
BIOGRAPHICAL SKETCH

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NAME Krane, Elliot Jeffrey	POSITION TITLE Professor of Anesthesiology & Pediatrics
eRA COMMONS USER NAME (credential, e.g., agency login)	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Reed College, Portland, Oregon	B.A.	5/74	Organic Chemistry
University of Arizona School of Medicine, Tucson, Arizona	M.D.	12/77	
Massachusetts General Hospital, Boston		7/80	Pediatrics
Massachusetts General Hospital, Boston		12/82	Anesthesiology
Boston Children's Hospital		12/83	Pediatric Anesthesiology and Critical Care

A. Personal Statement

As a physician specializing in the management of childhood pain for over 3 decades, I know from experience that determining the source of pain in the preverbal child and the cognitively impaired older child and teenager is a challenging and sometimes impossible challenge, leading too often to the empiric treatment of pain rather than disease specific interventions. Even in the older communicative child, pain perception is often remote to the actual site of pathology, a fact known all too well to adults with degenerative spine disease who experience the severe pain of sciatica, whereas the pathology is actually within the spine.

A methodology, therefore, that has the potential to identify markers of pain promises to allow clinicians to deliver disease and anatomically appropriate therapy to reduce the suffering in their patients who are unable to communicate the features of their pain accurately, and to all patients in whom the location of injury or pathology is different than the location of perceived pain.

I look forward to working with my collaborators on this project, combining our diverse academic backgrounds, clinical expertise and scientific talents to tackling this problem.

B. Positions and Honors

Positions

1994-present Professor of Anesthesiology, Stanford University School of Medicine, Stanford, California
1995-present Professor of Pediatrics, Stanford University School of Medicine, Stanford, California
1989-1994 Associate Professor, Department of Anesthesiology, University of Washington School of Medicine, Seattle, Washington
1989-1994 Adjunct Associate Professor, Department of Pediatrics, University of Washington Medicine School of Medicine, Seattle, Washington

- 1984-1989 Assistant Professor, Department of Anesthesiology, University of Washington School of Medicine, Seattle, Washington
- 1984-1989 Adjunct Assistant Professor, Department of Pediatrics, University of Washington School of Medicine, Seattle, Washington

Other Experience and Professional Memberships

- Fellow, Royal Society of Medicine
 American Pain Society
 American Society of Anesthesiologists
 Association of University Anesthetists
 California Society of Anesthesiologists
 Fellow, American Academy of Pediatrics
 International Anesthesia Research Society
 International Association for the Study of Pain
 Society of Critical Care Medicine (until 1998)
- 2018 International Association for the Study of Pain (IASP) Presidential Task Force on Cannabis and Cannabinoids
- 2016 Mayday Fund: Development of a consensus statement for the ethical management of pain in pediatric research subjects (Co-Investigator with Stefan Friedrichsdorf, MD, University of Minnesota)
- 2013 Certification, Pediatric Anesthesiology
- 2012 Certification, American Board of Pain Medicine
- 2011 Co-Founder, Pediatric Research Network for Pain (PRN-Pain)
- 2011 Organizer, Pediatric Pain SIG, International Association for the Study of Pain Satellite Symposium on the Science and Clinical Medicine of Challenging Pediatric Pain Syndromes, World Congress of Pain, Milan 2012
- 2011 Peer reviewer, Oregon Evidence-based Practice Center and American Pain Society: APS-CPDD Clinical Guidelines: Methadone Safety
- 2009 U.S. Food and Drug Administration Pediatric Analgesic Clinical Trials Workshop
- 2005-present Membership Committee, Society for Pediatric Anesthesia
- 2001-present Operation Rainbow Surgical Team, Esteli, Nicaragua
- 1999-2000 Medical Advisor, Project Hope and the Shanghai Children's Hospital
- 1996-2000 Medical Advisor, Project Hope and National Taiwan University Children's Hospital.
- 1992 Consultant for Program Evaluation, Project Hope Foundation, Humanitarian Assistance Program
- 1992 Medical Advisor, Health Care Assessment Team, Republics of Russia and Ukraine, Project Hope Foundation, Humanitarian Assistance Program
- 1991 Medical Advisor, Health Care Assessment Team, Republic of Russia, USSR, Project Hope Foundation, Humanitarian Assistance Program
- 1990 Certification, Critical Care Medicine (American Board of Pediatrics)
- 1990-1991 Secretary, Special Interest Group on Childhood Pain, International Association for the Study of Pain
- 1988-1991 Chairman, Scientific Committee, 2nd International Symposium on Pediatric Pain, Montreal, Quebec, 1991
- 1988-1991 Steering Committee, 2nd International Symposium on Pediatric Pain, Montreal, Quebec, 1991

