**, April 1994. Sydney South, NSW, Australia: Post Graduate Committee in Veterinary Science, University of Sydney [1994], iv. 449p, ill. ISBN: 1875582363  
NAL Call no: SF604.R37 no.226  
Descriptors: pain in animals.

Australian College of Veterinary Scientists, (1996), **Guidelines for the management of pain in veterinary practice**. *Australian Veterinary Practitioner*, 1996, 26: 4, p. 206-209. ISSN: 0005-0423.  
NAL Call no: 41.8 AU72  
Descriptors: pain, pain management, analgesia, guidelines.

Balfour, J.A.; Buckley, M.M., (1991), **Etodolac. A reappraisal of its pharmacology & therapeutic use in rheumatic diseases & pain states**. *Drugs*, 1991 Aug., v. 42 (2), p. 274-299. ISSN: 0012-6667.  
Descriptors: Etodolac, pain, rheumatic diseases, therapeutic use.

Barnett, J.L., (1997), **Measuring pain in animals**. *Australian Veterinary Journal*, Brunswick, Victoria: Australian Veterinary Association, 1927-1997, v. 75 (12), p. 878-879. ISSN: 0005-0423.  
NAL Call no: 41.8 Au72  
Descriptors: animal welfare, pain, assessment, measurement.

Bateson, P., (1992), **Do animals feel pain?** *New-Science*, London, England: New Science Publications, Apr. 25, 1992, v. 134 (1818), p. 30, 32-33. ISSN: 0028-6664.  
NAL Call no: 472 N42  
Descriptors: animal experiments, animal welfare.

Bateson, P., (1991), **Assessment of pain in animals**. *Animal Behavior*, London: Academic Press, Nov 1991, v. 42 (pt5), p. 827-839. ISSN: 0003-3472.  
NAL Call no: 410 B77  
Descriptors: animal welfare, pain assessment.

Baumans, V. ; Benson, G.J. ; Flecknell, P. ; Morton, D. ; Short, C., (1994), **Detecting & alleviating pain in non-human animals**. *Humane Innovative Alternatives*, Washington Grove, MD: Psychologists for the Ethical Treatment of Animals, c1991, 1994, v. 8, p. 580-586. ISSN: 1062-4805.  
NAL Call no: QL55.H8  
Descriptors: animals, pain, animal welfare, detection, alleviation.

Baumberger, A., (1983), **How to combat pain in animals: a report on the practical application of analgesics in experimental animals**. *Schweizer Arch Tierheilkd*, Zurich: Gesellschaft Schweizerischer Tierärzte, Jan 1983, v. 125 (1), p. 17-29. ISSN: 0036-7281.  
Language: German, Summary in English, French, Italian.  
NAL Call no: 41.8 SCH9  
Descriptors: pain, analgesics, animals.

Bechara, A.; Harrington, F.; Nader, K.; van-der Kooy, D., (1992), **Neurobiology of motivation: Double dissociation of the motivational mechanisms mediating opiate reward in drug-naive versus drug-dependent animals**. *Behavioral Neuroscience*, 1992 Oct., v. 106 (5), p. 798-807. ISSN: 0735-7044.  
NAL Call no: QP351.B45  
Descriptors: neurobiology, opiate, motivational mechanisms.

Bemier, J.F., (1994), **Euthanasia**. *Canadian Association for Laboratory Animal Science Newsletter*. Ottawa: Canadian Association for Laboratory Animal Science, June 1994, v. 28 (3), p. 69-71, 73-74. ISSN: 0045-4354.  
NAL Call no: SF405.5.C36  
Descriptors: animals, euthanasia, methodology, pain, animal welfare.

Benson, G.J.; Thurmon, J.C., (1987), **Species differences as a consideration in alleviation of animal pain & distress**. *Journal of the American Veterinary Medical Association*, Schaumburg, IL: The Association, Nov 15, 1987, v. 191 (10), p. 1227-1230. ISSN: 0003-1488.  
NAL Call no: 41.8 AM3  
Descriptors: animals, pain, stress, analgesics.

Bonica, J.J., (1992), **Pain research & therapy: History, current status & future goals**. *Animal pain*, edited by Charles E. Short, Alan van Poznak, N.Y.: Churchill Livingstone, 1992, p. 1-29. ISBN: 0443087725.  
NAL Call no: SF910 P34A55 1992  
Descriptors: animals, pain, research, drug therapy, analgesics, livestock, laboratory animals, surgical operations, anesthesia.

