

## CURRICULUM VITAE

Thomas P. Davis, Ph.D.

Departments of Medical Pharmacology and Pharmacology / Toxicology

The University of Arizona

Colleges of Medicine and Pharmacy

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### I. EDUCATION

#### A. INSTITUTIONS, DEGREES & DATES AWARDED:

B.S., Biology, Loyola University of Los Angeles. June 9, 1973.

M.S., Physiology, Honors. University of Nevada. May 18, 1975.

Ph.D., Physiology Analytical Biochemistry, High Honors. University of Missouri-Columbia. December 16, 1978.

#### B. MAJOR FIELDS of RESEARCH:

Major research emphasis is in the areas of central nervous system drug delivery and pathophysiology of the blood-brain barrier / neurovascular unit (BBB/NVU) after acute pain states and during CNS hypoxia/reperfusion/stroke, using preclinical models.

#### NEUROPHARMACOLOGY BRAIN BARRIER SCIENCE

Studying molecular signaling at the NVU required to maintain BBB tight junction protein (Claudin-5 and Occludin) integrity, and P-gp and OATP transporter protein function during hypoxia, stroke and reperfusion in preclinical animal models.

#### PHARMACODYNAMICS OF DRUG-DRUG INTERACTIONS

Effect of acute pain states on the NVU that limits pain drug therapy delivery to the CNS. This includes drug-drug interaction of opiates, NSAIDS and statins.

#### ACADEMIC TEACHING

Graduate “Medical Pharmacology- Principles and Therapeutics of cardiac, pulmonary, analgesics, anesthetics and drugs of abuse in man” - PHCL 601C (Course Director. Each Fall Semester October through December. 2001 to present. COM and COP).

Undergraduate “Senior Research Practicum” - MCB 498H & BCM499H (Course Director).

Undergraduate “Independent Study” - Chem 492, MCB 492, Neuro 920 (Course Director).

Undergraduate “Introduction to Toxicology” – PHCL 422. COM and COP. (Fall and Spring Semester. University of Arizona Main Campus up to 2020).

Undergraduate “Human Performance Pharmacology” – PHCL 442. COM and COP. (Fall and Spring Semester up to 2020. University of Arizona Main Campus).

### II. PROFESSIONAL AND ACADEMIC EMPLOYMENT

1973-1975 Graduate Research Assistant, Dr. David Bruce Dill's Laboratory of Applied Human Physiology, Desert Biology Research Institute, Boulder City, NV.

1975-1978 Graduate Research Assistant, Dr. Charles W. Gehrke's Experiment Station Chemical Laboratory, Department of Biochemistry, University of Missouri - Columbia.

- 1978-1980 Analytical/Development Chemist, Founding Member of Therapy Monitoring Venture Group (TDx), Abbott Pharmaceutical Company, Abbott Park, IL.
- 1981-1986 Assistant Professor- Pharmacology and Founding Director, Laboratory of Analytical Chemistry and Mass Spectrometry, University of Arizona Health Sciences Center. Founding Director, The Arizona Cancer Center Analytical Core Laboratory. Member, Pharmacology/Toxicology Graduate Program and Arizona Cancer Center.
- 1986-1992 Senior Research Fellow, NASA Center for Separation Sciences, University of Arizona Biophysics Technology Laboratory, Engineering Experiment Station, College of Engineering. Member, Pharmacology/Toxicology Graduate Program.
- 1986-1991 Associate Professor with Tenure - Pharmacology and Founding Director, Laboratory of Analytical / Peptide Chemistry and Brain Barriers/Drug Delivery, University of Arizona Health Sciences Center. Member, Arizona Cancer Center.
- 1991-present Professor with Tenure - Medical Pharmacology and Founding Director, Laboratory of Blood Brain Barrier Research, University of Arizona Health Sciences Center. Member, Arizona Cancer Center and Pharmacology/Toxicology Graduate Program.
- 1994-1995 Special Volunteer, NIH. National Cancer Institute, Biomarkers and Prevention Research Branch, NIH. Rockville, MD.
- 1999-present Chair, External Advisory Committee. The Aging Brain: Cerebrovascular Mechanisms. Multi-institutional Program. University of Rochester and University of Southern California. Member, Scientific Advisory Board, Socratech / ZZ-Biotech LLC. Houston, TX. Director of Drug Manufacturing for ZZ-Biotech LLC.
- 1999-2006 Founding Director, Program in Research Integrity Education, Office of the Vice President for Research and Graduate Studies, University of Arizona -Tucson.
- 1999-present Professor, Physiological Sciences, Graduate Interdisciplinary Program and Neuroscience, Graduate Interdisciplinary Program, University of Arizona -Tucson.
- 2005-present Professor, Bio5 Research Institute, University of Arizona – Tucson Campus.
- 2018-present Professor, Pharmacology / Toxicology, R. Ken Coit College of Pharmacy, University of Arizona- Tucson Campus.

### Visiting Professorships

**Department of Pharmacology**, Rudolf Magnus Institute, Laboratory of Professor David De Wied, Ph.D., Director, and Peter Burbach, Ph.D. The Netherlands. June/July/August 1986.

**Department of Neurosurgery**, University of Rochester School of Medicine, Frank P. Smith Laboratory of Professor Berislav Zlokovic, MD. Ph.D., Neuroscience and Neurological Research. July and August 2006, 2007, 2008, 2009 and 2010.

**Department of Neurology and Neuroprotection Research Laboratory**, Mass General Hospital-Harvard Medical School. Professor Eng Lo, Ph.D. Boston, MA. June 2014, September 2015, June 2016, 2018, and 2023.

### III. HONORS & AWARDS

*Academic State Scholarship Awardee*, Loyola University of Los Angeles (1969-1973).

