



January 12, 2015

Linda Porter, Ph.D.
National Institute of Neurological Disorders and Stroke
National Institutes of Health
31 Center Drive
Bethesda, MD 20892

Re: Nomination for Interagency Pain Research Coordinating Committee

Dear Dr. Porter,

The American Society of Anesthesiologists (ASA), representing over 52,000 members, is pleased to nominate Asokumar Buvanendran, M.D., for the Interagency Pain Research Coordinating Committee (IPRCC) at the National Institutes of Health (NIH). ASA believes that Dr. Buvanendran possesses the crucial experience and expertise including advancement of pain care research that the IPRCC seeks.

Dr. Buvanendran is an anesthesiologist specializing in Pain Medicine, and his academic activities are divided between research, teaching, clinical duties in the Rush University Department of Anesthesia, and national advocacy for the advancement of pain care. He was Chair of the 2011-2012 Defense Medical Research and Development Program for the Department of Defense Congressionally Directed Medical Research Programs for Pain Medicine. He reviewed several applications and effectively chaired the allocation of millions of dollars for research in pain medicine. He is currently conducting NIH-funded research projects on the predictors of opioid analgesic responses and common endogenous opioid mechanisms. He is also conducting several prospective randomized clinical trials on acute and chronic pain, including medical school grants with partnership from private entities. In addition, Dr. Buvanendran has led several key basic science research studies in pain, including creation of new animal pain models for acute pain. Dr. Buvanendran is a reviewer for *JAMA*, *New England Journal of Medicine* and multiple pain-related professional journals, and is on the editorial boards for *Regional Anesthesia and Pain Medicine*, *Anesthesia and Analgesia*, *Journal of Clinical Anesthesia*, and *Journal of Opioid and Pain Management*.

In regards to teaching, Dr. Buvanendran is a Professor of Anesthesiology and Director of Orthopedic Anesthesia at Rush University and is Co-Director of the Anesthesiology Research Clerkship at Rush Medical College. Dr. Buvanendran teaches anesthesiology residents and pain fellows in the operating room and clinic, participates in the Pain Fellowship Lecture series, and has conducted multiple lectures as a visiting professor on chronic pain management nationally and internationally. In 2010, he was invited to be an examiner for the American Board of Anesthesiology and is currently a question writer on pain medicine for the exam. He is editor-in-chief of SAM-PM, a self-study CME program that covers established knowledge in the subspecialty field of pain medicine. Dr. Buvanendran's clinical responsibilities at Rush University Medical Center include general and regional anesthesia,

interventional chronic pain medicine, and acute pain management. He is a member of the Advisory Committee to the Chairman, Research Committee on Anesthesiology, Curriculum Committee on Anesthesiology, Orthopedic Joint Pathway Committee, and is a former member of the Research Committee for Rush University Medical Center.

At ASA, Dr. Buvanendran is the Chair of the Educational Track Subcommittee for Pain Medicine, member of the Committee on Pain Medicine, member of the Committee on Standards and Practice Parameters, and is an Alternate Director from Illinois to the ASA House of Delegates and Board of Directors. Dr. Buvenandran is also a member of the Executive Committee and Treasurer for the American Society of Regional Anesthesia and Pain Medicine (ASRA), Past President of the Illinois Society of Anesthesiologists, Past President of the Illinois Society of Interventional Pain Physicians, and a Board Member of the Orthopedic Anesthesia and Rehabilitation Society.

If selected to serve on the IPRCC, Dr. Buvanendran is enthusiastically willing to serve and commit to the meetings required.

ASA is pleased to have the opportunity to nominate Dr. Buvanendran to the IPRCC and hopes that the IPRCC will seriously consider his appointment. Dr. Buvanendran is a recognized leader in pain medicine and provides a diverse and broad expertise that will benefit the important mission of the committee. If you have any questions, please do not hesitate to let me know.

Respectfully yours,

A handwritten signature in black ink, appearing to read "John Abenstein", written in a cursive style.

J.P. Abenstein, M.S.E.E., M.D.
President
American Society of Anesthesiologists

CURRICULUM VITAE

Asokumar Buvanendran, MB.BS

Date of Birth: Feb 12th 1967
Citizenship: United States, Canada

ACADEMIC APPOINTMENTS

Professor, Anesthesiology (Rush University)	Sept 2010 – Present
Associate Professor, Anesthesiology (Rush University)	Feb 2005 – Aug 2010
Director, Orthopedic Anesthesia (Rush University)	Aug 2002 – Present
Co-Director, Anesthesiology Research Clerkship, Rush Medical College	Sept 2002 – Present
Assistant Professor, Anesthesia (Rush University)	Feb 2005 – Aug 2010
Instructor, Staff Attending (Rush University, Chicago)	Jan 2000 – April 2000

EDUCATION

Fellow, Pain Management (Rush University, Chicago)	Jan 1999 – Dec. 1999
Resident, Anesthesia (Rush University, Chicago)	Jan 1996 – Dec. 1998
Rotational Internship (Rush University, Chicago)	Jan 1995 – Dec. 1995
Research Associate/Fellow, Anesthesia (University of Toronto)	Sept 1991 – Dec. 1994
Internship and Resident Anesthesia (Nigeria)	July 1989 – Aug 1991
MB.BS, Internship (Nigeria)	July 1984 – June 1989
College of Advanced Studies (Nigeria)	June 1982 – June 1984

SOCIETY MEMBERSHIPS

Association of University Anesthesiologist (AUA)	2007 – present
American Society of Regional Anesthesia (ASRA)	1997 – present
American Academy of Pain Medicine (AAPM)	2008 – present
American Society of Interventional Pain Physicians (ASIPP)	2006 – 2012
International Association for Study of Pain (IASP)	2006 – present
Illinois State Medical Society (ISMS)	2002 – present
American Society of Anesthesiologist (ASA)	1995 – present
International Anesthesia Research Society (IARS)	1995 – present
Illinois State of Anesthesiologist (ISA)	1995 – Life time member

CERTIFICATION AND LICENSURE

American Board of Anesthesiologists-Pain Medicine, Board Re-Certified	2014 – 2024
American Board of Anesthesiologists-Pain Medicine, Board Certified	2003 – 2013
American Board Anesthesiologists: Board Re-Certified	2012 – 2022
American Board Anesthesiologists: Board Certified	2000
Illinois State Professional licence, DEA, controlled sub.	1995
ECFMG (US Foreign Medical Graduate certificate):	1994

Member of National Task Forces/ Working groups:

- ASA representation at NIH: Pathways to Prevention Workshop: The Role of Opioids in the Treatment of Chronic Pain; Sept 29th-30th 2014
- ASA representative: Member of the National Board of pharmacy (NABP) on drug abuse.
- Safe use of steroid use for epidurals injections. A panel set up by FDA safe use Initiative.
- Multi-Society Pain Working group (MPW) on LCDs for pain procedures. Represent ASRA and author of LCD for Spinal cord stimulation from the ASRA group in collaboration with ASA.
- ASA member for Review of Sacroiliac joint anatomy and treatment guidelines with ISIS
- Response to LCD reviews for Local Medicare care for pain management
- ASA and ASRA Representative to NANS multi-society meeting

Federal Government Public Advisory Service

Invited National Grant reviewer for Department of Defense (DoD): Chair, 2012 Defense Medical Research and Development Program (DMRDP) for the Department of Defense Congressionally Directed Medical Research Programs (CDMRP) for Pain Medicine.

Europe Orthopaedic Advisory Board

- Member, of the Europe advisory meeting on total joint replacement pathway in Denmark June 2011

Invited Examiner for the American Board of Anesthesiology

- Question writer for *American Board of Anesthesiology* Pain Medicine: 2010 –present

Editor in Chief of SAM-PM 2012-2014 (1st Edition)

- SAM PM is a self-study CME program that covers established knowledge in the subspecialty field of pain medicine. Content includes 100 questions with answers, detailed discussions explaining the rationale for each answer and references for further study. Subscribers complete the program at their own pace and submit the answers online to receive CME credit till 2015.

NIH Research Grants

Title: Predictors of Opioid analgesic responses and common endogenous Opioid mechanisms

Role: Co-Investigator

Effort: 10%

Agency: NIH. RO1 DA031726-01 (PI: S. Bruehl & J. Burns)

Period: Sept 2011– May 2016

Funding: \$ 3,529,737.00

Goals: The major aim is to determine the degree to which an index of endogenous opioid function is related to exogenous opioid analgesic effects and to compare these associations in low back pain patients to those in healthy people.

Current Status: Active Recruiting

Title: Mechanisms of Psychosocial Chronic Pain Treatments
 Role: Co-Investigator
 Effort: 0.25%
 Agency: RO1 NR013910 NIH/NINR (PI: John Burns)
 Period: Sept- 2013 to June-2018
 Funding: \$ 3,259,454.00
 Current Status: IRB approved

National Society Funding:

Title: Patients after minor surgery with Monitored Anesthesia Care – Is it safe Drive?
 Role: Principal Investigator
 Effort: 10%
 Agency: Anesthesia Patient Safety Foundation (APSF).
 Period: Jan 2008-2012
 Funding: \$ 149,775.00

Goals: The major aim is to determine if new sedation, anesthetic and opioids drugs impair the driving of patients after surgery

Current Status: **Completed and data analysis in progress.**

Medical School Grants:

Title: Risk Factors and Mechanism for Prevention of Persistent Pain after Total Knee Replacement

Role: Principal Investigator
 Effort: 5%
 Agency: Pfizer Medical School Grant
 Period: Sept 2011– June 2014
 Funding: \$ 498,233.00

Goals: The major aim is to determine the risk factors for chronic pain after TKA and preoperative risk factors. There is no therapeutic agent tested, but rather to understand the natural progression of acute pain to chronic pain and the risk factors.

Current Status: Active Recruiting. Of the 300 patients to be enrolled, 70% of the consenting has been completed.