Breazile, J.E., (1987), **Physiologic basis & consequences of distress in animals**. *Journal of the American Veterinary Medical Association*, Schaumburg, IL: The Association, Nov 15, 1987, v. 191 (10), p. 1212-1215, ill. ISSN: 0003-1488.  
NAL Call no: 41.8 AM3  
Descriptors: animals, stress, feeding behavior, hormones, nervous system, reproduction.

Britton, J.T.; Rice, L.J., (1992), **Local anesthetic toxicity**. *Animal pain*, edited by Charles E. Short, Alan van Poznak, N.Y.: Churchill Livingstone, 1992, p. 306-310, 315. ISBN: 0443087725  
NAL Call no: SF910.P34A55 1992  
Descriptors: small animal practice, laboratory animals, local anesthetics, toxicity.

Brown, M.J., (1990), **Principles of anesthesia & analgesia. Essentials for animal research: A primer for research personnel**. by B.T. Bennett, M.J. Brown and J.C. Schofield, Beltsville, Md, USDA, National Agricultural Library (1990), p. 39-58.  
NAL Call no: aQL55.B36  
Descriptors: domestic animals, laboratory animals, anesthesia, anesthetics, analgesics, pain.

Buchholtz, C.; Goetschel, A.F.; Hassenstein, E.G.; Sambraus, H.H.; Tschanz, B.; Wechsler, B.; Wolf, M.; Van-Loeper, E., (1993), **Suffering & abnormal behavior in animals**. *Tierhaltung*, 1993, 23: 119 p.; published by Birkhauser Verlag, Switzerland. ISBN: 3763426727.  
Language: German.  
NAL Call no: SF105.T5 Bd.23

Descriptors: intensive husbandry, abnormal behavior, animal welfare.

Carbone, Lawrence G., (1997), **Death by decapitation: A case study of the scientific definition of animal welfare.** College of Veterinary Medicine, Cornell University, Ithaca, NY. *Society and Animals*, Oct. 1997, v. 5 (3), p. 239-256. ISSN: 1063-1119.  
NAL Call no: QL85.S63  
Descriptors: animal-human relations, scientific research, abuse.

Carstens, E.E., (1987), **Endogenous pain suppression mechanisms.** *Journal of the American Veterinary Medical Association*, Schaumburg, IL. The Association, Nov. 15, 1987, v. 191 (10), p.1203-1206, ill. ISSN: 0003-1488.  
NAL Call no: 41.8 AM3  
Descriptors: animals, pain, suppression, neurophysiology.

Carli, G., (1992), **Immobility responses & their behavioral & physiologic aspects, including pain: A review.** *Animal pain*, edited by Charles E. Short, Alan van Poznak, N.Y.: Churchill Livingstone, 1992, p. 543-554. ISBN: 0443087725.  
NAL Call no: SF910.P34A55 1992  
Descriptors: animals, pain, immobilization, physiology, literature reviews, tonic immobility, hypnosis.

Cats, B.P., (1988), **Pain in neonates.** *New developments in biosciences: Their implications for laboratory animal science: Proceedings of the Third Symposium*, Amsterdam, The Netherlands, 1-5 June 1987, edited by Anton C. Beyneen and Henk A. Solleveld, Dordrecht: M. Nijhoff, 1988, p. 47-51. ISBN: 0898383544.  
NAL Call no: QL55.F43 1987  
Descriptors: laboratory animals, neonates, pain, animal behavior, physiology.

Clark, J.D.; Rager, D.R.; Calpin, J.P., (1997), **Animal well-being II. Stress & distress.** *Laboratory Animal Science*, Cordova, TN: American Association for Laboratory Animal Science, Dec. 1997, v. 47 (6), p. 571-579. ISSN: 0023-6764.  
NAL Call no: 410.9 P94  
Descriptors: animal welfare, stress, perception, motivation, adaptation.

Curtis, S.E.; Stricklin, W.R., (1991), **The importance of animal cognition in agricultural animal production systems: An overview.** *Journal of Animal Science*, 1991 Dec., v. 69 (12), p. 5001-5007. ISSN: 0021-8812.  
NAL Call no: 49 J82  
Descriptors: animal cognition, animal production systems.

