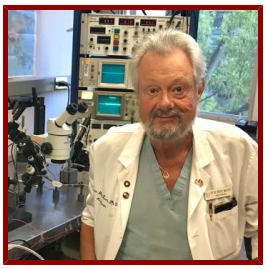
Stanford



M Bruce MacIver

Professor (Research) of Anesthesiology, Perioperative and Pain Medicine, Emeritus

NIH Biosketch available Online

Bio

BIO

I am a happy camper, searching for roads less traveled that end in wilderness trails.

ACADEMIC APPOINTMENTS

- Emeritus Faculty, Acad Council, Anesthesiology, Perioperative and Pain Medicine
- Member, Bio-X
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Neuroscience Program Executive, Stanford Medical School, (1997-2005)
- Neuroscience Admissions Panel, Stanford Medical School, (2000-2005)
- NIH Study Section - Adjunct, NIH, (2004-2012)
- Neuroscience Subcommittee, Amer Soc Anesthesiology, (2006-2013)
- Environmental Health & Safety, Stanford University, (2006-2009)
- Committee on Graduate Studies, Stanford University, (2008-2011)
- Faculty Senate, Stanford Medical School, (2008-2017)
- NIH SAT Study Section, NIH, (2013-2020)
- File Reviewer, Stanford Neuroscience PhD Program, (2017- present)
- Associate Editor, Journal of Neurophysiology, (2020- present)
- Editorial Board, Trends in Anaesthesia and Critical Care, (2020- present)
- Associate Editor, Anesthesia & Analgesia, (2022- present)

HONORS AND AWARDS

- Allen V. Cox Medal, Stanford University (2004)
- Top 100 Citations, Anesthesia & Analgesia (2005)
- Top 10 % Reveiwer, Publons (publons.com) (2015)
- Top 5 % of Reviews, Faculty of 1000 (2010 - 2015)
- Elmer Zsigmond Award, International Society for Anaesthetic Pharmacology (2017)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Subcommittee Member, American Society of Anesthesiology (2005 - 2013)
- Member, Society for Neuroscience (1985 - present)
- Member, Association of University Anesthesiologists (1998 - present)
- Member, International Society for Anaesthetic Pharmacology (2013 - present)

PROFESSIONAL EDUCATION

- BSc MSc PhD, University of Calgary, Alberta , Neuropharmacology (1987)

COMMUNITY AND INTERNATIONAL WORK

- KQED, San Francisco
- Sierra Club since 1987
- Amnesty International since 1996
- Wilderness Foundation since 1991

LINKS

- MacIver Lab Home Page: https://web.stanford.edu/group/maciverlab/

Research & Scholarship

RESEARCH INTERESTS

- Assessment, Testing and Measurement
- Brain and Learning Sciences
- Research Methods

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Neuropharmacology

Cellular, synaptic and molecular mechanisms of action of central nervous system drugs; especially barbiturates, opiates, anesthetics, abused inhalants and new experimental drugs. We use electrophysiological recording techniques and selective pharmacological probes, in hippocampal and cortical brain slices, to investigate sites and mechanisms of action for CNS active agents. The long-term goal of our studies is to provide physiological background information required for the rational design of safer and more effective drugs for anesthesia. Our recent studies have focussed on anesthetic effects at glutamate and GABA-mediated synapses as important targets for the CNS depressant effects of these agents. Depressed glutamate-mediated excitatory neurotransmission appears to be a common effect produced by most general anesthetics. We are currently studying agent specific actions at AMPA and NMDA glutamate receptor subtypes. Enhanced GABA-mediated inhibitory neurotransmission also appears to play an important role for many anesthetics. Anesthetics act at both pre- and post-synaptic sites to alter neurotransmission in higher brain centers. Thus, discrete synaptic targets could provide fruitful avenues for the development of safer and more effective therapeutic agents for analgesia and anesthesia.