*David Bruce Dill Scholar and Awardee* in Environmental Physiology, University of Nevada (1975).

*Member*, Sigma XI - Honorary Research Society of North America (1977).

*International Youth in Achievement Award*, University of Missouri (1978).

*Member*, Gamma Sigma Delta – Honorary Agriculture Society, University of Missouri (1978).

*Abbott Diagnostics Division Certificate of Achievement Award*, Abbott Pharmaceuticals Inc., (1979).

*Member*, *Who's Who* in the West, U.S., World and Frontiers of Science and Technology (1985).

*Fellow*, American Institute of Chemists (F.A.I.C.). October, (1986).

*Member*, Phi Beta Kappa Honorary Society (1995).

*Chartered Member*, Neurological Sciences III Study Section, N.I.H. / NINDS 1992 to 1996.

*Chartered Member*, Brain Disorders Clinical Neurosciences (BDCN-3) Study Section, N.I.H./NINDS 1996 to 2002.

*Fellow*, International Neuropeptide Society. (1998).

*Member*, International Organizing Committee, 4<sup>th</sup> International Conference of Cerebral Vascular Biology, Cambridge University, Cambridge UK, April 7-12, 2001.

*Awardee*, University of Arizona Faculty Senate, Chair of General Faculty and Faculty Senate, “*Extraordinary and Expert Service to the General Faculty of the University.*” March 5, 2001.

*Member*, International Organizing Committee, 5th International Conference of Cerebral Vascular Biology, Amarillo, TX. June 2003.

*Volunteer of the Year Award*, Salpointe Catholic High School, Tucson, AZ. 2002-2003.

*Awardee and Member*, Loyola-Marymount University, College of Science and Engineering, “*Alumni Wall of Fame,*” October 18, 2003.

*Medallion of Appreciation Awardee*, Salpointe Catholic High School Administration and Faculty. September 10, 2006.

*Elected Chairman*, Gordon Research Conference, “Barriers of the CNS”. June 17-22, 2008. Co-Chairman, 2006.

*Chartered Member*, Acute Neural Injury and Epilepsy (ANIE) Study Section, NIH/NINDS. 2010 to 2016.

*Member*. NIH-CASIS (*Center for the Advancement of Science in Space*) Coordinated MPS Program for TR in Space (UG3/UH3) Study Section. 2017.

*Founders Day Awardee and Lecture*, University of Arizona College of Medicine. November 16, 2011.

*Distinguished Alumnus Award and Speaker*. St. Francis High School. La Canada, CA. January 31, 2012.

*Keystone Speaker Awardee*, Gordon Research Conference, “Barriers of the CNS”. Colby-Sawyer College, NH. June 16, 2012.

*Member*, International Organizing Committee, “Brain 2013”, International Society Cerebral Blood Flow and Metabolism (ISCBFM). Shanghai, China. May 20-25, 2013.

*Member*, Austrian Science Fund- YIRP Study Section. Vienna, Austria. July 30/31, 2018-2020.

*Member*, Brain Injury Neuropathology (BINP) Study Section, NIH/NINDS. 2017 – 2020.

*Keynote Speaker Awardee*, Texas Tech Biology Days. Lubbock, Texas. June 11 and 12, 2021.

#### IV. TEACHING

##### A. COURSES TAUGHT:

1. PHARMACOLOGY 501/601; The Pharmacological Basis of Therapeutics  
 Enrollment: 100-120 Medical and Graduate Students; Spring, 1985 (Didactic lectures)
  - General Principles
  - Alcohol
  - Vitamins
  - Gout
  - Drugs of Abuse
 Spring, 1987 to 2006 (Patient Oriented Problem Solving, and Small Group Teaching)  
 10 x 3-hour blocks per year.
  - Pharmacokinetics Applied to Asthma
  - Cancer Drugs
  - Treatment of essential hypertension
  - Toxicology
  - Treatment of congestive heart failure
  - Complications of analgesic therapy
  - Treatment of Myocardial Infarction
  - Antithrombotic Therapy
  - Narcotics/Analgesics
 Spring, 1992 to 2006 (Didactic lectures)
  - Narcotics/Analgesics
  - Drugs of Abuse
2. PHARMACOLOGY 653; Neuropharmacology  
 Enrollment: 20-25; Fall, 1985 to 1996.
  - Synthesis and Processing of Neuropeptides
  - Analytical Techniques in Neuropharmacology

