**CURRICULUM VITAE**

Monday, April 17, 2023

**Holger K. Eltzschig, MD, PhD**

Chairman

Professor of Anesthesiology, Surgery, Obstetrics, and Biochemistry

John P. and Kathrine G. McGovern Distinguished University Chair

Associate Vice President for Translational Medicine

Director, Center for Perioperative Medicine

Department of Anesthesiology

McGovern Medical School

The University of Texas Health Science Center at Houston

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**Biographic Data:**

 Date of Birth: October 29, 1968

 Place of Birth: Stuttgart, Germany

 Marital Status: Shelley A. Eltzschig

Children: Josephine S. Eltzschig

 Tigerlily S. Eltzschig

**Education:**

1. MD Eberhard-Karls-University, Tübingen, Germany

1996 PhD (Dr. med.) Eberhard-Karls-University, Tübingen, Germany

2004 Habilitation Eberhard-Karls-University, Tübingen, Germany

**Postdoctoral Training:**

09/1996 - 06/1998 Residency in Anesthesiology and Critical Care Medicine, Department of Anesthesiology and Critical Care Medicine, Tübingen University Clinic, Hoppe-Seyler-Str. 3, 72076 Tübingen, Germany

07/1998 - 06/1999 Surgical Internship, Division of Cardiac Surgery, Brigham and Women’s Hospital, Harvard Medical School, 75 Francis Street, Boston, MA 02215

07/1999 - 06/2002 Residency in Anesthesiology, Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women’s Hospital, Harvard Medical School, 75 Francis Street, Boston, MA 02115

07/2002 - 06/2003 Clinical Fellowship in Cardiac Anesthesia and Perioperative Transesophageal Echocardiography, Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women’s Hospital, Harvard Medical School, 75 Francis Street, Boston, MA

01/2002 - 7/2003 Research Fellowship, Center for Experimental Therapeutics and Ischemia-Reperfusion Injury, Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women’s Hospital, Harvard Medical School, 75 Francis Street, Boston, MA

**Hospital or Affiliated Institution Appointments:**

06/1996 - 07/1998 Clinical Fellow, Department of Anesthesiology and Critical Care Medicine, University Hospital, Tübingen, Germany

07/1998 - 06/1999 Clinical Fellow, Division of Cardiac Surgery, Brigham and Women’s Hospital, Harvard Medical School, Boston, MA

07/1999 - 07/2003 Clinical Fellow, Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women’s Hospital, Harvard Medical School, Boston, MA

07/2003 - 08/2007 Assistant Professor, and Staff Anesthesiologist, Department of Anesthesiology and Critical Care Medicine, University Hospital, Tübingen, Germany

10/2004 Associate Professor (“Habilitation”), Department of Anesthesiology and Critical Care Medicine, University Hospital, Tübingen, Germany

01/2006 - 07/2007 Vice Chair (“Leitender Oberarzt”), Department of Anesthesiology and Critical Care Medicine, University Hospital, Tübingen, Germany

03/2007 - 07/2007 Professor, Department of Anesthesiology and Critical Care Medicine, University Hospital, Tübingen, Germany

08/2007 - 6/2010 Associate Professor, Department of Anesthesiology, University of Colorado, Aurora, Colorado

07/2010 - 8/2016 Professor and Tenure, Department of Anesthesiology, University of Colorado, Aurora, Colorado

10/2010 - 6/2013 Vice Chair for Research, Department of Anesthesiology, University of Colorado, Aurora, Colorado

06/2013 - 8/2016 Director, Organ Protection Program
Departments of Anesthesiology, Surgery, Medicine, Emergency Medicine and Pediatrics; University of Colorado School of Medicine, Aurora, Colorado

11/2014 - 8/2016 Chief, Anesthesia Service for Oncologic Surgery,
Department of Anesthesiology, University of Colorado School of Medicine, Aurora, Colorado

09/2016 - today Director, Center for Perioperative Medicine

Department of Anesthesiology, McGovern Medical School The University of Texas Health Science Center at Houston Houston, Texas

09/2016 - today Associate Vice President for Translational Research

The University of Texas Health Science Center at Houston Houston, Texas

09/2016 - 02/2017 Visiting Professor, Department of Anesthesiology, McGovern Medical School; The University of Texas

Health Science Center at Houston, Houston, Texas

03/2017 - today Professor with Tenure, Department of Anesthesiology McGovern Medical School; The University of Texas Health Science Center at Houston, Houston, Texas

09/2016 - 11/2016 Vice Chair for Research, Department of Anesthesiology, McGovern Medical School; The University of Texas Health Science Center at Houston, Houston, Texas

11/2016 - 08/2017 Chairman ad Interim, Department of Anesthesiology, McGovern Medical School; The University of Texas Health Science Center at Houston, Houston, Texas

02/2017 - 05/2019 John P. and Kathrine G. McGovern Distinguished Chair, Department of Anesthesiology, McGovern Medical School; The University of Texas Health Science Center at Houston, Houston, Texas

09/2017 - today Chairman, Department of Anesthesiology, McGovern Medical School; The University of Texas Health Science Center at Houston, Houston, Texas

06/2019 - today John P. and Kathrine G. McGovern Distinguished University Chair, Department of Anesthesiology, McGovern Medical School; The University of Texas Health Science Center at Houston, Houston, Texas

10/2022 - today Adjunct Professor, Department of Obstetrics, Gynecology and Reproductive Sciences, McGovern Medical School; The University of Texas Health Science Center at Houston, Houston, Texas

**Major Administrative Responsibilities:**

University of Tübingen, Germany (2003 - 2007)

07/2003 - 08/2007 Associate Director for Anesthesia Research, Department of Anesthesiology and Critical Care Medicine, University Hospital, Tübingen, Germany.

02/2004 - 08/2007 Financial Advisory Committee, Department of Anesthesiology and Critical Care Medicine, University Hospital, Tübingen, Germany

01/2006 - 08/2007 Vice Chair (“Leitender Oberarzt”), Department of Anesthesiology and Critical Care Medicine, University Hospital, Tübingen, Germany

University of Colorado

08/2007 - 08/2016 Associate Chair for Basic and Translational Research, Department of Anesthesiology, University of Colorado

08/2007 - 08/2016 Member, Mucosal Inflammation Program, Department of Medicine, University of Colorado, Denver

05/2008 - 08/2016 Member, Anesthesia Service for Solid Organ Transplantation, University of Colorado, Denver

06/2008 - 08/2016 Co-Director, Virtue Scholarship, Department of Anesthesiology, University of Colorado, Denver (this program provides additional clinical and research training for anesthesia residents dedicated towards an academic career as physician scientist)

06/2008 - 08/2016 Member, Recruitment Committee, Department of Anesthesiology, University of Colorado School of Medicine, Aurora, CO

06/2013 - 08/2016 Director, Organ Protection Program

11/2014 - 08/2016 Chief, Anesthesia Service for Oncologic Surgery

Cross-Appointments at the University of Colorado:

* Department of Medicine
* Division of Renal Medicine
* Department of Cell Biology, Stem Cells and Development (CSD)
* Integrated Department of Immunology
* Member, Medical Science Training Program
* Member, Cancer Research Center
* Member, Mucosal Inflammation Program
* Director, Organ Protection Program

McGovern Medical School, the University of Texas Health Science Center at Houston

09/2016 – today Director, Center for Perioperative Medicine

09/2016 – today Associate Vice President for Translational Research

09/2016 – 02/2017 Visiting Professor, Department of Anesthesiology

03/2017 – today Professor with Tenure, Department of Anesthesiology

09/2016 – 11/2016 Vice Chair for Research, Department of Anesthesiology

11/2016 – 08/2017 Chairman ad Interim, Department of Anesthesiology

02/2017 – 07/2019 John P. and Kathrine G. McGovern Distinguished Chair

09/2017 – today Chairman, Department of Anesthesiology

08/2019 – today John P. and Kathrine G. McGovern Distinguished University Chair

Cross-Appointments at the University of Texas Health Science Center at Houston

* Professor, Department of Surgery
* Professor, Department of Biochemistry
* Professor, Department of Obstetrics and Gynecology
* Advisory Member, UTHealth Graduate School of Biomedical Sciences

**Major Committee Assignments**:

 Tübingen University Hospital, Germany (2003 – 2007)

Education Committee, Department of Anesthesiology and Critical Care Medicine

Committee for Medical Student Training in Perioperative Medicine

Committee on Continued Medical Education

Recruitment Committee for Anesthesia Residents and Fellows

Recruitment Committee for Staff Anesthesiologists

 University of Colorado (2007 - 2016)

Executive Committee, Department of Anesthesiology, University of Colorado

Residency Training Committee, Department of Anesthesiology, University of Colorado

Recruitment Committee, Department of Anesthesiology, University of Colorado

Virtue Scholarship Committee, Department of Anesthesiology, University of Colorado

Seed Grant Committee, Department of Anesthesiology, University of Colorado

Executive Committee; Mucosal Inflammation Program, Department of Medicine, University of Colorado

Post-Doctoral Advisory Committee, University of Colorado

Research Enterprise Committee, Department of Anesthesiology, University of Colorado

SIRC (Strategic Infrastructure for Research Committee), University of Colorado

McGovern Medical School, the University of Texas Health Science Center at Houston (2016 – present)

Member, Search Committee for Position of Chair of Cardiac Surgery University of Texas Health Science Center at Houston

Chair, Search Committee for the Position of Chair of Emergency Medicine, University of Texas Health Science Center at Houston

Member, Surgeon’s Council, Memorial Hermann Hospital

Member, Operating Room Steering Committee, Memorial Hermann Hospital

Member, Board of Directors, University of Texas Physicians

Member, MD/PhD Committee for the MD/PhD Program, The University of Texas McGovern Medical School and MD Anderson Cancer Center UTHealth Graduate School of Biomedical Sciences

Chair, Search Committee for the Position of Chair for Neurosurgery, the University of Texas Health Science Center at Houston

Member, Search Committee for the Position of Co-Executive Director for Pediatric Cardiology, the University of Texas Health Science Center at Houston

Member, ASCI/AAIM Research Pathway Directors Workshop Planning Committee

Member, ASCI Physician-Scientist Development Committee

Chair, Search Committee for the Position of Division Chief, Pediatric Cardiology, the University of Texas Health Science Center at Houston

**Professional Societies:**

1992 - 1996 German National Scholarship Foundation

1996 - 2007 German Association of Physicians

1999 - present American Society of Anesthesiologists

2003 - present German Society of Anesthesia and Intensive Care Medicine

2007 - present Colorado Society of Anesthesiologists

2008 - present Association University Anesthesiologists

2008 - present American Thoracic Society

2008 - present International Anesthesia Research Society

2008 - present American Society of Nephrology

2009 - present American Association of Immunologists

2009 - present American Society of Anesthesiologists

2009 - present Elected Member, Association of University Anesthesiologists (AUA)

2011 - present Elected Member, American Society of Clinical Investigation

2012 - 2016 Colorado Medical Society

2017 - present Texas Society of Anesthesiologist (TSA)

2020 - present Member, Academy of Research Mentors, Foundation for Anesthesia Education and Research (FAER)

2021 - present Elected Member, Association of American Physicians

2022 - present Member, Outcomes Research Consortium, Cleveland, Ohio

# Editorial Services

 2001 - 2022 Guest Reviewer *Anesthesia & Analgesia*

2001 - present Guest Reviewer *Anesthesiology*

2001 - 2013 Guest Reviewer *Journal of Clinical Anesthesia*

2002 - 2006 Guest Reviewer *Journal of Cardiothoracic and*

*Vascular Anesthesia*

2002 - 2003 Guest Reviewer *Intern. Journal of Obstet. Anesthesia*

2003 - 2006 Guest Reviewer *The Laryngoscope*

2003 - present Guest Reviewer *American Journal of Respiratory and*

*Critical Care Medicine*

2004 - 2005 Guest Reviewer *American Journal of Physiology*

*Cell Physiology*

2004 - 2022 Guest Reviewer *Purinergic Signaling*

2004 - 2022 Guest Reviewer *American Journal of Physiology*

*Heart and Circulatory Physiology*

2004 - 2012 Guest Reviewer *American Journal of Physiology*

*Renal Physiology*

2005 - present Guest Reviewer *Journal of Immunology*

2006 - present Guest Reviewer *Critical Care Medicine*

2007 - 2013 Guest Reviewer *American Journal of Respiratory*

*Cell and Molecular Biology*

2007 - 2013 Guest Reviewer *Blood*

2007 - 2010 Guest Reviewer *Basic Research in Cardiology*

2007 - present Guest Reviewer *PLoS One*

2007 - present Guest Reviewer *ATVB*

2007 - 2008 Guest Reviewer *Current Cardiology Reviews*

2008 - 2012 Guest Reviewer *Gastroenterology*

2008 - 2011 Guest Reviewer *Circulation Research*

2008 - 2009 Guest Reviewer *Acta Physiologica*

2008 - 2013 Guest Reviewer *European Journal of Immunology*

2008 - 2012 Guest Reviewer *American Journal of Physiology*

***Lung Cellular and Molecular Physiology***

2008 - 2009 Guest Reviewer *PLoS Neglected Tropical Diseases*

2009 - 2022 Guest Reviewer *European Respiratory Journal*

2009 - 2012 Guest Reviewer *Hepatology*

2009 - 2012 Guest Reviewer *British Journal of Pharmacology*

2009 - 2010 Guest Reviewer *Journal of Pharmacology and*

*Experimental Therapeutics*

2009 - 2010 Guest Reviewer *European J. of Echocardiography*

2009 - 2010 Guest Reviewer *Journal of Leukocyte Biology*

2009 - 2010 Guest Reviewer *American Journal of Physiology*

*Regulatory, Integrative and Comparative Physiology*

2009 - 2012 Guest Reviewer *Haematologica*

2009 - 2012 Guest Reviewer *Journal of Inflammation*

2009 - 2010 Guest Reviewer *Nephron Clinical Practice*

2009 - 2022 Guest Reviewer *Transplantation*

2009 - 2011 Guest Reviewer *American Journal of Transplantation*

2009 - 2012 Guest Reviewer *Gut*

2010 - 2011 Guest Reviewer *The Journal of Thoracic and
 Cardiovascular Surgery*

2010 - present Guest Reviewer *American Journal of Respiratory and
 Cell and Molecular Biology*

2010 - 2011 Guest Reviewer *BMC Gastroenterology*

2010 - 2012 Associate Editor *The Journal of Immunology*

2010 - 2011 Guest Reviewer *European Journal of Pharmacology*

2010 - present Academic Editor *PLoS One*

2010 - 2011 Guest Reviewer *The Journal of Cystic Fibrosis*

2010 - present Guest Reviewer *FASEB Journal*

2011 - 2012 Guest Reviewer *APMIS*

2011 - 2013 Guest Reviewer *Critical Care*

2011 - 2012 Guest Reviewer *Liver Transplantation*

2011 - 2012 Guest Reviewer *Journal of Mol. and Cell. Cardiology*

2011 - 2012 Guest Reviewer *Current Medical Chemistry*

2011 - 2012 Guest Reviewer *International Journal of Cardiology*

2011 - 2022 Guest Reviewer *PNAS*

2012 - 2014 Guest Reviewer *Circulation*

2012 - 2013 Guest Reviewer *Molecular Medicine*

2012 - 2014 Guest Reviewer *The Journal of Clinical Investigation*

2012 - 2013 Guest Reviewer *British Journal of Anaesthesia*

2012 - 2013 Guest Reviewer *Pediatric Anesthesia*

2012 - present Associate Editor *Journal of Molecular Medicine*

2012 - present Section Editor *The Journal of Immunology*

2012 - 2013 Guest Reviewer *Pharmacological Reviews*

2012 - 2013 Guest Reviewer *Nature Communications*

2012 - 2014 Guest Reviewer *Kidney International*

2012 - 2013 Guest Reviewer *Arthritis Research and Therapy*

2012- present Guest Reviewer *New England Journal of Medicine*

2013 - 2014 Guest Reviewer *European Journal of Applied*

 *Physiology*

2013 - 2014 Guest Reviewer *Digestive Diseases and Science*

2013 - 2014 Guest Reviewer *BMC Medicine*

2013 - present Guest Reviewer *The American Journal of Pathology*

2013 - 2014 Guest Reviewer *Acta Biomaterialia*

2013 - present Guest Reviewer *Journal of Hepatology*

2013 - present Associate Editor *Anesthesiology*

2013 - present Guest Reviewer *PLoS Biology*

2013 - present Guest Reviewer *The Lancet – Respiratory Medicine*

2015 - present Associate Editor *Purinergic Signaling*

2016 - present Guest Reviewer *Science Translational Medicine*

2018 - present Guest Reviewer *Nature Immunology*

2018 - present Guest Reviewer *Trends in Immunology*

2019 - present Guest Reviewer *Journal of Cellular and Molecular*

 *Medicine*

2019 - present Guest Reviewer *Science*

2019 - present Guest Reviewer *Science Advances (AAAS)*

2019 - present Guest Reviewer *PLoS Pathogen*

2019 - present Guest Reviewer *American Journal of Transplantation*

2020 - present Guest Reviewer *American Journal of Physiology*

 *Lung*

2020 - presentGuest Reviewer *iScience*

2020 - presentGuest Reviewer *Physiology*

2020 - presentGuest Reviewer *Cell Death and Differentiation*

2020 - present Guest Reviewer *International Journal of Infectious*

 *Diseases*

2020 - present Guest Reviewer *Cancer Gene Therapy*

2020 - present Guest Reviewer *Nature Communication*

2020 - present Guest Reviewer *BMC Anesthesiology*

2021 - present Guest Reviewer *Clinical Science*

2021 - present Guest Reviewer *Liver International*

2021 - present Guest Reviewer *Thorax*

2021 - present Guest Reviewer *Cancer Investigation*

2021 - present Guest Reviewer *BMJ Anesthesiology*

2021 - present Guest Reviewer *EMBO Molecular Medicine*

2021 - present Guest Reviewer *Cell Reports*

2021 - present Guest Reviewer *The Federal Ministry of Education*

*and Research (BMBF)*

2021 - present Guest Reviewer *Pharmacology & Therapeutics*

2021 - present Guest Reviewer *Advanced Science*

2021 - 2022 Guest Reviewer *Scientific Reports*

2021 - present Guest Reviewer *The American Journal of the*

*Medical Sciences*

2022 - present Guest Reviewer *Journal of Zhejiang University -*

*Science B*

2022 - present Guest Reviewer *Nature Cell Biology*

2022 - present Guest Reviewer *Journal for ImmunoTherapy of*

*Cancer*

2022 - present Guest Reviewer *Cells*

2022 - present Guest Reviewer *Perioperative Medicine*

2022 - present Guest Reviewer *Molecular Metabolism*

2022 - present Guest Reviewer *EMBO Reports*

2022 - present Guest Reviewer *BMC Cance*

2022 - present Guest Reviewer *Journal of Cardiovascular*

*Development and Disease*

2022 - present Guest Reviewer *Aspects of Molecular Medicine*

2022 - present Guest Reviewer *Oxygen*

2022 - present Guest Reviewer *Metabolites*

2022 - present Guest Reviewer *International Journal of Molecular*

*Sciences*

2022 - present Guest Reviewer *Mucosal Immunology*

2022 - present Guest Reviewer *Nutrients*

**Appointments to the Editorial Board of Scientific Journals:**

 2009 - 2013 Associate Editor – *The Journal of Immunology*

 2010 - 2017 Academic Editor – *PLoS One*

 2012 - 2017 Associate Editor – *The Journal of Molecular Medicine*

 2013 - 2015 Section Editor – *The Journal of Immunology (First Term)*

 2013 - today Associate Editor – *Anesthesiology*

 2013 - 2017 Section Editor – *The Journal of Immunology (Second Term)*

2015 - 2019 Associate Editor – *Purinergic Signaling*

**Grant Review:**

2007 - 2008 Reviewer, Swiss National Research Foundation, Innsbruck, Switzerland

2009 Ad-hoc Reviewer, Lung Injury, Repair and Remodeling Study Section, National Institutes of Health, Center for Scientific Review, Bethesda, MD (Special Emphasis Panel)

2009 Ad-hoc Reviewer, Study Section Biophysics of Neural Systems (BPNS), National Institutes of Health, Center for Scientific Review, Bethesda, MD

2010 Ad-hoc Reviewer, Lung Cellular, Molecular, and Immunobiology Study Section, National Institutes of Health, Center for Scientific Review, Bethesda, MD

2010 - 2011 Reviewer Research Foundation Flanders

2011 - present Reviewer, German Research Foundation (Deutsche Forschungsgemeinschaft, DFG)

2012 - 2013 Reviewer, Royal Society, London, United Kingdom

2012 - 2013 Reviewer, The Netherlands Organisation for Health Research and Development

2013 Reviewer, Research Foundation - Flanders (Fonds Wetenschappelijk Onderzoek - Vlaanderen, FWO).

2013 - 2018 International Anesthesia Research Society (IARS) study section for “Mentored Research Award”.