Delft, A.M.L.-van, (1988), **Effects of exogenous pain relieving substances on experimental results.** *New developments in biosciences: Their implications for laboratory animal science: Proceedings of the Third Symposium*, Amsterdam, The Netherlands, 1-5 June, 1987, edited by Anton C. Beyneen and Henk A. Solleveld, Dordrecht M. Nijhoff, 1988, p. 59-61. ISBN: 0898383544.  
NAL Call no: QL55.F43 1987  
Descriptors: laboratory animals, animal experiments, pain, treatment, analgesics.

Delo, J.A.; Coombs, D.W.; Colburn, R.W., (1992), **The differentiation of nociceptive processing in mechanically & chemically induced visceral pain models.** *Animal pain*,

edited by Charles E. Short, Alan van Poznak, N.Y.: Churchill Livingstone, 1992, p. 497- 505, 507-508. ISBN: 0443087725.  
NAL Call no: SF910.P34A55 1992  
Descriptors: laboratory animals, pain, models, animal experiments, duodenal obstruction, analgesics, dosage, immunochemistry.

Doris, Pete A., (1989), **Humane principles & procedures in animal research.** *Animal research training series*, Lubbock, TX: Texas Tech University Health Science Center, c1989, 1 video cassette (30 min).  
NAL Call no: videocassette no. 804 and 805  
Descriptors: animal welfare, law and legislation (US), laboratory animals, animal experimentation.

Dubner, R., (1987), **Research on pain mechanisms in animals.** *Journal of the American Veterinary Medical Association*, Schaumburg, IL: The Association, Nov. 15, 1987, v. 191 (10), p. 1273-1276. ISSN: 0003-1488.  
NAL Call no: 41.8 AM3  
Descriptors: animals, pain, measurement, research, guidelines.

Dyson, D.H.; Mathews, K., (1992), **Recommendations for the intensive care management in small animals following anaesthesia.** Department of Clinical Studies, Ontario Veterinary College, Guelph, Ont. *Veterinary & Comparative Orthopaedics & Traumatology*, 1992, 5:2, p.66-70, 15 ref. ISSN: 0932-0814.  
NAL Call no: SF910.5.V4  
Descriptors: anaesthesia, postoperative complications, pain, therapy, postoperative care.

Erickson, H.H.; Kitchell, R.L., (1984), **Pain perception & alleviation in animals.** Federation of American Societies for Experimental Biology (FASEB). *Federation Proceedings*, v. 43 (5), 1984, p. 1307-1312. ISSN: 0014-9446.  
NAL Call no: 442.9 F31P  
Descriptors: pain, sedation, alleviation of pain, sensory receptor.

Faggella, A.M., (1997), **Management of pain in the critically ill patient.** *Seminars in Veterinary Medicine and Surgery-Small Animal*, Philadelphia, PA: W.B. Saunders Co., May 1997, v. 12 (2), p. 115-121. ISSN: 0882-0511.  
NAL Call no: SF911.545  
Descriptors: pain, control, analgesics, drug therapy, opioids, non-steroidal anti- inflammatory agents, application methods, animals.

Fikes, L.L.; Tranquilli, W.J.; Raffe, M.R., (1989), **Symposium on pain management. I Understanding pain & analgesic therapy in pets. II Classifying commonly used analgesic agents. III Selecting the right analgesic: Indications & dosage requirements.** College of Veterinary Medicine, University, Urbana, IL., *Veterinary Medicine*, 1989, 84: 7, p. 677-697, 44 ref. ISSN: 8750-7943.  
NAL Call no: 41.8 M69  
Descriptors: animal welfare, dog diseases, cat diseases, anti-inflammatory agents, opioids, anesthesia, burns, pain, young animals, analgesics.

Fraser, A.F.; Quine, J.P., (1989), **Veterinary examination of suffering as a behavior-linked condition.** *Applied Animal Behavior Science*, Amsterdam: Elsevier Science Publishers, B.V. July 1989, v. 23 (4), p. 353-364. ISSN: 0168-1591.

NAL Call no: QL750.A6

Descriptors: domestic animals, pain, animal welfare, veterinary medicine, animal behavior.

Flecknell, P.A., (1988), **The control of pain in animals.**

Veterinary Annual, London: *Scientifica*, 1989, v. 28, p. 43-48. ISSN: 0083-5870.