Title: Preoperative Cognitive Therapy for Reducing Persistent Postsurgical Pain after Total Knee Arthroplasty

Role: Principal Investigator
 Effort: 3%. The role of PI is minimal as majority of the funding is for the psychologist involved with the RCT.
 Agency: Pfizer medical school grant
 Period: Jan 2013– Dec 2015
 Funding: \$ 323,188.00

Goals: The major aim is to determine if preoperative and continuous postoperative Cognitive Therapy (CT) via Skype, or a control group; can reduce the incidence of chronic pain after total knee arthroplasty in high risk patients with catastrophizing.

Current Status: Active Recruiting. Of the 100 patients to be enrolled, 20% of the consenting has been completed.

Title: Improving functional outcomes and lowering health care costs by enhanced integration of primary care providers and pain medicine physicians for the management of chronic non-cancer pain patients.

Role: Principal Investigator

Effort: 5%. The role of PI

Agency: Pfizer Independent Grants for Learning & Change for Employing Integrated and Coordinated Multimodal-Therapies in a Primary Care Setting to Improve Outcomes and Optimize Healthcare Utilization for Patients with Chronic Pain

Period: Jan 2014– Dec 2016

Funding: \$ 345,000.00

Goals: The major aim is to determine if chronic pain patients managed by primary care vs pain medicine specialist will make a difference in outcome at 6 months

Current Status: Awaiting IRB approval

TEACHING

Rush University

- Orthopedic Fellows at rush Univeristy: lecture on pain 2013- to present
- Anesthesiology Resident Introductory lectures on Pain Medicine 2000 – 2009
- Anesthesiology Resident teaching in operating room (2 times/week) 2000 – Present
- Anesthesiology Resident Lectures on Pain Medicine 2000 – 2009
- Pain Fellowship Lecture series 2003 – Present
- Pain Fellows teaching in operating room and Clinic (2 times/week) 2000 – Present

Visiting Professor Lectures:

1. Multimodal Analgesia and prevention of chronic pain: Lecture to implementation of protocol for orthopaedic surgery. University of Virginia (UVM). Sept 2014
2. The role of perioperative physicians in prevention of chronic pain after surgery. Wayne State University (DMC). May 2014
3. International Congress for Joint Reconstruction (ICJR) Charleston, SC in May 2013. Talk title:
 - a. Multimodal management of pain and analgesia
 - b. Managing the opioid dependent patient
4. Perioperative Management of the Opioid Tolerant Patient. Michigan Society of Anesthesiologists. March 2013
5. Does Acute Pain become chronic pain after surgery? Grand rounds and residents teaching at department of Anesthesiology and Pain Medicine. Vanderbilt University, TN. November 8-9th 2012
6. Advanced techniques for Acute and Chronic Pain Management 2012: Wayne State, Detroit, MI. Key note speaker: Does Acute Postoperative Pain lead to chronic pain?

7. University of Vancouver, BC, Canada: Combined Grand rounds of Orthopedic Surgeons and Anesthesiologists with Satellite broadcast to 3 Institutions: January 2010: Multimodal Analgesia: An Evidence Based Update
8. University of Alberta Combined Grand Rounds for Department of Anesthesiology and Orthopedic Surgeons with Satellite broadcast to 2 Hospitals, Canada in October 2009. Multimodal Analgesia: An Update
9. University of Miami: Grand rounds at Department of Anesthesiology on September 2009.
 - Multimodal Analgesia Improves Outcome: Is this True?
 - Resident Journal club on Novel Analgesics
10. University of Illinois Masonic Hospital: Prevention of Chronic Pain after surgery: September 2009
11. University of Western Ontario: Combined city wide rounds for Departments of Anaesthesiology and Orthopaedic Surgery: June 2009
Multimodal Analgesia Improves Outcome: Is this True?
12. University of California at San Diego (UCSD). January 2009
 - Multimodal Analgesia an Update
 - Prevention of Chronic pain after surgery
 - Journal club to Residents on basic animal pain studies
13. University of Toronto, Department of Anesthesiology, Toronto General Hospital:
 - Multimodal Analgesia and Outcome– Invited for. *2nd Memorial Yogen's Lecture series*– October 31st 2008
14. University of Toronto, Department of Anesthesiology, Toronto Western Hospital:
 - Prevention of Chronic Pain from Surgery. October 30th 2008
15. Holland Orthopaedic & Arthritis Center, Toronto, Canada
 - *Key note Speaker*: Role of multimodal analgesia in prevention of chronic pain after total knee arthroplasty
16. University of Toronto, Sunnybrook Hospital (Grand rounds with Web Broadcast): Sept 2008: Prevention of Chronic Pain after Orthopedic Surgery
17. University of Pittsburgh, Department of Anesthesiology: May 2008
 - Grand rounds on Multimodal and Prevention of chronic pain
 - Journal club for Anesthesiology residents
18. Medical Education Day: *Key Note Speaker* for Pennicle Health, PA in April 2008
 - Multimodal Analgesia and Prevention of Chronic Pain

19. Grand Rounds at Rush University Medical Center: April 2008
 - Multimodal Analgesia and Prevention of Chronic Pain
20. Heresy Medical Center, PA 2006 November
 - Mutimodal Analgesia
21. Alexian Brothers Hospital, Chicago, IL Sept 2006
 - Prevention of Chronic Pain from Surgery
22. Henry Ford Hospital, Detroit, MI– January 2006
 - Interventional Pain Therapy
23. Sunny Brook Hospital, University of Toronto: City Wide grand rounds –Sept 2005.
 - Inflammatory Mediators of Surgery
24. National Institute of Health (NIDCR) (Neurobiology and Pain Therapeutics section):
Lecture in October 2004
 - Central role of action of COX-2 inhibitors
25. University of Newfoundland, Canada in September 2004
 - New Concepts in Preemptive Analgesia: Department of Anesthesiology
26. University of Wisconsin, Madison, WI, September 2004 with– Live Web Broadcast
 - Chronic Pain Management: Department of Medicine
27. University of London, Ontario, Canada: May 2004
 - COX-2 from basic to clinical science for perioperative use
28. McMaster University, Ontario, Canada (combined Orthopedic and Anesthesia rounds) May 2004
 - COX-2 inhibitor use in the perioperative period
29. Halifax General Hospital, Halifax, NS, Canada, October 2003
 - New trends in Preemptive Analgesia
30. Ottawa Medical College, Ottawa, Ontario, Canada, May 2003
 - Preemptive Analgesia
31. Rush University Medical College, Chicago, IL 2003
 - COX-2 inhibitors from basic to clinical science
32. Rush University Medical Center: April 2002
 - Preemptive Analgesia: Current Views
33. Rush University Medical College: August 2000
 - Pharmacology of the Neuroaxial Analgesia: An Update

Invitation & Accepted:

Best Doctors in America:
Who is Who in America

2005-To Present
2006-To Present

CLINICAL SERVICE

General/Regional Anesthesia at Rush University Medical Center
Interventional Chronic Pain Medicine, Grade I implanter of Interventional Procedures (> 30 implants/year), Acute Pain service Management

COMMITTEE AND ADMINISTRATIVE SERVICES

Departmental/ Hospital Appointments

Member, Advisory committee to Chairman	July 2005 – present
Member, Research Committee Anesthesiology	July 1999 – present
Member, Patient Care Committee Anesthesiology	June 2005 – 2010
Member, Curriculum committee Anesthesiology	June 2006 – present
Member, Search Committee for Chairman, Behavioural Science	2007
Member, Orthopedic Joint pathway committee	Jan 2001 – present
Member, Research Committee for Rush University Medical Center	Jan 2005 – 2007
Administrative management of Orthopedic anesthesia	
Preparation of Anesthetic pathways for orthopedic anesthesia	

SCIENTIFIC AND SCHOLARLY ACTIVITIES

Officer in Professional Societies:***American Society of Anesthesiologist (ASA)-Appointments***

Chair, Educational track for Pain medicine	2013 – 2017
Member of AMOC for ASA	2012 - 2015
Member, Committee on Standards and Practice Parameters	2014 - 2016
Member, Committee on Specialty Societies	2014 - 2017
ASA Alternate 14 th District Director	Oct 2013-2016.
Vice Chair, Educational track for Pain medicine	2012 – 2013
Chair, Subcommittee Regional Anesthesia & Acute Pain	2010 – 2013
Member, Reference Committee 3 (Scientific Affairs)	2012
Member, Committee on Pain Medicine	2011 – 2014
Member of Education track for Pain Medicine	2010 – 2013
Chair of Cadaver workshops for Pain Medicine	2009 – 2011
Member, Committee of Scientific oversight committee	2010 – 2013
Member of Education track for Regional Anesthesia	2010 – 2012
Member, Subcommittee Regional Anesthesia & Acute Pain	2007 – 2009
Member, Committee on Regional Anesthesia	2007 – 2010
Adj. Member, Committee on Regional Anesthesia	2006 – 2007
Member, Subcommittee on Chronic and Cancer Pain	2006 – 2010
Member, Subcommittee on Local Anesthesia and Pain	2004 – 2005
Delegate, ASA	2009 – 2016
Alternate Delegate for, ASA,	2004 – 2009
Member, Reference Committee 1 (Administrative Affairs)	2009