2015 International Anesthesia Research Society (IARS) study section for “Frontiers in Anesthesia Research Award.”

2015 - 2018 Foundation for Anesthesia Research and Education (FAER); ASA Committee of Research; Review Committee for Mentored Research Training Grants

2015 - 2016 Ad Hoc Reviewer, NIH Study Section, Surgery, Anesthesia and Trauma (SAT), National Institutes of Health, Center for Scientific Review, Bethesda, MD

2015 Ad Hoc Reviewer, NIH Study Section Lung Injury and Repair (LIRR), Special Emphasis Panel, National Institutes of Health, Center for Scientific Review, Bethesda, MD.

2015 Ad Hoc Reviewer, European Society Anesthesiology

2016 - 2022 Member, NIH Study Section, Surgery, Anesthesia and Trauma (SAT), National Institutes of Health, Center for Scientific Review, Bethesda, MD

2018 Reviewer, Irish Research Council’s Laureate Awards, Ballsbridge, Ireland

2018 Reviewer, Evaluation for Tenure Track Professorship, Technical University of Munich, Germany

2018 Reviewer, Wings for Life Spinal Cord Research Foundation, Salzburg, Austria

2021 Ad-hoc Reviewer, SEP on ARDS PPG, National Institutes of Health, Center for Scientific Review, Bethesda, MD

2021 Reviewer for UTHealth John S. Dunn Foundation Collaborative Research Award

2021 Reviewer for German Federal Ministry of Education and Research (BMBF): A new national call for “Interdisciplinary collaborative research on pathomechanisms.”

2021 Reviewer for The University of Rochester Del Monte Institute for Neuroscience

2021 Reviewer for the European Society of Anaesthesiology and Intensive Care (ESAIC)

2022 Reviewer of U.S.-Israel Binational Science Foundation

2022 Ad Hoc Reviewer, Lung Injury, Repair and Remodeling Study Section (LIRR), National Institutes of Health, Center for Scientific Review, Bethesda, MD

**Awards and Honors:**

1996 *German National Scholarship Foundation*

1994 *Poster Presentation Award*, European Society of Regional Anesthesia (ESRA), Stockholm, Sweden

1996 *Magna cum Laude*, PhD Thesis, Eberhard-Karls-University, Tübingen, Germany

2003 *Thomas Smith Lecture*; Nucleotide Metabolism and Signaling, Harvard Medical School, Boston

2004 *Hanse Research Award for Intensive Care Medicine*, Bremen, Germany

2006 *Hanse Research Award for Intensive Care Medicine*, Bremen, Germany

2006 *Heinrich-Dräger Research Award for Intensive Care Medicine*, Leipzig, Germany

2007 *Karl-Thomas Research Award for Anesthesiology, Intensive Care Medicine and Emergence Medicine,* Hamburg, Germany

2008 *BioSymposia Investigator Award*, Ischemia and Inflammation Biosymposium, Boston, Massachusetts, USA

2009 Elect Member, *Association of University Anesthesiologist (AUA)*

2010 - 2013 Associate Editor, *The Journal of Immunology*

2010 Academic Editor, *PLoS One*

2011 *Heinrich-Dräger Research Award for Intensive Care Medicine*, Hamburg, Germany

2011 Elect Member, *American Society of Clinical Investigation (ASCI)*

2013 Section Editor, 1st Term, *The Journal of Immunology*

2013 Associate Editor, *Anesthesiology*

2015 Section Editor, 2nd Term, *The Journal of Immunology*

2015 Member, Editorial Board, *Purinergic Signaling*

2015 *John Hedley-Whyte Lecture.* The Hypoxia-Inflammation Link, Beth Israel Deaconess Hospital, Department of Anesthesiology, Harvard Medical School, Boston, USA

2017 *John P. and Kathrine G. McGovern Distinguished Chair*, Department of Anesthesiology, McGovern Medical School; The University of Texas Health Science Center, Houston, Texas

2019 *John P. and Kathrine G. McGovern Distinguished University Chair*, Department of Anesthesiology, McGovern Medical School; The University of Texas Health Science Center at Houston, Houston, Texas

2019 *Franz-Koehler Inflammation Award*, German Society of Anesthesiology and Intensive Care (DGAI), Berlin, Germany

2020 *Interdisciplinary Intensive Care Forum*, Keynote. German Society of Anesthesiology and Intensive Care Medicine (DGAI), Berlin.

2020 Member, Academy of Research Mentors, Foundation for Anesthesia Education and Research (FAER)

2021 Elect Member, *Association of American Physicians (AAP)*

2022 Research Directors Workshop Planning Committee, *The American Society for Clinical Investigation (ASCI)*/ *Alliance for Academic Internal Medicine (AAIM)*

2022 Physician-Scientist Development Committee, *The American Society for Clinical Investigation (ASCI)*

 **Licensure and Certification:**

03/1998 Certificate for Emergency Medicine Baden-Württemberg (“Fachkundenachweis, Mitwirkung im Rettungsdienst”)

05/2001 Perioperative Transesophageal Echocardiography Exam (National Board of Echocardiography)

09/2002 Massachusetts State Board of Registration

03/2003 German Board of Anesthesiology

05/2003 Transesophageal Echocardiography during Anesthesia and Critical Care Medicine, German Society of Anesthesiology and Intensive Care Medicine (DGAI)

10/2003 German Board of Intensive Care Medicine

10/2003 American Board of Anesthesiologists

10/2007 National Board of Echocardiography, Perioperative Transesophageal Echocardiography

07/2007 Colorado State Board of Registration

07/2013 Maintenance of Certification in Anesthesiology (MOCA)

11/2016 Medical License Texas

**Patents:**

1. ***Therapeutic use of soluble apyrase or nucleotidase in ventilator induced lung injury:*** Nucleotide phosphohydrolysis for the prophylaxis, treatment, or diagnosis of acute lung injury (WO 2008/034621)
2. ***Therapeutic use of soluble apyrase, nucleotidase, or A2B adenosine receptor agonists in myocardial ischemia:***Medications for the prophylaxis, treatment or diagnosis of myocardial ischemia (WO 2008/034623)
3. ***Compositions and methods for preventing or treating acute kidney injury using proton pump inhibitors:*** Embodiments of the present invention generally relate to compositions, methods for preventing or treating acute kidney injury or other kidney conditions in a subject. In certain embodiments, compositions to treat or prevent a kidney condition can include one or more proton pump inhibitors (Serial # 61/613,765)

**Teaching**

Teaching in different settings - including the lecture hall, the laboratory or the operating room as classroom - is one of the responsibilities I enjoy most and carry out very well. My goal as academic teacher is to present relevant material as clearly as possible. Over the years, I have learned not to rush through simply to cover all the topics. Instead, I focus on the learning objectives, handling student difficulties by asking questions and waiting for questions to be asked. I teach primarily through a hands-on approach. Not with a view to disseminate what I know, but with a view to help students learn the concepts. Thus, much of my efforts are directed towards the development of hands-on experiences.

Due to my training and leadership roles in different premier anesthesia departments around the world, including Harvard Medical School in Boston, the Eberhard-Karls University in Tübingen, and the University of Colorado School of Medicine, I have had the privilege of being exposed to a wide variety of teaching environments and styles, some of them considered to be the best in the world. This has allowed me to develop a highly innovative teaching style, where I believe that hands on teaching, exposure to simulation and group training, and allowing students to come to their own conclusions rather than simply disseminating my own knowledge are critical elements to a teaching environment that is highly valued by the students and effective in training the leaders in clinical medicine and biomedical research of tomorrow.

At the same time, my work as academic teacher has significantly reflected back on myself. Indeed, I am convinced that the best way to learn is to teach. Throughout my teaching experiences in different settings and in different countries, I had the privilege to meet with a wide spectrum of individuals, including medical students, anesthesia or surgical residents, junior and senior faculty members and trainees coming through my own laboratory, or via interactions during class room teaching or teaching in the operating room. This spectrum includes individuals from high-school students to post-doctoral fellows or junior and senior faculty members. I feel blessed for the privilege of having worked with this very diverse group of students and each individual has taught me both didactic and personal lessons. Moreover, I am proud that my teaching and mentoring efforts had allowed many of my mentees to develop outstanding careers in academic medicine, including the development of independently funded research programs (for example Dr. Dirk Hohmann – R01 funded basic scientist – or Dr. Tobias Eckle – R01 funded physician scientist and anesthesiologist at the University of Colorado). Others successfully took over and fulfilled academic leadership roles (for example Dr. Peter Rosenberger, Chairman of the Department of Anesthesiology, Eberhard-Karls University, Tübingen).

**Report of Classroom Teaching:**

University of Tübingen, Germany (2003 - 2007)

**Medical School Courses**

 2003 - 2007 Obstetric Anesthesia

 Eberhard-Karls-University Tübingen

 105 students

 2 hours lecture per week, 2 weeks (total 4 hours lecture)

 2 hours preparation per lecture (8 hours total preparation)

 2003 - 2007 Monitoring during Anesthesia

 Eberhard-Karls-University Tübingen

 95 students

 2 hours lecture per week, 2 weeks (total 4 hours lecture)

 2 hours preparation per lecture (8 hours total preparation)

 2003 - 2007 Pulmonary Embolism

 Eberhard-Karls-University Tübingen

 On average 100 students

 2 hours lecture per week, 2 weeks (total 4 hours lecture)

 2 hours preparation per lecture (8 hours total preparation)

 2003 - 2007 Valvular Heart Disease

 Eberhard-Karls-University Tübingen

 On average 100 students

 2 hours lecture per week, 2 weeks (total 4 hours lecture)

 2 hours preparation per lecture (8 hours total preparation)

 2003 - 2007 Applied Human Biochemistry

 Eberhard-Karls University Tübingen

 On average 40 students

 3 hours lecture per week, 2 weeks (total 6 hours lecture)

 2 hours preparation per lecture (12 hours total preparation)

2003 - 2007 Coordination of Inflammation

 Eberhard-Karls University Tübingen

 On average 40 students

 2 hours lecture per week, 2 weeks (total 4 hours lecture)

 2 hours preparation per lecture (8 hours total preparation)

**Organization of CME-accredited Lectures and Research Seminars:**

Dr. Eltzschig has been organizing an educational research conferences and seminar series on clinical, translational, and basic science research topics at the University of Colorado School of Medicine. Nationally, and internationally renown world leaders in their specific research field have contributed to this research seminar series. Since Dr. Eltzschig founded the Organ Protection Program in 2013, many of these seminars are part of the Educational Program of the Organ Protection Program. On average, these lectures are attended by an audience of 50 to 250 individuals from different Departments and Institutions, including the Departments of Anesthesiology, Surgery, Emergency Medicine, Pulmonary Medicine, Renal Medicine and the Children’s Hospital and National Jewish Health. Below are a few select examples from the past years:

In addition to CME-accredited, educational conferences and seminars, Dr. Eltzschig is also in charge of organizing a weekly research in progress report meeting (90 min) for his research laboratory, and weekly research in progress reports for the Mucosal Inflammation Program (60 min), and monthly research in progress reports for the Organ Protection Program (60 min).

Other teaching activities of Dr. Eltzschig include class room teaching of students of the Anesthesia Assistant Program at the University of Colorado School of Medicine. On average, Dr. Eltzschig teaches 8 class room hours per semester to Anesthesia Assistant students. The topics of these class room lectures focus on anesthesia care in patients with co-existing disease, such as thyroid disease, adrenal disease, and other disorders of the endocrine system.

Much of Dr. Eltzschig’s teaching activities occur in the operating room, where hands on teaching of medical students, anesthesia assistant students, nursing students and anesthesia students are part of Dr. Eltzschig’s most favorite activities. This is reflected in numerous teaching evaluations and testimonies that highlight that Dr. Eltzschig is one of the highest regarded teachers of the Department of Anesthesiology at the University of Colorado School of Medicine.

As part of the highly competitive process of becoming a Tenured Professor, the University of Colorado School of Medicine attested Dr. Eltzschig “Excellence in Teaching”. This attestation has taken into account Dr. Eltzschig’s track record of successful mentorship of students, residents, fellows and faculty members. For example, several of Dr. Eltzschig’s mentees’ received funding through the NIH (for example K08 or R01 funding), or became academic leaders in perioperative medicine. For example Dr. Eltzschig’s mentee Dr. Peter Rosenberger recently became the Chairman of the Department of Anesthesiology and Critical Care Medicine at the University Hospital of the University of Tübingen. As such, numerous of Dr. Eltzschig’s mentees have pursued outstanding careers in academic medicine.

Moreover, Dr. Eltzschig has developed many innovative teaching methods, such as many research methods paper that disseminate technical approaches to study acute organ injury, including methodological papers on acute lung injury, acute kidney injury, acute liver injury or myocardial ischemia. Similarly, Dr. Eltzschig published 4 video publications describing innovative approaches to study acute organ injury. Dr. Eltzschig has published clinical and basic science review papers that disseminate and illustrate many innovative teaching aspects of perioperative medicine and basic research work. These review papers are published in the leading journals of the field, such as Anesthesiology, Blood, Nature, Nature Medicine or Nature Review Drug Discovery. Many of these papers are extremely highly cited, for example a review paper published by Dr. Eltzschig on ischemia and reperfusion injury in the journal Nature Medicine has received 170 annual citations (PMID: 22064429). Dr. Eltzschig is the only anesthesiologist who has published three highly cited review articles in the New England Journal of Medicine, including an educational review article on anesthesia and analgesia, as well as two teaching review articles on mechanisms of disease related to his basic science research. Finally, Dr. Eltzschig’s excellence in teaching is also reflected in the fact that he is frequently invited to give teaching lectures at the local, national and international level.