NAL Call no: 41.8 V6456

Descriptors: animals, pain, anesthetics, analgesics, treatment.

Flecknell, P.A., (1985), **Recognition & alleviation of pain in animals.** *Advances in Animal Welfare Science*, Boston:

Martinus Nijhoff Publishers, 1985, c1986, p. 61-77.

NAL Call no: HV4701.A34

Descriptors: laboratory animals, pain, animal welfare, analgesics, anti-inflammatory agents.

Flecknell, P.A.; Molony, V., (1997), **Pain & injury.** *Animal welfare*, Wallingford, Oxon, UK; N.Y.: CAB International, c1997, p.63-73. ISBN: 0851991807.

NAL Call no: HV4711.A587 1997

Descriptors: animals, pain, trauma, animal welfare.

Flecknell, P.A., (1994), **Refinement of animal use - assessment & alleviation of pain & distress.** *Laboratory Animals* (UK), 1994, v. 28 (3), p. 222-231. ISSN: 0023-6772.

NAL Call no: QL55.A1L3

Descriptors: laboratory animals, animal welfare, experimentation, pain, stress, mammals, neurophysiology.

Fleetwood-Walker, S.M.; Hope, P.J.; Mitchell, R.; Molony, V., (1991), **Control of pain by chemical gating in the dorsal horn: Role of opioids, tachykins, & other peptides.** *Animal pain*, edited by Charles E. Short, Alan van Poznak, N.Y.: Churchill Livingstone, 1991, p. 489-497, 506-507. ISBN: 0443087725.

NAL Call no: SF910.P34A55 1992

Descriptors: laboratory animals, pain, opioids, peptides, analgesics, spinal cord receptors, drug effects.

Fujimoto, J.L., (1992), **Dosage tables for opiate agonist & agonist-antagonists in laboratory animals.** *Animal pain*, edited by Charles E. Short, Alan van Poznak, N.Y.: Churchill Livingstone, 1992, p. 539-542. ISBN: 0443087725.

NAL Call no: SF910.P34A55 1992

Descriptors: agonists, antagonists, dosage, morphine, laboratory animals.

Gibson, T.E., (1985), **The proceedings of the Animal Welfare Foundation's Second Symposium: Entitled the detection & relief of pain in animals**, held 16 Apr. 1985.

*British Veterinary Association, Animal Welfare foundation*, 1985, 136 p. ISBN: 0901028290.

NAL Call no: HV4704.A54 1985

Descriptors: animal welfare congress, pain congress.

Grauvogl, A., (1982), **The concept of pain in animals, behavior, welfare.** *Tierzuchter, Hildesheim, W.Ger., Arbeitsgemeinschaft Deutscher Tierzuchter*, July 25, 1982, v. 34 (7), p. 297-301. ISSN: 0040-7364.

Language: German with a summary in English.

NAL Call no: 49 T445

Descriptors: pain, animals, behavior, welfare.

Hansen, B., (1997), **Pain.** *Seminars in Veterinary Medicine & Surgery Small Animal*, 1997, v. 12 (2), p.55-142, many ref.

NAL Call no: SF911.S45

Descriptors: pain, animals, surgery.

Hansen, Hans C., (1999), **Treatment of chronic pain with anti-epileptic drugs: A new era.** *Southern Medical Journal*, July 1999, v. 92 (7), p. 642-649. ISSN: 0038-4348.

Descriptors: chronic pain, management, analgesic drugs, anti-epileptics.

Hapke, H.J., (1977), **The influence of drugs on the manifestation & sensation of pain [animals].** *Kleinter Prex*, Mar. 1977, v. 22 (2), p. 55-58.

Language: German with a summary in English.

NAL Call no: 41.8 K67

Descriptors: pain, animals, drugs, behavior.

Hardie, E.M.; Kyles, A.E., (1995), **Pharmacological management of pain & infection in the surgical oncology patient.** *Veterinary Clinics of North America, Small Animal Practice*, 1995, v. 25 (1), p. 77-96. 60 ref. ISSN: 0195-5616.

NAL Call no: SF601.V523

Descriptors: dog diseases, surgery, anti-inflammatory agents, neoplasms, pain, drug therapy.

Harrison, P., (1991), **Do animals feel pain?** *Philosophy* (Cambridge) v. 65 no. 255, 1991, p. 25-40. ISSN: 0031-8191.