Teaching

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Anesthesia (Fellowship Program)
- Bioengineering (Phd Program)
- Neurosciences (Phd Program)

Publications

PUBLICATIONS

- **A historical review of ephaptic field research: from early foundations through contemporary renaissance.** *Frontiers in human neuroscience*
  Hunt, T., MacIver, M. B.
  2026; 20: 1747899

- **Lamotrigine Restores Impairments in Theta Rhythms and LTP as Early Biomarkers of Aβ1-42-Induced Hippocampal Network Dysfunction** *AGING AND DISEASE*
  Studzian, M., Bobula, B., Maciver, M., Bocian, R., Kobrzycka, A., Caban, B., Kowalczyk, T., Grebowski, J., Michlewska, S., Jankowski, M. M., Tokarski, K., Kazmierska-Grebowska, P.
  2025

- **Lamotrigine Restores Impairments in Theta Rhythms and LTP as Early Biomarkers of Aβ1-42-Induced Hippocampal Network Dysfunction.** *Aging and disease*
  Studzian, M., Bobula, B., MacIver, M. B., Bocian, R., Kobrzycka, A., Caban, B., Kowalczyk, T., Grebowski, J., Michlewska, S., Jankowski, M. M., Tokarski, K., Kazmierska-Grebowska, P.
  2025

- **Solving the enigma of burst suppression. Response to Br J Anaesth 2025.** *British journal of anaesthesia*
  Liou, J. Y., Maciver, M. B., Sleigh, J. W.
  2025

- **Solving the enigma of burst suppression.** *British journal of anaesthesia*
  Liou, J. Y., Maciver, M. B., Sleigh, J. W.
  2025; 134 (4): 900-902

- **Reduced GABAA, slow synaptic inhibition in Alzheimer's disease.** *Journal of Alzheimer's disease : JAD*
  MacIver, M. B., Pearce, R. A.
  2025: 13872877251328940

- **Comparative Electroencephalographic Profile of a New Anesthetic and Anticonvulsant That Is Selective for the GABAAR Slow Receptor Subtype.** *Anesthesia and analgesia*
  Maciver, M. B., McCarren, H. S., Eagleman, S. L., Davies, F. M., Jahangir, A., Pal, D., Mashour, G. A., Bertaccini, E. J.
  2024

- **Missing Puzzle Pieces in Dementia Research: HCN Channels and Theta Oscillations** *AGING AND DISEASE*
  Kazmierska-Grebowska, P., Jankowski, M. M., MacIver, M.
  2024

- **Cannabinoids in Treating Chemotherapy-Induced Nausea and Vomiting, Cancer-Associated Pain, and Tumor Growth.** *International journal of molecular sciences*
  Bathula, P. P., Maciver, M. B.
  2023; 25 (1)

- **Electronic Energy Migration in Microtubules.** *ACS central science*
  Kalra, A. P., Benny, A., Travis, S. M., Zizzi, E. A., Morales-Sanchez, A., Oblinsky, D. G., Craddock, T. J., Hameroff, S. R., MacIver, M. B., Tuszyński, J. A., Petry, S., Penrose, R., Scholes, et al
  2023; 9 (3): 352-361

- **Consciousness and inward electromagnetic field interactions.** *Frontiers in human neuroscience*
  MacIver, M. B.
  2022; 16: 1032339

- **Lamotrigine Attenuates Neuronal Excitability, Depresses GABA Synaptic Inhibition, and Modulates Theta Rhythms in Rat Hippocampus.** *International journal of molecular sciences*
  Kazmierska-Grebowska, P., Siwiec, M., Sowa, J. E., Caban, B., Kowalczyk, T., Bocian, R., MacIver, M. B.
  1800; 22 (24)