Member, Reference Committee 3 (Scientific Affairs)	2007
Member task force on ASA Outcome registry	2007
<i>American Society of Regional Analgesia (ASRA)-Appointments</i>	
Executive Committee, ASRA	2012 – 2020
Treasurer for ASRA	2013 – 2015
Board of Directors	2009 – 2012
AMOC for ASRA	2013-2015
Chair, Research Committee for ASRA	2010 – 2013
Chair, Annual meeting ASRA (San Antonio)	2009
Member of the Program Committee ASRA Annual Spring meeting	2010, 2013
Member of the Program Committee ASRA Annual Fall meeting	2010
Member of the AcutePOP web database	2007 – present
Member, Education Committee	2007 – 2009
Member of Annual meeting Program Committee	2007 – 2009
Member, Committee on Membership	2007 – present
Member, Committee on ASRA Newsletter	2006 – 2008
<i>Illinois Society of Anesthesiologist (ISA)</i>	
ASA Alternate 14 th District Director	Oct 2013-2016.
Past President, Illinois Society of Anesthesiologist	May 2011 –May 2012
President, Illinois Society of Anesthesiologist	May 2010 –May 2011
Chair of Executive Committee	May 2010 –May 2011
President-Elect, Illinois Society of Anesthesiologist	2009 – May 2010
Chair, Ad Hoc Committee on Interventional Pain	May 2009 – May 2011
Vice President, Illinois Society of Anesthesiologist	2008 – 2009
Board of Directors	2003 – present
Assistant Treasurer	2007 – 2008
District Director I	2004 – 2007
Nominating committee	2004 – 2007
Alternate District Director I	2002 – 2003
Delegate, ISA	2001 – 2004
<i>Illinois Society of Interventional Pain</i>	
Past-President of Illinois Society of Interventional Pain	2009 – 2011
President, Illinois Society of Interventional Pain Society	2007– 2009
<i>Chicago Society of Anesthesia (CSA)</i>	
President, Chicago Society of Anesthesia	2005 – 2006
Vice-President, Chicago Society of Anesthesia	2004 – 2005
Secretary, CSA	2002 – 2004
Treasurer, CSA	2001 – 2002
<i>Orthopedic Anesthesia and Rehabilitation society (OAPRS)</i>	
Board Member	2005 – present
Chair, 3 rd PreASA Annual OAPRS meeting	2006

American Academy of Pain Medicine (AAPM)

Member of the Annual Scientific Program Committee (interventional pain): 2010 Feb

Editorial Boards:

- Executive Editor, Regional Anesthesia and Pain Medicine 2014-to Present
- Editor for Regional Anesthesia and Pain Medicine: 2013 – 2014
- Associate editor of Regional Anesthesia and Pain Medicine 2010-2013
- Associate Editor for Anesthesia & Analgesia 2010 – 2015
- Guest Editor for Anesthesia & Analgesia 2008 – 2010
- Journal of Clinical Anesthesia 2007 – on going
- Pain Physician 2007 – 2012
- Journal of Opioid and Pain Management 2005 – on going

Reviewer for Funding Agencies

Grant Reviewer for Raine Medical Research Foundation,
Government of Western Australia

2012

Grant Reviewer, Physicians Services of Ontario (PSI), Canada

2009, 2008, 2005, 2014

Grant Reviewer, Canadian Institutes of Health Research

2009, 2005

Reviewer for Professional Journals

- JAMA, Lancet, Neuroscience, Cytokines, New England Journal of medicine,
- Anesthesia & Analgesia, Anesthesiology, Journal of Clinical Anesthesia, Regional Anesthesia & Pain Medicine, Acta Anaesthesiologia Scandinavia
- Pain Physician, Journal of Opioid and Pain Management, Palliative Medicine

International & National Invited Speaker, Lectures and Meetings***American Society of Regional Analgesia (ASRA)-Invited Faculty for Fall Annual Meeting 2014***

Refresher Course: Diagnosis and Management of Complex Regional Pain Syndrome

Panel: Opioids and Driving: Is it Safe and legal implications

Panel: Multi-Society Pain Work Group Recommendations for epidural steroid Injections

American Society of Anesthesiologists (ASA)-Invited Faculty for Annual Meeting 2014 October, New Orleans

- Panel: Perioperative Management of opioid tolerant patient
- Refresher Course: The Role of Anesthesiologists in Prevention of Chronic Pain After Surgery

American Society of Regional Analgesia (ASRA)-Invited Faculty for Spring Annual Meeting, Chicago, 2014

Refresher Course: Can regional anesthesia and analgesia prevent the transition from acute to chronic pain?

PBLD: What is new in multimodal analgesia

Panel: Genotype association for acute pain and opioid responsiveness

Panel: Current gaps in the knowledge of multimodal analgesia

Panel: Neuropathic pain treatment for the Advanced Nurses

American Society of Regional Analgesia (ASRA)-Invited Faculty for Fall Annual Meeting 2013

Refresher Course: Chronic pain after surgery and trauma. Can we prevent it?

Panel/Moderator: Pain Management in special population. Substance Abusers

Panel: Anticoagulation and Pain Medicine. When is it safe to start after surgery?

Workshop: Special hands on workshop on Advances in Neuromodulation

Moderator: Abstracts

American Society of Anesthesiologists (ASA)-Invited Faculty for Annual Meeting 2013 October, San Francisco

- Panel: Multimodal Analgesia
- Lead Speaker/ Panel: Chronic Pain After Surgery
- Pro/Con Debate: PRO: Opioids Are a Safe and Effective Treatment for Chronic Nonmalignant Pain
- Refresher Course: The Role of Anesthesiologists in Prevention of Chronic Pain After Surgery

American Society of Regional Analgesia (ASRA)-Invited Faculty for Spring Annual Meeting, Boston 2013

Refresher Course: Acute Pain Management outcomes: Measuring quality and pay for performance

PBLD: Clinical pathways for joint replacements

Moderator: Best of Abstracts and Research Awards

Panel: ASRA-ESRA Perioperative management of joint replacement patient

American Society of Regional Analgesia (ASRA)-Invited Faculty for Fall Annual Meeting 2012

Refresher Course: Can we prevent the transition from acute to chronic pain after surgery

Panel/Moderator: Current outbreak of Meningitis after epidural steroid injections

Panel: Anticoagulation and Pain Medicine. When is it safe to start after surgery?

Panel: An update on the recommendations for intrathecal drugs

Moderator: Best of Abstracts and Research Awards

American Society of Anesthesiologist (ASA)-Invited Faculty for Annual Meeting 2012 October, Washington, DC

Point-Counterpoint : PC21 Opioids for Chronic Nonmalignant Pain

PRO: Opioids Are a Safe and Effective Treatment for Chronic Nonmalignant Pain

Refresher Course: Lecture 313, Multimodal Analgesia for Perioperative Pain Management: Lecture to Hospital Implementation Protocols

Clinical Forum: CF12 Postoperative Pain Management in the Opioid Tolerant Patient
Creating and Analgesic Plan for the Opioid-Tolerant Patient

Point-Counterpoint: PC26 Optimal Postoperative Analgesic Technique Following Total Knee and Hip Arthroplasty: Epidural Infusion

International Association for the Study of Pain (IASP 2012)

- Refresher course faculty: Persistent pain after surgery

American Society of Regional Analgesia (ASRA)-Invited Faculty for Spring Annual Meeting 2012

- PBLD and Best of Abstract Presentations

American Academy of Orthopedic Surgeons (AAOS) 2012

- Instructional Course Lecture (ICL): Emerging Trends in Analgesia for Total Joint Arthroplasty (2/8/2012)

American Society of Regional Analgesia (ASRA)-Invited Faculty for Fall Annual Meeting 2011

- *ASRA Luncheon session*: Best of Abstracts of the meeting and Research announcements
- *Workshop*: Spinal cord stimulation
- *Problem based Learning Discussion*: Treatment of neuropathic pain

University of Toronto Regional Anesthesia 18th Annual meeting October 2011

- Optimal management of pain for Knee replacements: Debate
- Expert panel discussion on opioid tolerant patients to the operating room

American Society of Anesthesiologist (ASA)-Invited Faculty for Annual Meeting 2011 October

- Refresher Course: Multimodal Analgesia for Perioperative Pain Management: Evidence Based
- *Panel*: Acute Postop pain Management in profoundly opioid tolerant patient
- *Panel*: Best practice perioperative management: Clinical pathways for abdominal and pelvic surgery
- *Panel on Geriatric Anesthesia*: Hey that is all my patients. Management of postoperative pain

Orthopaedic Society of Anesthesia Annual Meeting October 2011

- Anesthesia and postoperative analgesia for minimal invasive spine surgery

Canadian Society of Anaesthesiologist (CSA)- Faculty for Annual Meeting June 2011

- *Panel*: Does Acute pain lead to chronic pain
- *Panel*: COX-2 inhibitors: Is there a need?

International Anesthesia Research Society (IARS) 2011

- Refresher course: Multimodal Analgesia for perioperative pain management

American Society of Regional Analgesia (ASRA)-Invited Faculty for Spring Annual Meeting 2011

- Refresher course: Multimodal Analgesia and intra-articular injections (General session)
- *Breakfast panel*: Medication safety, Error reduction & Drug and infusion preparation: What Regional Anesthesiologist needs to know about USP 797
- *Panel*: Role of Preoperative Imaging in Regional Anesthesia and Pain
- *PBLD*: Multimodal regimens for Acute Pain Management

World Anesthesia and Pain Congress 2011, Italy

- Refresher course: Chronic pain after surgery
- Panel: Intrathecal drug delivery

American Society of Regional Analgesia (ASRA)-Invited Faculty for Fall Annual Meeting 2010

- Refresher course: Treatment of Neuropathic Pain
- Panel: Common Sports related Pain Conditions
- Workshop: Spinal cord stimulation
- Problem based Learning Discussion: The athlete with chronic pain

American Society of Anesthesiologist (ASA)-Invited Faculty for Annual Meeting October 2010

- Refresher Course: Multimodal Analgesia for Perioperative Pain Management: Evidence Based
- Panel: Acute Postop pain Management in profoundly opioid tolerant patient
- Panel: Update on Acute Pain Management: Beyond neuroaxial & regional nerve block techniques
- Breakfast Panel: The future of Pain Medicine in Celebration of Pain Medicine
- Luncheon Panels: Caring for the elderly Orthopedic patient: from Hip Fracture to Shoulder Reconstruction– What you need to do?