Descriptors: philosophy and ethics, pain perception in animals, philosophical evaluation.

Headly, P.M., (1993), **Norbook Lecture: Mechanisms of pain & its control.** *Veterinary Record.*, 1993, Aug. 14, v. 133 (7), p. 153-155. ISSN: 0042-4900.

NAL Call no: 41.8 V641

Descriptors: pain mechanisms, pain control.

Heavner, J.E., (1992), **Pain recognition during experimentation & tailoring anesthetic & analgesic administration to the experiment.** *Animal pain*, edited by Charles E. Short, Alan van Poznak, N.Y.: Churchill Livingstone, 1993, p. 509-513. ISBN: 0443087725.

NAL Call no: SF910.P34A35 1992

Descriptors: animal experiment, pain, anesthetics, analgesics, laboratory animals.

Hellyer, P.W.; Frederick, C.; Lacy, M.; Salman, M.D.; Wagner, A.E., (1999), **Attitudes of veterinary medical students, house officers, clinical faculty, & staff toward pain management in animals.** *Journal of the American Veterinary Medical Association.*, Schaumburg, IL: American Veterinary Medical Association, Jan. 15, 1999, v. 214 (2), p. 238-244. ISSN: 0003-1488.

NAL Call no: 41.8 Am3

Descriptors: pain, treatment, attitudes, veterinary medicine, medical students, teachers, personnel, analgesics.

Hellyer, P., (1998), **American College of Veterinary Anesthesiologists' position paper on treatment of pain in animals.** *Journal of the American Veterinary Medical Association*, Schaumburg, IL: American Veterinary Medical Association, Sept. 1, 1998, v. 213 (5), p. 628-630. ISSN: 0003-1488.

NAL Call no: 41.8 Am3

Descriptors: animal welfare, pain, symptoms, treatment, anesthesia.

Hooff, Jaram, van, (1988), **On the ethology of pain, its experience & expression.** *New developments in biosciences: Their implications for laboratory animal science. Proceedings of the Third Symposium*, Amsterdam, The Netherlands, 1-5 June 1987, edited by Anton C. Beyneen and Henk A. Solleveld, Dordrecht: M. Nijhoff, 1988, p. 41-46. ISBN: 0898383544.  
NAL Call no: QL55.F43 1987  
Descriptors: laboratory animals, animal experiments, pain, ethics, animal behavior.

Hooff, Jaram, van; Baumans, V.; Brain, P.F.; Zutphen, L.F.M. van (ed); Beyneen, A.C., (1993), **Recognition of pain & distress.** *Principles of laboratory sciences: A contribution to the humane use and care of animals and the quality of experimental results.* 1993, p. 255-265, 15 ref. Elsevier Science Publishers; Amsterdam, Netherlands. ISBN: 0444812709.  
NAL Call no: QL55.P762 1993  
Descriptors: laboratory animals, pain, animal welfare, animal experiments.

Hoskins, J.D., (1991), **Pain management.** *Veterinary Technician*, 1991, 12:10, p. 715-717, 12 ref. ISSN: 8750-8990.  
NAL Call no: SF406.A5  
Descriptors: pain, analgesics.

Hsu, W.H., (1992), **Antagonism of pharmacologic effects of xylazine.** *Animal pain*, edited by Charles E. Short, Alan van Poznak, N.Y.: Churchill Livingstone, 1992, p. 225-236, 243.  
ISBN: 0443087725.  
NAL Call no: SF910.P34A35 1992  
Descriptors: dogs, domestic animals, ruminants, agonists, adverse effects, adrenergic receptors, yohimbine, phenoybenzamine, propranolol, central nervous system, pain, drug therapy, xylazine.

Iggo, Ainsley, (1985), **Pain in animals:** The Hume Memorial Lecture, 15th Nov.1984 at King's College, Universities of London & 22nd Nov. 1984 at the Royal Society of Edinburgh. Potters Bar, Hertfordshire: *Universities Federation for Animal Welfare*, c1985, 16 p; ill.  
ISBN: 0900767375.  
NAL Call no: QP451.4.I28 1985  
Descriptors: animal welfare, pain, animals.

Institute of Laboratory Animal Resources (ILAR) (US). Committee on Pain & Distress in Laboratory Animals, (1992), **Recognition & alleviation of pain & distress in laboratory animals.** Washington, DC, National Academy Press, 1992, xiii, 137 p., ill. ISBN: 0309042755.  
NAL Call no: SF996.5.R43 1992  
Descriptors: laboratory animal diseases, pain in animals, laboratory animals, effect of stress on, animal welfare.