- **Ketamine Produces a Long-Lasting Enhancement of CA1 Neuron Excitability.** *International journal of molecular sciences*
  Jang, G., MacIver, M. B.
  2021; 22 (15)
- **Offline comparison of brain function monitors for geriatric anaesthetic-induced electroencephalogram changes** *British Journal of Anaesthesia*
  Eagleman, S., Drover, C., Li, X., MacIver, B., Drover, D.
  2021
- **Molecular diversity of anesthetic actions is evident in electroencephalogram effects in humans and animals** *International Journal of Molecular Sciences*
  Eagleman, S., MacIver, M.
  2021; 22 (2)
- **Advances in precision anaesthesia may be found by testing our resistance to change** *British Journal of Anaesthesia*
  Eagleman, S. L., MacIver, M.
  2020
- **A newly developed anesthetic based on a unique chemical core.** *Proceedings of the National Academy of Sciences of the United States of America*
  Cayla, N. S., Dagne, B. A., Wu, Y., Lu, Y., Rodriguez, L., Davies, D. L., Gross, E. R., Heifets, B. D., Davies, M. F., MacIver, M. B., Bertaccini, E. J.
  2019
- **Wake Up, Neurons! Astrocytes Calling** *ANESTHESIOLOGY*
  Perouansky, M., MacIver, M., Pearce, R. A.
  2019; 130 (3): 361–63
- **Wake Up, Neurons! Astrocytes Calling.** *Anesthesiology*
  Perouansky, M., MacIver, M. B., Pearce, R. A.
  2019
- **Nonlinear dynamics captures brain states at different levels of consciousness in patients anesthetized with propofol.** *PLoS One*
  Eagleman*, S. L., Chander*, D., Reynolds, C., Ouellette, N. T., MacIver, B.
  2019
- **Do Complexity Measures of Frontal EEG Distinguish Loss of Consciousness in Geriatric Patients Under Anesthesia?** *Frontiers in neuroscience*
  Eagleman, S. L., Vaughn, D. A., Drover, D. R., Drover, C. M., Cohen, M. S., Ouellette, N. T., MacIver, M. B.
  2018; 12: 645
- **Can you hear me now? Information processing in primary auditory cortex at loss of consciousness.** *British journal of anaesthesia*
  Eagleman, S. L., MacIver, M. B.
  2018; 121 (3): 526-529
- **Remifentanil and Nitrous Oxide Anesthesia Produces a Unique Pattern of EEG Activity During Loss and Recovery of Response** *FRONTIERS IN HUMAN NEUROSCIENCE*
  Eagleman, S. L., Drover, C. M., Drover, D. R., Ouellette, N. T., MacIver, M.
  2018; 12: 173
- **Can you hear me now? Information processing in primary auditory cortex at loss of consciousness** *British Journal of Anaesthesia*
  Eagleman, S. L., MacIver, M. B.
  2018; 121 (3): 526-529
- **Do complexity measures of frontal EEG distinguish loss of consciousness in geriatric patients under anesthesia?** *Frontiers in Neuroscience*
  Eagleman*, S. L., Vaughn*, D. A., Drover, D. R., Drover, C. M., Cohen, M. S., Ouellette, N. T., MacIver, B.
  2018
- **High Dose Gamma Radiation Selectively Reduces GABAA-slow Inhibition.** *Cureus*
  Dagne, B. A., Sunay, M. K., Cayla, N. S., Ouyang, Y., Knox, S. J., Giffard, R. G., Adler, J. R., Maciver, B.
  2017; 9 (3)