American Academy of Hospice and Palliative Medicine Annual Meeting August 12th 2010

- Interventional Pain Medicine

American Society of Regional Analgesia (ASRA)-Invited Faculty for Spring Annual Meeting 2010

- Refresher course: Multimodal Analgesia and intra-articular injections (General session)
- Breakfast panel: Medication safety, Error reduction & Drug and infusion preparation: What Regional Anesthesiologist needs to know about USP 797
- Panel: Role of Preoperative Imaging in Regional Anesthesia and Pain
- PBLD: Multimodal regimens for Acute Pain Management

American Academic of Hip and Knee Society (AAHKS) 2009 Annual Meeting

- Symposium Panel on Perioperative Pain Management, Dallas: November

American Academy of Pain Medicine (AAPM)Annual Meeting Feb 2010

- Intrathecal Drug Delivery: update

American Society of Regional Analgesia (ASRA)-Invited Faculty for Fall Annual Meeting 2009

- Role of Multimodal Analgesia for postoperative Pain in uncertain times

American Society of Anesthesiologist (ASA)-Invited Faculty for Annual Meeting October 2009

- Refresher Course: Multimodal Analgesia for Perioperative Pain Management: Evidence Based

- *Refresher Course:* Intrathecal drug delivery for chronic pain: Indications, Management and complications.
- *Panel:* Acute Postop pain Management in profoundly opioid tolerant patient
- *Panel:* Update on Acute Pain Management-Beyond epidurals and catheters
- *Panel:* Imaging for Chronic Pain Medicine
- Moderated Poster Discussion for Pain medicine

Alberta Association of Orthopedic Surgeons Annual Meeting Sept 2009

- Update of Multimodal Analgesia as it applies to orthopaedic Surgery

American Society of Regional Analgesia (ASRA)-Invited Faculty for Spring Annual Meeting 2009

- *Parallel Session:* Role of cytokines in Chronic-post surgical pain
- *Parallel Session:* Off-label use of PO medications– adjuvant to anaesthetics
- Problem based Learning Discussion: Multimodal analgesia
- *Hands on Workshop:* Femoral, lower extremity blocks

American Society of Regional Analgesia (ASRA)-Invited Faculty for Fall Annual Meeting 2008

- *Refresher Course:* Preventing Chronic Pain from Surgery
- Complications of interventional Pain Therapy (Parallel session)
- Multimodal Analgesia: Breakfast symposium
- Problem based learning discussion (2)
- Hands on cadaver workshop – spinal cord stimulator

American Society of Anesthesiologist (ASA)-Invited Faculty for Annual Meeting October 2008

- *Panel:* Intrathecal Drug Delivery for treatment of chronic pain
- *Panel:* Acute Postop pain Management in profoundly opioid tolerant patient
- Moderator of Acute and Chronic Poster Discussion sessions (2)

University of Toronto Regional Anesthesia 15th Annual meeting Sept 2008

- *Andrews-Anelevitz Mt. Sinai Hospital Lecture* – An Update on Non-Opioid Analgesics
- Controlling perioperative pain management for orthopaedic surgery

American Society of Regional Analgesia (ASRA)-Invited Faculty for Spring Annual Meeting 2008

- Refresher course: Multimodal Analgesia
- Problem based Discussion: NSAIDs

American Society of Regional Analgesia (ASRA)-Invited Faculty for Fall Annual Meeting 2007

- Problem Based Discussion: Spinal cord stimulation
- Cadaver workshop: Cervical Intensive injection workshop

American Society of Anesthesiologist (ASA)-Invited Faculty for Annual Meeting October 2007

- *Panel:* Spinal cord stimulation– current practice
- Moderator of Chronic Pain section

Latin America Pain Symposium: Panama city April 2007

- Talks on CRPS, Back pain and multi-modal analgesia

American Society of Anesthesiologist (ASA)-Invited Faculty for Annual Meeting October 2006

- Cadaver workshop on chronic pain
- Moderator of Chronic Pain section

American Society of Anesthesiologist (ASA)-Invited Faculty for Annual Meeting October 2005

- *Panel discussion:* Pre-operative therapy for patients with CRPS undergoing surgery
- *Panel discussion:* Fast track anesthesia for minimally invasive joint replacement surgery
- Moderator of Chronic Pain section

University of Toronto Regional Anesthesia and Pain Medicine 12th Annual Meeting Sept 2005
Niagara, Ontario:

- **Andrews-Anelevitz Mt. Sinai Hospital Lecture:** Multimodel Pain Treatment for Fast Track orthopedic recovery.
- COX-2 inhibitors– lecture
- Workshop and Panel discussions

Mid-Atlantic Orthopedic Society, St. John's, NF, Canada in September 2004

- Perioperative Pain Management for Orthopedic Surgeons

American Society of Colon and Rectal Surgeons Annual Meeting June 2002

- Reduction in hospital stay and ileus:– The State of the Art Postoperative Pain Management

Michigan Society of Anesthesiologist– Millennium III Symposium. August 2002

- The future of Pain Medicine-Preemptive Analgesia

Illinois Society of Anesthesiologist (ISA) Fall meeting – 2002

- Controversy over Preemptive analgesia

Chicago Society of Medicine Annual Meeting 2002

- Preemptive Analgesia

Michigan Society of Anesthesiologist: in the new Millennium II: Michigan August 2001

- Neuroaxial analgesia: Anesthesiology

Illinois Society of Anesthesia: Annual Meeting 2001

- Real World Case: Pain Management

Chicago Society of Medicine 2001

- Current Interventional Chronic Pain Therapies

Presentations at Association of University Anesthesiologist (AUA)

1. **Buvanendran A**, Kroin J, Tuman KJ: Effects of anesthesia on surgery-induced up regulation of CSF prostaglandin E2 levels in the rat. Annual meeting 2006
2. **A. Buvanendran**, MD; T. Lubenow, MD; A. Ivankovich, MD; K. Tuman, MD A Prospective, Randomized, Placebo Controlled Outcome Trial Of Perioperative Selective Cyclooxygenase-2 (COX-2) Inhibition For Patients Undergoing Total Knee Arthroplasty (TKA). Annual meeting 2002

Peer-Reviewed Grants

1. **Principal Investigator:** (\$ 149,775.00): Patients after minor surgery with Monitored Anesthesia Care – Is it safe Drive? **Anesthesia Patient Safety Foundation (APSF)** Jan 2008-2010.
2. **Principal Investigator:** (\$ 19,952.00): Modulation of the surgical inflammatory response: peripheral versus central site of action of cyclooxygenase-2 inhibition. **Rush University Research Grant**, Chicago, IL. 2004-2005.

Investigator Initiated NIH Research Collaboration

Neuronal Gene Expression Unit, National Institute of Dental and Craniofacial Research (NIDCR), NIH

- Genetic Factors and Broad spectrum screening for aberrant antibody response: Complex regional pain syndrome (CRPS). Intramural Collaborator with NIH: Dr. M. Iadarola– Contract # HHSN268200900429P 2009-2011

Investigator Initiated International Research Collaboration

Modulation of surgical inflammatory mediators by Eterocoxib in humans: (Co-PI with *K. Brune* from Germany: Merck grant to K. Brune and University \$400,000.00) 2005-Completed.

Investigator Initiated Research Grants:

1. A Prospective randomized clinical trial on perioperative pregabalin to reduce chronic post-operative pain and CRPS after total knee arthroplasty. (PI: Pfizer: Medical School grant \$ 140,000.00) 2006– completed and published. One of the highest cited articles in *Anesth & Analg* 2012
2. A prospective clinical trial to evaluate the cerebrospinal fluid and plasma pharmacokinetics of rofecoxib with single and multiple oral drug administration in subjects with implanted drug pumps with sampling side ports and lumbar intrathecal catheters for the control of chronic pain. (PI: Merck Medical School grant: \$ 50,000.00)– 2004 – completed and published.
3. Potentiation effects of systemic Rofecoxib on intrathecal morphine analgesia for postoperative pain in a rat model. (Merck– Medical School grant; *Grant: \$ 25,000*, Principal Investigator) –2000– completed.
4. Prospective, Randomised, Blinded, Placebo Controlled Study to determine the utility of COX-2 inhibitor (Rofecoxib) as a pre-emptive and adjuvant in the postoperative phase

following Total Knee Arthroplasty. (Merck– Medical School grant; *Grant: \$ 50,000*, Principal Investigator) –2000-Completed and published (JAMA)

Other Research Funding:

1. The use of Tapentadol for postoperative arthroscopy shoulder pain: Ortho McNeil: \$ 60,000– study completed 2010
2. Evaluation of Occipital nerve stimulators for chronic headache. Advance bionics. 2006-completed \$ 120,000. (co-PI)
3. A randomised, placebo controlled study-comparing efficacy of Hydromorphone HCL extended release and Duragesic in subjects with non-malignant pain. (Purdue Pharma) 2003
4. Double blind multicenter study of the efficacy of Parecoxib followed by Valdecoxib compared to placebo in general surgery patients for the treatment of post-surgical pain. (Pharmacia) PI– completed
5. Randomised, double blind active controlled study of the Safety and efficacy of SKY0404 (propofol 2%) versus Diprivan injectable emulsion 1% in balanced anesthesia (SkyPharma)-PI – completed.
6. Study on Analgesic Efficacy safety and tolerability of AR-P900758XX a six week randomised double blind placebo-controlled dose finding multicenter study comparing AR-P900758XX with Vioxx and with Naproxen in subjects with Osteoarthritis of the Knee (Astra-Zeneca)-PI-2002
7. Comparison of the safety and efficacy of Diram and placebo in combination with NSAID therapy in the treatment of moderate to severe hip or knee osteoarthritis (Shire Pharmaceutical Grant: \$ 60,000, Principal Investigator) 2002-Closed.
8. Double blind study of the efficacy and safety of a single dose of IV parecoxib sodium followed by seven days of oral valdecoxib for the pain following laparoscopic cholecystectomy (Pharmacia; Grant 16,000, Co-Investigator) – completed 2001.
9. A comparison of the analgesic efficacy and safety of Topirimate versus placebo for the treatment of the pain of diabetic neuropathy (Orth-McNeil; *Grant: \$ 11,000*, Principal Investigator) –2001.
10. The safety and efficacy of Electrotransport (E-TRANS) Fentanyl compared to IV PCA Morphine for the treatment of postoperative pain. (Alza; *Grant: \$120,000*, Co-Investigator) –2000-completed
11. An open evaluation of safety and clinical utility of E-TRANS (fentanyl) for management of postoperative pain in children and Adolescents. (Alza; *Grant: \$100,000*, Co-Investigator) –2000-completed
12. A Randomised Double blinded, Placebo Controlled Study to determine the efficacy and Safety of Topiramate with Painful small fiber neuropathy. (Orth-McNeil; *Grant: \$ 100,000*, Principal Investigator) –2000-Completed
13. Safety, efficacy and impact of quality of long term administration of Dilaudid CR for patients with chronic low back pain. (Knoll Pharma; *Grant: \$ 65,000*, Principal Investigator) – 1999– Completed.
14. Multicenter, Blinded, Randomised, Placebo Controlled Study of 0.05% Clonidine Gel In Patients With Post-Diabetic Neuralgia (Curatek Pharmaceuticals; *Grant: \$ 50,000*, Co-Investigator) – 2000– Terminated.

15. Pain medicine Data Bank for the Rush Pain clinic at Rush University (Roxane, Grant: \$ 25,000, Principal Investigator) – 1999.
16. Is Early Extubation Safe in Patients Following Coronary Artery Bypass Surgery? A Prospective Randomized Controlled Outcome Study And Cost-Analysis. (Grants by Anesthesia and Patient Safety Foundation and Zeneca, Canada \$220,000 Co-Investigator) –1994-Completed.

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Peer Reviewed Publications in International Journals:

1. **Buvanendran A**, Fiala J, Patel K, Golden A, Moric M, Kroin JS: Has the Incidence and Severity of Postoperative Pain after Inpatient Surgery Changed over the Last 10 Years? *Submitted to Regional Anesthesia and Pain Medicine 2014*
2. Franco C, **Buvanendran A**, Petersohn J, Menzies R, Menzies L: Innervation of the Anterior Capsule of the Human Knee: Implications for Radiofrequency Ablation. *Submitted to Regional Anesthesia and Pain Medicine 2014*
3. Narouze S, Benzon HT, Provenzano D, **Buvanendran A**, De Andres J, Deer T, Rauck R, Huntoon M: The American Society of Regional Anesthesia and Pain Medicine (ASRA), the European Society of Regional Anesthesia and Pain Therapy (ESRA), the American Academy of Pain Medicine (AAPM), the International Neuromodulation Society (INS), the North American Neuromodulation Society (NANS) and the World Institute of Pain (WIP) Guidelines for Interventional Spine and Pain procedures in patients on antiplatelets and anticoagulants. *Regional Anesthesia and Pain Medicine 2015. Accepted*
4. Kroin JS, **Buvanendran A**, Li J, Moric M, Im H, Tuman KJ: Short-Term Glycemic Control is Effective in Reducing Surgical Site Infection in Diabetic Rats. *Anesthesia & Analgesia 2015 Accepted*
5. Bruehl S, Burns JW, Passik SD, Gupta R, **Buvanendran A**, Chont M, Schuster E, France C: The Contribution of Differential Opioid Responsiveness to Identification of Opioid Risk in Chronic Pain Patients. *Journal of Pain 2015(Accepted)*
6. Young A, Shah S, and **Buvanendran A**. Use of a quantitative platelet function test to guide epidural catheter removal in a patient who inadvertently received clopidogrel. *The Journal of Pain Medicine*, accepted for publication.
7. Young A, **Buvanendran A**, and Lubenow T. The Parturient with Implanted Spinal Cord Stimulator: Management and Review of the Literature. *Regional Anesthesia and Pain Medicine*, submitted for publication.
8. Huntoon M, **Buvanendran A**: Transforaminal epidural steroid injections. Anatomical and imaging analysis trumps other agendas. *Regional Anesthesia and Pain Medicine 2014; 39: 445-446. Editorial*

9. Deer T.R., Mekhail N., Provenzano D., Pope J., Krames E., Leong M., Levy R.M., Abejon D., Buchser E., Burton A., **Buvanendran A.**, Candido K., Caraway D., Cousins M., DeJongste M., Diwan S., Eldabe S., Gatzinsky K., Foreman R.D., Hayek S., Kim P., Kinfe T., Kloth D., Kumar K., Rizvi S., Lad S.P., Liem L., Linderoth B., Mackey S., McDowell G., McRoberts P., Poree L., Prager J., Raso L., Rauck R., Russo M., Simpson B., Slavin K., Staats P., Stanton-Hicks M., Verrills P., Wellington J., Williams K., North R. The Appropriate Use of Neurostimulation of the Spinal Cord and Peripheral Nervous System for the Treatment of Chronic Pain and Ischemic Diseases: The Neuromodulation Appropriateness Consensus Committee. *Neuromodulation* 2014; 17: 515–550.
10. Deer, T. R., Mekhail, N., Petersen, E., Krames, E., Staats, P., Pope, J., Saweris, Y., Lad, S. P., Diwan, S., Falowski, S., Feler, C., Slavin, K., Narouze, S., Merabet, L., **Buvanendran, A.**, Fregni, F., Wellington, J. and Levy, R. M. The Appropriate Use of Neurostimulation: Stimulation of the Intracranial and Extracranial Space and Head for Chronic Pain. *Neuromodulation* 2014; 17: 551–570.
11. Deer, T. R., Mekhail, N., Provenzano, D., Pope, J., Krames, E., Thomson, S., Raso, L., Burton, A., DeAndres, J., Buchser, E., **Buvanendran, A.**, Liem, L., Kumar, K., Rizvi, S., Feler, C., Abejon, D., Anderson, J., Eldabe, S., Kim, P., Leong, M., Hayek, S., McDowell, G., Poree, L., Brooks, E. S., McJunkin, T., Lynch, P., Kapural, L., Foreman, R. D., Caraway, D., Alo, K., Narouze, S., Levy, R. M. and North, R. The Appropriate Use of Neurostimulation: Avoidance and Treatment of Complications of Neurostimulation Therapies for the Treatment of Chronic Pain. *Neuromodulation* 2014; 17: 571–598.
12. Deer, T. R., Krames, E., Mekhail, N., Pope, J., Leong, M., Stanton-Hicks, M., Golovac, S., Kapural, L., Alo, K., Anderson, J., Foreman, R. D., Caraway, D., Narouze, S., Linderoth, B., **Buvanendran, A.**, Feler, C., Poree, L., Lynch, P., McJunkin, T., Swing, T., Staats, P., Liem, L. and Williams, K. (2014), The Appropriate Use of Neurostimulation: New and Evolving Neurostimulation Therapies and Applicable Treatment for Chronic Pain and Selected Disease States. *Neuromodulation*: 2014; 17: 599–615.
13. Burns JW, Gerhart JI, Bruehl S, Peterson KM, Smith DA, Porter LS, Schuster E, Kinner E, **Buvanendran A**, Fras AM, Keefe FJ: Anger Arousal and Behavioral Anger Regulation in Everyday Life Among Patients With Chronic Low Back Pain: Relationships to Patient Pain and Function. *Health Psychol.* 2014 Aug 11.
14. Wesemann K, Coffey RJ, Wallace MS, Tan Y, Broste S, **Buvanendran A**: Clinical Accuracy and Safety Using the SynchronMed II Intrathecal Drug Infusion Pump. *Regional Anesthesia and Pain Medicine* 2014 July-Aug;

15. Gupta RK, Bruehl S, Burns JW, **Buvanendran A**, Chont M, Schuster E, France CR: Relationship between endogenous opioid function and opioid analgesic adverse effects: *Regional Anesthesia Pain Medicine* 2014; 39: 219-224.
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Textbook Chapter:

1. Elmofty D, Buvanendran A, Brandstetter J. Persistent Postsurgical Pain/Postsurgical Thoracic Pain In: Hayek S, Shah B, Desai M, Smith H, Chelimsky T, Eds. Pain Medicine: A Case Study Text of Interdisciplinary Management. Oxford University Press (In Press)
2. Young AC and **Buvanendran A**. Multimodal analgesia and prevention of persistent postoperative pain. In NYSORA (Ed.), *Textbook of Regional Anesthesia and Acute Pain Medicine*. McGraw-Hill.
3. Wall & Melzacks Textbook of Pain, 6th edition
Chapter 46: Postoperative pain and its Management
Authors: **Asokumar Buvanendran**, Timothy Lubenow, Jeffrey Kroin
4. Essentials of Pain Medicine, Third Edition
Non-opioid analgesics (NSAIDs, COX-2 inhibitors and Acetaminophen)
Authors: Bryan Williams, **Asokumar Buvanendran**
5. Barash Clinical Anesthesia, 7th edition
Chronic Pain Management:
Authors: Benzon, Hurley, Deer, **Asokumar Buvanendran**
Editors: Paul Barash, Bruce F Cullen, Robert K Stoelting, Michael Cahalan, M. Christine Stock, Rafael Ortega
6. Complex Regional Pain Syndrome: Current Diagnosis and Therapy.
Chapter 15: Implantable therapies for CRPS
Authors: Lubenow T, **Buvanendran A**, Stanton-Hicks M
7. Raj Practice of Pain Management: (4th Edition)
Chapter 35: NSAIDs and COX-2 inhibitors