**List of Mentees**

**Years: Name: Current Position:**

1997 - 1998 **Juergen B.Eissler, MD, PhD** Medical Student (MD/PhD program)

University of Tübingen,

Medical School, Germany

1997 - 1998 **Gregor Kadner, MD** Medical Student (MD/PhD program)

University of Tübingen,

Medical School, Germany

2000 - 2003 **Torsten Schroeder, MD, PhD** Associate Professor

University of Tübingen

Chair, Department of Anesthesiology

Karl - Olga - Krankenhaus, Stuttgart, Germany

2000 - 2003 **Thomas W. Felbinger, MD, PhD** Associate Professor

University of Munich

Chair, Department of Anesthesiology

Klinikum Neuperlach

Munich, Germany

2001 - 2003 **Thomas Edrich, MD, PhD** Assistant Professor

 Department of Anesthesiology,

 Perioperative and Pain Medicine

 Brigham and Women’s Hospital

Harvard Medical School, Boston

2004 - 2007 **Jorn Karhausen, MD, PhD** Associate Professor

 Department of Anesthesiology

 Tübingen University Hospital

 Tübingen, Germany

2001 - 2006 **Hans - Juergen Dieterich, MD** Associate Professor

Leitender Oberarzt

Department of Anesthesiology

Ludwig Maximilian University

Munich, Germany

2003 - 2005 **Simone Knapp, MD, PhD** Resident in Anesthesiology

University of Tübingen, Germany

2004 - 2006 **Kristian Jaeckle, BS** Medical Student (MD/PhD program)

University of Tübingen, Germany

2004 - 2006 **Lars Fuellbier, BS** Medical Student (MD/PhD program)

University of Tübingen, Germany

2003 - 2007 **Martina Nowak, MD, PhD** Assistant Professor

 Department of Anesthesiology,

Perioperative and Pain Medicine

Brigham and Women’s Hopsital

Harvard Medical School, Boston

1997 - 2015 **Jan Hilberath, MD, PhD** Clinical Fellow in Anesthesiology

 Department of Anesthesiology,

Perioperative and Pain Medicine

Brigham and Women’s Hopsital

Harvard Medical School, Boston

2005 - 2006 **Dennis Doecker, BS** Medical Student (MD/PhD program)

University of Tübingen, Germany

2003 - 2013 **Peter Rosenberger, MD, PhD** Professor and Chairman

 Department of Anesthesiology, and

Intensive Care Medicine

Tübingen University Hopsital

D-72076 Tübingen Germany

2003 - 2005 **Melanie Falk, BS** Medical Student (MD/PhD program)

University of Tübingen, Germany

2004 - 2006 **Monika Fitz,BS** Medical Student (MD/PhD program)

University of Tübingen, Germany

2004 - 2005 **Natalie Kueper, BS** Medical Student (MD/PhD program)

University of Tübingen, Germany

2005 - 2006 **Sarah Schott, BS** Medical Student (MD/PhD program)

University of Tübingen, Germany

2003 - 2005 **Philip Born, BS** Medical Student (MD/PhD program)

University of Tübingen, Germany

2003 - 2006 **Thomas Weissmueller, MD, PhD** Clinical Fellow in Anesthesiology

 Department of Anesthesiology,

Perioperative and Pain Medicine

Brigham and Women’s Hopsital

Harvard Medical School, Boston

University of Colorado

2004 - 2005 **Dana Mergner, MD** Instructor in Anesthesiology

University of Tübingen, Germany

2004 - 2005 **Katja Hindler, MD** Clinical Fellow in Anesthesiology

University of Tübingen, Germany

2004 - 2006 **Jessica Seeßle, BS** Medical Student (MD/PhD program)

University of Tübingen, Germany

2006 - 2012 **Ann - Kathrin Stenz, BS** Medical Student (MD/PhD program)

University of Tübingen, Germany

2006 - 2008 **Eva Masekovsky, BS** Medical Student (MD/PhD program)

University of Tübingen, Germany

2005 - 2008 **Chressen Much, BS** Medical Student (MD/PhD program)

University of Tübingen, Germany

2006 - 2008 **Carin Duerrstein, BS** Medical Student (MD/PhD program)

University of Tübingen, Germany

2004 - 2007 **Johannes Kuhlicke, PhD** PhD Student, Department of Anesthesiology

University of Tübingen, Germany

2007 - 2014 **Iris Gorzolla, BS** Medical Student (MD/PhD program)

University of Tübingen, Germany

2005 - 2008 **Julio C. Morote Garcia, PhD** Instructor

Department of Anesthesiology

University of Tübingen, Germany

2006 - 2010 **Ulrich Schingnitz, MD, PhD** Anesthesia Resident, Department of

Anesthesiology, Frankfurt University

Hospital, Germany

2007 - 2009 **Barbara Jacobi, BS** Medical Student (MD/PhD program)

University of Tübingen, Germany

2006 - 2008 **Martina Henn, BS** Medical Student (MD/PhD program)

University of Tübingen, Germany

2006 - 2007 **Valbona Mirakaj, MD** Clinical Fellow in Anesthesiology

University of Tübingen, Germany

2004 - 2013 **Melanie Hart, PhD** Assistant Professor

 Department of Anesthesiology

University of Tübingen, Germany

2004 - 2007 **David Koehler, PhD** Instructor

 Department of Anesthesiology

University of Tübingen, Germany

2006 - 2008 **Maria Wildermuth, MD** Resident in Anesthesiology

University of Tübingen, Germany

2004 - 2016 **Tobias Eckle, MD, PhD** Associate Professor

 Funding by the NIH via K08

Department of Anesthesiology

University of Colorado

2007 - 2008 **Karim El Kasmi, MD, PhD** Assistant Professor

Department of Pediatrics

University of Colorado

2008 - 2010 **Emily Kewley, PhD** Postdoctoral Fellow

 Department of Anesthesiology

University of Colorado

2010 - 2014 **Eunyoung Tak, PhD** Postdoctoral Fellow

 Department of Anesthesiology

University of Colorado

2006 - 2012 **Ann-Kathrin Riegel, MD, PhD** Postdoctoral Fellow

 Department of Anesthesiology

University of Colorado

2008 - 2019 **Carol Aherne, PhD** Assistant Professor

Funded by the Crohn’s and Colitis Foundation of America (CCFA)

 Department of Anesthesiology

University of Colorado

2008 - 2009 **Laura Ivan, B.S.** PhD Student

 University of Essen, Germany

2008 - 2009 **Ana Fernandez, MD, PhD** Associate Professor of Anesthesiology

 Department of Anesthesiology

University of Colorado

2008 - 2013 **Michael Zimmermann, MD** Associate Professor

Funded by NIH via K08

Department of Surgery

University of Colorado

2008 - 2012 **Michael Koeppen, MD, PhD** Assistant Professor

Funded by Deutsche Forschungsgemeinschaft (DFG)

Anesthesiology

University of Colorado

2008 - 2009 **Allen Waziri, MD** Associate Professor

 Division of Neurosurgery

University of Colorado

2008 - 2015 **Douglas Komminsky, PhD** Associate Professor

Department of Anesthesiology

University of Colorado

2008 - 2014 **Marco Idzko, MD, PhD** Associate Professor

Department of Pneumology

University of Freiburg, Germany

2008 - 2010 **Jessica Bauerle, B.S.**  Medical Student

 University of Colorado

2009 - 2016 **Eric Clambey, PhD** Assistant Professor

 Department of Anesthesiology

University of Colorado

2009 - 2011 **Julee Y. Dalton**  Medical Student

 University of Colorado

2009 - 2010 **Timothy Luebbert**  Medical Student

University of Colorado

(Research Track)

2010 - 2017 **Eoin McNamee, PhD** Assistant Professor

Funded by the Crohn’s and Colitis Foundation of America (CCFA)

 Department of Anesthesiology

University of Colorado

2010 - 2014 **Dirk Homann, MD, PhD** Associate Professor

Department of Anesthesiology

University of Colorado

Received R01 funding in 2012

2011 - 2013 **Heidi Ehrentraut, PhD** Post-Doctoral Research Fellow

Funded by Deutsche Forschungsgemeinschaft (DFG)

Department of Anesthesiology

University of Colorado

2011 - 2014 **Jens Poth, MD, PhD** Post-Doctoral Research Fellow

Funded by DAAD

Department of Anesthesiology

University of Colorado

2011 - 2015 **Viola Neudecker, MD, PhD** Post-Doctoral Research Fellow

Funded by Deutsche Forschungsgemeinschaft (DFG)

Department of Anesthesiology

University of Colorado

2012 - 2014 **Seongwook Seo, MD, PhD** Post-Doctoral Research Fellow

Department of Anesthesiology

University of Colorado

2011 - 2015 **Sandra Hoegl, MD, PhD** Post-Doctoral Research Fellow

Funded by Leopoldina, National

Academy of Science

Department of Anesthesiology

University of Colorado

2012 - 2015 **Francisco Ramirez-Victorino** PhD Student; Immunology Program

Department of Anesthesiology

University of Colorado

2013 - 2022 **Christine Vohwinkel, MD, PhD** Associate Professor, Section of Pediatric

Critical Care

 Department of Pediatrics

 University of Colorado

2017 - 2019 **Thanh-Thuy T Le, MD, PhD** Anesthesia Resident

Department of Anesthesiology

McGovern Medical School, UT Health

2017 - 2018 **Matthew Jacobs, MD** Anesthesia Resident

 Department of Anesthesiology

 Baylor College of Medicine

 2017 - 2018 **Luan Hai Phan** Medical Student

 McGovern Medical School, UT Health

2017 - 2017 **Dana Zhang**  Summer Student (undergraduate)

 Department of Anesthesiology

 McGovern Medical School, UT Health

2017 - 2017 **Ojeni Touma**  Summer Student (undergraduate)

 Department of Anesthesiology

 McGovern Medical School, UT Health

2017 - 2018 **Oscar Villarreal**  Summer Student (MD/PhD student)

GSBS Program

McGovern Medical School, UT Health

2014 - 2019 **Jae Woong Lee, MD**  Clinical Resident

Department of Anesthesiology

Yale University

2016 - 2018 **Jessica Bowser, PhD**  Assistant Professor

Department of Anesthesiology

McGovern Medical School, UT Health

2017 - present **Xiaoyi Yuan, PhD**  Assistant Professor

Department of Anesthesiology

McGovern Medical School, UT Health

2017 - 2021 **Nathaniel Berg**  MD/PhD Student

GSBS Program

McGovern Medical School, UT Health

 2017 - 2021 **Boyun Kim, PhD** Post-doctoral Research Fellow

 Department of Anesthesiology

 McGovern Medical School, UT Health

2017 - 2021 **Jiwen Li, MD** Post-doctoral Research Fellow

Department of Anesthesiology

McGovern Medical School, UT Health

2017 - 2018 **Na Jing, MD**  Visiting Scientist

 Department of Anesthesiology

 McGovern Medical School, UT Health

2020 - present **Jennifer Bailey, PhD** Assistant Professor

Department of Anesthesiology

McGovern Medical School, UT Health

2020 - present **Tingting Mills, PhD**  Assistant Professor

Department of Biochemistry

McGovern Medical School, UT Health

2020 - present **Agnieszka K. Czopik, PhD**  Assistant Professor

Department of Anesthesiology

McGovern Medical School, UT Health

2017 - 2018 **Elise Sullivan, MD** Anesthesia Resident

Department of Anesthesiology

McGovern Medical School, UT Health

2019 - 2020 **Xiangyun Li** Visiting MD/PhD Student

Department of Anesthesiology

McGovern Medical School, UT Health

2019 - 2020 **Duomao Lin, MD, PhD** Visiting Scientist

Department of Anesthesiology

McGovern Medical School, UT Health

2019 - present **Wei Ruan, MD, PhD** Instructor

Department of Anesthesiology

McGovern Medical School, UT Health

2019 - 2020 **Wanyi Yeow, MD** Anesthesia Resident

Department of Anesthesiology

McGovern Medical School, UT Health

2019 - 2020 **Chad Zhao** Medical Student

Department of Anesthesiology

McGovern Medical School, UT Health

2020 - 2021 **Busra Tok-Cekmecelioglu, MD** Post-Doctoral Research Fellow

Department of Anesthesiology

McGovern Medical School, UT Health

2021 - present **InHuyk Bang, PhD** Post-Doctoral Research Fellow

Department of Anesthesiology

McGovern Medical School, UT Health

2021 **Jessica Van Sweringen** Medical Student

Department of Anesthesiology

McGovern Medical School, UT Health

2021 - present **Jieun Kim, Ph.D** Post-Doctoral Research Fellow

Department of Anesthesiology

McGovern Medical School, UT Health

2021 - present **Yu An, MD, PhD** Assistant Professor

Department of Anesthesiology

McGovern Medical School, UT Health

2022 - present **Thu Thien Tran, DO** Research Fellow

Department of Anesthesiology

McGovern Medical School, UT Health

2022 - present **Katherine Figarella, PhD** Instructor

Department of Anesthesiology

McGovern Medical School, UT Health

**Research**

*Research work from our laboratory focuses on the concept of endogenous anti-inflammatory pathways that can be targeted therapeutically to dampen excessive and unhealthy inflammatory responses. Particularly in the perioperative field, exploiting such pathways could yield novel therapeutic approaches to medical conditions such as renal, hepatic, and intestinal ischemia, acute lung injury, coronary events, or to improve outcomes of solid organ transplantation. These studies focus on two molecular areas:*

*1) The Hypoxia-Inflammation Link:*

Human life depends on the uptake, transport and delivery of oxygen to different tissues. To maintain adequate oxygen supply, mammals have evolved an array of physiological responses elicited by oxygen sensing mechanisms. For example, limited oxygen availability (hypoxia) leads to alternations in the respiratory rate and breathing pattern, cardiac output or blood pressure. If inadequate availability of oxygen persists, hypoxia will elicit cellular survival responses, driven towards restoration of adequate cellular oxygenation or adaptation to hypoxia. This response relies on a conserved pathway of transcription factors and regulatory proteins, including oxygen sensing prolyl-hydroxylases (PHDs) and hypoxia-inducible transcription factors (HIFs). More recently, it has become obvious, that the PHD/HIF system also regulates various aspects of the immune host defense response, with prominent impact on multiple inflammatory processes ranging from mucosal inflammation (acute lung injury, inflammatory bowel disease) to cancer to infections with human pathogens and other diseases. At the molecular level, many regulatory elements connect the PHD/HIF pathway to inflammatory signaling. Research work from our laboratory is directed towards developing a better understanding how hypoxia signaling regulates innate or adaptive immune responses, and how molecular aspects of the hypoxia-inflammation cross-talk affect mucosal inflammation.

*2) Extracellular Adenosine Signaling:*

Adenosine is implicated in a wide variety of basic biological functions, including nucleotide biosynthesis or cellular energy metabolism. On the outside of the cell, adenosine mainly serves as a signaling molecule and its biological functions occur through the activation of adenosine receptors (ARs) localized on the extracellular surface of the cell membranes. Particularly during conditions of hypoxia and inflammation, extracellular adenosine signaling events have the potential to adapt cellular metabolism, attenuate hypoxia-driven inflammation, and reconstitute epithelial or endothelial barriers. In the extracellular space, adenosine mainly stems from the enzymatic phosphohydrolysis of precursor nucleotides, such as ATP, ADP or AMP. This typically occurs in a two-step enzymatic process: Conditions of hypoxia or inflammation are associated with nucleotide release in the form of ATP or ADP from multiple sources (e.g. inflammatory cells, epithelia, endothelia, cardiac myocytes, platelets).

In a first step, ATP or ADP are rapidly converted to AMP by the ecto-apyrase (CD39) to AMP. In a second step, AMP is converted to adenosine by the ecto-5’-nucleotidase (CD73). Adenosine liberated at the extracellular surface can then signal through four individual ARs. Work from our research laboratory has tested the biological role of this pathway in different models of ischemia and inflammation. Particularly during the past two years, we have focused on signaling events through the A2B adenosine receptor (A2BAR). In fact, these studies point towards a critical role of the A2BAR in adapting cardiac, renal or mucosal tissues to conditions of hypoxia. Moreover, recent studies from our laboratory identified an important contribution of the neuronal guidance molecule netrin-1 in enhancing A2BAR signaling events and the prevention of hypoxia-elicited inflammation (see Figure, Cover Story, Nature Immunology February 2009)

Other studies from our laboratory focus on the contribution of adenosine uptake mechanisms to tissue injury during inflammation and hypoxia. Extracellular adenosine signaling events are rapidly terminated due to uptake of extracellular adenosine towards the intracellular compartment, followed by its rapid metabolism. Adenosine uptake in cardiac or mucosal tissues mainly involves equilibrative nucleoside transporters. At present, we are generating mice with conditional deletion of adenosine transporters in different tissues. Thus, we will be in a position to define the tissue specific role of individual adenosine transporters in a wide range of disease models, including acute lung injury, myocardial, renal, hepatic or intestinal ischemia, or during colitis, and target these mechanisms for the treatment of hypoxia-elicited inflammation.

**The University of Colorado “Organ Protection Program” (Founded in 2013)**

In July 2013, we founded the Organ Protection Program. While our program is housed within the Department of Anesthesiology, it represents an interdisciplinary research program supported by the Department of Anesthesiology, Surgery, Medicine, Emergency Medicine and Pediatrics.

Our mission is develop a highly innovative basic and translational research program to identify novel molecular targets for organ protection, and to train the next generation of biomedical scientists. Established disease models within the OPP include brain ischemia, acute lung injury, intestinal inflammation and ischemia, hepatic injury, diabetic organ injury, myocardial ischemia and acute kidney injury and sepsis. The OPP currently houses 15 faculty members from different Departments of the University of Colorado School of Medicine, including Anesthesiology, Surgery, Renal Medicine, Emergency Medicine and Pediatrics. Our faculty are currently funded with approximately 10 R01 grants and 15 research training grants (e.g. K08, AHA fellowship grants). We have a track record of publishing in the leading biomedical journals, including Nature Medicine, New England Journal of Medicine, Nature Immunology, Journal of Clinical Investigation, PLoS Medicine, and PLoS Biology, to name just a few. We anticipate that the OPP will effectively allow basic scientists to test their hypothesis in a clinical setting, while clinician scientists are supported to pursue mechanistic questions that relate to their clinical studies. Our goal over the next years is to achieve additional research funding through T32, R01, multiple PI-R01 and PPG funding mechanisms. In addition, we anticipate that the OPP will support the transition of mentored faculty members towards scientific independence. Moreover, we believe the OPP will be an extremely attractive environment to recruit additional basic researchers or physician scientists to the University of Colorado School of Medicine. It is our vision to become the national and international leader in Organ Protection, and to introduce novel and effective ways of organ protection into the clinical treatment of surgical patients, critical care and emergency medicine.

**The UTHealth Center for Perioperative Medicine (Founded in 2018)**



In February 2018, the Center for Perioperative Medicine at the McGovern Medical School, University of Texas Health Science Center of Houston was founded under the Directorship of Dr. Eltzschig. The “Center for Perioperative Medicine (CPM)” is a multi-disciplinary, interdepartmental research program focused on finding novel therapeutic approaches to improve outcomes in surgical patients, and patients requiring emergency medicine or critical care. One of the foci of the center is the prevention of perioperative organ injury. Perioperative organ injury is one of the leading causes of morbidity and mortality in the Western countries. If death within 30 days of surgery was defined as a single-standing entity by the Center for Disease Control, it would account for the third leading cause of death in the USA. In most instances, morbidity of surgical patients is attributable to acute organ dysfunction during the perioperative period, such as acute kidney injury, myocardial injury, acute lung injury, liver injury, intestinal injury or sepsis. Importantly, many basic and clinical studies indicate that prevention of organ injury is a much more attainable goal than successful treatment of fully established organ dysfunction. The CPM combines different strategies to make progress towards this front. Research strategies include the following approaches:

* 1. Molecular studies in primary or cultured cell systems
	2. Studies of acute organ injury in mice, including acute lung and kidney injury, myocardial and hepatic injury, intestinal inflammation and sepsis.
	3. Studies in genetic mouse models. We have a library of approximately 80 mouse lines with global or tissue-specific deletion of target genes, overexpression of specific target genes, and reporter mice.
	4. Translational studies in tissues and body fluids derived from patients with organ injury.
	5. Clinical risk assessment studies.
	6. Randomized, clinical trials to examine novel approaches to treat or prevent perioperative organ injury.
	7. Comparative effectiveness trials to examine best clinical practice approaches to treat or prevent organ injury in surgical patients.