- **Alteration of Interneuron Immunoreactivity and Autophagic Activity in Rat Hippocampus after Single High-Dose Whole-Brain Irradiation.** *Cureus*
  Ouyang, Y. B., Ning, S. n., Adler, J. R., Maciver, B. n., Knox, S. J., Giffard, R. n.
  2017; 9 (6): e1414
- **Median Raphe Stimulation-Induced Motor Inhibition Concurrent With Suppression of Type 1 and Type 2 Hippocampal Theta** *HIPPOCAMPUS*
  Bland, B. H., Bland, C. E., MacIver, M. B.
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- **Mind and Brain: Consciousness in Unresponsive Subjects** *CURRENT BIOLOGY*
  MacIver, M. B.
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- **Anesthetic agent-specific effects on synaptic inhibition.** *Anesthesia and analgesia*
  MacIver, M. B.
  2014; 119 (3): 558-569
- **Chaos analysis of EEG during isoflurane-induced loss of righting in rats.** *Frontiers in systems neuroscience*
  MacIver, M. B., Bland, B. H.
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- **Teaching an Old GABA Receptor New Tricks** *ANESTHESIA AND ANALGESIA*
  Trudell, J. R., Bertaccini, E., MacIver, M. B.
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- **Human Subthalamic Neuron Spiking Exhibits Subtle Responses to Sedatives** *ANESTHESIOLOGY*
  MacIver, M. B., Bronte-Stewart, H. M., Henderson, J. M., Jaffe, R. A., Brock-Utne, J. G.
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- **Loss of Recall and the Hippocampal Circuit Effects Produced by Anesthetics** *40th Annual Winter Conference on Brain Research*
  MacIver, M. B.
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- **Abused Inhalants Enhance GABA-Mediated Synaptic Inhibition** *NEUROPSYCHOPHARMACOLOGY*
  MacIver, M. B.
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- **Anesthetics Discriminate Between Tonic and Phasic gamma-Aminobutyric Acid Receptors on Hippocampal CA1 Neurons** *ANESTHESIA AND ANALGESIA*
  Bieda, M. C., Su, H., MacIver, M. B.
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- **Slow GABA(A) mediated synaptic transmission in rat visual cortex** *BMC NEUROSCIENCE*
  Sceniak, M. P., MacIver, M. B.
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- **Cellular actions of urethane on rat visual cortical neurons in vitro** *JOURNAL OF NEUROPHYSIOLOGY*
  Sceniak, M. P., MacIver, M. B.
  2006; 95 (6): 3865-3874
- **Anesthesia in silico** *ANESTHESIOLOGY*
  Sceniak, M. P., MacIver, M. B.
  2006; 104 (3): 400-402
- **Isoflurane depresses hippocampal CA1 glutamate nerve terminals without inhibiting fiber volleys** *BMC NEUROSCIENCE*
  Winegar, B. D., MacIver, M. B.
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- **Anesthetic-induced burst suppression EEG activity requires glutamate-mediated excitatory synaptic transmission** *CEREBRAL CORTEX*

Lukatch, H. S., Kiddoo, C. E., MacIver, M. B.
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- **Multiple synaptic and membrane sites of anesthetic action in the CA1 region of rat hippocampal slices** *BMC NEUROSCIENCE*
  Pittson, S., Himmel, A. M., MacIver, M. B.
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- **Determination of diffusion and partition coefficients of propofol in rat brain tissue: implications for studies of drug action in vitro** *BRITISH JOURNAL OF ANAESTHESIA*
  Gredell, J. A., Turnquist, P. A., MacIver, M. B., Pearce, R. A.
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- **Major role for tonic GABA(A) conductances in anesthetic suppression of intrinsic neuronal excitability** *JOURNAL OF NEUROPHYSIOLOGY*
  Bieda, M. C., MacIver, M. B.
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- **Anesthetic properties of 4-iodopropofol - Implications for mechanisms of anesthesia** *ANESTHESIOLOGY*
  Lingamaneni, R., Krasowski, M. D., Jenkins, A., Truong, T., Giunta, A. L., Blackbeer, J., MacIver, M. B., Harrison, N. L., Hemmings, H. C.
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- **Agent-selective effects of volatile anesthetics on GABA(A) receptor-mediated synaptic inhibition in hippocampal interneurons** *ANESTHESIOLOGY*
  Nishikawa, K., MacIver, M. B.
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- **Membrane and synaptic actions of halothane on rat hippocampal pyramidal neurons and inhibitory interneurons** *JOURNAL OF NEUROSCIENCE*
  Nishikawa, K., MacIver, M. B.
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- **Ischemia-induced eeg waveform alterations recorded from cortical brain slices**
  Rabinovici, G. D., Lukatch, H. S., MacIver, M. B.
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- **Halothane enhances presynaptic GABA release by increasing internal calcium**
  Doze, V. A., Monroe, F. A., MacIver, M. B.
  LIPPINCOTT-RAVEN PUBL.1997: A626
- **Volatile anesthetics depress glutamate transmission via presynaptic actions** *American-Society-of-Anesthesiologists Annual Meeting*
  MacIver, M. B., Mikulec, A. A., Amagasu, S. M., Monroe, F. A.
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- **Volatile anesthetics enhance presynaptic GABA release**
  Doze, V. A., Lukatch, H. S., Monroe, F. A., MacIver, M. B.
  LIPPINCOTT-RAVEN PUBL.1996: A706
- **Halothane enhances feedback but feedforward GABA inhibition**
  Pittson, S., Monroe, F. A., MacIver, M. B.
  LIPPINCOTT-RAVEN PUBL.1996: A674
- **Halothane prolongs GABA(A) fast and slow inhibitory currents**
  Lukatch, H. S., Doze, V. A., MacIver, M. B.
  LIPPINCOTT-RAVEN PUBL.1996: A673
- **Calcium electrode measures aqueous volatile anesthetic concentrations**
  Hagan, C. E., Pearce, R. A., Trudell, MacIver, M. B.
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- **RILUZOLE PRODUCES A POTENT, USE-DEPENDENT DEPRESSION OF SYNAPTIC TRANSMISSION IN RAT HIPPOCAMPAL CA-1 NEURONS**
  AMAGASU, S. M., MIKULEC, A. A., MONROE, F. A., MACIVER, M. B.