Authors: **Buvanendran A**, Reuben SS

8. Clinical Cases in Anesthesiology– A Learning Guide Eds. Shorten G, Dierdorf S, O'Connor C, Iohom G, Hogue C. Wolters Kluwer.
Chapter 17: Peripheral nerve block vs Epidural Analgesia for total knee arthroplasty.
Author: **Asokumar Buvanendran**
9. Bonica: Management of Pain.(4th Edition)
Chapter 74: NSAIDs and Acetaminophen
Author: **Asokumar Buvanendran**, Art Lipman
10. Acute Pain Management
Chapter 12: The role of preventive Analgesia
Author: **Asokumar Buvanendran**
11. ACL surgery: How to get it right the first time and what to do if it Fails
Chapter 16: Perioperative pain management in ACL reconstruction: Pearls and pitfalls.
Authors: **Asokumar Buvanendran**, Shyamala Badrinath
12. The Essence of Analgesics and Analgesia
Chapters 8: Multimodal Analgesia
Authors: Bryan Williams, **Asokumar Buvanendran**
13. The Essence of Analgesics and Analgesia
Chapters: Etoricoxib
Authors: Bryan Williams, **Asokumar Buvanendran**
14. The Essence of Analgesics and Analgesia
Chapters 8: Memantine
Authors: Bryan Williams, **Asokumar Buvanendran**
15. Insall and Scott Surgery of the knee 5th Edition.
Chapter 145: Multimodal approach to Pain Management in TJA
Author: **Asokumar Buvanendran**, B. Williams, CJ. Della Valle
16. Manual of Geriatric Anesthesia. Publisher Springer 2013
Chapter 11: Chronic Pain in Geriatric Patients.
Authors: Thillainahan V, Young A, **Asokumar Buvanendran**
17. Encyclopedia of Neurological Sciences, 2nd Ed. Expected Release Date is 1/9/2014
Acute and Postoperative Pain Management
Authors: Adam Young, **Asokumar Buvanendran**
18. The Hip.
Chapter 34: Pain management
Authors: **Buvanendran A**, Young A.

Textbook Associate Editor & Author

1. Young A and **Buvanendran A**. *Advances in postoperative pain management*. Future Medicine, Ltd., London UK. Published online August 2014.
2. American Academy of Pain Medicine (AAPM) Textbook of Pain Medicine
Editors of Interventional Section: **Asokumar Buvanendran**, Philp Kim and Sunil Panchal
Author of chapter: Non-Steroid Anti-inflammatory drugs

Editor of Textbooks

1. Interventional and Neuromodulatory Techniques for Pain Management
Volume 2: Intrathecal Drug Delivery for Chronic Pain and Spasticity, 1st Edition
Editors: **Asokumar Buvanendran**, Sudhir Diwan
Author of 3 Chapters

Submitted Textbook Chapters and In Press:

1. Minimally Invasive Surgery for Hip and Knee Arthroplasty
Chapter 13: Anesthesia and Pain Management in MIS Arthroplasty
Authors: JE Chelly, **Asokumar Buvanendran**

HONORS AND AWARDS

- 1999 Abbott Laboratories Resident Scholars Program grant from the Foundation for Anesthesia, Education and Research (**FAER**).
- **1st Prize-winner** at the Rush Surgical Sciences Clinical Research Award, June 1998.
- **2nd Prize** winner at the Chicago Medical Society, Annual Residents' Unusual Clinical Case Vignettes Competition, April, 1998.
- **1st Prize-winner** at the Mid-West Anesthesia Resident Conference, March 1998 for Pain/Regional section.

ASRA Newsletter Articles:

1. Nov 2006: Clinical Relevance of central and peripheral prostaglandins in postoperative pain
2. Feb 2007: Chronic Back Pain: An update from 2006 ASA meeting
3. July 2007: Research update on 2007 ASRA meeting
4. October 2007: Legal aspects prescribing chronic opioids for back pain: part 1
5. February 2008: Legal aspects of pain management: part II
6. Mar 2008: Summary of ASRA fall meeting of 2007

Presentations at National Meetings And Published Abstracts:

1. **Buvanendran A**, Kim HS, Moric M, Deng Y, Li Y, Tuman KJ, Kroin JS. Acute gene upregulation after total knee replacement. American Society of Anesthesiologists 2014 Annual Meeting, New Orleans, LA, October 11-15, 2014:A3290.
2. **Buvanendran A**, Kim HS, Moric M, Deng Y, Li Y, Tuman KJ, Kroin JS. Changes in RNA expression in patients with chronic pain after total knee replacement. American

Society of Anesthesiologists 2014 Annual Meeting, New Orleans, LA, October 11-15, 2014:A1043.

3. **Buvanendran A**, Fiala J, Patel KA, Golden AD, Moric M, Kroin JS. Reduction in after-discharge postoperative pain severity after inpatient surgery. American Society of Anesthesiologists 2014 Annual Meeting, New Orleans, LA, October 11-15, 2014:A4212.
4. **Buvanendran A**, Fiala J, Patel KA, Golden AD, Moric M, Kroin JS. Is effective postoperative pain management maintained after the patient leaves the hospital? American Society of Anesthesiologists 2014 Annual Meeting, New Orleans, LA, October 11-15, 2014:A1294.
5. Kroin JS, Li X, Li J, **Buvanendran A**, Tuman KJ, Chen D, Im HJ. Loss of PKC δ genes in experimental osteoarthritis augments osteoarthritic knee joint pain. American Society of Anesthesiologists 2014 Annual Meeting, New Orleans, LA, October 11-15, 2014:A3064.
6. Kroin JS, Li X, Li J, **Buvanendran A**, Tuman KJ, Chen D, Im HJ. Sensory nerve sprouting in PKC δ KO mice in an osteoarthritic knee model. A2220.
7. Kroin JS, Li X, Li J, **Buvanendran A**, Tuman KJ, Chen D, Im HJ. Augmentation of the NGF/TrkA axis in PKC δ KO mice in an osteoarthritic knee model. American Society of Anesthesiologists 2014 Annual Meeting, New Orleans, LA, October 11-15, 2014:A3065.
8. Kroin JS, Shafikhani S, Li J, Li J, Tuman KJ, **Buvanendran A**. A model of surgery and infection in STZ-induced diabetic rats. 2014 American Society of Anesthesiology SA Annual Meeting Abstract. American Society of Anesthesiologists 2014 Annual Meeting, New Orleans, LA, October 11-15, 2014:A4151,
9. Moric M, **Buvanendran A**. Meta-analysis of pain catastrophizing and persistent postoperative pain after total knee arthroplasty (TKA). American Society of Anesthesiologists 2014 Annual Meeting, New Orleans, LA, October 11-15, 2014:A2141.
10. Moric M, **Buvanendran A**, Kroin JS, O'Neill, Tuman KJ. Pain catastrophizing and postoperative pain course in TKA patients. American Society of Anesthesiologists 2014 Annual Meeting, New Orleans, LA, October 11-15, 2014:A3084.
11. Moric M, **Buvanendran A**, Kroin JS, O'Neill C, Tuman KJ. State or trait anxiety: Which has the greater effect on the postoperative pain course in TKA patients? American Society of Anesthesiologists 2014 Annual Meeting, New Orleans, LA, October 11-15, 2014:A2230.
12. Provenzano DA, Deer TR, **Buvanendran A**, Hayek SM, Narouze SN. An International Survey to Understand Infection Control Practices for Neuromodulation., American Society of Anesthesiologists 2014 Annual Meeting, New Orleans, LA, October 11-15,

2014:A1044.

13. Kroin JS, **Buvanendran A**, Li J, Tuman KJ. Can Epigenetic Inhibition at the Spinal Level Reduce Pain in Neuropathic Rats? A1275, 2013 ASA Annual Meeting.
14. Kroin JS, **Buvanendran A**, Tuman KJ. Does Methylglyoxal Mediate Sciatic Nerve Block Duration in Diabetic Rats? A1276, 2013 ASA Annual Meeting.
15. Kroin JS, **Buvanendran A**, Tuman KJ. Intrathecal TRPA1 Antagonist in a Mouse Neuropathic Pain Model. A1277, 2013 ASA Annual Meeting.
16. Kroin JS, **Buvanendran A**, Tuman KJ. Is There Post-Surgery Pain Sensitization in a Rat Knee Surgery Model? A1319, 2013 ASA Annual Meeting.
17. **Buvanendran A**, Mario M, Shah M, Kroin JS, Tuman KJ. Heat Pain Sensitivity Predicts Persistent Postoperative Pain (PPP) After Total Knee Replacement. A2015, 2013 ASA Annual Meeting.
18. **Buvanendran A**, Mario M, Shah M, Kroin JS, Tuman KJ. Hyperalgesia Around Surgical Wound is Associated With Persistent Pain After Total Knee Replacement. A2015, 2013 ASA Annual Meeting.
19. Berges SD, Candiotti KA, Ayad SS, Philip BK, Turan A, **Buvanendran A**, Viscusi ER, Witham S, Gan TJ. Multicenter. Open-label Surveillance Trials to Evaluate the Safety and Efficacy of a Shortened Infusion Time of Intravenous Ibuprofen. A3084, 2013 ASA Annual Meeting.
20. **Buvanendran A**, Mario M, Shah M, Kroin JS, Tuman KJ. Preoperative Pain Catastrophizing Predicts Incidence of Chronic Pain After Total Knee Replacement. A3207, 2013 ASA Annual Meeting.
21. Kroin JS, **Buvanendran A**, Li J, Tuman KJ. Can Continuous Low-Dose Ketamine Infusion Attenuate Neuropathic Pain After Infusion is Discontinued? A4019, 2013 ASA Annual Meeting.
22. Kroin JS, Kerns JM, Tuman KJ, **Buvanendran A**. Glycemic Control Mediates Sciatic Nerve Block Duration in Diabetic Rats. A1177, 2012 ASA Annual Meeting.
23. **Buvanendran A**, Moric M, Vilardo L, Toleikis SC, Kroin JS, Tuman KJ. Preoperative Pain Catastrophizing Predicts Acute Pain After Total Knee Replacement. A033, 2012 ASA Annual Meeting.
24. Kroin JS, Li X, Li J, **Buvanendran A**, Tuman K, Im HJ. Early Intervention with Resveratrol Reduces Osteoarthritis and Osteoarthritis-Induced Pain in Mice. A517, 2012 ASA Annual Meeting.