- Laboratory: HPLC Analysis of Peptide Metabolites
3. PHARMACOLOGY 550; Drug Metabolism and Disposition  
Enrollment: 30; Fall, 1985; 1986  
Separation and Analysis of Drug Metabolites  
Structural Assignments by Mass Spectrometry
  4. PHYSIOLOGY 501/601; Medical Physiology  
Enrollment: 100-120; Spring, 1985; 1986; 1987; 1989; 1990; 1991; 1992; 1993; 1994 to 2001.  
Temperature Regulation in Man  
Adaptation to Heat  
Problem Based Learning (16-hour blocks).
  5. PHARMACOLOGY 551; Molecular Biology of Pharmacological Agents  
Enrollment: 20; Fall 1989; 1991; 1992; 1993; 1994; 1995; 1996.  
Regulation of Neuropeptide Gene Expression
  6. PHYSIOLOGY/MEDICINE 495 A/B; Principles of Neuroscience  
Enrollment: 15-20; Spring/Fall, 1988  
Centrally Active Drugs  
Drugs of Abuse
  7. MOLECULAR AND CELLULAR BIOLOGY 494; Independent Study for Undergraduates  
Enrollment: 2-3 per semester. 3 credit hours per student per semester.  
Spring/Fall, 1985; 1986; 1987; 1990; 1991; 1992; 1993; 1994; 1995; 1996; 1997.  
Effect of Opioid Peptides on Mu, Kappa and Delta Receptors.  
Methods to Control Microflora in Juice Concentrates.  
Solid Phase Synthesis of Neuropeptides.  
Effect of Cell Passage Number and Mycoplasma on Cytogenetics of SCLC Cells  
Characterization of Proteolytic Enzyme Metabolism Using Computer Modeling Techniques.  
Use of MTT Assay to Predict Neuropeptide Effects in SCLC Cell Growth.  
Development of a Specific and Sensitive Assay for Aminopeptidase M and Leucine.  
Aminopeptidase: Application to SCLC Inhibition Studies.  
Effect of Peptide Structure on *In Vitro* Enzymatic Metabolism.  
Effect of Peptide Structure on Binding to Human Plasma.  
Effect of Peptide Structure on Permeability through the Blood-Brain Barrier.  
Demonstration of Prohormone Convertase mRNA in Small Cell Lung Cancers.
  8. MOLECULAR AND CELLULAR BIOLOGY 266; Principles of Neural and General Pharmacology  
Enrollment: 60; Summer 1991
  9. CLINICAL ROUNDS, Department of Neurology  
Enrollment: 5-20; Spring 1992; 1993  
Graduate Level Lectures to Neurology Residents Concerning Polypeptide Hormones.
  10. PHARMACOLOGY 696 A, Introduction to PHCL and TOX Research  
Enrollment: 2-6 per semester for 3 credit hours per semester; Fall 1992 – present.  
Graduate Level Course Offered to Graduate Students. *Director of Course*.
  11. PHYSIOLOGY 485, Undergraduate Physiology Course in Cardiovascular Physiology  
Enrollment: 50 per year for 4 credit hours per semester; Spring 1999 to 2005.
  12. PHYSIOLOGY 549, *Survival Skills and Ethics*. Graduate Course offered each Spring.  
Enrollment: 50 per year for 3 credit hours per semester; Spring 2000-2012.
  13. PHYSIOLOGY 700, *Research Methodology in Physiological Sciences*. Graduate Course offered each semester. Enrollment: 2 per year for 3 credit hours per semester; Spring 2000 - present.
  14. PUBLIC HEALTH 696, *Research Methodology and Design*. Graduate course offered each semester. Enrollment: 10; Fall 2001 to 2006.
  15. PHARMACOLOGY and NEUROSCIENCE 595B, *Strategic Scientific Writing and Ethics*.

- Enrollment: 40 every Fall semester; Fall 2003 - 2014.
16. CASE BASED INSTRUCTION (CBI), *Cardio/Pulmonary/Renal (CPR) Block. Medical Student Facilitator*, every Spring for 10 First Year Medical Students. Spring 2007 - 2015.

**Present Teaching Responsibility in College of Medicine and College of Pharmacy. Didactic Teaching Pharmacology course covering 3-man months of each academic year:**

17. PHARMACOLOGY 601 C. *Medical Pharmacology* for Graduate Students. This 2-credit course is offered every academic year. I am *Director and lecturer in Section C of the 6 credit 601 required course*. Enrollment is 12 to 20 Ph.D. Graduate students each Fall semester for the months of October, November, and December. 2001 – present.

**B. STUDENT RESEARCH PRECEPTORSHIP CREDIT HOURS TAUGHT**

**1. UNDERGRADUATE STUDENTS DIRECTED:**

1. Ms. Benay Shive, Co-operative Education Program, Antioch College, Cincinnati, Ohio, biochemistry student. “Effect of Parkinson’s Disease on Catecholamine Levels in Discrete Brain Regions.” 6 credits. 4/1/82 to 12/1/82.
2. Ms. Leslie Clark, biochemistry student, University of Arizona. “Cyclosporin A metabolism in heart transplant patients—a study using high performance liquid chromatography.” Biochemistry 494. Senior Practicum. 3 credits. 1/1/83 to 9/1/83.
3. Ms. Ann Peterson, biochemistry student, University of Arizona. “Effect of unique opioid peptides on mu, kappa, and delta receptors.” Senior Practicum. MCB 494. 3 credits. 1/1/85 to 6/1/85.
4. Ms. Lori Trombley, Microbiology student, Univ. of Arizona. “Methods to control microflora in juice concentrates.” Senior Practicum. MCB 494. 3 credits. 1/1/86 to 6/1/87.
5. Mr. Tom DiMatteo, pre-pharmacy student, University of Arizona. “Solid phase 'Merrifield' peptide synthesis of neuropeptides which regulate gastrointestinal motility. Chemistry 399.” Independent Study. 3 credits. 5/1/87 to 9/1/87.
6. Ms. Susan Crowell, Biochemistry student, University of Arizona. “Effect of cell passage number and mycoplasma on cytogenetics of SCLC cell lines.” MCB 498H. Senior Practicum. 3 credits. 9/1/88 to 5/1/89.
7. Mr. Jim Vranich, Biochemistry student, Humboldt State University, California. Pharmacology/Toxicology National Research Training Program. “Use of biochemical techniques to study enzyme biochemistry.” 5 credits. 5/1/89 to 8/30/89.
8. Mr. Darren Merrill, Biochemistry student, University of Arizona. “Characterization of proteolytic enzyme metabolism of select neuropeptides using computer modeling techniques.” MCB 494. Senior Practicum. 3 credits. 8/1/89 to 12/30/89.
9. Ms. Brena McInturff, Microbiology student, University of Arizona. “Use of MTT assay to predict neuropeptide regulation of small cell lung cancer cell line growth.” MCB 494. Senior Practicum. 3 credits. 8/1/89 to 12/30/89.
10. Ms. Renee Louis, Molecular Biology student, University of Arizona. “Development of a sensitive and specific assay for aminopeptidases in SCLC cell lines.” MCB 494 Senior Practicum. 3 credits. 8/1/90 to 12/30/90.
11. Ms. Diana Greene, Chemistry and Latin student, University of Arizona. “Selected to Undergraduate Biology Research Program for 1990-1992.” Distribution of DPDPE and its halogenated analogues in the rat: Effect of blood-brain barrier. Chem. 499. 4 credits. 6/1/91 to 12/30/91.
12. Ms. Tanya Lewis, Molecular Biology student, University of Arizona. “Selected to Undergraduate Biology Research Program for 1991-1992.”