Jennings, R.C., (1998), **A philosophical consideration of awareness.** *Applied Animal Behavior Science*, 1998, v. 57, n. 3-4, p. 201-211. ISSN: 0168-1591.  
NAL Call no: QL750.A6  
Descriptors: self recognition, cognitive ability, reviews, philosophy.

Jennings, V.M., (1995), **Review of selected adjuvants used in antibody production.** *Institute for Laboratory Animal*

*Resources Journal*, Washington, DC, Institute for Laboratory Animal Resources, National Research Council, 1995, v. 37 (3), p. 119- 124. ISSN: 1084-2020.  
NAL Call no: QL55.A1143  
Descriptors: adjuvants, immunostimulants, antibodies, biological production, toxicity, adverse effects, pain, granuloma, arthritis, animal welfare, laboratory animals.

Jones, R.B., (1997), **Fear & distress.** *Animal Welfare*, Wallingford, Oxon, UK; N.Y.: CAB International, c1997, p. 75-87. ISBN: 0851991807.  
NAL Call no: HV4711.A587 1997  
Descriptors: animal suffering.

Kamerling, S.G., (1993), **Narcotics & local anesthetics.** *Veterinary Clinics of North America Equine Practice*, v.. 9 (3), 1993, p. 605-620, 46 ref. ISSN: 0749-0739.  
NAL Call no: SF951.V47  
Descriptors: anesthetics, local therapeutic use, horse diseases, drug therapy, pain, narcotics.

Keefe, F.J.; Fillingham, R.B.; Williams, D.A., (1991), **Behavioral assessment of pain: Nonverbal measures in animals & humans.** *Institute of Laboratory Animal Resources News*, Washington, DC: Institute of Laboratory Animal Resources, National Research Council, Winter/Spring 1991, v. 33 (1/2), p.3-13. ISSN: 0018- 9960.  
NAL Call no: QL55.A1143  
Descriptors: laboratory animals, man, pain evaluation, behavior.

Kelly, D.D., (1986), **Stress-induced analgesia.** *Annals of the New York Academy of Sciences*, New York, NY: New York Academy of Sciences, 1986, v. 467, 447 p. ISSN: 0077-8923.  
NAL Call no: 500 N484 v.467  
Descriptors: analgesia, stress physiology, central nervous system, pain, opium alkaloids, peptides, animals, nerves, tolerance.

Kitchell, R.L., (1987), **Problems in defining pain & peripheral mechanisms of pain.** *Journal of the American Veterinary Medical Association*, Schaumburg, IL: The Association, Nov. 15, 1987, v. 191 (10), p. 1195-1199. ISSN: 0003-1488.  
NAL Call no: 41.8 AM3  
Descriptors: animals, pain, neurophysiology, perception, receptors.

Kitchell, R.L.; Johnson, R.D., (1985), **Assessment of pain in animals.** *Animal stress*, editor Gary P. Moberg, Bethesda, MD: American Physiological Society, c1985, p. 113-140, ill. ISBN: 0683061011.  
NAL Call no: QP82.2.58A55  
Descriptors: domestic animals, pain, senses, perception, animal behavior, cerebral cortex, receptors, thalamus.

Kitchell, R.L.; Ericksen, H.H.,(Eds), (1983), **Animal pain: Perception & alleviation.** *American Physiological Society*, 1983: i-x, p. 1-221, ill. Based on a symposium held at 66th Annual Meeting, Federation of American Societies for Experimental Biology (FASEB), New Orleans, 1982.  
NAL Call no: QP451.4.A54  
Descriptors: pain, perception, alleviation.

Klide, A.M., (1993), **Use of acupuncture for the control of chronic pain & for surgical anesthesia.** *Animal pain*, edited

by Charles E. Short, Alan van Poznak, N.Y.: Churchill Livingstone, 1992, p. 249-257. ISBN: 0443087725.  
NAL Call no: SF910.P34A55 1992  
Descriptors: animals, horses, laminitis, surgical operations, analgesics, treatment, acupuncture.