Some of the key elements of this program include:

1. Defining novel and exciting ways to prevent or treat acute organ injury in a wide set of diseases and patient groups (for example the heart, liver, kidney, lungs, intestine, brain, sepsis, multi-organ failure, and in diabetic patients)
2. Integration of different Departments, and Institutions of the Medical School (e.g. including for example anesthesiology, surgery, orthopedic surgery, critical care medicine, emergency medicine, pediatrics, transplantation, hepatology, pulmonary medicine, diabetes research, oncology). We strongly believe that research does not have departmental borders. In our experience, the integration of different view-points represented by physician scientists from different clinical departments, as well as basic scientists with different backgrounds sets the stage for truly cutting edge and transformative research.
3. Emphasis on research training - particularly of physician scientists and PhD scientists and integration with the GSBS and MD/PhD training programs.
4. Goal to help transition junior scientists to become independent researchers (e.g. K-to-R transition), and provide the platform for allowing scientists that recently achieved R-01 funding to continue their success, renew their funding, and contribute to collaborative research efforts.
5. Provide the collaborative environment that would allow for successful support by the NIH of collaborative research efforts (e.g. via the PPG mechanism, or multiple PI R-01 grants) and grants that support research training (e.g. via the T32 mechanism).
6. Making research highly clinically relevant and moving novel targets from the laboratory towards patient treatment. The fact that the Center for Perioperative Medicine (CPM) will include physician scientists, PhD scientists and clinicians, in addition to the highly collaborative nature of the center will put us into the unique position that we can truly perform research that translates from bench to the bedside.

**Funding Information:**

**Ongoing Research Support (current funding volume of approximately $4.5m/year)**

**R01HL169519 (Award Pending) Impact Score: 30 (12th percentile)**

**Multi-PI: Eltzschig (contact); Yuan 07/01/2023 – 06/30/2028**

**NIH/NHLBI** $700,000/yr (requested)

Functional Role of HIF PHDs in ARDS

This project aims to investigate the regulation of hypoxia-inducible factor HIF1A by HIF- prolyl hydroxylases (PHDs) during acute respiratory distress syndrome (ARDS).

Budget: $3,421,710 in total funding (requested)

**R01HL154720 (Administrative Supplement) (Award Pending)**

**Multi-PI: Eltzschig (contact) 07/01/2023 – 06/30/2024**

**NIH/NHLBI** $390,000

Hypoxia Inducible Factors in Shaping Neuroinflammation and Alzheimer’s Pathogenesis

This project aims to understand the role that HIFs play as a critical role(s) in AD-related tauopathy by affecting microglial function and promoting neuro-inflammation.

Budget: $390,000 in total funding

**R01HL165748 (Award Pending) Impact Score: 30 (9th percentile)**

**Multi-PI: Eltzschig (contact); Tsai; Muehlschlegel 04/01/2023 – 03/31/2028**

**NIH/NHLBI** $720,000/yr (requested)

Circadian Rhythm as a Therapeutic Target for Perioperative Cardioprotection

The main goal of this grant application is to target circadian rhythm for perioperative cardioprotection.

Budget: $3,616,387 in total funding (requested)

**1T32GM135118 Multi-PI: Eltzschig; Ju 07/01/2022 – 6/30/2027**

**NIH/NIGMS** $162,269 - $248,095/yr

Research Training of Anesthesiology Physician-Scientists

The goal of this training grant is to provide the next generation of physician-scientists and researchers with the tools and training necessary for those who seek to improve medical care in areas relevant to perioperative care, palliative care, acute and chronic pain, and health services delivery.

Budget: $1,149,959 in total funding

**W81XWH2110032 PI: Eltzschig** **01/01/2021-06/30/2024**

**DoD** $5,162,372

A Randomized, Phase 2 Clinical Trial of HIF Activator Vadadustat for Prevention or Treatment of ARDS in Hospitalized COVID-19 Patients.

The goal of this project is to test the hypothesis that pharmacologic activators of the transcription factor “hypoxia-inducible factor” (HIF) can be used for the prevention or treatment of acute respiratory distress syndrome (ARDS) in hospitalized patients with COVID-19.

Budget: $5,162,372 in total funding

# 1R01HL154720 PI: Eltzschig 12/15/2020-11/30/2024

**NIH/NHLBI** $410,110/yr

MicroRNA miR-147 Dampens Alveolar Epithelial Inflammation during ARDS

The main goal of this grant application is to identify microRNA (miRNA) targets that protect the alveolar epithelium from excessive inflammation during acute lung injury (ALI).

Budget: $1,795,867 in total funding

**1R01DK122796 Multi-PI: Eltzschig; Ju 05/11/2020-03/31/2024
NIH-NIDDK** $477,000/yr

Targeting microRNA miR-122 for the Treatment of Perioperative Liver Injury

These studies were designed to target microRNAs for dampening liver inflammation during hepatic ischemia and reperfusion injury, such as occurs during liver transplantation. The grant is focused on targeting the microRNA miR-122, and its target gene PHD1 during liver protection.

Budget: $1,829,330 in total funding

**1R01CA237327** **PI: Lee, Co-I: Eltzschig** **02/06/2020-01/31/2025**

**NIH/NCI** $13,353/yr

PEA15 in Development of Liver cancer and Its Therapeutic Implication

This study will determine the molecular mechanisms underlying PEA15 regulation of HIF1a and determine accountability for sorafenib resistance in HCC cells.

Budget: $67,485 in total funding

**Completed Research Support**

**R01HL133900 PI: Eltzschig 06/08/2017-03/31/2021**

**NIH/NHLBI** $385,000/yr

MicroRNA Shuttling during Acute Respiratory Distress Syndrome

The goal is to study target MicroRNA shuttling to prevent or treat perioperative acute respiratory distress syndrome (ARDS).

Budget: $1,155,000 in total funding

**R01DK109574 Multi-PI: Eltzschig; Ju 09/21/2016-06/30/2021**

**NIH/NIDDK** $130,000/yr

Hypoxia-Inducible Factors in Acetaminophen-Induced Liver Injury

These studies will show the functional role of macrophage-dependent HIF2A in liver protection during acute liver injury

Budget: $1,380,762 in total funding

**R01HL109233 PI: Herzog; Co-PI: Eltzschig 07/01/2016-04/30/2020**

NIH/NIDDK $18,241/yr

Neuronally Active Proteins in IPF

The goal is to study the role of the neuronal guidance molecule netrin-1 during pulmonary.

Budget: $72,965 in total funding

**POI HL114457-01 PI: Eltzschig (Project 2) 06/01/2013-05/31/2019**

**NIH-NHLBI** $533,750/yr

Hypoxic adenosine response; Project 2: Equilibrative Nucleoside Transporters during Acute Kidney Injury

These studies are designed to study the contribution of adenosine transporters – particularly the equilibrative nucleoside transporter ENT1) during acute kidney injury.

Budget: $2,668,750 in total funding

**POIHL114457-01 Core B (PI: Bowser; Co-PI Eltzschig) 06/01/2013-05/31/2019**

**NIH-NHLBI** $228,750/yr

Transgenic Mouse Breeding core;

**The Transgenic Mouse Breeding Core will provide state of the art mouse models with tissue-specific deletions of key genes of the hypoxic adenosine response so that the individual projects can address their hypotheses.**

**Budget: $1,143,750 in total funding**

**R01 HL119837 PI: Eltzschig 05/01/2014-03/31/2019**

**NIH-NHLI** $385,000/yr

Amphiregulin Signaling in Perioperative Cardio-Protection

Perioperative myocardial injury is among the leading causes of morbidity and mortality of surgical patients. Studies in genetic models implicate the transcription factor hypoxia-inducible factor (HIF)-2A in cardio-protection via induction of the growth factor amphiregulin. The long-term goal of this research project is to identify novel therapeutic approaches to treat perioperative myocardial ischemia and injury via the HIF-amphiregulin pathway.

Budget: $1,540,000 in total funding

**RO1 DK097075 PI: Eltzschig 04/01/2013-01/31/2019**

**NIH-NIDDK** $334,950/yr

Proton Pump Inhibitors for Perioperative Acute Kidney Injury

Genetic studies in mice targeted for oxygen sensing pathways revealed to us that the proton pump ATP4A can be targeted to prevent acute kidney injury. The proposed studies are designed to explore the mechanism and therapeutic potential in proton pump inhibitors (such as omeprazole) in preventing acute kidney injury. This grant is scored at the 3rd percent

Budget: $1,674,750 in total funding

**R01DK082509 PI:Garcia; Co-PI: Eltzschig 04/10/2011-09/30/2017**

**NIH/NIDDK**  $15,820/yr

Reduction of Kidney Progressive Fibrosis by A2a Adensine Receptor

These studies will determine the contribution of macrophages A2aR activation in kidney protection during established glomerulonephritis.

Budget: $79,100 in total funding

**R01 HL098294 PI: Eltzschig 01/01/2011-12/31/2015**

**NIH-NHLBI**  $372,190/yr

Hypoxia-Inducible Factors during Acute Lung Injury

Acute lung injury is among the leading causes of morbidity and mortality in critical care medicine. Based on preliminary studies showing stabilization of hypoxia-inducible factor (HIF)-1 during acute lung injury, we will pursue its functional role in lung injury induced by mechanical ventilation or LPS inhalation. The long-term goal of this research is to identify novel therapeutic approaches to treat acute lung injury.

Budget: $1,480,000 in total funding

 **CCFA Senior Research Award PI: Eltzschig 07/01/2011-06/30/2014 Crohn’s and Colitis Foundation of America** $115,830/yr

Title: Equilibrative Nucleoside transporters During Intestinal Inflammation

Studies will provide insight into molecular mechanisms of how extracellular adenosine uptake is achieved during conditions of intestinal inflammation.

Budget: $345,000 in total funding.

**R01 HL092188 PI: Eltzschig 04/01/2009–01/31/2014**

**NIH-NHLBI**  $ 345,513 /yr

Extracellular Adenosine During Ventilator Induced Lung Injury

Acute lung injury is among the leading causes of morbidity and mortality in critical care medicine. This research project is designed to study mechanisms of extracellular adenosine generation, signaling and uptake during acute lung injury and to target these molecular mechanisms towards lung protection.

Budget: $1,750,000 in total funding.

**R01 Supplement PI: Eltzschig 07/01/2009-06/30/2011**

**NIH-NHLBI** $115,000/yr

Extracellular Adenosine During Ventilator Induced Lung Injury

Acute lung injury is among the leading causes of morbidity and mortality in critical care medicine. This research project is designed to study mechanisms of extracellular adenosine generation, signaling and uptake during acute lung injury and to target these molecular mechanisms towards lung protection.

Budget: $230,000 in total funding.

**R01 DK083385 PI: Eltzschig 05/01/2010-04/30/2014**

**NIH-NIDDK** $282,871/yr

Alternative Mechanisms of Adenosine Receptor Activation

This research project is designed to identify mechanisms – other than adenosine itself – to activate or enhance adenosine receptor signaling events. Based on preliminary studies indicating a protective role of adenosine signaling during inflammatory bowel disease, we will implement these findings in models of intestinal inflammation. The long-term goal of this research project is to identify novel therapeutic approaches during inflammatory bowel disease.

Budget: $1,180,000 in total funding.

**FAER PI: Eltzschig 07/01/2007-06/30/2009**

**Foundation for Anesthesia Education and Research**

Role of A2B Adenosine Receptor in Vascular Leakage during Hypoxia

The major goal of this project is to define the contribution of individual adenosine receptors to vascular leakage during conditions of ambient hypoxia in vitro and in vivo.

Budget: $255,000 in total funding.

**Fortün Grant PI: Eltzschig 12/01/2006-11/30/2007**

**University of Tübingen Grant**

Adenosine Generation in Gastrointestinal Ischemia and Reperfusion Injury

The major goal of this work is to define the contribution of enzymatic generation of extracellular adenosine via the 5’-ectonucleotidase CD73 to gastrointestinal ischemia and reperfusion injury.

Budget: $150,000 in total funding.

**IZKF Programmatic Grant PI: Eltzschig** **06/01/2006-05/31/2008**

**University of Tübingen Grant**

Role of HIF in Inflammation and Infection

The main goal of these studies is to define the contribution of hypoxia-inducible factor HIF-1 as transcriptional regulator during inflammation or infection

Budget: $350,000 in total funding.

**DFG Grant EL274/2-2 PI: Eltzschig** **08/01/2004-07/31/2007**

**German Research Foundation (DFG)**

Vascular Barrier Function during Hypoxia: Role of the Ecto-5’-nucleotidase (CD73)

The major goal of these studies is to define the contribution of CD73-dependent adenosine generation to vascular barrier function during hypoxia.

Budget: $450,000 in total funding.

**Fortün Grant PI: Eltzschig 12/01/2005-11/30/2006**

**University of Tübingen Grant**

Modulation of Vascular ATP Signaling during Hypoxia

The major goal of this work is to define the contribution of extracellular ATP signaling events in vascular barrier function during conditions of limited oxygen availability (hypoxia)

Budget: $170,000 in total funding.

**Fortün Grant PI: Eltzschig 03/01/2004-02/28/2005**

**University of Tübingen Grant**

Pulmonary Barrier Function: Hypoxic Modulation by the Ecto-5’-nucleotidase (CD73)

The major goal of these studies is to identify the contribution of CD73-dependent adenosine generation to pulmonary barrier function during hypoxia.

Budget: $180,000 in total funding.

**Examples for Mentor on Research Fellowship Training Awards**

(e.g. by the Crohn’s and Colitis Foundation of America (CCFA), NIH, or foreign funding agencies (e.g. Deutsche Forschungsgemeinschaft DFG, Leopoldina or DAAD):

* Jessica Bowser, PhD (IARS mentored research award)
* Michael Koeppen, MD, PhD (DFG)
* Carol Aherne, PhD (CCFA, NIH – K award)
* Eoin McNamee, PhD (CCFA)
* Jens Poth , MD, PhD (DAAD)
* Heidi Ehrentraut, PhD (DFG)
* Jessica Bauerle (Student grant from the ASN)
* Sandra Hoegl, PhD (Leopoldina)
* Eric Clambey, PhD (AHA)
* Tobias Eckle, MD, PhD (FAER, AHA, NIH - K08)
* Melanie Hart, PhD (European Society of Anesthesiology Research Grant)
* Xioayi Yuan, PhD (Francis B. Parker Fellowship; American Lung Association Fellowship; American Thoracic Society Fellowship, American Heart Associatio Fellowship)
* Wei Ruan, MD, PhD (IARS Mentored Research Award)
* Agnieszka Czopik, PhD (mentored career development award, US Department of Defense)

**Report of Clinical Activities:**

Throughout my medical school training at the University of Tübingen, Germany, and at the Harvard Medical School in Boston, I became inspired to focus my clinical practice on perioperative medicine. In fact, I am probably one of the few students to enter medical school with the desire to become an anesthesiologist. This was inspired by working together with anesthesiologists during a mandatory two-year period as paramedic following graduation from Gymnasium (“Zivildienst”). The hands-on experience of caring for patients with life-threatening medical conditions, and the desire to better understand mechanisms of physiology and disease became the basis for my decision to study medicine. Very early on in my medical school training, the multiple facets of cardiovascular and pulmonary physiology, in the setting of perioperative medicine became the focus of my clinical training. Thus, it also was a natural fit for me to pursue clinical training in anesthesiology, cardiac anesthesia and perioperative echocardiography (Harvard Medical School, Boston), critical care medicine (University of Tübingen, Germany), and emergency medicine (University of Tübingen, Germany), to broaden my knowledge and clinical experience in the area of perioperative cardiovascular and pulmonary disease.

My clinical training has prepared me to provide anesthesia care for patients with complex cardiovascular and pulmonary diseases undergoing major surgery. This has become the focus of my clinical practice, e.g. by anesthetizing patients with pre-existing heart and lung disease who are undergoing major abdominal surgery. Moreover, I am among the few physician scientists with a clinical practice that perfectly fits with my research interests. In fact, my basic science research with focus on tissue protection from ischemia and inflammation translates extremely well into my clinical case mix. One of the major problems experienced by surgical patients is perioperative organ injury (e.g. acute kidney injury, myocardial ischemia, or acute lung injury). Indeed, one could make the case that perioperative death – which is most frequently occurring in the setting of acute organ injury – is the third leading cause of death in the USA (see Bartels et al., Anesthesiology 2013). As such, my research interest and clinical practice match up in an interdependent relationship, where the clinical exposure provides stimulation and ideas for research revenues. Simultaneously, our research laboratory provides a platform for clinical translation of basic research findings from our laboratory towards the clinic. As such, there are many examples where we have taken bench-to-bedside approaches with our research work.

In addition to my clinical responsibilities, I have consistently published original clinical research work, case reports, and review articles that focus on perioperative patient care. As such, I have been the lead-author on over 50 contributions in peer-reviewed clinical journals, including many original research publications, clinical commentaries and editorials, and a clinical review article published in the New England Journal of Medicine that gives an update on analgesia and anesthesia in obstetric patients. In fact, with over 30 publications on perioperative echocardiography, my clinical research work has significantly advanced the field of intraoperative echocardiography. As of today, I continue to pursue novel aspects of perioperative patient care. Fox example, we recently studied the impact of acute kidney injury on outcomes in over 39.000 surgical patients. The findings from this study indicate that small increases of perioperative creatinine values – even below values that would be consistent with acute kidney injury – are associated with profound increases in mortality and hospital length of stay (see Kork et al., Anesthesiology 2015 in press). Therefore, we are currently considering early warning systems to alert physicians to the potential presence of increased perioperative risk due to acute kidney injury.

Clinical Board Certifications:

1. Certificate for Emergency Medicine Baden-Württemberg (“Fachkundenachweis, Mitwirkung im Rettungsdienst”)
2. American Board of Perioperative Echocardiography (2002)
3. Board Certification, German Board of Anesthesiologists (2003)
4. Board Certification, German Board of Intensive Care Medicine (2003)
5. Board Certification, American Board of Anesthesiologists (2004)
6. Board Certification, American Board of Perioperative Echocardiography (2007)
7. Maintenance of Certification in Anesthesiology (MOCA) (2013)
8. Current Medical License in Texas, Colorado and Massachusetts

These board certifications are based on residency training in anesthesiology (at the Brigham and Women’s Hospital, Harvard Medical School, Boston and in Tübingen), fellowship in cardiac surgery (Harvard Medical School), cardiac anesthesia and perioperative echocardiography (Harvard Medical School), fellowships in critical care medicine (Tübingen) and training in emergency medicine (Tübingen). I have successfully completed these training programs with highest honors.