- Effect of peptide structure on membrane passage in the rat.” MCB 494. 3 credits. 8/1/91-12/30/91 and MCB 499 Independent Study. 2 credits. 1/1/92-5/1/92.
13. Mr. Brad Merrill, Molecular Biology student, University of Arizona. “Regulation of gene expression for GRP in discrete cell lines.” MCB 494. 4 credits. 1/1/92 to 12/31/92. Assistant Professor, University of Illinois at Chicago, Department of Biochemistry and Molecular Genetics.
  14. Mr. Tom Abbruscato, Molecular Biology Student, University of Arizona. “Studies of the blood brain barrier using an *in vitro* approach.” MCB 494. 2 credits. 8/92 to 12/92. Associate Professor, Texas Tech University College of Pharmacy.
  15. Ms. Sharon Hom, Molecular Biology, Student, University of Arizona. “Effect of Antipsychotic Drugs on Neurotensin in the Brain.” MCB. 494. 3 credits 8/93 to 5/94.
  16. Mr. Erik Szeto, Biochemistry Student, Univ. of Arizona. “Studies on the Metabolism of Substance-P in Discrete Brain Regions.” Biochem. 494. 3 credits. 8/94 to 12/94.
  17. Ms. Lisa M. Stoll, Molecular Biology, University of Arizona. “Studies on the molecular biology of small cell lung cancer.” MCB 492. 6 credits. 8/96 to 5/97.
  18. Mr. Vincent Hau, Molecular Biology Student, University of Arizona. “Saturable carriers in bovine endothelial cells and the blood-brain barrier – characterization.” MCB 494. 3 credits. 8/96 to 5/97.
  19. Ms. Katy Venisnik, Molecular Biology Student, University of Arizona. “Effect of ischemia/aglycemia on endothelial cell cytoarchitecture.” MCB 494. 3 credits. 8/99 to 12/99.
  20. Mr. Chris Campos, Biochemistry Student, University of Arizona. “Effect of PEG on analgesic efficacy.” Biochem. 494. 2 credits. 8/00 to 12/00. Senior Thesis, December 2002 to May 2003, 3 credits.
  21. Ms. Lindsay Borg, Biological Sciences Student, Stanford University. “Effect of Hypoxia on endothelial cells of the blood brain barrier.” 3 credits. Summer, 2003 to 2005.
  22. Ms. Amanda Burroughs, Biology Student, Northern Arizona University. "Effect of hypoxia/reoxygenation on endothelial cell tight junctions." Summer, 2003.
  23. Mr. Ryan Davis, Biosystems Engineering Student, University of Arizona “Effect of inflammatory pain on analgesic drug delivery to the brain.” Summer and Spring, 2003 to 2005.
  24. Mr. Ian Butler, Senior Biochemistry Student, University of Arizona. “Effect of Hypoxia on BBB endothelial cell protein cytoarchitecture-Functional Analysis”. January 2004 to October 1, 2004.
  25. Ms. Carolyn Quigley, Physiological Sciences Student, University of Arizona. “Effect of Hypoxia on BBB cytoarchitecture”. January 2005 to 2009.
  26. Ms. Rachel Charles, Physiology Student, Occidental College. "Effect of Pain and Inflammation on the cytoarchitecture of the blood-brain barrier". 3 Biochem Course credits. Summer, 2005 to 2007.
  27. Ms. Jessica Finch, Nursing student, University of Arizona. “Effect of Pain and Hypoxia on Blood Brain Barrier Tight Junction Protein Integrity”. 5 MCB course Credits. 2007 to 2012.
  28. Mr. Seph Palomero, student, Pima Community College, “Effect of Pain on trafficking of occludin at the tight junction of the blood brain barrier”. 2009 to 2011.
  29. Ms. Kristin DeMarco, Molecular Biology student, University of Arizona,

- “Effect of pain on the delivery of analgesics to the brain”. 5 MCB course Credits. 2007 to 2012.
30. Ms. Nicole Nametz, Molecular Biology and Medical Student. University of Arizona. 3 Credits. “Effect of pain on occludin protein trafficking at the blood brain barrier. 2005 to 2008.
  31. Ms. Mei Li Laracuente, Chemistry student, University of Arizona. “Effect of hypoxia-reperfusion on nanoparticle drug delivery at the BBB”. 5 Biochem Course Credits. 2011 to 2015. Recipient of Outstanding Undergraduate Researcher Award and Galileo Scholar Award for 2014, Department of Chemistry.
  32. Ms. Yifeng Zhang, MCB Student, University of Arizona. 5 Credits. “Effect of pain on P-gp transporter trafficking at the BBB”. 2012 - 2015. Recipient of the Galileo Scholar Award, MCB department. Medical Student, 2015- present
  33. Mr. Chaz Schaefer, Biochemistry Student, University of Arizona. 3 Credits. “Effect of peripheral pain on trafficking of P-glycoprotein at the BBB”. 2012 - 2015. Graduate student, Medical Pharmacology Graduate Prog, 2015- 2017.
  34. Mr. Fabian Matty, Biochemistry Student, University of Arizona. “Effect of Chronic Pain on the Delivery of Opioids at the BBB.” 2014-2015.
  35. Ms. Chelsea Jarvis, MCB/Physiology Student, “Effect of pain on P-gp transporter trafficking at the BBB”. 2015- 2017.
  36. Ms. Julia Lipiz, MCB/Biochemistry Student, “Effect of pain on P-gp transporter trafficking at the BBB”. 2015 -2018.
  37. Ms. Kristin Hunn, Chemical Engineering Student, “Role of caveolin 1/2 on P-gp trafficking at the BBB”. 2016 - 2018.
  38. Mr. Nathan Arkwright, Chemical Engineering Student, “Effect of acute versus chronic pain on P-gP trafficking at the BBB”. 2016 - 2018.
  39. Ms. Kathryn Kellohen , Biochemistry Student, “ Role of caveolin in regulating P-gP trafficking at the BBB”. 2017 - 2018.
  40. Ms. Peyton Mierau , Engineering Student. “Signaling by caveolins at the BBB”. 2017 - 2018.