25. Kroin JS, Li X, Li J, **Buvanendran A**, Tuman K, Im HJ. Reverse Osteoarthritis but Not Osteoarthritis-Induced Pain in Mice. A518 FGF-2, 2012 ASA Annual Meeting.
26. **Buvanendran A**, Vilardo L, Moric M, Toleikis SC, Kroin JS, Tuman KJ. Does Preoperative Heat Pain Sensitivity Predict Postoperative Pain After Total Knee Replacement? A061, 2012 ASA Annual Meeting.
27. Kroin JS, **Buvanendran A**, Tuman KJ. Dexamethasone Does Not Prolong Duration of Sciatic Nerve Block with Local Anesthetics in Rats. A716, 2012 ASA Annual Meeting.
28. **Buvanendran A**, Vilardo L, Moric M, Toleikis SC, Kroin JS, Tuman KJ. Is Numbness Around Surgical Wound Associated with Acute Pain After Total Knee Replacement (TKR)? A855, 2012 ASA Annual Meeting.
29. Young A, **Buvanendran A**, Moric M, Shah MK. Ketamine May Attenuate Persistent Pain Following Knee and Hip Arthroplasty. A872, 2012 ASA Annual Meeting.
30. Moric M, **Buvanendran A**, Tuman KJ. Regional Variation in Prescription Medication Abuse and Illicit Drug Abuse. A1083, 2012 ASA Annual Meeting.
31. Kroin JS, Kerns JM, Tuman KJ, **Buvanendran A**. Safety of Spinal Local Anesthetics in Diabetic Rats. A988, 2011 ASA Annual Meeting.
32. Kroin JS, Kerns JM, Tuman KJ, **Buvanendran A**. Glycemic Control Mediates Sciatic Nerve Block Duration in Diabetic Rats. A1177, 2011 ASA Annual Meeting.
33. Moric M, **Buvanendran A**, Kroin JS, Tuman KJ. Boomerang Effect: Can Prescription Drug Abuse Media Campaigns Paradoxically Lead to Increased Abuse? A721, 2011 ASA Annual Meeting.
34. Moric M, **Buvanendran A**, Kroin JS, Tuman KJ. Teen Drug Abuse Patterns Over The Past Three Decades: Trading Amphetamines For Narcotics? A720, 2011 ASA Annual Meeting.
35. Kroin JS, **Buvanendran A**, Levine BR, Tuman KJ, Im HJ. Pharmacological Modulation of Tactile Allodynia in a Mouse Osteoarthritis Model. A1607, 2011 ASA Annual Meeting.
36. Kroin JS, Kim J, **Buvanendran A**, Tuman KJ, Im HJ. Rat Intervertebral Disc Degeneration Pain Model. A1606, 2011 ASA Annual Meeting.
37. Kroin JS, Kim J, Im HJ, Tuman KJ, **Buvanendran A**. A Rat Model of Lumbar Facet Joint Osteoarthritis and Pain. A1605, A1606, 2011 ASA Annual Meeting.
38. Kroin JS, **Buvanendran A**, Tuman KJ, Im HJ. TNF- α Inhibition Does Not Attenuate Mechanical Hypersensitivity in a Rat Knee Osteoarthritis Model. A1604, 2011 ASA

Annual Meeting.

39. **Buvanendran A**, Kerns JM, Kroin JS, Tuman KJ: Effect of diabetes on duration of spinal blocks in rats. IARS 2011.
40. **Buvanendran A**, Ali A, Stoub T, Kroin JS, Tuman KJ: Specific brain activity associated with chronic cancer pain. IASP 2010, Montreal: Poster Discussion: PT232.
41. Young A, **Buvanendran A**. Effect of Oral Opioid Dosing on Driving Performance in Chronic Pain Patients. Poster presentation at Midwest Anesthesia Conference 2010.
42. Young A, Moric M, **Buvanendran A**. Gender: Differences in Prescription Pain Medication Abuse Rates and Rehabilitation Admissions. Oral presentation at Midwest Anesthesia Residents Conference 2010.
43. **Buvanendran A**, Mitchell K, Kroin JS, Iadarola MJ. Cytokine gene expression after total hip arthroplasty: surgical site versus circulating neutrophil response. *Anesth Analg* 2009;108: S-243.
44. Kroin JS, Li J, **Buvanendran A**, Wagenaar B, Tuman KJ. Does ACE inhibition alter mechanical allodynia in diabetic rats. *Anesth Analg* 2009;108: S-254.
45. **Buvanendran A**, Moric M, Ananda R, Zavislak P, Kroin JS, Tuman KJ. Safety of driving in patients after minor surgery with monitored anesthesia care: a pilot study. *Anesth Analg* 2009;108: S-122.
46. Kroin JS, Li J, **Buvanendran A**, Wagenaar B, Tuman KJ. Effect of diabetic neuropathy on duration of nerve blocks in rats. *Anesth Analg* 2009;108: S-261.
47. **Buvanendran A**, Ali A, Stoub TR, Kroin JS, Tuman KJ. Activation in discrete brain regions during chronic pain: A positron emission tomography (PET) scan study. *Anesth Analg* 2009;108: S-258.
48. Kroin JS, Li J, Im H-J, **Buvanendran A**, Tuman KJ. Is the Calcium Channel $\alpha_2\delta$ Subunit Upregulated in Rat Spinal Cord in a Knee Osteoarthritis Model? ASA 2009 Annual Meeting Abstract.
49. Kroin JS, **Buvanendran A**, Kerns JM, Wagenaar B, Tuman KJ. Does Lidocaine Nerve Block Cause Neurotoxicity in Diabetic Rats? ASA 2009 Annual Meeting Abstract.
50. Kroin JS, Li J, **Buvanendran A**, Wagenaar B, Tuman KJ. Does a Plantar Foot Incision Upregulate the Calcium Channel $\alpha_2\delta$ Subunit in Rat Spinal Cord? ASA 2009 Annual Meeting Abstract.
51. Kroin JS, **Buvanendran A**, Wagenaar B, Tuman KJ. Effect of Adjuvants on Duration of Nerve Blocks in Diabetic Rats. ASA 2009 Annual Meeting Abstract.

52. **Buvanendran A**, Ali A, Stoub TR, Kroin JS, Tuman KJ. Brain Activation with Chronic Cancer Pain: A Positron Emission Tomography (PET) Scan Study. ASA 2009 Annual Meeting Abstract.
53. **Buvanendran A**, Kroin JS, Tuman KJ. Does the Non-Sedating GABA-A Agonist L-838,417 Produce Analgesia in Rat Postoperative Pain Models? ASA 2009 Annual Meeting Abstract.
54. **Buvanendran A**, Moric M, Ananda R, Zavislek P, Tuman KJ. Driving Proficiency in Patients after Minor Ambulatory Surgery with Monitored Anesthesia Care. ASA 2009 Annual Meeting Abstract.
55. **Buvanendran A**, Lubenow T, Moric M, Kerchberger JM, Tuman KJ. The INR Values at Removal of Epidural Catheter in 6078 Patients Receiving Warfarin. ASA 2009 Annual Meeting Abstract.
56. Kroin JS, **Buvanendran A**, Kari M, Jain LA, Tuman KJ: Anti-allodynic effect of intrathecal pregabalin and neostigmine in rats with neuropathic pain. *Anesthesiology* 109: A599, 2008.
57. Kroin JS, **Buvanendran A**, Li J, Tuman KJ: Do the anti-allodynic effects of intrathecal drugs differ between two rat neuropathic pain models? *Anesthesiology* 109: A637, 2008.
58. Kroin JS, **Buvanendran A**, Tuman KJ: Postoperative pain in a rat model of diabetic neuropathy. *Anesthesiology* 109: A118, 2008.
59. Li J, Kroin JS, **Buvanendran A**, Tuman KJ: Effect of lysophosphatidic acid (LPA) inhibition on neuropathic pain development in the rat. *Anesthesiology* 109: A125, 2008.
60. **Buvanendran A**, Ali A, Stoub TR, Kroin JS, Kenneth J. Tuman: Brain PET scans in patients with minimal pain. *Anesthesiology* 109: A1027, 2008.
61. **Buvanendran A**, Lubenow T, Majewski M, Kari M, Kroin JS: The INR values at removal of epidural catheter in 4013 patients receiving warfarin. *Anesthesiology* 109: A427, 2008.
62. Moric M, **Buvanendran A**, Hlubocky J, Kroin JS, M.D., Tuman KJ: Impaired driving evaluation measures for patient safety: Use of alcohol for model validation. *Anesthesiology* 109: A1342, 2008.
63. **Buvanendran A**, Reuben SS, Kroin JS, Kari M, Moric M: Perioperative pregabalin improves postoperative outcomes after Total Knee Arthroplasty. *Anesthesiology* 109: A393, 2008.
64. **Buvanendran A**, Reuben SS, Kari M, Kroin JS, Moric M: Reduced costs and time to discharge following total knee arthroplasty with perioperative pregabalin. *Anesthesiology*

109: A392, 2008.