- 1986-1988 Founder and Co-Chairman, 1st International Symposium on Pediatric Pain, Seattle, Washington, 1988.
- 1985 Certification, American Board of Anesthesiology
- 1985 Certification, American Board of Pediatrics

Honors

- 1972 Dana Scholarship for Excellence in Humanities
- 1974 Phi Beta Kappa
- 1976 Arizona Medical Association Award
- 1977 Alpha Omega Alpha
- 1997 American Medical Association Physician's Recognition Award, Anesthesiology
- 1997 American Medical Association Physician's Recognition Award, Pediatrics
- 1998 Poster Award, Vienna International Congress 1998 on Anesthesiology and Perioperative Care
- 2010 Mayday Pain & Society Fellowship: A Media and Policy Initiative
- 2012 American Pain Society Jeffrey Lawson Award (for advocacy in pediatric pain treatment)
- 2013 Mayday Fund: Development of a database for regional anesthesia provided to children with chronic pain
- 2015 Ellis N. Cohen Achievement Award of the Stanford Department of Anesthesiology, Perioperative and Pain Medicine
- 2016 Mayday Fund:
Development of a consensus statement for the ethical management of pain in pediatric research subjects (Co-Investigator with Stefan Friedrichsdorf, MD, University of Minnesota)

C. Selected Peer-reviewed Publications (Selected from 67 peer reviewed publications)

Most relevant to the current application

1. Davis PJ, Galinkin J, McGowan FX, Lynn AM, Yaster M, Rabb MF, Krane EJ, Kurth CD, Blum RH, Maxwell L, Orr R, Szmuk P, Hechtman D, Edwards S, Henson LG. A randomized multicenter study of remifentanil compared with halothane in neonates, infants undergoing pyloromyotomy I Emergence, recovery profiles. *Anesth Analg* 93: 1370-2, 2001.
2. Galinikin J, Davis PJ, McGowan FX, Lynn AM, Rabb RF, Yaster M, Henson LG, Hechtman D, Maxwell L, Szmuk P, Orr R, Krane EJ, Edwards S, Kurth CD. A randomized multicenter study of remifentanil compared with halothane in neonates and infants undergoing pyloromyotomy. II. Perioperative breathing patterns in neonates and infants with pyloric stenosis. *Anesth Analg* 93: 1387-92, 2001.
3. Taenzer AH, Walker BJ, Bösenberg AT, Martin L, Suresh S, Polaner D, Wolf C, Krane EJ. Asleep vs. Awake - Does it matter? Pediatric regional block complications by patient state. A report from the Pediatric Regional Anesthesia Network (PRAN). *Reg Anesth Pain Med* 39:279-283, 2014, DOI:10.1097/AAP.000000000000102. (Accompanying editorial).
4. Berde CB, Walco G, Krane E, Anand K, Aranda J, Craig K, Dampier C, Finkel J, Grabois M, Johnston C, Lantos J, Lebel A, Maxwell L, McGrath P, Oberlander T, Schanberg L, Stevens B, Taddio A, von Baeyer C, Yaster M, Zempsky W. Pediatric Analgesic Clinical Trials: Designs, Measures, and Extrapolation from Adult Studies. *Pediatrics* 129:1-11, 2012.
5. Hsieh, VC, Krane EJ, Morgan FG. Mitochondrial disease and anesthesia. *J Inborn Errors Metabolism & Screening* 5: 1-5, 2017, DOI: 10.1177/2326409817707770.