*Clinical practice at the Department of Anesthesiology, University of Tübingen, Germany (2003 - 2007)*

Following completion of my clinical training, I was provided the opportunity to develop a clinical leadership role at the Department of Anesthesiology, Tübingen University Hospital, Germany. Initially, I was appointed as senior attending (“Oberarzt”). In the following years, I advanced to the position as Vice Chairman (“Leitender Oberarzt”). As such, my clinical leadership role included supervision of residents, fellows and more junior attending anesthesiologists throughout the spectrum of intraoperative anesthesia, critical care medicine and labor analgesia. Particularly, I was involved in complex cases, e.g. of patients with cardiovascular disease undergoing cardiac- or non-cardiac surgery. Frequently, my advice and help was asked by peer anesthesiologists and attending surgeons to help with the care of patients with severe cardiovascular or pulmonary diseases. In addition, I consulted on patients at the critical care unit with unclear cardiovascular problems, where my skills and advanced training in perioperative transesophageal echocardiography, cardiovascular disease and critical care would provide critical contributions to resolve care decisions in these patients. Moreover, on multiple occasions, attending surgeons who required surgery themselves, would ask me to conduct their anesthetic. I took over multiple clinical leadership roles within the Department of Anesthesiology at the University Hospital of Tübingen:

1. Faculty Board, Department of Anesthesiology and Intensive Care Medicine, University Hospital, Tübingen, Germany
2. Financial Advisory Committee, Department of Anesthesiology and Intensive Care Medicine, University Hospital, Tübingen, Germany
3. Education Committee, Department of Anesthesiology and Intensive Care Medicine
4. Committee on Continued Medical Education, Department of Anesthesiology and Intensive Care Medicine
5. Search Committee for Anesthesia Residents and Fellows, Department of Anesthesiology and Intensive Care Medicine
6. Search Committee for Anesthesia Staff, Department of Anesthesiology and Intensive Care Medicine
7. Executive “Fortuen” Research Grant Committee

*Clinical Roles at the University of Tübingen, Germany (2003 - 2007)*

07/2003 - 08/2007 Staff Anesthesiologist (Oberarzt). Clinical focus: Providing anesthesia care for patients with complex cardiovascular or pulmonary diseases undergoing major surgery and complex obstetric patients.

07/2003 - 08/2007 Performance of intraoperative or postoperative transesophageal echocardiographic examinations in surgical patients.

07/2003 - 08/2007 “Notarztdienst”; participation in the emergency call system of the Tübingen University Hospital. Going out with a specialized ambulance to take care of severe out-of-hospital emergencies (e.g. trauma patients, or medical emergencies)

07/2003 - 08/2007 In charge of organizing CME accredited clinical conferences (on average 1 conferences per month).

01/2006 - 08/2007 Vice Chair (leitender Oberarzt), Department of Anesthesiology and Critical Care Medicine, University Hospital, Tübingen, Germany.

01/2006 - 08/2007 In charge of the daily clinical morning conference (35 min) of the Department of Anesthesiology at the University of Tübingen at the “downtown campus site”. This included discussion of clinical patient care, complications, or short updates or seminars on aspects of perioperative medicine.

*Clinical practice at the Department of Anesthesiology, University of Colorado, Denver, (2007 - present)*

Since my recruitment to the Department of Anesthesiology and Perioperative Medicine at the University of Colorado School of Medicine as Associate Chair, I took over different clinical leadership roles. My clinical practice of anesthesia covers all type of anesthetics, including patients undergoing general surgery, neurosurgery, organ transplantation, or requiring labor analgesia. An additional clinical focus is in the field of cardiothoracic anesthesia and perioperative echocardiography. As such, attending surgeons would frequently request my help for the care of patients with complex cardiovascular disease undergoing non-cardiac surgery. In addition, I take a full share of overnight and late calls for the Department of Anesthesiology at the University of Colorado (on average 3-4 overnight call shifts per month). Also, I have been instrumental in setting up a fellowship for anesthesia care during abdominal organ transplantation. This fellowship program trains clinical fellows in anesthesia for liver and kidney transplantation, while at the same time providing opportunities for translational or basic science research. Moreover, I am co-chairing the Virtue Scholarship of the Department of Anesthesiology at the University of Colorado – a program that provides anesthesia residents with additional clinical, translational or basic science research opportunities. In 2014, I founded the Anesthesia Service for Oncologic Surgery, an anesthesia service that focuses on enhanced recovery in general surgery patients. We realized that that a team approach is critical to optimize perioperative care in general surgery patients (e.g. patients undergoing colorectal or pancreatic surgery) with the goal to improve outcomes, and simultaneously decreasing hospital length of stay and cost effectiveness. As such, the Anesthesia Service of Oncologic Surgery has implemented perioperative protocols for early preoperative patient assessment and optimization, effective use of regional anesthesia, goal-directed fluid therapy, and postoperative recovery such as early enteral nutrition and ambulation in patients requiring major abdominal surgery. As chief of the Anesthesia Service for Oncologic Surgery, I am paying particular attention to close communication with the surgeons, intensivists and nurses involved in the care approach of our patients, as only a comprehensive team approach will allow for enhancing recovery after surgery. Both, my clinical background in cardiac anesthesia and in critical care medicine have been instrumental in this successful operation, as well as my leadership style of empowering a team approach and finding meaningful solutions that work for all different parties involved in complex clinical situation.

*Clinical Leadership Roles at the University of Colorado (2007 - 2016)*

Chief, Anesthesia Service for Oncologic Surgery (ASOS)

*With the vision that a team approach to optimize perioperative care in general surgery patients (e.g. patients undergoing colorectal or pancreatic surgery) is critical to improve patient outcome while simultaneously improving hospital length of stay and cost effectiveness, Dr. Eltzschig founded the Anesthesia Service for Oncologic Surgery in 2014. Dr. Eltzschig is the founder and the Chief of this specialized anesthesia service.*

Mission and Vision of the Anesthesia Service for Oncologic Surgery (ASOS):

Provide a team approach to improve the perioperative care of patients undergoing surgical treatment of neoplastic diseases of the abdomen. Our goals include improvements of patient care, outcomes, and efficiency, teaching of students, residents and faculty in perioperative management of surgical oncology patients, and providing scholarly opportunities and research mentoring focused on patients requiring major abdominal surgery.

Vision:

* Members of the Anesthesia Service for Oncologic Surgery (ASOS) represent a diverse group of anesthesiologists that focus on providing perioperative care for patients requiring surgical procedures for the treatment of neoplastic diseases of the abdomen.
* Importantly, the ASOS focuses on providing a team approach for the perioperative management of surgical oncology patients, including preoperative assessment prior to surgery, intraoperative management approaches, and state of the art intensive care and pain therapy.
* Our clinical team includes experts for preoperative patient assessment, cardiovascular anesthesia, perioperative management of acute and chronic pain conditions, intensive care therapy and advanced general practitioners with experience in trauma and volume resuscitation.
* The multi-disciplinary approach of the ASOS allows for the introduction and routine clinical use of extended invasive monitoring capabilities (e.g. transesophageal echocardiography; perioperative use of invasive monitoring, including pulmonary artery catheter use if indicated), specialized intensive care treatment, and efficient use of state-of-the-art approaches of pain relief, including ultrasound guided regional anesthesia.
* Other extended clinical services include early preoperative assessment of patients by the team of surgeons and anesthesiologists, help and support of the patients’ families, with the goal to further integrate all surgical, anesthesia, intensive care and pain management approaches for patients requiring major abdominal surgery.
* A team approach together with the surgeons will help to guide perioperative management aspects, such as implicating standardized preoperative treatment approaches (e.g. energy drinks up to 2h before surgery), intraoperative fluid management (goal directed fluid therapy), early mobilization, early application of oral fluids etc.
* The ASOS will provide specialized training for students, resident and faculty in the complex care of surgical oncology patients. This will include specialized rotations residents, grand round presentations on management of surgical oncology patients etc.
* Together with the team of surgeons, the ASOS will establish a critical platform for scholarly activities, including mentoring and support for clinical and translational research designed to guide and improve perioperative care for surgical oncology. The long-term goal of these efforts will be to establish funded investigators in this important area of research.

*Since its foundation in 2014, the Anesthesia Service for Oncologic Surgery has been highly successful in implementing protocol driven approaches to enhance recovery after surgery. Such protocols include preoperative assessment and optimization, efficient use of regional anesthesia approaches, intraoperative use of goal-directed fluid therapy, and post-operative enhanced recovery guidelines. In addition, ASOS also serves as a role model for other clinical services at the University of Colorado, including preoperative patient assessment and testing, as well as other surgical specialties, such as orthopedic surgery, back surgery or obstetric surgery.*

*Other Clinical Activities and Leadership Roles:*

08/2007 - 07/2016 Staff Anesthesiologist. Clinical focus: Providing anesthesia care for patients with complex cardiovascular or pulmonary diseases undergoing major surgery.

08/2007 - 07/2016 Participation in the clinical call system of the Department of Anesthesiology, including on average three to four overnight calls, and 4 late calls per month. Coverage of the general operating room, anesthesia for trauma patients, pain service, and the obstetric anesthesia service.

08/2007 - 07/2016 Organization of clinical CME accredited conferences for the areas of solid organ transplantation, and cardiovascular physiology.

08/2007 - 07/2016 Cross appointments with other clinical departments at the University of Colorado:

* Department of Medicine; Member of the Faculty Board
* Division of Renal Medicine; Member of the Faculty Board

6/2008 - 07/2016 Co-Director, Virtue Scholarship, Department of Anesthesiology, University of Colorado, Denver (this program provides additional clinical and research training for anesthesia residents dedicated towards an academic career as physician scientist)

06/2008 - 07/2016 Participation in the voluntary obstetric anesthesia call system to cover the obstetric anesthesia service on weekends.

07/2008 - 07/2016 Member, Anesthesia Service for Solid Organ Transplantation, University of Colorado, Denver

011/2014 - 07/2016 Chief, Anesthesia Service for Oncologic Surgery, University of Colorado, Denver

*Leadership as Chairman, Department of Anesthesiology, Critical Care and Pain Medicine of the McGovern Medical School, University of Texas at Houston 2016 - present*

As Chair of the Department of Anesthesiology, Critical Care and Pain Medicine at the McGovern Medical School of the University of Texas in Houston (<https://med.uth.edu/anesthesiology/>), I have been leading a department of approximately 120 faculty, and 400 total departmental members since 2016. We have a fairly large residency program with 30 residents per class (2nd largest in the USA) and approximately 25 fellows per year. In addition, we have approximately 90 advanced practice providers (CRNAs and Anesthesia Assistance) in our Department. We are a truly a perioperative Department, including preoperative testing and assessment, all areas of intraoperative anesthesia, critical care, chronic pain and obstetric anesthesia. When I was appointed to the role of chairman in 2016, we were struggling with recruitment and had 15 open faculty positions that were unfilled. With increased faculty satisfaction and improved retention, we are now fully staffed and have over 15 potential faculty applicants that we cannot hire, even though these are strong candidates from many leading programs around the country. At least in part, I attribute our success in improving our staffing to enhancing faculty engagement in the Department’s leadership. We have established leadership teams for the Department’s finances, education, scheduling, quality and safety, disaster preparedness, research, recruitment and importantly for diversity and inclusion. These leadership teams allow faculty to engage in leadership of the Department and provide transparency and equal opportunities. In 2017, we were one of the first Departments of Anesthesiology in the country to appoint a Vice Chair for Diversity and Inclusion. Providing flexible alternative contracts with decreased call and weekly work-hour requirements, a focus on physician well-being and resilience, and paying attention to our hiring process, we are now one of the most divers Departments in our medical school and probably around the country. We were able to expand our NIH funding base, and are currently having approximately 20 R01 grants in our Department, compared to no NIH funding when I joined UTHealth in 2016. We also established research scholarships for anesthesia residents, and received funding for a T32 training grant for training physician scientists in anesthesiology in January 2012 (PIs Drs. Eltzschig and Ju). Expansions of the Department have occurred on several fronts, including for example pediatric cardiac anesthesia, where we are now a leading program in Houston. Similarly, we have expanded our ICU presence with two new ICUs under the leadership of our Department. Similarly, we have established a new program for chronic pain treatment, and established an academic obstetric anesthesia program. These successful expansions and increases in our contributions to our institution were possible through the outstanding relationships to leaders of our Institution, and our physician leadership colleagues in surgery, pediatric surgery ICU, OB and many other areas. In addition, we were supported and worked closely together to achieve these goals with our Dean and our President of UTHealth.

**Invited Seminars, Lectures, Presentations:**

**A.) Local Contributions**

**Eltzschig HK**. Effect of 5’-Adenosine-Triphosphate on Endothelial Permeability. Center for Experimental Therapeutics and Reperfusion Ischemia, Brigham and Women’s Hospital, Harvard Medical School, Boston, USA, April 2002

**Eltzschig HK**. Effect of Aspirin on Perioperative Morbidity and Mortality in Patients undergoing Coronary Artery Bypass Grafting. Center for Experimental Therapeutics and Reperfusion Ischemia, Brigham and Women’s Hospital, Harvard Medical School, Boston, USA, January 2003.

**Eltzschig HK**. Nucleotide Metabolism in the Hypoxic Vasculature. Center for Experimental Therapeutics and Reperfusion Ischemia, Brigham and Women’s Hospital, Harvard Medical School, Boston, USA, February 2003.

**Eltzschig HK**. The Thomas Smith Lecture. Nucleotide Metabolism and Nucleoside Signaling in the Posthypoxic Endothelium. Brigham and Women’s Hospital, Harvard Medical School, Boston, USA, June 2003.

**Eltzschig HK**. Department of Anesthesiology, Perioperative and Pain Medicine -

Fellowship Lecture. Hypoxia and Vascular Barrier Function. Brigham and

Women’s Hospital, Harvard Medical School, Boston, USA, June 2003.

**Eltzschig HK**. Hypoxia and Vascular Barrier Function. Grand Rounds, Department of Medicine, University Hospital, Tübingen, May 2003.

**Eltzschig HK**. Adenine Nucleotide Metabolism and Vascular Barrier. Research Grand Rounds, Department of Radiology, University Hospital, Tübingen, Germany, May 2004.

**Eltzschig HK.** Extracellular Adenosine during Hypoxia. Medicine Grand Rounds. Department of Medicine, University of Tübingen, Tübingen, Germany, November 2004.

**Eltzschig HK.** Nucleoside Transporters during Hypoxia. Grand Rounds. Department of Microbiology, University of Tübingen, Tübingen, Germany, July 2005.

**Eltzschig HK.** Adenosine - An Old Drug Newly Discovered. Grand Rounds. Department of Biochemistry, Tübingen, Germany, March 2006.

**Eltzschig HK.** Adenosine - An Old Drug Newly Discovered. Anesthesia Research Seminar. Department of Anesthesiology and Intensive Care Medicine, University of Tübingen, Tübingen, Germany, November 2006.

**Eltzschig HK**. Into thin air - Adenosine in Tissue Adaptation to Hypoxia. Anesthesiology Research Seminar. Department of Anesthesiology, University of Colorado Health Science Center, Denver USA. November 2007

**Eltzschig HK**. Adenosine in Cardioprotection from Ischemia. Grand Rounds, Department of Anesthesiology, University of Colorado, Aurora, CO, USA, May 2008

**Eltzschig HK**. Hepatic Ischemia Reperfusion Injury. Grand Rounds, Division of Gastroenterology, Department of Medicine, University of Colorado, Aurora, CO, USA, June 2008

**Eltzschig HK**. Hepatic Ischemia Reperfusion Injury. Research Symposium: Building a Research Transplantation Center - Frontiers in Liver Transplantation. University of Colorado, Aurora, CO, USA, November 2008

##### Eltzschig HK. Alternative Mechanisms of Adenosine Receptor Activation. National Jewish Health, Integrated Department of Immunology, Denver, Colorado, USA, January 2009

##### Eltzschig HK. Alternative Mechanisms of Adenosine Receptor Activation. Department of Anesthesiology, University of Colorado, Aurora, Colorado, USA, February 2009

##### Eltzschig HK. Adenosine in Innate Immunity. Barbara Davis Center for Childhood Diabetes, University of Colorado, Aurora, Colorado, USA, February 2009

**Eltzschig HK.** Alternative Mechanisms of Adenosine Receptor Activation. Department of Cell Biology, Stem Cells and Development (CSD), University of Colorado, Aurora, Colorado, USA, January 2009

##### Eltzschig HK. Alternative Mechanisms of Adenosine Receptor Activation. University of Colorado School of Pharmacology, Denver, Colorado, USA. November 2009

##### Eltzschig HK. The Hypoxia-Inflammation Link. Grand Rounds; Department of Medicine, University of Colorado, Denver, Colorado, USA. February 17 2010

##### Eltzschig HK. Nucleotides Released by Apoptotic Cells Acts as Find-Me Signal; Immunology Journal Club; Barbara Davis Center, University of Colorado, Denver, CO, USA, May 3 2010

##### Eltzschig HK. Adenosine and Acute Kidney Injury; Grand Rounds; Renal Division, Department of Medicine, University of Colorado, Denver, CO, USA, May 6 2010

##### Eltzschig HK. The Hypoxia-Inflammation Link; Grand Rounds; Department of Anesthesiology, University of Colorado, Denver, CO, USA, August 9 2010

##### Eltzschig HK. The Hypoxia-Inflammation Link; Grand Rounds; Department of Cardiology, University of Colorado, Denver, CO, USA, October 25 2010

##### Eltzschig HK. Oxygen-Sensing Prolylhydroxylases during Acute Kidney Injury; Renal Research Grand Rounds; University of Colorado, Denver, CO, USA, June 8 2011

##### Eltzschig HK. The Hypoxia-Inflammation Link. Grand Rounds; Division of Gastroenterology, Department of Medicine, University of Colorado, Denver, Colorado, USA. October 7 2011

##### Eltzschig HK. The Hypoxia-Inflammation Link. Pulmonary Grand Rounds; Division of Pulmonary Medicine, Denver Health Medical Center, Denver, Colorado, USA. August 29 2012

##### Eltzschig HK. The Hypoxia-Inflammation Link. CCTCARE Transplantation Lecture), Department of Surgery, University of Colorado School of Medicine, Denver, Colorado, USA. April 17 2013

##### Eltzschig HK. Hypoxia Signaling during Acute Lung Injury. Translational Cardiovascular Biology Conference, Department of Pediatrics, University of Colorado School of Medicine, Denver, Colorado, USA. April18 2015

##### Eltzschig HK. The Hypoxia-Inflammation Link. Grand Rounds, Department of Anesthesiology, MD Anderson, University of Texas, Houston, Texas, USA. September 14 2016

##### Eltzschig HK. The Hypoxia-Inflammation Link. Research Seminar, Division of Pulmonary Medicine, MD Anderson, University of Texas, Houston, Texas, USA, October 4 2016