65. **Buvanendran A**, Reuben SS, Kroin JS, Moric M, Tuman KJ: Perioperative Pregabalin Reduces Neuropathic Pain at 6 Months after Total Knee Arthroplasty (TKA). *Anesthesiology* 109: A595, 2008.
66. Kroin JS, **Buvanendran A**, Li Jinyuan, Tuman KJ: Differential Upregulation of Spinal pERK in Rat Surgical Pain Models. *Anesth Analg* 106:S145, 2008.
 - a. Selected as one of 8 abstracts for the Best of Meeting 2008– International Anesthesia Research Society
67. Kroin JS, **Buvanendran A**, Kari M, Tuman KJ: Synergistic Effect of Intrathecal Neostigmine and Pregabalin in a Rat Postoperative Incisional Pain Model. *Anesth Analg* 106:S146, 2008.
68. Kroin JS, **Buvanendran A**, Tuman KJ: Local Injection of Resiniferatoxin Reduces Hyperalgesia at a Non-antinociceptive Dose in a Rat Incision Model of Postoperative Pain. *Anesth Analg* 106:S147, 2008.
69. **Buvanendran A**, Reuben SS, Kari M, Kroin JS, Della Valle C: Perioperative Pregabalin Reduces Neuropathic Pain at 3 Months after Total Knee Arthroplasty (TKA). *Anesth Analg* 106:S163, 2008.
 - a. Selected as one of 8 abstracts for the Best of Meeting 2008– International Anesthesia Research Society.
70. **Buvanendran A**, Kari M, Reuben SS, Kroin JS, Tuman KJ: Cerebrospinal Fluid Bioavailability of Oral Pregabalin. *Anesth Analg* 106:S206, 2008.
71. **Buvanendran A**, Lubenow T: Efficacy of tripolar spinal cord stimulator for the relief of chronic low back pain from failed back surgery. *Reg Anesth Pain Med* 2007; A5.
 - a. Selected as the Best of the Meeting
72. **Buvanendran A**, Moric M, Lubenow TJ, Kroin JS, Della Valle C: Use of long term (6 weeks) tunneled epidural catheter for rehabilitation following knee surgery. *Anesthesiology* 107:A2009, 2007.
73. **Buvanendran A.**, Kroin JS, Tuman KJ: A new knee surgery model in rats to evaluate postoperative pain: effect of intrathecal analgesics. *Anesthesiology* 107:A2022, 2007.
74. **Buvanendran A**, Moric M, Kroin JS, Lubenow TR, Tuman KJ: Do chronic oral opioids impair driving skills? a randomized controlled trial. *Anesthesiology* 107:A278, 2007.
 - a. Multiple media release (CBS, Web news releases)
75. **Buvanendran A**, Moric M, Kroin JS, Venkatesan N, Tuman KJ: Does chronic intrathecal opioid treatment adversely affect driving skills? *Anesthesiology* 107:A1893, 2007.

76. **Buvanendran A**, Reuben SS, Kari M, Kroin JS, Della Valle C: Perioperative pregabalin improves postoperative outcomes after total knee arthroplasty (TKA). *Anesthesiology* 107:A493, 2007
 - a. Multiple media release (New York Times, CBS, Web news releases)
77. Kroin JS, **Buvanendran A**, Gurney M, Zeller W, Singh J: Evaluation of preemptive prostaglandin EP3 antagonists with the carrageenan assay of hyperalgesia. *Anesthesiology* 107:A763, 2007.
78. Kroin JS, **Buvanendran A**, Tuman KJ: Carrageenan-induced mechanical allodynia in mice following chronic COX-2 inhibitor treatment. *Anesthesiology* 107:A162, 2007.
79. Kroin JS, **Buvanendran A**, Watts DE, Tuman KJ: Effect of oral glutamine on laparotomy-induced pain in rats. *Anesthesiology* 107:A913, 2007.
80. Kroin JS, **Buvanendran A**, Tuman KJ: Spinal NF-kB inhibition does not prevent postoperative pain-related behavior in rats. *Anesthesiology* 107:A1353, 2007.
81. Kroin JS, **Buvanendran A**, Watts DE, Tuman KJ: Role of central interleukin-6 in surgery-induced upregulation of prostaglandin E2. *Anesthesiology* 107:A1355, 2007.
82. Kroin JS, **Buvanendran A**, Tuman KJ: Effect of BH4 inhibition on neuropathic and postoperative pain in rats. *Anesthesiology* 107:A1355, 2007.
83. Moric M, **Buvanendran A**, Lubenow TR: Increases in Methadone Drug Related Emergency Room Visits and Poisoning Deaths. *Anesthesiology* 107:A284, 2007.
84. Tsao GC, Reuben SS, **Buvanendran A**: Celecoxib, pregabalin or their combination on punctuate hyperalgesia following spine fusion surgery. *Anesthesiology* 107:A489, 2007.
85. **Buvanendran A**, Tuman JK: A new knee model in rats to evaluate postoperative pain and function: Effect of intrathecal analgesics. *Reg Anesth Pain Medicine* 2007; A51.
86. **Buvanendran A**, Ali A, Stoub TR, Berger RA, Rossi R, Ramsy G: Positron emission tomography evaluation of postoperative pain response following total knee arthroplasty. *Anesth Analg* 2007; S 183.
87. **Buvanendran A**, Kroin JS, Tuman KJ: Use of knee surgery animal model to assess modulation of postoperative pain-related behaviour by morphine, ketamine or clonidine. *Anesth Analg* 2007; S 172.
88. Kroin JS, **Buvanendran A**, Tuman KJ: M Minocycline doesnot reduce hyperalgesia in a plantar incision pain model. *Anesth Analg* 2007: S169.

89. **Buvanendran A**, Kroin J and Tuman KJ: A new surgery model in rats to evaluate postoperative pain and function: Effect of morphine and cyclooxygenase inhibitors. *ASRA 2006 – fall meeting*.
90. Kroin JS, Li J, **Buvanendran A**, Watts DE, Tuman KJ: Spinal galanin is not upregulated in a rat postoperative pain model. *Anesthesiology 105:A*, 2006.
91. Kroin JS, Takatori M, Chen E-Y, Li J, **Buvanendran A**: Upregulation of dorsal horn microglial COX-1 and neuronal COX-2 in a rat postoperative pain model. *Anesthesiology 105:A*, 2006.
92. Kroin JS, **Buvanendran A**, Watts DE, Tuman KJ: Tissue, but not cerebrospinal fluid interleukin-6, increases following thoracic surgery in the rat. *Anesthesiology 105:A*, 2006.
93. Kroin JS, **Buvanendran A**, Watts DE, Tuman KJ: Intrathecal pregabalin is more potent than gabapentin in reducing mechanical allodynia in the rat spared nerve injury pain model. *Anesthesiology 105:A*, 2006.
94. Kroin JS, **Buvanendran A**, Watts DE, Tuman KJ: Reversal of pain-related behavior by cyclooxygenase inhibitors after thoracic surgery in the rat. *Anesthesiology 105:A*, 2006.
95. Kroin JS, Chen E-Y, Zhang Y, **Buvanendran A**, Tuman KJ: No compensatory expression of cyclooxygenase-1 and-2 detected in transgenic mice with differences in neuropathic and inflammatory pain. *Anesthesiology 105:A*, 2006.
96. Li J, Kroin JS, Watts DE, **Buvanendran A**, Tuman KJ: Effect of ROCK inhibition on neuropathic pain development in the rat. *Anesthesiology 105:A*, 2006.
97. **Buvanendran A**, Berger RA, Pash JS, Moric M, Kroin JS : Multimodal pain therapy for minimally invasive total hip arthroplasty for same-day discharge. *Anesthesiology 105:A*, 2006.
98. **Buvanendran A**, Berger RA, Venkatesan N, Moric M, Kroin JS : Multimodal pain therapy for minimally invasive total knee arthroplasty for same-day discharge home. *Anesthesiology 105:A*, 2006.
99. **Buvanendran A**, Lambropoulos A, Moric M, Kroin JS : Long-term epidural infusion for pain management and rehabilitation following total knee arthroplasty. *Anesthesiology 105:A*, 2006.
100. Moric M, **Buvanendran A**, Lubenow TJ, Kroin JS, Tuman KJ: Abuse distribution of prescription pain medication in the U.S. *Anesthesiology 105:A*, 2006.
101. Saha C, **Buvanendran A**, Moric M, Kroin JS, Lubenow TJ: Opioid tolerance and adjuvant drugs in intrathecal drug delivery systems in non-cancer patients. *Anesthesiology 105:A*, 2006.

102. Takatori M, Kroin JS, **Buvanendran A**, Watts DE, Tuman KJ: Effect of intraplantar endothelin ETA receptor antagonist in a mouse foot incision model. *Anesthesiology* 105:A, 2006.
103. **Buvanendran A**, Berger R, Kroin JS, Moric M, Tuman KJ: Pre-anesthetic management reduces heterotrophic ossification after hip arthroplasty. *Anesth Analg* 102:S299, 2006: Selected for “best of the meeting session”.
104. Kroin JS, **Buvanendran A**, Watts DE, Tuman KJ: Effects of thoracic muscle surgery on spinal interleukin-6 concentration in the rat. *Anesth Analg* 102:S227, 2006.
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106. Kroin JS, **Buvanendran A**, Watts DE, Tuman KJ: Presurgical administration of intrathecal pregabalin reduces postoperative hyperalgesia in rats. *Anesth Analg* 102:S217, 2006.
107. Kroin JS, **Buvanendran A**, Watts DE, Tuman KJ: Intrathecal pregabalin reduces mechanical allodynia in the rat spared nerve injury pain model. *Anesth Analg* 102:S214, 2006.
108. Kroin JS, Chen EY, **Buvanendran A**, Watts DE, Kordower JH: Time course of mechanical allodynia in COX-1 and COX-2 knockout female mice following sciatic nerve injury. *Anesth Analg* 102:S213, 2006.
109. Kroin JS, Chen EY, **Buvanendran A**, Watts DE, Kordower JH: Time course of mechanical hyperalgesia in COX-1 and COX-2 knockout female mice following carrageenan injection. *Anesth Analg* 102:S216, 2006.
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