6. Connolly MR, Kitt RA, Herrmann RR, Berde CB, Krane EJ, LeBel AA, McDermott MP, Smith SM, Walco GA, Weisman S, Turk DC, Dworkin RH, Gewandter JS. Design and reporting characteristics of clinical trials of select chronic and recurrent pediatric pain conditions: An ACTION systematic review. *J Pain*: pii: S1526-5900(18)30568-6. doi: 10.1016/j.jpain.2018.08.007. 2018.
7. Walco GA, Kopecky EA, Weisman SJ, Stinson J, Stevens B, Desjardins PJ, Berde CB, Krane EJ, Anand KJS, Yaster M, Dampier CD, Dworkin RH, Gilron I, Lynn AM, Maxwell LG, Raja S, Schachtel B, Turk DC. Clinical trial designs and models for analgesic medications for acute pain in neonates, infants, toddlers, children, and adolescents: ACTION recommendations. *Pain* 159:193-205, 2018.
- 8.

Additional recent publications of importance to the field (in chronological order)

1. Fillingim RB, Bruehl S, Dworkin RH, Dworkin SF, Loeser JD, Turk DC, Widerstrom-Noga E, Arnold L, Bennett R, Deyo RA, Edwards RR, Freeman R, Gewandter J, Hertz S, Hochberg M, Krane E, Mantyh PW, Markman J, Neogi T, Ohrbach R, Paice J, Porreca F, Rappaport BA, Smith S, Smith T, Sullivan M, Verne GN, Wasan A, Wesselmann U. The ACTION-American Pain Society Pain Taxonomy (AAPT): An Evidence-Based and Multi-Axial Approach to Classifying Chronic Pain Disorders. *J Pain* 15 241-249, 2014.
2. Taenzer AH, Walker BJ, Bösenberg AT, Martin L, Suresh S, Polaner D, Wolf C, Krane EJ. Asleep vs. Awake - Does it matter? Pediatric regional block complications by patient state. A report from the Pediatric Regional Anesthesia Network (PRAN). *Reg Anesth Pain Med* 39:279-283, 2014, DOI:10.1097/AAP.000000000000102. (Accompanying editorial).
3. Taenzer AH, Walker BJ, Bösenberg AT, Martin L, Suresh S, Polaner D, Wolf C, Krane EJ. Interscalene Blocks under General Anesthesia – Safe Practice? A report from the Pediatric Regional Anesthesia Network (PRAN). *Reg Anesth Pain Med* 39:502-505, 2014, DOI: 10.1097/AAP.000000000000102.
4. Drummond JC, Krane EJ, Tomatsu S, Theroux MC, Lee RR. Paraplegia after epidural-general anesthesia in a Morquio patient with moderate thoracic spinal stenosis. *Can J Anaesth* 62:45-49, 2015, DOI:10.1007/s12630-014-0247-1.
5. Suresh S, Ivani G, Ecoffey C, Bosenberg A, Lonnqvist PA, Krane E, Veyckemans F, Polaner D, Van de Velde M, Neal J. The European Society of Regional Anesthesia (ESRA) and the American Society of Regional Anesthesia (ASRA) Joint Committee Practice Advisory on Pediatric Regional Anesthesia. *Reg Anesth Pain Med* 40: 1-7, 2015, DOI: 10.1097/AAP.000000000000280.
6. Bhandari RP, Feinstein A, Huestis S, Krane E, Dunn A, Cohen L, Kao MC, Darnall B, Mackey S. Pediatric-Collaborative Health Outcomes Information Registry (Peds-CHOIR): A Learning Health System to Guide Pediatric Pain Research and Treatment. *Pain* 157: 2033-44, 2016, DOI: 10.1097/ j.pain.0000000000000609.
7. Walco GA, Krane EJ, Schmader KE, Weiner DK. Applying a Life-Span Developmental Perspective to Chronic Pain: Pediatrics to Geriatrics. *J Pain* 17: 108-17, 2016, DOI: 10.1016/j.jpain.2015.11.003.
8. Wiffen PJ, Cooper TE, Heathcote LC, Clinch J, Howard R, Krane E, Lord S, Sethna N, Schechter N, Wood C. Antiepileptic drugs for chronic non-cancer pain in children and adolescents. *Cochrane Database of Systematic Reviews* 2017, Issue 2. Art. No.: CD012536. DOI:10.1002/14651858.CD012536
9. Cooper TE, Fisher E, Gray AL, Krane E, Sethna N, van Tilburg MAL, Zernikow B, Wiffen PJ. Opioids for chronic non-cancer pain in children and adolescents. *Cochrane Database of*