##### Eltzschig HK. The Hypoxia-Inflammation Link. Research Seminar, Pulmonary Center of Excellence, University of Texas Health Science Center, Houston, Texas, USA, October 6 2016

##### Eltzschig HK. MicroRNA Shuttling during Acute Lung Injury. Grand Rounds. Department of Anesthesiology, McGovern Medical School, University of Texas Health Science Center, Houston, Texas, USA, January 12 2017

##### Eltzschig HK. The Hypoxia-Inflammation Link. Research Seminar, Cullen Trust Symposium, University of Texas Graduate School of Biomedical Sciences at Houston, University of Texas Health Science Center at Houston and the University of Texas MD Anderson Cancer Center, Houston, Texas, USA, January 13 2017

##### Eltzschig HK. The Hypoxia-Inflammation Link. Research Seminar, Department of Immunology, Baylor College of Medicine, Houston, Texas, USA, February 17 2017

##### Eltzschig HK. Inflammation. Grand Rounds. Division of Gastro-Intestinal Diseases, Department of Medicine, McGovern Medical School, University of Texas Health Science Center, Houston, Texas, USA, March 2 2017

##### Eltzschig HK. The Hypoxia-Inflammation Link. Research Seminar, Center for Regenerative Medicine, Department of Orthopedics, McGovern Medical School, University of Texas Health Science Center, Houston, Texas, USA, March 2 2017

##### Eltzschig HK. The Hypoxia-Inflammation Link. Grand Rounds, Division of Hematology, Department of Medicine, McGovern Medical School, University of Texas Health Science Center, Houston, Texas, USA, March 6 2017

##### Eltzschig HK. Perioperative Organ Injury. Grand Rounds, Department of Anesthesiology, School of Medicine, University of Texas Medical Branch at Galveston, Galveston, Texas, USA, August 9 2017

##### Eltzschig HK. Perioperative Organ Injury. Keynote Address, MD/PhD program, UT Health Graduate School of Biomedical Sciences, University of Texas McGovern Medical School and MD Anderson Cancer Center, Houston, Texas, USA, August 18 2017

##### Eltzschig HK. HIF-a and cancer biology: is a complicated story; Guest Speaker; 5th Global Conference on Perioperative Care of the Cancer Patient, The University of Texas MD Anderson Cancer Center, Houston, Texas. November 30 2017

**Eltzschig HK.** Perioperative Organ Injury. Grand Round Presentation. Department of Cardiothoracic and Vascular Surgery, University of Texas Health Science Center at Houston, Houston, Texas, USA. May 4, 2018

**Eltzschig HK.** The Hypoxia-Inflammation Link; Guest Speaker; 3rd Annual Symposium on Aging Research, The University of Texas Health Science Center, Houston, Texas. June 19 2018

##### Eltzschig HK. Hypoxia Signaling during Myocardial Ischemia and Reperfusion Injury; Grand Rounds Presentation. Center for Advanced Heart Failure, The University of Texas Health Science Center, Houston, Texas. October 18 2018

##### Eltzschig HK. The Hypoxia-Inflammation Link; Michael E. DeBakey VAMC/CTRID Research Seminar Series. Center for Translational Research on Inflammatory Diseases (CTRID), Baylor College of Medicine, Houston, Texas. March 28, 2019

##### Eltzschig HK. Opening Adress; Research Retreat. Center for Perioperative Medicine (CPM), The University of Texas Health Science Center at Houston, Houston, Texas. May 3 2019

##### Eltzschig HK. Perioperative Organ Injury; MD/PhD Seminar, Graduate School of Biomedical Sciences, MD Anderson and The University of Texas Health Science Center at Houston, Houston, Texas. October 2 2019

##### Eltzschig HK.Novel Therapeutic Approaches for Acute Respiratory Distress Syndrome; Anesthesiology and Perioperative Excellence Series, Department of Anesthesiology, The University of Texas Health Science Center at Houston, Houston, Texas. October 3 2019

##### Eltzschig HK. Promoting a Culture of Responsible Conduct of Research; Responsible Conduct of Research Training Seminar, Department of Anesthesiology, The University of Texas Health Science Center at Houston, Houston, Texas. March 2 2020

##### Eltzschig HK. The hypoxia-adenosine link during intestinal inflammation; Weekly GI Research Webinar, Department of Medicine, Gastroenterology and Hepatology, TMC Digestive Diseases Center, Baylor College of Medicine, Houston, Texas November 12 2020

##### Eltzschig HK. The Hypoxia-Inflammation Link; Topics on Molecular Medicine, UTHealth/MD Anderson combined GSBS program, Houston, Texas. April 7 2021

##### Eltzschig HK. Journal Club on Hypoxia Signaling during Inflammation; Topics on Molecular Medicine, UTHealth/MD Anderson combined GSBS program, Houston, Texas. April 14 2021

##### Eltzschig HK. Targeting Hypoxia Signaling for ARDS Treatment; Research Symposium, Department of Anesthesiology, Touchstone Diabetes Center, UT Southwestern, Dallas, Texas. August 17 2021

**Eltzschig HK.** Hypoxia-Inducible Factors (HIFs) and Pharmacologic HIF Activators. Research Meeting on Targeting Hypoxia Signaling for Battlefield Injury; Visiting Professor, Institute of Surgical Research, U.S. Army Institute of Surgical Research, Fort Sam Houston, TX, USA. December 1 2021

**Eltzschig HK.** The Hypoxia-Adenosine Link during ARDS. Research Meeting on Targeting Hypoxia Signaling for Battlefield Injury; Visiting Professor, Institute of Surgical Research, U.S. Army Institute of Surgical Research, Fort Sam Houston, TX, USA. December 1 2021

**Eltzschig HK.** How to Become a Perioperative Physician Scientist; An Introduction for Resident Applicants; Department of Anesthesiology. The University of Texas Health Science Center, Houston, Texas. January 10 2022

**Eltzschig HK.** Scientific Misconduct Proceedings; Seminar Series Responsible Conduct of Research; Department of Anesthesiology. The University of Texas Health Science Center, Houston, Texas. February 24 2022

**Eltzschig HK.** How to Give a Scientific Resarch Talk; Department of Anesthesiology, Critical Care, and Pain Medicine. The University of Texas Health Science Center, Houston, Texas. October 26, 2022

**Eltzschig HK.** Making Surgery Safer; McGovern Medical School Advisory Board Meeting; The University of Texas Health Science Center, Houston, Texas. November 7, 2022

**Eltzschig HK.** How to Write a Scientific Manuscript and How to Give a Research Talk; Department of Anesthesiology, Critical Care, and Pain Medicine. The University of Texas Health Science Center, Houston, Texas. November 17, 2022

**Eltzschig HK.** Welcome and Research Presentation; An Introduction for Resident Scientist Applicants; Department of Anesthesiology, Critical Care, and Pain Medicine. The University of Texas Health Science Center, Houston, Texas. January 24, 2023

**Eltzschig HK.** Pharmacological Interventions and Inflammatory Processes in Disease; Medical Scientist Training Program Faculty Chalk Talk; Graduate School of Biomedical Sciences. The University of Texas Health Science Center, Houston, Texas. January 25, 2023

**Eltzschig HK.** Targeting Hypoxia-Signaling for ARDS Treatment; Critical Care Medicine Lecture Series; Department of Anesthesiology, Critical Care and Pain Medicine. The University of Texas Health Science Center, Houston, Texas. February 21, 2023

**Eltzschig HK.** Scientific Misconduct Proceedings; 2023 Training in the Responsible Conduct of Research; Department of Anesthesiology, Critical Care and Pain Medicine Research Ethics Committee. The University of Texas Health Science Center, Houston, Texas. March 2, 2023

**Eltzschig HK.** The Hypoxia Imflammation Link; Molecular Basis of Cell Signaling Series; The University of Texas Health Science Center, Houston, Texas. April 10, 2023

##### B.) National Contributions

**Eltzschig HK**. Coordinated Adenine Nucleotide Phosphohydrolysis and Nucleoside Signaling in Posthypoxic Endothelium*.* Oxygen and the Cell. Berlin, Germany, September 2003

**Eltzschig, HK.** Role of CD73 in Vascular Barrier Function during Hypoxia. Wissenschaftliche Arbeitstage der DGAI (German Society of Anesthesiology and Critical Care Medicine). February 2004

**Eltzschig, HK.** Coordinated adenine nucleotide phosphohydrolysis and nucleoside signaling in posthypoxic endothelium: role of ectonucleotidases and adenosine A2B receptors. Plenary Session. Critical Care Medicine Congress. Bremen, Germany, February 2004.

**Eltzschig, HK.** Endogenous adenosine produced during hypoxia attenuates neutrophil accumulation: coordination by extracellular nucleotide metabolism. Plenary Session. German Critical Care Medicine Congress (DIVI). Hamburg, December 2004.

**Eltzschig, HK.** Role of CD73 in Vascular Barrier Function during Hypoxia. Wissenschaftliche Arbeitstage der DGAI (German Society of Anesthesiology and Critical Car Medicine). February 2005

**Eltzschig, HK.** Nucleoside Transporters during Hypoxia. Plenary Session. German Anesthesia Congress (DAC). Munich, April 2005

**Eltzschig HK.** Role of Connexin 43 in Neutrophil-Dependent ATP Release. Visiting Professor. Department of Pathophysiology, University of Essen, May 2005.

**Eltzschig, HK.** Equilibrative Nucleoside Transporters (ENTs) in Vascular Leakage during Hypoxia. Plenary Session. Critical Care Medicine Congress. Bremen February 2006.

**Eltzschig, HK.** Role of CD73 and A2B Adenosine Receptor in Cardioprotection by Ischemic Preconditioning. Wissenschaftliche Arbeitstage der DGAI (German Society of Anesthesiology and Critical Care Medicine). February 2006

**Eltzschig, HK**. Extracellular Adenosine Generation and Signaling in Myocardial Ischemic Preconditioning. Plenary Session. German Anesthesia Congress (DAC). Leipzig, May 2006.

**Eltzschig, HK.** Adenosine in Ventilator Induced Lung Injury. Plenary Session. German Anesthesia Congress (DAC). May 2006.

**Eltzschig, HK.** Adenosine, an old Drug Newly Discovered. Visiting Professor. Department of Anesthesiology, Jena, July 2006

**Eltzschig, HK.** Extracellular Adenosine Generation in Acute Lung Injury. Plenary Session. German Critical Care Medicine Congress (DIVI). Hamburg, November 2006

**Eltzschig, HK.** Role of Connexin 43 in Neutrophil-Dependent ATP Release. Plenary Session. German Critical Care Medicine Congress (DIVI). Plenary Session, November 2006

**Eltzschig, HK.** Adenosine in Tissue Protection during Hypoxia. Visiting Professor. Department of Anesthesiology and Critical Care Medicine. Hamburg, April 2007.

**Eltzschig HK.** Adenosine in Cardioprotection by Ischemic Preconditioning. Visiting Professor. Department of Anesthesiology, Bochum. January 2007

**Eltzschig HK.** Adenosine an Old Drug Newly Discovered. Visiting Professor. Department of Microbiology, Giessen, May 2007

Eckle, T., **Eltzschig HK**. Role of CD39 in Cardioprotection from Ischemia and Reperfusion Injury. Wissenschaftliche Arbeitstage der DGAI (German Society of Anesthesiology and Critical Care Medicine). February 2007

**Eltzschig, HK.** Adenosine in Tissue Protection during Hypoxia. Visiting Professor. Department of Anesthesiology and Critical Care Medicine. Hamburg, April 2007.

**Eltzschig HK.** Alternative Mechanisms of Adenosine Receptor Activation. Visiting Professor. Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA, November 2008

**Eltzschig HK.** Alternative Mechanisms of Adenosine Receptor Activation. Visiting Professor. Department of Biochemistry and Medicine, Boston University, Boston, MA, USA, November 2008

**Eltzschig HK.** HIF-Dependent Repression of Nucleoside Transporter ENT2 Attenuates Mucosal Inflammation During Intestinal Hypoxia. Plenary Session, Research Symposium: Hypoxia, Ischemia, and Inflammation, Boston, MA, USA, November 2008

**Eltzschig HK.** Alternative Mechanisms of Adenosine Receptor Activation. Visiting Professor. Department of Biochemistry and Molecular Biology, University of Texas-Houston Medical School, Houston, USA, January 2009

##### Eltzschig HK. Extracellular Adenosine Production during Hepatic Ischemia. International Liver Transplantation Society Meeting, New York, USA. July 2009

##### Eltzschig HK. Alternative Mechanisms of Adenosine Receptor Activation. Visiting Professor. Oklahoma Research Foundation, Oklahoma, USA. May 2009

##### Eltzschig HK. Alternative Mechanisms of Adenosine Receptor Activation. Association of University Anesthesiologists Meeting, Galveston, Texas, USA. April 2009

##### Eltzschig HK. Alternative Mechanisms of Adenosine Receptor Activation. Visiting Professor. Columbia University, New York, USA. July 2009

##### Eltzschig HK. Hypoxia-Inducible Factor in Acute Lung Injury. Cell Biology Meeting, CSD, Vail, Colorado, USA. October 2009

##### Eltzschig HK. Kidney and Inflammation. Winchell Symposium – Modulation of Inflammatory Pathways to Protect against Multi-Organ Failure. Columbia University, New York, USA. February 2010.

##### Eltzschig HK. New Approaches for Prevention of Ischemic Reperfusion Injuries; Controversies in Transplantation; Breckenridge, CO, USA, February 15 2010

##### Eltzschig HK. Novel Adenosine-mediated Signaling Pathways during Inflammation; Experimental Biology Meeting; Anaheim, CAUSA, April 27 2010

**Eltzschig HK.** The Hypoxia-Inflammation Link; Visiting Professor; University of Pittsburgh Medical Center, Pittsburgh, PA, USA, May 19 2010

**Eltzschig HK.** Circadian Rhythm Proteins in Cardio-Protection from Ischemia; American Society of Anesthesiologists Annual Meeting, San Diego, California, October 18 2010

**Eltzschig HK.** The Hypoxia-Inflammation Link; Grand Rounds; National Jewish Health; Denver, CO, USA, November 3 2010

**Eltzschig HK.** Role of Adenosine and Hypoxia-Inducible Factor in Restoring the Alveolar Capillary Barrier during Acute Lung Injury; Annual Thoracic Society Meeting, Denver, Colorado, May 15 2011

**Eltzschig HK.** The Hypoxia-Inflammation Link; Keynote Speaker; Simon Gelman Symposium; Harvard Medical School, Boston, MA, May 25 2011

**Eltzschig HK.** Oxygen-Sensing Prolylhydroxylases during Acute Kidney Injury; Visiting Professor; Intensive Care Grand Rounds, Columbia University, New York, USA, June 16 2011

**Eltzschig HK.** The Hypoxia-Inflammation Link; Visiting Professor; Research Grand Rounds, Columbia University, New York, USA, June 16 2011

**Eltzschig HK.** The Hypoxia-Inflammation Link; Visiting Professor; Colorado State University; Fort Collins, CO, August 26 2011

**Eltzschig HK.** The Role of Adenosine Signaling in Ischemia and Reperfusion Injury; Nature Medicine Research Symposium: Frontiers of Clinical Investigation – From Bench to Bedside; San Diego, USA. October 15 2011

**Eltzschig HK.** The Hypoxia-Inflammation Link; Fresenius Research Symposium, Orlando, USA, November 21 2011

**Eltzschig HK.** The Hypoxia-Inflammation Link; Visiting Professor; Grand Rounds, Department of Medicine, New York University; Department of Medicine, New York, USA, January 7 2012

**Eltzschig HK.** Adenosine during Ischemia and Reperfusion Injury; Visiting Professor; Research Grand Rounds, New York University; Department of Medicine, New York, USA, January 7 2012

**Eltzschig HK.** Adenosine during Renal Ischemia and Reperfusion Injury; Visiting Professor; Grand Rounds, Division of Renal Medicine, Department of Medicine, Boston University, Boston, USA, January 8 2012

**Eltzschig HK.** The Hypoxia-Inflammation Link; Visiting Professor; Research Seminar, Vascular Medicine Institute, University of Pittsburgh, USA, March 27 2012

**Eltzschig HK.** Perioperative Acute Kidney Injury – A Search for Novel Treatment Modalities, Visiting Professor; Research Seminar, Department of Anesthesiology, University of Pittsburgh, USA, March 27 2012

**Eltzschig HK.** The Hypoxia-Inflammation Link; Visiting Professor; Research Seminar, Department of Anesthesiology, Washington University, St. Louis, USA, June 5 2012

**Eltzschig HK.** Ischemia and Reperfusion: From Mechanism to Translation; Grand Rounds, Department of Anesthesiology, Washington University, St. Louis, USA, June 5 2012

##### Eltzschig HK. Acute Kidney Injury: from Mechanism to Therapy; Department of Biochemistry and Molecular Biology; University of Texas Medical School at Texas; Houston, TX, USA. August 13 2012

##### Eltzschig HK. The Hypoxia-Inflammation-Link; ISIS Pharmaceuticals, Inc. Carlsbad, CA, USA. August 23 2012

**Eltzschig HK.** Grand Rounds: Acute Kidney Injury: from Mechanism to Translation; Department of Anesthesiology at Baylor College of Medicine; Houston, TX, USA. January 16 2013

##### Eltzschig HK. The Hypoxia-Inflammation-Link; University of Medicine & Dentistry of New Jersey. Newark, NJ, USA. January 30, 2013

##### Eltzschig HK. The Hypoxia-Inflammation-Link; Grand Rounds, Division of Gastroenterology, Beth Israel Deaconess Hospital, Harvard Medical School, Boston, MA, USA. April 10, 2013

##### Eltzschig HK. The Hypoxia-Inflammation-Link; Visiting Professor, North Eastern University, Boston, MA, USA. April 12 2013

##### Eltzschig HK. The Hypoxia-Inflammation-Link; John Hedley-Whyte Lecture, Harvard Medical School, Beth Israel Deaconess Hospital, Boston, MA, USA. September 29 2015.