## 2. **MEDICAL STUDENTS MENTORED AND DIRECTED:**

1. Dr. Abe Hahn, M.Sc. M.D. Master's degree candidate, University of Nevada. 5/1/83-8/1/83. As an invited member of his committee, I directed the major section of his M.Sc. research on "The central processing of  $\beta$ -endorphin in temperature acclimated desert animals" in my laboratory.
2. Dr. Curt Dunshee, B.S., M.D. second year Medical Student, University of Arizona. 6/1/83-5/10/84. "In vitro endorphin metabolism in human cerebrospinal fluid." Medical Student Research Program.
3. Dr. Duncan Tang, B.S., M.D. second-year Medical Student, University of Arizona College of Medicine. 1/1/86-8/30/87. "Isolation and characterization of specific subcellular enzymes in the brain." Medical Student Research Program.
4. Dr. Diana Greene B.S., M.D. Medical Student, University of Arizona College of Medicine. 5/1/92 to 5/1/95. "Blood-brain distribution of opioid Pro-Drugs." Medical Student Research Program grantee. 5/1/92-5/1/95. M.D. degree granted May 10, 1997. Director of Neuroscience Critical Care, Professor, Departments of Neurosurgery and Neurology. The Ohio State University Medical Center. Columbus, Ohio.
5. Dr. Vincent Hau, B.S., M.D., Ph.D. 1998-2005. Doctoral and Medical Student, University of Arizona College of Medicine. “Effect of cationization on the delivery of opioids to the CNS.” Medical Student Research Program grantee, Retinal Surgeon and Clinical Assistant Professor, Kaiser Permanente

Medical School, Pasadena, CA. Graduated May 2005.

6. Dr. Melissa Seelbach, nee Brym, M.D., Ph.D. 2003-2007. “Effect of lambda carrageenan-induced inflammatory pain on brain uptake of morphine: role of P-glycoprotein”. Graduated Ph.D. - December 2007. Fellow, Center for Pain Treatment and Management, University of Arizona. Private Practice Pain Clinician, Tucson, AZ.

**C. GRADUATE STUDENTS MENTORED AND DIRECTED:**

1. Mr. Andrew Chen, M.S., 1981-1983. (Graduated 7/1/83). Techn., U.C.S.D. CA.
2. Ms. Li Zhiwei, M.S., 1986-1989. (Graduated 12/1/89). CADRE *Synthesis*, Indus Park, China
3. Dr. David Clark, DVM, Ph.D., 1990-1993. (Graduated 7/20/93) Retired Senior Scientist, Arizona Cancer Center, Tucson, AZ.
4. Dr. Mary Oakes, Ph.D., 1989-1994. (Graduated 9/1/94) **Recipient of NIH/NRSA Pre-doctoral Fellowship.** *REHS*, Environmental Health Specialist, Las Vegas, NV. 2000 – present.
5. Dr. James C. Ritchie, M.P.H., Ph.D. – Pharmacology Department, Duke University Medical Center, Durham, N.C., 1989-1995, (Dissertation Co-Director). Graduated 1995. Professor, Pathology, Emory University Hospitals, Atlanta, GA. **NIH RO1 Funded.**
6. Peg Davis, M.S., 1991-1996; (Graduated 5/10/96) Senior, Biochemistry Technician, University of Arizona, Tucson, AZ. Retired, 2015.
7. Dr. Steve Waters, Ph.D., 1992-1996. (Graduated 8/15/96). **Recipient of Pre-doctoral NIH/NRSA Fellowship.** Senior Scientist, Neurogen Biopharm. Pharmacist Manager and owner, Branford, CN.
8. Dr. Tom Abbruscato, Ph.D., 1993-1997. (Graduated 6/25/97). **Recipient of NIH/ NRSA Pre and Post-doctoral Fellowship from N.I.N.D.S.**, Distinguished Professor and Chairman, Department of Pharmaceutical Sciences, Dean of Research and Graduate Studies. Texas Tech University College of Pharmacy, Amarillo, 2012 – present. **Funded NIH RO1 grants.**
9. Dr. Ken Witt, Ph.D., 1998-2001. (Graduated 7/8/01). **Post-doctoral fellow, University of Arizona. Recipient of NIH/ NRSA Post-doctoral Fellowship from N.I.N.D.S. Professor, Pharmaceutical Sciences.** Southern Illinois University College of Pharmacy, September, 2005-present. **Funded NIH RO1 grants.**
10. Dr. Brian Hawkins, Ph.D. 1999-2004. (Graduated 11/26/04). **Recipient of NIH/NRSA pre-doctoral fellowship.** Medical Faculty Lecturer, University of Washington Medical School, Seattle. 2011-2013. Senior Scientist, Research Triangle Institute (RTI), North Carolina. 2013-15. Research Scientist, Duke University Center for WaSH-AID and Associate Director of Technology Development.
11. Dr. Vi Hau, M.D., Ph.D. 1996-2005. (Graduated 5/10/05). Resident in Ophthalmology, University of Utah-Moran Eye Center, Salt Lake City, Utah. (**Recipient of Deans M.D./Ph.D. Fellowship from NIH**). Pediatric Retinal Surgeon, Kaiser Permanente, Riverside, California. Assistant Professor, Kaiser Medical School. Pasadena, CA.
12. Dr. Sharon Hom, M.S., R.N., Ph.D., 1997-2006. (Graduated 08/05/06). Clinical Professor, University of Arizona College of Nursing. 2011-present.
13. Dr. Melissa Seelbach, M.D., Ph.D., 2003-2007. (Graduated December 15, 2007) 2007 to 2009. Post-Doctoral Fellow, University of Kentucky, Lexington, KY. Anesthesiology Senior Resident, Univ. of Kentucky Hospitals, Lexington. 2013 to 2017. Fellow, Comprehensive Pain Clinic. University of Arizona Medical Center / Banner Hospital, Tucson, AZ.
14. Dr. Christopher Campos, Ph.D., 2004-2009. (Graduated May 10, 2009). Post-Doctoral Fellow at NIEHS, Research Triangle Park, N.C. (12/2009 to 12/2014). Senior scientist, Hoffmann - La Roche Pharmaceutical, Basel, Switzerland. 2015-2018. Principle Scientist, Director of Compliance. Monster Energy Company, Corona, CA. 2019 – present.
15. Dr. Jeff Lochhead, Ph.D., 2004-2010. Post-Doctoral Fellow, University of Wisconsin College of Pharmacy (2011 to 2016). Research Assistant Professor, Univ. of Arizona, 2017. **Recipient of AHA research scientist development grant 2018-2021.**
16. Dr. Lucy Sanchez-Covarrubias, Ph.D. 2007-2013. (Graduated 5/18/2013) (Post-Doctoral