LIPPINCOTT-RAVEN PUBL.1995: A745

- **PROPOFOL ENHANCES GABA(A,SLOW) FEEDFORWARD INHIBITION IN CA-1 NEURON DENDRITES**
  TRAVIS, V. L., MACIVER, M. B.
  LIPPINCOTT-RAVEN PUBL.1995: A751
- **PROPOFOL, THIOPENTAL AND ISOFLURANE-INDUCED BURST SUPPRESSION EEG PATTERNS ARE INTRINSIC TO NEOCORTEX**
  LUKATCH, H. S., MACIVER, M. B.
  LIPPINCOTT-RAVEN PUBL.1995: A750
- **GABA-A INHIBITION CONTRIBUTES MORE TO THE ANESTHETIC ACTIONS OF THIOPENTAL THAN HALOTHANE**
  TRAVIS, V. L., LUKATCH, H. S., MONROE, F. A., MACIVER, M. B.
  LIPPINCOTT-RAVEN PUBL.1994: A801
- **PROLONGED GABA-A CHLORIDE CURRENTS UNDERLIE THE THIOPENTAL INDUCED SLOWING OF EEG FREQUENCIES**
  LUKATCH, H. S., MACIVER, M. B.
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- **STRUCTURAL AND FUNCTIONAL SPECIALIZATION OF A-DELTA-FIBER AND C-FIBER FREE NERVE-ENDINGS INNERVATING RABBIT CORNEAL EPITHELIUM** *JOURNAL OF NEUROSCIENCE*
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- **TONIC CORNEAL NERVE INJURY DISCHARGE CAN BE REDUCED BY LIDOCAINE WITHOUT ALTERING NERVE-CONDUCTION**
  MACIVER, M. B., TANELIAN, D. L.
  LIPPINCOTT-RAVEN PUBL.1991: 1076
- **ANESTHETIC ACTIONS IN THE HIPPOCAMPAL-FORMATION** *CONF ON MOLECULAR AND CELLULAR MECHANISMS OF ALCOHOL AND ANESTHETICS*
  Kendig, J. J., MacIver, M. B., Roth, S. H.
  NEW YORK ACAD SCIENCES.1991: 37–53
- **2 MECHANISMS FOR ANESTHETIC-INDUCED ENHANCEMENT OF GABA-A-MEDIATED NEURONAL INHIBITION** *CONF ON MOLECULAR AND CELLULAR MECHANISMS OF ALCOHOL AND ANESTHETICS*
  MacIver, M. B., Tanelian, D. L., Mody, I.
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- **INHALATION ANESTHETICS EXHIBIT PATHWAY-SPECIFIC AND DIFFERENTIAL ACTIONS ON HIPPOCAMPAL SYNAPTIC RESPONSES INVITRO** *BRITISH JOURNAL OF ANAESTHESIA*
  MacIver, M. B., Roth, S. H.
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- **CHOLINERGIC THETA RHYTHM IN TRANSECTED HIPPOCAMPAL SLICES - INDEPENDENT CA1 AND DENTATE GENERATORS** *BRAIN RESEARCH*
  Konopacki, J., Bland, B. H., MacIver, M. B., Roth, S. H.
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- **ANESTHETICS PRODUCE DIFFERENTIAL ACTIONS ON MEMBRANE RESPONSES OF THE CRAYFISH STRETCH-RECEPTOR NEURON** *EUROPEAN JOURNAL OF PHARMACOLOGY*
  MacIver, M. B., Roth, S. H.