##### Eltzschig HK. The Hypoxia-Inflammation-Link; Visiting Professor, Department of Immunology, UCLA, Los Angeles, CA, USA. October 13 2015

##### Eltzschig HK. Perioperative Organ Injury. Grand Rounds. Visiting Professor, Department of Anesthesiology, UCLA, Los Angeles, CA, USA. January 6 2016

##### Eltzschig HK. The Hypoxia-Inflammation Link. Research Seminar. Visiting Professor, Department of Anesthesiology, UCLA, Los Angeles, CA, USA. January 6 2016

##### Eltzschig HK. Perioperative Organ Injury. Grand Round Presentation. Visiting Professor, Department of Anesthesiology, UPMC, Pittsburgh, PA, USA. January 21 2016

##### Eltzschig HK. Perioperative Organ Injury. Grand Round Presentation. Visiting Professor, Department of Anesthesiology, UT Health, Houston, USA. April 21 2016

**Eltzschig HK.** Perioperative Organ Injury. Grand Round Presentation. Visiting Professor, Department of Anesthesiology, University of Miami, USA. January 16 2017

**Eltzschig HK.** The Hypoxia – Inflammation Link. Vail Scientific Summit. Keynote Speaker, Steadman Philippon Research Institute, Vail, CO, USA. August 24 2017

**Eltzschig HK.** Perioperative Organ Injury. Grand Round Presentation. Visiting Professor, Department of Anesthesiology, Columbia University, New York, NY, USA. October 26 2017

**Eltzschig HK.** The Hypoxia – Inflammation Link. Research Seminar. Visiting Professor, Department of Anesthesiology, Columbia University, New York, NY, USA. October 26 2017

**Eltzschig HK.** The Hypoxia – Inflammation Link. Outside Speaker Seminar Series. Visiting Professor, Department of Microbiology and Immunology, University of Miami Miller School of Medicine, Miami, FL, USA. March 22 2018

**Eltzschig HK.** Perioperative Organ Injury. Grand Rounds. Visiting Professor, Department of Anesthesiology, University of California San Diego, San Diego, CA, USA. August 8 2018

**Eltzschig HK.** Perioperative Organ Injury. Grand Rounds. Visiting Professor, Department of Anesthesiology, David Geffen School of Medicine, University of California Los Angeles, Los Angeles, CA, USA. August 22 2018

**Eltzschig HK.** Research in Anesthesiology & Perioperative Medicine in 2018: Challenges and Opportunities. Presenter, Texas Society of Anesthesiologists Annual Meeting, Lost Pines, TX, USA. September 9 2018

**Eltzschig HK.** The Hypoxia-Inflammation Link, Guest Speaker, Research Lecture Series, Visiting Professor, University of California – San Francisco, San Francisco, CA USA. January 15 2019

**Eltzschig HK.** Perioperative Organ Injury, Grand Rounds, Visiting Professor, Department of Anesthesiology, University of California – San Francisco, San Francisco, CA USA. January 16 2019

**Eltzschig HK.** Perioperative Organ Injury, Research Seminar, Visiting Professor, Department of Medicine, NYU School of Medicine, New York, NY USA. February 8 2019

**Eltzschig HK.** Perioperative Organ Injury, Clinical Conference, Visiting Professor, Department of Anesthesiology, Brigham and Women’s Hospital, Boston, Harvard Medical School, MA USA. February 27 2019

**Eltzschig HK.** Academic Anesthesiology: A Journey from Good to Great, Grand Rounds, Visiting Professor, Department of Anesthesiology, Brigham and Women’s Hospital, Harvard Medical School, Boston, MA USA. February 27 2019

**Eltzschig HK.** The Hypoxia-Inflammation Link, Research Seminar, Visiting Professor, Department of Anesthesiology and Critical Care Medicine, UNM Hospital, University of New Mexico School of Medicine, Albuquerque, NM, USA. August 15 2019

**Eltzschig HK.** Perioperative Organ Injury, Grand Rounds, Visiting Professor, Department of Anesthesiology and Critical Care Medicine, University of New Mexico School of Medicine, Albuquerque, NM USA. August 16 2019

**Eltzschig HK.** HIF1A-dependent induction of miR-122 dampens hepatic IRI, Liver Ischemia-Reperfusion Injury: From Bench to Bedside Symposium, Invited Speaker, Department of Surgery, University of California Los Angeles, Los Angeles, CA USA. August 29 2019

**Eltzschig HK.** MicroRNA Shuttling During Acute Respiratory Distress Syndrome, Featured Session: Perioperative Lung Dysfunction: New Understanding, New Approaches, Speaker, 2019 ASA Annual Meeting, Orlando, FL USA. October 20 2019

**Eltzschig HK.** Perioperative Organ Injury, Grand Rounds Speaker, Department of Surgery, Loyola University Health System, Chicago, IL USA. May 12 2021

**Eltzschig HK.** Targeting Hypoxia Signaling for ARDS Treatment, Grand Rounds Speaker, Department of Anesthesiology and Critical Care Medicine, Memorial Sloan Kettering Cancer Center, New York City, NY USA. May 24 2021

**Eltzschig HK.** Hypoxia Signaling during ARDS, Visiting Professor, Department of Anesthesiology and Perioperative Medicine, David Geffen School of Medicine, University of California Los Angeles, Los Angeles, CA, USA. December 7 2021

**Eltzschig HK.** Hypoxia-Inducible Factors in Liver Protection from Ischemia and Reperfusion Injury, Visiting Professor, Department of Surgery, University of California Los Angeles, Los Angeles, CA, USA. December 8 2021

**Eltzschig HK.** Targeting Hypoxia Signaling for ARDS Treatment, Grand Rounds, Department of Anesthesiology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA. March 23 2022

**Eltzschig HK.** Hypoxia Inducible Factor – A New Therapeutic Target, Medical Science and Technology Innovation Events, The University of Texas System, U.S. Army Futures Command, and U.S. Army Medical Research and Development Command, Army Futures Command Headquarters, Austin, TX, USA. April 18 2022

**Eltzschig HK.** Targeting Hypoxia Signaling for ARDS Treatment, Keynote Speaker, Louisiana Lung Conference, Center for Lung Biology and Disease, Louisiana State University, Baton Rouge, LA, USA. September 2 2022

**Eltzschig HK.** Vadadustat for the Prevention of Acute Respiratory Distress Syndrome (ARDS) in 450 Hospitalized Patients with Coronavirus Disease 2019 (COVID-19), Military Health System Research Symposium, Department of Defense, Kissimmee, FL, USA. September 12 2022

**Eltzschig HK.** Hypoxia-Signaling during Myocardial Ischemia and Reperfusion Injury, Visiting Professor, Department of Cardiology, Mount Sinai Morningside Hospital, Morningside, NY, USA. November 2, 2022

**Eltzschig HK.** Targeting Hypoxia Signaling for Perioperative Organ Injury, Visiting Professor, 17th Annual Apgar Scholars Day, Department of Anesthesiology, Columbia University, New York, NY, USA. November 3, 2022

**C.) International Contributions**

**Eltzschig HK**. Into Thin Air: Vascular Consequences of Hypoxia. Visiting Professor. Department of Anesthesiology, University of Tübingen, Germany, March 2003.

**Eltzschig HK**. Endogenous Adenosine Liberated during Hypoxia Attenuates Neutrophil Accumulation: Coordination by Extracellular Nucleotide Metabolism.. Center for Experimental Therapeutics and Reperfusion Ischemia, Brigham and Women’s Hospital, Harvard Medical School, Boston, USA, November 2003.

**Eltzschig HK**. Regulation of Equilibrative Nucleoside Transporters (ENTs) by Hypoxia. Visiting Professor. Center for Experimental Therapeutics and Reperfusion Ischemia, Brigham and Women’s Hospital, Harvard Medical School, Boston, USA, April 2004.

**Eltzschig HK**. Regulation of Equilibrative Nucleoside Transporters (ENTs) by Hypoxia. Visiting Professor. Center for Experimental Therapeutics and Reperfusion Ischemia, Brigham and Women’s Hospital, Harvard Medical School, Boston, USA, April 2004.

**Eltzschig HK**. Intracellular Adenosine Metabolism during Hypoxia. Center for Experimental Therapeutics and Reperfusion Ischemia, Brigham and Women’s Hospital, Harvard Medical School, Boston, USA, June 2004.

**Eltzschig HK**. Critical Role for the ecto-5’-nucleotidase (CD73) in vascular permeability during hypoxia. Purine Meeting, North-Carolina, USA June 2004.

**Eltzschig HK**. Endogenous Adenosine Liberated during Hypoxia Attenuates Neutrophil Accumulation: Coordination by Extracellular Nucleotide Metabolism. Purine Meeting, North-Carolina, USA, June 2004.

**Eltzschig HK.** Coordinated Induction of Adenosine Deaminase and CD26 during Hypoxia. Center for Ischemia and Reperfusion Injury, Harvard Medical School, Boston, MA, USA, November 2004

**Eltzschig HK.** CD73 and A2B Adenosine Receptors in Ischemic Preconditioning. Center for Ischemia and Reperfusion Injury, Harvard Medical School, Boston, MA, USA, March 2005

**Eltzschig HK.** Nucleoside Transporters during Hypoxia. Plenary Session. International Purine Meeting, Prague, June 2005

**Eltzschig HK.** Extracellular Adenosine in Tissue Protection. Visiting Professor. Center for Ischemia and Reperfusion Injury, Harvard Medical School, Boston, MA, USA, January 2006

**Eltzschig HK.** Extracellular Adenosine Generation during Myocardial Ischemic Preconditioning. Plenary Speaker. Keystone Meeting. Breckenridge, CO, USA, January 2006.

**Eltzschig HK.** Extracellular Adenosine Generation in Acute Lung Injury. Plenary Session. Purine Meeting, Ferrara, Italy, May 2006

**Eltzschig, HK.** Adenosine in Vascular Permeability during Hypoxia. Visiting Professor. Department of Anesthesiology, Sofia, Bulgaria, June 2006.

**Eltzschig HK.** Adenosine - an Old Drug Newly Discovered. Visiting Professor. Research Seminar, Department of Anesthesiology and Perioperative Medicine. Denver, CO, USA, September 2006

**Eltzschig HK**. Extracellular Adenosine Generation and Signaling in Myocardial Ischemic Preconditioning. Research Seminar, Department of Anesthesiology, University of Colorado Health Science Center, Denver, CO, USA, February 2007

**Eltzschig HK**. Extracellular Adenosine Signaling and Generation in Cardioprotection. 7th World Congress on Trauma, Shock, Sepsis, Inflammation. Plenary Session. March 2007, Munich, Germany.

**Eltzschig HK**. Role of Adenosine Deaminase and CD26 during Hypoxia. 7th World Congress on Trauma, Shock, Sepsis, Inflammation. Plenary Session. March 2007, Munich, Germany.

**Eltzschig HK.** Extracellular Adenosine Signaling during Ventilator Induced Lung injury. Plenary Session. Purine Meeting, Copenhagen, Denmark, June 2008.

**Eltzschig HK.** Adenosine production and signaling in cardioprotection from ischemia. Plenary Session. Purine Meeting, Copenhagen, Denmark, June 2008.

**Eltzschig HK.** Extracellular adenosine generation and signaling in cardiovascular and renal injury. Plenary Session. Scandinavian Physiological Society Annual Meeting, Oulu, Finland, August 2008.

##### Eltzschig HK. P1 and P2 Receptor Signaling during Inflammation. University of Tübingen, Germany. August 2009

##### Eltzschig HK. [Extracellular Adenosine Production by Ecto-5'-Nucleotidase Protects during Hepatic Ischemic Preconditioning](http://www.ncbi.nlm.nih.gov/pubmed/18804111?ordinalpos=2&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum). The Liver Intensive Care Group of Europe Meeting, Vienna, Austria. June 2009

##### Eltzschig HK. Adenosine-Dependent Stabilization of the Circadian Rhythm Protein Per2 in Myocardial Ischemia. Keynote Presentation; Purine Meeting 2010; Tarragona, Spain, May 31 2010

##### Eltzschig HK. Mechanisms of Research Funding – a Comparison between Germany and USA. Annual Meeting of the German Association of Anesthesiologists (DAC), Nürnberg, Germany, June 20 2010

##### Eltzschig HK. The Hypoxia-Inflammation Link; Visiting Professor; University of Frankfurt, Frankfurt, Germany, August 30 2010

##### Eltzschig HK. The Hypoxia-Inflammation Link; Visiting Professor; Charite University, Berlin, Germany, March 31 2011

##### Eltzschig HK. The Hypoxia-Inflammation Link; International Anesthesia Research Society Meeting; Vancouver, Canada, May 24 2011

##### Eltzschig HK. The Hypoxia-Inflammation Link; Visiting Professor; Conway Institute, Dublin University, Dublin, Ireland, July 27 2011

##### Eltzschig HK. The Hypoxia-Inflammation Link; Visiting Professor; Ludwig Maximilians University, Munich, Germany, September 14 2011

##### Eltzschig HK. The Hypoxia-Inflammation Link; Visiting Professor; University of Hamburg, Hamburg, Germany, September 16 2011

##### Eltzschig HK. Oxygen-Sensing Prolylhydroxylases during Acute Kidney Injury; Visiting Professor; University of Korea, Seoul, Korea, November 3 2011

##### Eltzschig HK. The Hypoxia-Inflammation Link; Keynote Speaker; Annual Meeting of the Korean Society of Anesthesiologists, Seoul, Korea, November 3 2011

##### Eltzschig HK. Good to Great; Keynote Speaker; Research Symposium, University of Tübingen, Germany, December 12 2011

##### Eltzschig HK. The Hypoxia-Inflammation Link; Visiting Professor; University of Turku, Finland, December 12 2011

##### Eltzschig HK. Purinergic Signaling in Vascular Integrity; Intensive Care Society Meeting, London, United Kingdom. December 14 2011

##### Eltzschig HK. The Role of Adenosine Signaling in Ischemia and Reperfusion Injury; Future of Critical Care Medicine Meeting, Cebu, Philippines. January 14 2012

##### Eltzschig HK. Hypoxia Responses in Acute Ischemia-Reperfusion Injury. Advances in Hypoxic Signaling – From Bench to Bedside; Keystone Meeting; Banff, Canada February 15 2012.

##### Eltzschig HK. Ischemia and Reperfusion of the Heart and the Liver: From Mechanism to Novel Targets. Department of Anesthesiology Grand Rounds; Regensburg University; Regensburg Germany, September 25 2012.

##### Eltzschig HK. My Dream Therapy – Adenosine for Ischemia and Reperfusion. 33rd International Symposium of Intensive Care and Emergency Medicine, Brussels, Belgium, March 20 2013.

##### Eltzschig HK. The Hypoxia-Inflammation Link. 33rd International Symposium of Intensive Care and Emergency Medicine, Brussels, Belgium, March 20 2013.

##### Eltzschig HK. Role of Adenosine – Microcirculatory Changes. 33rd International Symposium of Intensive Care and Emergency Medicine, Brussels, Belgium, March 20 2013.

##### Eltzschig HK. The Hypoxia-Inflammation Link. Department of Anesthesiology Grand Rounds; Ludwig Maximilian University; Munich, Germany, May 17 2013

##### Eltzschig HK. The Hypoxia-Inflammation Link. Institute of Pharmacology and Toxicology; University of Bonn, Bonn, Germany, September 11 2015.

##### Eltzschig HK. The Hypoxia-Inflammation Link. Deutsches Herzzentrum München; Technische Universität München, Germany, September 15 2015.

##### Eltzschig HK. The Hypoxia-Inflammation Link. China Capital University, Beijing, China, November 13 2015.

##### Eltzschig HK. The Hypoxia-Inflammation Link. Tianjin Nankai Hospital and Tianjin Medical University. Innate Immunity Dynamics in Infection and Inflammation Conference, Inflammation Research Association. Tianjin, China, November 14 2015.

##### Eltzschig HK. Perioperative Organ Injury. Technische Universität München, Germany, December 15 2015.

##### Eltzschig HK. The Hypoxia-Inflammation Link; Visiting Professor; Department of Anesthesiology, Charite University, Berlin, Germany, July 7 2016

##### Eltzschig HK. Hypoxia-Signaling during Acute Lung Injury; Visiting Professor; Department of Anesthesiology, University of Dresden, Dresden, Germany, July 11 2016

##### Eltzschig HK. The Hypoxia-Inflammation Link; Visiting Professor; Institute of Immunology, Tsinghua University, Beijing, China, November 15 2016

##### Eltzschig HK. The Hypoxia-Inflammation Link; Visiting Professor; Capital Medical School, Beijing, China, November 16 2016

##### Eltzschig HK. The Hypoxia-Inflammation Link; Visiting Professor; State Key Laboratory of Stem Cell and Reproductive Biology, Institute of Zoology, Chinese Academy of Sciences, Beijing, China, November 18 2016

##### Eltzschig HK. MicroRNA Shuttling during ARDS; International Inflammation Research Meeting; Tianjin University, Tianjin, China, November 19 2016

##### Eltzschig HK. Perioperative Organ Injury; Visiting Professor; Department of Anesthesiology; Tianjin University, Tianjin, China, November 20 2016

##### Eltzschig HK. Hypoxia-Signaling during Myocardial Ischemia and Reperfusion Injury; International Hypoxia Meeting, Banff, Canada, February 8 2017

##### Eltzschig HK. Minor Increases in Creatinine Matter; International Symposium on Intensive Care and Emergency Medicine, Brussels, Belgium, March 22 2017

##### Eltzschig HK. Hypoxia Signaling during Acute Lung Injury; International Symposium on Intensive Care and Emergency Medicine, Brussels, Belgium, March 24 2017

##### Eltzschig HK. The Hypoxia-Inflammation Link; Visiting Professor; Department of Anesthesiology, University Hospital of Münster, Münster, Germany, March 27 2017

##### Eltzschig HK. Perioperative Organ Injury; Visiting Professor; Department of Anesthesiology, University Hospital of Aachen, Aachen, Germany, March 29 2017

##### Eltzschig HK. The Hypoxia-Inflammation Link; Visiting Professor; Asan Medical Center, Seoul, Korea, April 25 2017

##### Eltzschig HK. Perioperative Organ Injury; Visiting Professor; Department of Anesthesiology of Beijing Tiantan Hospital, Capital Medical University, Beijing, China, September 5 2017

##### Eltzschig HK. Novel Therapeutic Concepts for Acute Lung Injury; Visiting Professor; Tianjin Medical University, Tianjin, China, September 6 2017

##### Eltzschig HK. The Hypoxia-Inflammation Link; Keynote Speaker; Annual Meeting of Chinese Society of Anesthesiology, Zhengzhou, China, September 8 2017

##### Eltzschig HK. MicroRNA shuttling during Acute Lung Injury; Keynote Speaker; Society for Leukocyte Biology 50th Annual Meeting, Vancouver, CA. October 7 2017

##### Eltzschig HK. Perioperative Organ Injury; Visiting Professorship; Department of Pharmacology and Toxicology, University of Bonn, Bonn, Germany. November 24 2017