Fellow, University of Arizona College of Medicine, Tucson. **Recipient of NIH/NRSA Pre-doctoral fellowship).**

17. Mr. Charles Schaefer, B.Sc., M.Sc. 2015-2017. Co-Mentor, Medical Pharmacology graduate program, University of Arizona. Tucson. Graduated 2017. **Research Assistant**, Physiology Department. Midwestern University. Phoenix, AZ.

18. Ms. Erica Williams, B.Sc. Ph.D. Candidate. Co-Mentor . 2018 - present. Medical Pharmacology graduate program. University of Arizona, Tucson. Co-Sponsor for **NIH/NRSA F31 Pre-doc fellowship awarded 2022-2025.**

19. Robert Betterton, B.Sc. Ph.D. Candidate. Co- Mentor. 2018-present. Medical Pharmacology graduate program. Co-Sponsor of **NIH/F34 Pre-doc fellowship Application . 2023-2025.**

20. Junzhi Yang, B.Sc. Ph.D. Co-Mentor . Pharmacology/Toxicology Graduate Program. 2017 – 2023.

21. Kelsey Nilles, B.Sc. Ph.D. Neuroscience Graduate Program (Ph.D. Dissertation Committee Member and Co-Mentor). 2021- present. Awarded **Peter Likins Graduate Student Award.**

22. Joshua A. Stanton., Bsc. Medical Pharmacology Graduate Program. Ph.D. Dissertation Committee Member and Co-Mentor. 2022 - present.

#### **D. POSTDOCTORAL FELLOWS and PROFESSORS MENTORED:**

1. Hans Schoemaker, Ph.D., 1983-1985. Director of Neuroscience, Sanofi-Synthelabo Recherche. Institute, Bagneaux, France. (Co-mentored with H.I. Yamamura).

2. R.K. Rao, Ph.D., 1988-1990. Professor of Medical Physiology, University of Tennessee College of Medicine, Memphis, TN. (Co-mentored with O. Koldovsky). **Multiple NIH RO1 Grants.**

3. Pierre Konings, Ph.D., 1990-1992. European Trademark and Design Attorney, NLO Shieldmark, Eindhoven Area, The Netherlands.

4. Steve Weber, Ph.D., 1990 - 1993. Chief Executive Officer, PharmaOptima LLC., Kalamazoo, Michigan.

5. David Clark, Ph.D., July 1993 to December 1993. Retired. Senior Research Scientist, Iowa.

6. Barbara Mania-Farnell, Ph.D., 1992-1994. Professor of Pharmacology, Purdue University School of Nursing, Calumet, IN. Retired. **NIH funded.**

7. Ana Brownson, Ph.D. 1993-1994. Senior Research Fellow, Biological Sciences, Colorado State University Fort Collins, CO. Retired.

8. Chris Konkoy, Ph.D., 1992-1995. Scientific Communications Consultant, Eli Lilly Pharmaceutical Co., Indianapolis, IN.

9. John Schetz, Ph.D., 1994-1995. Professor, Physiology, Univ. of North Texas. **Multiple NIH RO1 grants.** Deceased.

10. Sarah Thomas, Ph.D., 1994-1996. Reader in Physiology, Department of Physiology, Guys and St. Thomas Medical School, Neuroscience Division, Kings College, London, U.K. **Funded MRC research foundation in UK.**

11. Allen Erenberg, M.D., Visiting Research Professor of Pharmacology, Univ. of Kansas Medical Center, 1995-1996. Professor of Pediatrics, University of Arizona-retired.

