Joan Kendig
Professor of Biology in the Department of Anesthesia, Emeritus
Anesthesiology, Perioperative and Pain Medicine

Bio

ACADEMIC APPOINTMENTS
- Emeritus Faculty, Acad Council, Anesthesiology, Perioperative and Pain Medicine

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS
My laboratory tries to find out how pharmacologic agents used in the practice of anesthesia (general anesthetic and analgesic agents) lead to therapeutically desirable endpoints including unconsciousness, immobility and absence of pain. The old idea that general anesthetics are uniformly non-specific "membrane stabilizers" has given way to the realization that these agents exert specific actions on particular ion channels and intracellular signalling systems. Currently we are identifying anesthetic effects on ligand-gated and second messenger-operated ion channels in mammalian neurons, using both receptor-specific evoked potentials from isolated superfused spinal cord and whole cell patch clamp of neurons in situ in spinal cord slices. The goal of the research program is to construct a manageable set of actions which alone or in combination are both necessary and sufficient to bring about an anesthetic state. Most recently we have focused attention on mechanisms of spinal sensitization that contribute to chronic pain following injury and also to the development of tolerance to anesthetic and analgesic agents. We have described and partially characterized long term potentiation (LTP) in isolated spinal cord. We have also discovered long-lasting increases in spinal cord excitability following exposure to opioids such as morphine and to ethanol; these changes may be related to mechanisms of tolerance, dependence, and withdrawal.

Publications

PUBLICATIONS
- Hyperresponsiveness on washout of volatile anesthetics from isolated spinal cord compared to withdrawal from ethanol ANESTHESIA AND ANALGESIA
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- Protein kinase C gamma mediates ethanol withdrawal hyper-responsiveness of NMDA receptor currents in spinal cord motor neurons BRITISH JOURNAL OF PHARMACOLOGY
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- Acute and chronic ethanol exacerbates formalin pain in neonatal rats NEUROSCIENCE LETTERS
  Shumilla, J. A., Sweitzer, S. M., Kendig, J. J.
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- Acute and chronic ethanol does not affect incisional pain in neonatal rats NEUROSCIENCE LETTERS
  Shumilla, J. A., Sweitzer, S. M., Kendig, J. J.
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- Mechanical allodynia and thermal hyperalgesia upon acute opioid withdrawal in the neonatal rat PAIN
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- Exaggerated nociceptive responses on morphine withdrawal: roles of protein kinase C epsilon, and gamma *PAIN*
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- Inhibition of spinal protein kinase C-epsilon or -gamma isoforms does not affect halothane minimum alveolar anesthetic concentration in rats *ANESTHESIA AND ANALGESIA*
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- Protein kinase C epsilon and gamma: Involvement in formalin-induced nociception in neonatal rats *JOURNAL OF PHARMACOLOGY AND EXPERIMENTAL THERAPEUTICS*
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- Ethanol withdrawal hyper-responsiveness mediated by NMDA receptors in spinal cord motor neurons *BRITISH JOURNAL OF PHARMACOLOGY*
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- Ethanol tachyphylaxis in spinal cord motorneurons: role of metabotropic glutamate receptors *BRITISH JOURNAL OF PHARMACOLOGY*
  Li, H. F., Wang, M. Y., Knappe, J., Kendig, J. J.
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- Pre- and postsynaptic volatile anaesthetic actions on glycineergic transmission to spinal cord motor neurons *BRITISH JOURNAL OF PHARMACOLOGY*
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- In vitro networks: subcortical mechanisms of anaesthetic action *BRITISH JOURNAL OF ANAESTHESIA*
  Kendig, J. J.
  2002; 89 (1): 91-101

- Acetylcholine receptors do not mediate isoflurane's actions on spinal cord in vitro *ANESTHESIA AND ANALGESIA*
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  Wong, S. M., Cheng, G., Homanics, G. E., Kendig, J. J.
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  Cheng, G., Kendig, J. J.
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• **ISOFLURANCE DEPRESSES BOTH GLUTAMATE-MEDIATED AND PEPTIDE-MEDIATED SLOW SYNAPTIC TRANSMISSION IN NEONATAL RAT SPINAL-CORD**  
  *ANNALS OF THE NEW YORK ACADEMY OF SCIENCES*  
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  Kendig, J. J., MacIver, M. B., Roth, S. H.  
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  Savola, M. K., MacIver, M. B., Doze, V. A., Kendig, J. J., Maze, M.  

• **ALPHA-2-ADRENOCEPTORS INHIBIT A NOCICEPTIVE RESPONSE IN NEONATAL RAT SPINAL-CORD**  
  *EUROPEAN JOURNAL OF PHARMACOLOGY*  
  Kendig, J. J., Savola, M. K., Woodley, S. J., Maze, M.  
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• **ANESTHETIC EFFECTS ON RESTING MEMBRANE-POTENTIAL ARE VOLTAGE-DEPENDENT AND AGENT-SPECIFIC**  
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• **ENFLURANE-INDUCED BURST DISCHARGE OF HIPPOCAMPAL CA1-NEURONES IS BLOCKED BY THE NMDA RECEPTOR ANTAGONIST APV**  
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