##### Eltzschig HK. The Hypoxia-Inflammation Link; Visiting Professorship; School of Basic Medical Science, Beijing Tian Tan Hospital, Capital Medical University, Beijing, China. February 23 2018

##### Eltzschig HK. The Hypoxia-Inflammation Link; Visiting Guest Speaker; General Hospital of the People’s Liberation Army; Medical School of Chinese PLA, Beijing, China. February 24 2018

**Eltzschig HK.** Perioperative Organ Injury; Visiting Professorship; Department of Anesthesiology, Xijing Hospital, The Fourth Military Medical University, Xi’an, China. February 26 2018

**Eltzschig HK.** ERAS and Perioperative Organ Protection; Key Note Speaker; Department of Anesthesiology, Beijing Tian Tan Hospital, Capital Medical University, Beijing, China. May 20 2018

**Eltzschig HK.** Hypoxia-Signaling during Myocardial Ischemia and Reperfusion Injury; Visiting Professorship; Department of Anesthesiology, Beijing Tian Tan Hospital, Capital Medical University, Beijing, China. May 21 2018

**Eltzschig HK.** Hypoxia-Signaling during Myocardial Ischemia and Reperfusion Injury; Visiting Professorship; Department of Anesthesiology, Tsinghua University, Beijing, China. May 21 2018

**Eltzschig HK.** Hypoxia-Inflammation Link; Visiting Professorship; Department of Anesthesiology, University of Shandong, Jinan, China. May 22 2018

**Eltzschig HK.** Perioperative Organ Injury and Protection. Where we are now and where we are heading?; Visiting Professorship; The First Affiliated Hospital, Zhejiang University, Hangzhou, China. May 26 2018

**Eltzschig HK.** Perioperative Organ Protection – Bench to Bedside; Key Note Speaker; Zhongshan International Symposium, Zhongshan Hospital, Fudan University Shanghai, China. May 27 2018

**Eltzschig HK.** Perioperative Organ Injury; Visiting Professor; Center for Anesthesia, Beijing Anzhen Hospital, Capital Medical University, Beijing, China November 1 2018

**Eltzschig HK.** Hypoxia Signaling During Myocardial Ischemia and Reperfusion Injury; Guest Speaker; Cardiovascular Center, Beijing, China November 2 2018

**Eltzschig HK.** Novel Therapeutic Approaches to Prevent or Treat Acute Lung Injury; Invited Speaker; 26th Annual Meeting of Chinese Society of Anesthesiology, Beijing, China November 3 2018

**Eltzschig HK.** A Celebration of 50 Years - Department of Anesthesiology; Keynote Speaker: From Good to Great. Eberhard-Karls- University of Tubingen; Tubingen, Germany, November 17 2018

**Eltzschig HK.** Perioperative Organ Injury, Visiting Professor, Department of Pharmacology and Toxicology, University of Ulm Medical Center; Ulm, Germany, November 19, 2018

**Eltzschig HK.** Novel Therapeutic Concepts for Acute Respiratory Distress Syndrom, Panel Organizer and Speaker, Organ Protection During the Perioperative Period Presentation, IARS Annual Meeting 2019; Montreal, Quebec, Canada May 20 2019

**Eltzschig HK.** Novel Therapeutic Approaches for Acute Lung Injury, Visiting Professor, Research Seminar,Charite Clinic Berlin; Berlin University, Germany September 17 2019

**Eltzschig HK.** Inflammation - Novel Approaches to Treat Acute Lung Injury in Surgical Patients, Honored Guest Speaker, 21st DGAI Congress of Anaesthesiology and Intensive Care Therapy; Berlin, Germany September 19 2019

**Eltzschig HK.** Novel Therapeutic Approaches for Acute Lung Injury, Keynote Speaker, Interdisciplinary Critical Care Forum; Berlin, Germany January 15 2020

**Eltzschig HK.** Novel Therapeutic Approaches for Acute Lung Injury, Visiting Professor, Department of Pharmacology, University of Bonn; Bonn, Germany February 17 2020

**Eltzschig HK.** Perioperative Organ Injury, Guest Speaker, 2020 Fumin International Anesthesia and Perioperative Medicine Symposium; Shanghai, China September 26 2020

**Eltzschig HK.** Perioperative Organ Injury, Guest Speaker, 9th Oriental Congress of Anesthesiology and Perioperative Medicine & 8th Conference of Perioperative Care of the Cancer Patient; Shanghai, China October 17, 2020

**Eltzschig HK.** Perioperative Organ Injury, Guest Speaker, Perioperative Organ Protection Symposium; Taipei Medical University; Taipei, Taiwan December 19, 2020

**Eltzschig HK.** Targeting Hypoxia Signaling for ARDS Treatment, Guest Speaker, 1st Symposium “Imflammation and Imaging”; University of Münster; Münster, Germany November 3, 2021

**Eltzschig HK.** Targeting Hypoxia Signaling for ARDS Treatment, Guest Speaker, 22nd International Hypoxia Symposium; Alberta, Canada February 11, 2023

**Clinical Presentations**

**Eltzschig HK.** Regional Anesthesia during Ophthalmic Surgery. Abteilungsfortbildung für Augenärzte. Augenklinik, Universitätsklinikum Tübingen, Germany, May 1997

**Eltzschig HK.** Thoracic Anesthesia. Fortbildung der Klinik für Anaesthesiologie und Transfusionsmedizin. Klinik für Anaesthesiologie und Transfusionsmedizin, Universitätsklinikum Tübingen, Germany, September 1997

**Eltzschig HK.** Remifentanil in Ophtalmic Anesthesia. Abteilungsfortbildung für Augenärzte. Augenklinik, Universitätsklinikum Tübingen, Germany, March 1998

**Eltzschig HK.** Remifentanil for Ophthalmic Anesthesia. Remifentanil Symposium, Tübingen, Germany, April 1998.

**Eltzschig HK.** Fluid Resuscitation in Cardiac Surgery. Intravenous use of Colloids: Hydroxyethyl Starch or Human Albumin? Department of Surgery, Brigham and Women’s Hospital, Harvard Medical School, Boston, USA, May 1999.

**Eltzschig HK.** Updates in Obstetric Anesthesia: Peripartum Hemorrhage. Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women’s Hospital, Harvard Medical School Boston, USA, April 2000.

**Eltzschig HK.** Anesthetic Management of Patients with Increased Intracranial Pressure. Updates in Neuroanesthesia. Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women’s Hospital, Harvard Medical School Boston, May 2000.

**Eltzschig HK.** Management of High Risk Obstetric Patients: Obstetric Anesthesia and Cardiac Disease. Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women’s Hospital, Harvard Medical School Boston, USA, September 2000.

**Eltzschig HK.** Updates in Regional Anesthesia: Brachial Plexus Anesthesia. Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women’s Hospital, Harvard Medical School Boston, October 2000.

**Eltzschig HK.** Anesthesia for Patient’s with Subarachnoid Hemorrhage. Updates in Neuroanesthesia. Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women’s Hospital, Harvard Medical School Boston, USA, January 2001.

**Eltzschig HK.** Perioperative Use of Transesophageal Echocardiography. Fortbildung der Klinik für Anaesthesiologie und Transfusionsmedizin. Klinik für Anaesthesiologie und Transfusionsmedizin, Universitätsklinikum Tübingen, Germany, October 2001.

**Eltzschig HK**. The use of readily available equipment in a simple method for intraoperative monitoring of recurrent laryngeal nerve function during thyroid surgery. New England Surgical Congress Meeting, November 2001.

**Eltzschig HK.** Controversies in Obstetric Anesthesia. Effect of Epidural Analgesia on Progress and Outcome of Labor. Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women’s Hospital, Harvard Medical School Boston, USA, February 2002.

**Eltzschig HK.** Influence of Epidural Analgesia on the Cesarean Section Rate. Klinik für Anaesthesiologie und Transfusionsmedizin, Universitätsklinikum Tübingen, Germany, October 2002.

**Eltzschig HK.** Epicardial Echocardiography during Cardiac Surgery. Luzern Hospital, Luzern, Swiss, November 2003.

**Eltzschig HK.** Laryngeal Nerve Monitoring during Thyroid Surgery. Department of Anesthesiology and Intensive Care Medicine. Tübingen University Hospital, Germany, November 2004.

**Eltzschig HK.** Transesophageal Echocardiography for Evaluation of Valvular Function. Department of Anesthesiology and Intensive Care Medicine. Tübingen University Hospital, Germany, March 2005.

**Eltzschig HK.** Perioperative Pulmonary Embolism. Department of Anesthesiology and Intensive Care Medicine. Tübingen University Hospital, Germany, December 2005.

 **Eltzschig HK.** Anesthetic Management of Pulmonary Embolectomy. Department of Anesthesiology and Intensive Care Medicine. Tübingen University Hospital, Germany, February 2006.

**Eltzschig HK.** Usefulness of Intraoperative Echocardiography to Detect Pulmonary Emboli. Department of Anesthesiology and Intensive Care Medicine. Tübingen University Hospital, Germany, June 2006.

**Eltzschig HK.** Preoperative evaluation and perioperative management of patients with increased cardiovascular risk. Department of Anesthesiology and Intensive Care Medicine. Tübingen University Hospital, Germany, November 2006.

**Eltzschig HK.** Perioperative echocardiography: Basic principles. Research Seminar, Department of Anesthesiology and Intensive Care Medicine. Tübingen University Hospital. June 2007.

**Eltzschig HK.** Intraoperative Echocardiography - Influence on Surgical Decision Making. Visiting Professor. Department of Anesthesiology. Frankfurt, March 2007.

**Eltzschig HK.** Transesophageal Echocardiography: Influence on Surgical Decision Making. Department of Anesthesiology and Intensive Care Medicine. Tübingen University Hospital, Germany, June 2007.

**Eltzschig HK.** Influence of Epiaortic Scanning on Surgical Decision Making. Department of Anesthesiology and Intensive Care Medicine. Tübingen University Hospital, Germany. June 2007.

**Eltzschig HK.** How to give a research presentation. Department of Anesthesiology, University of Colorado, October 2007

**Eltzschig HK.** How to prepare a research manuscript. Department of Anesthesiology, University of Colorado, December 2007

**Eltzschig HK.** How to give a research presentation. Department of Anesthesiology, University of Colorado, September 2008

**Eltzschig HK.** How to prepare a research manuscript. Department of Anesthesiology, University of Colorado, March 2009

**Eltzschig HK.** Crystalloids versus Colloids. Department of Anesthesiology, University of Colorado, August 17 2010

**Eltzschig HK.** Anesthesia for the Morbidly Obese Patient. Colorado Review of Anesthesiology for Surgicenters and Hospitals (CRASH), Vail, Colorado, March 2 2011

**Eltzschig HK.** Why Some Mentors Make the Leap and Others Don’t. University of Colorado, March 17 2011

**Eltzschig HK.** Crystalloids versus Colloids. Department of Anesthesiology, University of Colorado, July 20 2012

**Eltzschig HK.** Crystalloids versus Colloids. Department of Anesthesiology, University of Colorado, July 17 2013

**Eltzschig HK.** Crystalloids versus Colloids. Department of Anesthesiology, University of Colorado, July 22 2015

**Eltzschig HK.** Muscle Relaxants – A Clinical Update. Department of Anesthesiology, University of Colorado School of Medicine, December 9 2015

**Eltzschig HK.** Thyroid Gland: Anatomy, Physiology and Implications for Anesthesia, Department of Anesthesiology, McGovern Medical School, University of Texas Health Science Center, Houston, Texas, USA, August 16 2017

**Eltzschig HK**. Department of Anesthesiology – Annual Presentation, Dean’s Departmental Presentation Series. Department of Anesthesiology, UT Health, McGovern Medical School, Houston, TX, USA. March 19 2018

**Eltzschig HK**. Department of Anesthesiology – Faculty Retreat Presentation, 2018 Annual Retreat. Department of Anesthesiology, UT Health, McGovern Medical School, Houston, TX, USA. September 22 2018

**Eltzschig HK**. Thyroid Gland: Anatomy, Physiology and Implications for Anesthesia, Guest Lecturer, Master of Science in Anesthesia program, Case Western Reserve University – Houston, Houston, TX, USA. February 10 2020

**Eltzschig HK**. Achieving Diversity and Inclusion in Anesthesiology Departments: Whose Responsibility Is It?, Moderator, ANESTHESIOLOGY 2020 Annual Meeting, Virtual Conference, USA October 4 2020

**Eltzschig HK.** Scientific Misconduct Proceedings, Annual Responsible Conduct in Research Annual Training, Speaker, Department of Anesthesiology, McGovern Medical School, UT Health, Houston, TX USA November 18 2020

##### Eltzschig HK. Impact of Epidural Analgesia on the Mode of Delivery; Grand Rounds Presentation. Anesthesiology Perioperative Excellence Series, The University of Texas Health Science Center, Houston, Texas. December 17, 2020

##### Eltzschig HK. How to Give a Research Talk “Do’s and Don’ts; Guest Speaker; Clinical Research in Progress; Department of Anesthesiology. The University of Texas Health Science Center, Houston, Texas. March 3, 2021

##### Eltzschig HK. Impact of Epidural Analgesia on the Mode of Delivery; Guest Speaker;UT Health Nurse Anesthesia Program; Department of Graduate Studies. Cizik School of Nursing at UT Health, Houston, Texas. April 27, 2021

##### Bibliography (over 320 Peer-Reviewed Publications, H-index 97)

*Dr. Eltzschig has published over 320 peer-reviewed research contributions, including first or senior-author papers in Nature Medicine, Nature Immunology, Circulation, Gastroenterology, Gut, Science Translational Medicine, The Journal of Clinical Investigations, The Journal of Experimental Medicine, PLoS Medicine, PLoS Biology, Circulation Research, Blood, PNAS, Nature Communications, and many other leading biomedical journals. In addition, Dr. Eltzschig is the lead author of three review papers published in the New England Journal of Medicine. Moreover, he published review papers in Nature, Nature Medicine, Nature Reviews Cardiology, Blood, and Anesthesiology and three review papers in Nature Reviews Drug Discovery that focus on his research findings. With an H-index of 97 and over 34,000 citations, Dr. Eltzschig is among the highest-cited physician-scientists from the field of perioperative medicine.*

# Original Articles (Basic Science)

1. Synnestvedt, K., G.T. Furuta, K.M. Comerford, N. Louis, J. Karhausen, **H.K. Eltzschig**, K.R. Hansen, L.F. Thompson, and S.P. Colgan. 2002. Ecto-5'-nucleotidase (CD73) regulation by hypoxia-inducible factor-1 mediates permeability changes in intestinal epithelia. *J Clin Invest* 110:993-1002. (PMID: 12370277; PMCID: PMC151145)
2. **Eltzschig, H.K.**, J.C. Ibla, G.T. Furuta, M.O. Leonard, K.A. Jacobson, K. Enjyoji, S.C. Robson, and S.P. Colgan. 2003. Coordinated adenine nucleotide

phosphohydrolysis and nucleoside signaling in posthypoxic endothelium: role of ectonucleotidases and adenosine A2B receptors. *J Exp Med* 198:783-796. (PMID: 12939345; PMCID: PMC2194189)

1. Kong, T., **H.K. Eltzschig**, J. Karhausen, S.P. Colgan, and C.S. Shelley. 2004. Leukocyte adhesion during hypoxia is mediated by HIF-1-dependent induction of beta-2 integrin gene expression. *Proc. Nat Acad Sci (USA)* 101:10440-10445. (PMID: 15235127; PMCID: PMC478589)
2. **Eltzschig, H.K.**, L.F. Thompson, J. Karhausen, R.J. Cotta, J.C. Ibla, S.C. Robson, and S.P. Colgan. 2004. Endogenous adenosine produced during hypoxia attenuates neutrophil accumulation: coordination by extracellular nucleotide metabolism. *Blood* 104:3986-3992. (PMID: 15319286)
3. Thompson, L.F., **H.K. Eltzschig**, J.C. Ibla, C.J. Van De Wiele, R. Resta, J.C. Morote-Garcia, and S.P. Colgan. 2004. Crucial Role for Ecto-5'-Nucleotidase (CD73) in Vascular Leakage during Hypoxia. *J. Exp. Med.* 200:1395-1405. (PMID: 15583013; PMCID: PMC1237012)
4. **Eltzschig, H.K.**, P. Abdulla, E. Hoffman, K.E. Hamilton, D. Daniels, C. Schonfeld, M. Loffler, G. Reyes, M. Duszenko, J. Karhausen, A. Robinson, K.A. Westerman, I.R. Coe, and S.P. Colgan. 2005. HIF-1-dependent repression of equilibrative nucleoside transporter (ENT) in hypoxia. *J. Exp. Med.* 202:1493-1505. (PMID: 16330813; PMCID: PMC2213326)
5. Dieterich, H.J., T. Weissmuller, P. Rosenberger, and **H.K. Eltzschig**. 2006. Effect of hydroxyethyl starch on vascular leak syndrome and neutrophil accumulation during hypoxia. *Crit Care Med* 34:1775-1782.
(PMID: 16625120)
6. Eckle, T., A. Grenz, D. Kohler, A. Redel, M. Falk, B. Rolauffs, H. Osswald, F. Kehl, and **H.K. Eltzschig**. 2006. Systematic evaluation of a novel model for cardiac ischemic preconditioning in mice. *Am J Physiol Heart Circ Physiol* 291:H2533-2540. (PMID: 16766632)
7. **Eltzschig, H.K.**, M. Faigle, S. Knapp, J. Karhausen, J. Ibla, P. Rosenberger, K.C. Odegard, P.C. Laussen, L.F. Thompson, and S.P. Colgan. 2006. Endothelial catabolism of extracellular adenosine during hypoxia: the role of surface adenosine deaminase and CD26. *Blood* 108:1602-1610.
(PMID: 16670267; PMCID: PMC1895500)
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10. **Eltzschig, H.K.**, T. Eckle, A. Mager, N. Kuper, C. Karcher, T. Weissmuller, K. Boengler, R. Schulz, S.C. Robson, and S.P. Colgan. 2006. ATP release from activated neutrophils occurs via connexin 43 and modulates adenosine-dependent endothelial cell function. *Circ Res* 99:1100-1108. (PMID:17038639)
11. Grenz, A., T. Eckle, H. Zhang, D.Y. Huang, M. Wehrmann, C. Kohle, K. Unertl, H. Osswald, and **H.K. Eltzschig**. 2007. Use of a hanging-weight system for isolated renal artery occlusion during ischemic preconditioning in mice. *Am J Physiol Renal Physiol* 292:F475-F485. (PMID:16912063)
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**Comments and Editorials**

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