Kyles, A.E., (1998), **Transdermal fentanyl**. *Compendium on Continuing Education for the Practicing Veterinarian*, 1998, v. 20 (6), p. 721-722, 724-726, 23 ref. ISBN: 0444824243.  
ISSN: 0193-1903.  
NAL Call no: SF601.C66  
Descriptors: pain, analgesia.

Lane, D.R., (1987), **The assessment of welfare in diseased companion animals**. *The proceedings of the British Veterinary Association, Animal Welfare Foundation's fifth symposium: Entitled "Animal disease--a welfare problem?"* held on 18 Nov. 1987, edited by T.E. Gibson; asst. ed., D.A. Paterson, London: The Foundation, 1987, p. 31-41. ISBN: 0901028347.  
NAL Call no: HV4704.A54 1987  
Descriptors: animal welfare, pet animals, animal diseases, pain, euthanasia, veterinary services.

Loeffler, K., (1993), **Pain & fear in animals**. *Deutsche Tierärztliche Wochenschrift*, 1993, Feb., v. 100 (2), p. 69-70, 11 ref. ISSN: 0341-6593.  
Language: German with a summary in English.  
NAL Call no: 41.8 D482  
Descriptors: nervous system, fright, animal behavior, pain, animal welfare.

Loew, F.M., (1981), **Alleviation of pain: The researchers obligation**. *Laboratory Animals*, N.Y., United Business Publications, Sept. 1981, v. 10 (5), p. 36, 38. ISSN: 0093-7355.  
NAL Call no: QL55.A1L33  
Descriptors: pain, drugs, alleviation.

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Descriptors: animals, pain, endorphins.

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Descriptors: horses, animal behavior, animal welfare, animal research, laboratory animals, pain, castration, suxamethonium.

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Descriptors: dogs, cats, analgesics, pain, opium alkaloids, receptors, narcotic antagonists, anti-inflammatory agents, arachidonic acid, modes of action, treatment, dosage.

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Descriptors: pain, management.

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Descriptors: animals, pain, neurons, animal behavior, post operative care, veterinary practice, animal welfare, analgesics, anesthetics.

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Descriptors: laboratory animals, rats, pain, alpha adrenergic receptors, drugs, testing drug effects, analgesics, yohimbine, dosage, methoxamine.

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Descriptors: laboratory animals, animal experiments, animal welfare, death & dying, assessment, pain, euthanasia.

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Descriptors: laboratory animals, animal welfare, pain.

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Descriptors: animals, pain, measurement, central nervous system, reflexes, analgesics.

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Language: Dutch with a summary in English.  
NAL Call no: 41.8 T431  
Descriptors: sows, calves, intensive livestock farming, pain, endorphins, stress, abnormal behavior.

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Descriptors: spinal cord, sensory reception, nervous system & behavior, pain reception & responses.

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## LABORATORY ANIMALS

### GENERAL

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NAL Call no: 41.8 AM3

Descriptors: laboratory animals, pain, stress, adjuvants, monoclonal antibodies, infectious diseases, animal experiments.

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NAL Call no: 41.8 R3224

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NAL Call no: 41.8 R3224

Descriptors: dogs, cats, analgesics, dosage, drug effects, anesthesia, pain.

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NAL Call no: QL55.A1L3

Descriptors: laboratory animals, pain, analgesics.

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NAL Call no: QL55.A1L3

Descriptors: laboratory animals, local anesthetics, lidocaine, intravenous injection, ointments, local anesthesia.

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NAL Call no: SF77.F5

Descriptors: laboratory animals, anaesthesia.

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Descriptors: laboratory animals, anaesthesia.

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NAL Call no: QL55.L274

Descriptors: laboratory animals, animal welfare, anesthesia, analgesics, pain, stress, pharmacokinetics.

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Descriptors: laboratory animals bibliography, animal experimentation bibliography, pain bibliography, analgesia bibliography, veterinary anesthesia bibliography.

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Descriptors: humane endpoints, animals, experiments, biomedical research.

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NAL Call no: 41.8 AM3

Descriptors: laboratory animals, pain, stress, animal behavior, animal experiments, restricted feeding.

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NAL Call no: SF601.I4

Descriptors: dogs, spine, pain, spinal cord, radiography, spondylitis, trauma, degeneration, neoplasms, meningitis, drug therapy.

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Language: German with a summary in English.

NAL Call no: 41.8-B45

Descriptors: pain, laboratory animals, elimination, control.