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- **ANESTHETICS PRODUCE DIFFERENTIAL ACTIONS ON THE DISCHARGE ACTIVITY OF A SINGLE NEURON** *EUROPEAN JOURNAL OF PHARMACOLOGY*
  MacIver, M. B., Roth, S. H.
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- **CARBACHOL-INDUCED EEG THETA-ACTIVITY IN HIPPOCAMPAL BRAIN-SLICES** *BRAIN RESEARCH*
  Konopacki, J., MacIver, M. B., Bland, B. H., Roth, S. H.
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- **ENFLURANE-INDUCED BURST FIRING OF HIPPOCAMPAL CA 1 NEURONS - INVITRO STUDIES USING A BRAIN SLICE PREPARATION** *BRITISH JOURNAL OF ANAESTHESIA*
  MacIver, M. B., Roth, S. H.
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- **BARBITURATE EFFECTS ON HIPPOCAMPAL EXCITATORY SYNAPTIC RESPONSES ARE SELECTIVE AND PATHWAY SPECIFIC** *CANADIAN JOURNAL OF PHYSIOLOGY AND PHARMACOLOGY*
  MacIver, M. B., Roth, S. H.
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- **THETA IN HIPPOCAMPAL SLICES - RELATION TO SYNAPTIC RESPONSES OF DENTATE NEURONS** *BRAIN RESEARCH BULLETIN*
  Konopacki, J., MacIver, M. B., Bland, B. H., Roth, S. H.
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- **Carbachol induced rhythmical slow wave activity recorded from dentate granule neurons in vitro.** *Proceedings of the Western Pharmacology Society*
  MacIver, M. B., Harris, D. P., Konopacki, J., Roth, S. H., Bland, B. H.
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  Roth, S. H., MacIver, M. B.
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- **THE EFFECTS OF TEMPERATURE ON NEURONAL EXCITABILITY** *PROCEEDINGS OF THE WESTERN PHARMACOLOGY SOCIETY*
  MacIver, M. B., Roth, S. H.
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- **A SIMPLE AND SENSITIVE FORCE TRANSDUCER SUITABLE FOR MEASURING TENSIONS IN SMALL MUSCLE-FIBERS** *JOURNAL OF PHARMACOLOGICAL METHODS*
  MacIver, M. B., Damson, E., Tan, K. S., Roth, S. H.
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- **EFFECTS OF HALOTHANE ON THE NEURONAL OUTPUT, MEMBRANE-PROPERTIES AND SYNAPTIC TRANSMISSION OF AN ISOLATED NEURON** *PROCEEDINGS OF THE WESTERN PHARMACOLOGY SOCIETY*
  MacIver, M. B., Roth, S. H.
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PRESENTATIONS

- Anesthsia for DBS surgery - University of Wisconsin-Madison (8/21/2010 - present)
- Anesthesia and conciousness. - Tucson Science of Consciousness Series