D. Research Support

Ongoing Research Support

Completed Research Support

Endo Pharmaceuticals, Inc. ("An Open-Label, Ascending, Two-Part, Single- and Multiple-Dose Evaluation of the Safety, Pharmacokinetics, and Effectiveness of Oxymorphone for Acute Postoperative Pain in Pediatric Subjects")

Endo Pharmaceuticals, Inc. ("An Open-Label Safety and Tolerability Study of Immediate-Release and Extended-Release Oxymorphone in Opioid-Tolerant Pediatric Subjects With Chronic Pain")

Purdue Pharmaceuticals, Inc. ("An Open-label, Multicenter Study of the Safety of Twice Daily Oxycodone Hydrochloride Controlled-release Tablets in Opioid Experienced Children from Ages 6 to 16 Years Old, Inclusive, with Moderate to Severe Malignant and/or Nonmalignant Pain Requiring Opioid Analgesics") Cadence Pharmaceuticals, Inc. ("A Phase III Multi-Center, Open-Label, Prospective, Repeated Dose, Multi-Day Study of the Safety and Efficacy of Intravenous Acetaminophen in Pediatric Inpatients")

Mayday Fund ("Initiation of a Juvenile CRPS National Consensus Group")

SkyePharma, Inc. ("A Phase 2/3, Multicenter, Randomized, Double-Blind, Dose-Finding and Dose-Confirmation Study to Evaluate the Safety and Efficacy of a Single Epidural Dose of SKY0401 (Morphine Sulfate Extended-Release Liposome Injection) in the Management of Post-Operative Pain in Pediatric Subjects Undergoing Lower Abdominal (Below the Umbilicus), Genitourinary, or Lower Extremity Orthopedic Surgery")

Corgentech Corporation ("A Phase III, Randomized, Double-Blind, Placebo-Controlled Study to Confirm the Effectiveness and Safety of ALGRX 3268 In Pediatric Subjects")

Cephalon, Inc. ("A Double-Blind, Placebo-Comparison Study to Evaluate the Efficacy and Safety of ACTIQ® (Oral Transmucosal Fentanyl Citrate [OTFC®]) Treatment for Opioid-Tolerant Children and Adolescents With Breakthrough Pain")

Neurex Corporation ("An Evaluation of Corloпам® for the Induction of Deliberate Hypotension in Pediatric and Adult Patients Undergoing Craniofacial Surgery, and Major Orthopedic Surgery")

Glaxo Wellcome Pharmaceuticals ("A Randomized Study of Ultiva versus Halothane in Neonates Undergoing Surgery for Pyloric Stenosis")

Roche Pharmaceuticals ("The Efficacy and Safety of Three Single Oral Doses of Midazolam Syrup in Pediatric Patients")

Janssen Pharmaceuticals ("Dose Response of Epidural Sufentanil in Children")

NIH Biomedical Research Grant ("Epidural Sufentanil in Children")

Washington State Society of Anesthesiologists ("Spinal anesthesia in ex-premature infants")

NIH Biomedical Research Grant ("Continuous epidural sufentanil in children")

Diabetes Research and Education Foundation Grant ("Prevention of brain swelling during diabetes ketoacidosis")

NIH Biomedical Research Grant ("Comparison of caudal morphine caudal bupivacaine, and intravenous morphine for postoperative pain relief in children")

American Society of Anesthesiologists ("Cerebral blood flow in an infant animal model")