12. Matthew Rounseville, Ph.D., September 1995 - 1999. Senior Scientist, High Throughput Genomics (HTG), University of Arizona Biotechnology Park, Tucson, AZ.

13. Thomas J. Abbruscato, Ph.D., July 1, 1997- May 01, 2000. Professor and Chairman, Pharmaceutical Sciences Department, VP Research, Texas Tech University College of Pharmacy, Amarillo, TX. **Multiple NIH RO1 grants.**

14. Richard D. Egleton, Ph.D., December 1996- May 2007. Professor, Physiology and Pharmacology, Marshall University School of Medicine, Huntington, WV. **NIH funded.**

15. Karen Mark, Ph.D., October 1, 1999-December 31, 2003. Associate Professor, Pharmaceutical Sciences Department, South College School of Pharmacy, Knoxville, TN. **NIH funded.**

16. Anne Wolka, Ph.D., June 1, 2002-November 26, 2003. Benefit-Risk Consultant Scientist, Associate. Eli Lilly Pharmaceutical., Indianapolis, IN
17. Jason Huber, Ph.D., July 1, 1999-March 01, 2004. Professor, Department of Pharmacology, West Virginia University, College of Pharmacy, Morgantown, WV. **Multiple NIH RO1 Funded.**
18. Rachel Brown, Ph.D., 2000-2004. Visiting Researcher, Kings College, London. Research Assistant Professor, Department of Integ. Biology and Pharmacology, University of Texas Health Sciences Center Houston. **NIH funded.**
19. Ken Witt, Ph.D., July 1, 2001-2005. Professor, Pharmacology, Southern Ill. University School of Pharmacy, Edwardsville, Illinois. **Multiple NIH RO1 funded.**
20. Melissa Fleegal, Ph.D., June 1, 2003 - July 15, 2006. Professor, Biological Sciences, Clarke College, Des Moines, Iowa. **NIH funded.**
21. Tracy Brooks, Ph.D., March 1, 2004 - January 01, 2007. Professor, Pharmaceutical Sciences Department, State University of New York Pharmacy School. New York. **NIH funded. Endowed professor.**
22. Scott Ocheltree Hynes, Pharm.D., Ph.D., June 1, 2005 - May 30, 2006. Director, Global PK/PD, Eli Lilly Pharmaceutical Inc., Indianapolis, IN.
23. Gwen McCaffrey, Ph.D., Research Specialist. Retired. 2005-2012. University of Arizona.
24. Colin Willis, Ph.D., Research Assistant Professor, August 2007-2010. Assistant Professor, University of New England College of Osteopathic Medicine, Maine. Retired.
25. Patrick Ronaldson, Ph.D., Post-Doctoral research fellow, 2008-2011. Professor tenured, 2016 - present. University of Arizona College of Medicine, Department of Pharmacology. **Multiple NIH RO1, PHarma and AHA grants funded.**
26. Margaret Tome, Ph.D., Emeritus Professor, Research Track, University of Arizona College of Medicine, Department of Pharmacology. 2013 - 2018. **NIH funded.** Deceased.
27. Joseph Herndon, Ph.D., Post-doctoral research fellow. 2014 - 2015. Scientist, Roche Diagnostics / Ventana Medical Systems. Oro Valley, AZ. **NIH funded to 2015.**
28. Jeff Lochhead, Ph.D., Assistant Professor, Research Track, University of Arizona College of Medicine, Department of Pharmacology. 2016 – present. **AHA grantee 2018-2021.**

**E. VISITING PROFESSORSHIPS SPONSORED AT UNIVERSITY OF ARIZONA**

- Greg Del Zoppo, M.D., Ph.D., Department of Medicine, University of Washington College of Medicine, Seattle, WA. At University of Arizona, January 2009 and March 2010.
- Eng Lo, Ph.D., Department of Neurosurgery and Neuroscience, Harvard Medical School, Boston, MA. At University of Arizona, September 2011.

**V. PROFESSIONAL SERVICE ACTIVITIES**

**A. DEPARTMENTAL COMMITTEES**

- Department of Neurology/Biochemistry Faculty Search Committee, University of Arizona, College of Medicine, 1987-1989.
- Department of Pharmacology Faculty Search Committee, University of Arizona, College of Medicine, 1985-1990 and 2013-2015.
- Department of Pharmacology and Department of Pharmacology/Toxicology Graduate Program Executive Council, University of Arizona Health Sciences Center, 1987-1995. 2002-2005.
- Member, Medical Pharmacology Graduate Admissions Committee, January 2004–2012.
- Member, Medical Pharmacology Department Chair Academic Program Review, 2011 and 2019.
- Chairman, Medical Pharmacology Department Head Search Committee, 2013.
- Member, Medical Pharmacology Department, Post-Tenure Review Committee, 2017 - 2020.
- Member, Promotion & Tenure Committee, Medical Pharmacology Department, 2022-present.

**B. COLLEGE OF MEDICINE COMMITTEES**

- University of Arizona College of Medicine, Medical Student Admissions Interviewer, 1981-

2011.

University of Arizona College of Medicine, Committee on Medical Student Honors and Awards 1983-1987. Chairman, 1985-1987.

University of Arizona College of Medicine, Ad Hoc Committee on Guidelines for Dual-Track System Promotion and Tenure, 1983.

University of Arizona College of Medicine Committee on Medical Student Progress, 1984-1986.

University of Arizona College of Medicine LCME Subcommittee F on Basic Science Departments January 1, 1990-January 31, 1996.

University of Arizona Pre-Medical Honor Society Advisory Committee; Chairman, 1991-1992.

University of Arizona College of Medicine Committee on Pediatrics Clerkship Review Dec, 1992-July 1993.