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NAL Call no: 41.8 AM3

Descriptors: laboratory animals, pain, stress, animal experiments, experimental design, animal husbandry, carcinoma, toxicology.

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NAL Call no: HV4735.M67

Descriptors: laboratory animals, animal welfare, animal experimentation.

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NAL Call no: 41.8 V641

Descriptors: laboratory animals, animal welfare, pain.

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NAL Call no: QL55.A1L33

Descriptors: pain, relief, animal welfare act.

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NAL Call no: QL55.N48

Descriptors: laboratory animals, pain, protection, animal experiments.

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Descriptors: laboratory animals, pain, animal welfare.

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Descriptors: laboratory animals, animal welfare, pain , control.

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Descriptors: laboratory animals, animal research, pain, stress, students, psychology, attitudes.

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Descriptors: laboratory animals, pain, standards, improvement, analgesics, surgical operations, animal welfare, anesthetics.

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Descriptors: post operative pain, management, dogs, cats.

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Descriptors: canine, spinal surgery, postoperative management.

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Descriptors: analgesics, drug therapy, animal welfare, pain.

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Descriptors: rats, analgesics, postoperative care.

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Descriptors: dogs, cats, analgesics.

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Descriptors: cats, pain, ovariectomy, hysterectomy, anesthesia, medetomidine, ketamine, acepromazine, thiopental.

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Descriptors: animals, postoperative care, pain, inhaled anesthetics, anesthetics, local anesthetics, opioids, analgesics, agonists.

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Descriptors: medetomidine, pain, alleviation, dogs.

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NAL Call no: QL55.A1L3  
Descriptors: rats, hepatomegaly, pain, assessment.

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Descriptors: pain, adrenal medullary transplants, spinal cord injury.

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NAL Call no: 410.9 P94  
Descriptors: rats, newborn animals, droperidol, methoxyfluthane, ketamine, pentobarbital, fentanyl, combination, anesthesia, induction, hypothermia, efficacy, safety.

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NAL Call no: 410.9 P94  
Descriptors: rats, laboratory animals, man, carbon dioxide, oxygen, mixtures, anesthesia, euthanasia, pain, histology, animal welfare.

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NAL Call no: Film S-1779  
Descriptors: alleviation, neuropathic pain, cell grafts.

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NAL Call no: QL55.A1L3  
Descriptors: rats, local anesthetics, opioids, analgesics, postoperative care, timing, body weight, feed intake, water intake, physical activity, laparotomy, pain.

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Descriptors: nerve injury, immunoreactivity, adrenal medullary grafts.

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NAL Call no: 41.8 V643

Descriptors: pain, surgery, abdomen, analgesics, opioids, food intake, water intake, body weight, locomotion, rats.

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NAL Call no: QL55.F43 1993

Descriptors: pain assessment, pain relief, rats.

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Descriptors: analgesia, sciatic nerve, ketorolac tromethamine.

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NAL Call no: RB127.P34

Descriptors: pain responses, attenuation, adrenal medullary transplants.

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NAL Call no: QL55.A1L3

Descriptors: rats euthanasia, carbon dioxide, heart rate, blood pressure, oxygen, animal behavior, death.

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NAL Call no: 410.9 P94

Descriptors: rats, male animals, pentobarbitol, fentanyl, droperidol, ketamine, xylazine, diazepam, pain, drug effects.

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NAL Call no: RB127.P34

Descriptors: alleviation, allodynia-like behaviors, spinal cord injury.

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NAL Call no: QL55.A1L3

Descriptors: rats, blood sampling, pain, veins, animal welfare, body weight, blood volume, hematocrit, feed intake, water intake, erythrocyte count.

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NAL Call no: QL55.A1L3

Descriptors: laboratory animals, rodents, lagomorphs, animal welfare, pain measurements, symptoms, law, rabbits.

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NAL Call no: QL55.L342

Descriptors: rodents, laboratory animals, animal welfare, pain.

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NAL Call no: SF910.P34A55 1992

Descriptors: laboratory animals, pain, rodents, post operative complications, postoperative care, locomotion, anesthetics, water intake, drug effects, surgical operations, food intake, adverse effects.

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Descriptors: melatonin effects, behavior, mediation.

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NAL Call no: QL55.A1L3

Descriptors: mice, rabbits, pain, anti-inflammatory agents, analgesics, dosage, adverse effects.





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