University of Arizona College of Medicine Committee on Problem Based Learning in Basic Science Curricula, 1995-1996.

University of Arizona College of Medicine Graduate Education Advisory Committee (GEAC) 1988-2001; Chairman, 1990-2001.

University of Arizona College of Medicine Committee of Nine, 2004-2009.

University of Arizona College of Medicine Founders Day Committee, Chairman, 2012.

#### **C. UNIVERSITY COMMITTEES**

University of Arizona Committee on Biophysics (CB), and Curriculum Committee, 1989-1994.

University of Arizona Committee on Academic Freedom and Tenure (CAFT), May 1990 - April 1992.

University of Arizona Committee on Graduate Study (CGS), May 1991-May 1999.

University of Arizona Committee on Ethics and Commitment (UCEC), May 1994-May 2000. Chairman, May 1995-January 1999. Co-Chairman, Education/Research Integrity, January 1999-May 2000.

University of Arizona Faculty Senate, Senator, August 1996-May 2001.

University of Arizona Committee on Science and Technology Park, May 1996-2000.

Member, Technology Transfer Committee (TTC), Univ. of Arizona, September 1996-September 2000.

University of Arizona Faculty Co-Governance Committee, October 1997-October 1998.

University of Arizona Committee on Corporate Relations, Chairman, March 1999-February 2001.

University of Arizona Intercollegiate Athletics Committee (ICAC), 1999-2012.

Member, Neuroscience Advisory Council to Senior VP-Health Sciences, 2013-2018.

#### **D. THESIS AND DISSERTATION COMMITTEE MEMBERSHIP**

1. Ron Webb, Ph.D. - Pharmacology/Toxicology, 1981-1983. Graduated 1983.
2. Charles Prussak, Ph.D. - Pharmacology/Toxicology, 1981-1983. Graduated 1983.
3. Steven Glass, M.S. - Pharmacology/Toxicology, (M.S. Program), Graduated 1983.
4. Rick Schnellman, Ph.D. - Pharmacology/Toxicology, 1982-1984. Graduated 1984.
5. Robert Dorr, Ph.D. - Pharmacology/Toxicology, 1982-1984. Graduated 1984.
6. Lane Hirning, Ph.D. - Pharmacology/Toxicology, 1982-1985. Graduated 1985.
7. Andrew Chen, M.S. - Pharmacology, (M.S. Program), 1983-1985. (Thesis Director); Graduated 1985.
8. Joni Kathryn Kalis, M.S. - Exercise and Sports Medicine (M.S. Program). Graduated 1985.
9. Sara Jilka, M.S. - Exercise and Sports Medicine (M.S. Program) 1985.
10. Muhammad Schumann, Ph.D. - Pharmacology/Toxicology, 1985-1986. Graduated 1986.
11. Arthur Buckley, Ph.D. - Pharmacology/Toxicology, 1984-1986. Graduated 1986.

12. David B. Duignan, Ph.D. - Pharmacology/Toxicology, 1984-1987. Graduated 1987.
13. Paul Ciaccio, Ph.D. - Pharmacology/Toxicology, 1986-1989. Graduated 1989.
14. Zhiwei Li, M.S., M.D. - Pharmacology (M.S. Program), 1986-1989 (Thesis Director). Graduated 1989.
15. J. Andrew Taylor, Ph.D. - Animal Physiology, 1986-1990. Graduated 1990.
16. Qi Jiang, Ph.D. - Pharmacology/Toxicology, 1986-1991. Graduated 1991.
17. Dave Clark, DVM, Ph.D. - Pharmacology/Toxicology, 1990-1993. (Dissertation Director). Graduated 1993.
18. Ken Wild, Ph.D. - Pharmacology/Toxicology, 1989-1993. Graduated 1993.
19. Mary Oakes, Ph.D. - Pharmacology/Toxicology, 1989-1994. (Dissertation Director). Graduated 1994.
20. Li Fong, Ph.D. - Pharmacology/Toxicology-1991-1994. Graduated 1994.
21. Hong Bing Wei, Ph.D. Pharmacology/Toxicology, 1992-1994. Graduated 1994.
22. James C. Ritchie, M.P.H., Ph.D. - Pharmacology, Duke University Medical Center, Durham, N.C., 1989-1995, (Dissertation Co-Director). Graduated 1995. Professor, Pathology, Emory University Hospitals, Atlanta, GA.
23. Alexander Clar, M.S., Pharmacology, 1994-1996. Graduated 1996.
24. W. Kong, Ph.D. - Physiology/Toxicology, 1988-1996. Graduated 1996.
25. Peg Davis, M.S. Pharmacology, 1991-1996 (Thesis Director). Graduated 1996.
26. Steve Waters, Ph.D. - Pharmacology/Toxicology, 1992-1996 (Dissertation Director). Graduated 1996.
27. Craig Mayr, Ph.D. - Pharmacology/Toxicology, 1992-1997. Graduated 1997.
28. Tom Abbruscato, Ph.D. - Pharmacology/Toxicology, 1993-1997 (Dissertation Director). Graduated 1997. Distinguished Professor, Texas Tech Pharmacy School.
29. Farshad (Mazda) Shirazi, M.D., Ph.D., Pharmacology/Toxicology 1992-1997 Graduated 1997. Tenured Professor of Emergency Medicine and Pharmacology.
30. Hiram E. Albino, M.S. Pharmacology/Toxicology, 1998-2000. Graduated 2000.
31. Art Riegel, Ph.D., Pharmacology/Toxicology, 1999-2001. Graduated 2001.
32. Ken Witt, Ph.D. - Pharmacology/Toxicology (Dissertation Director). 1998-2001. Graduated May 15, 2001. Associate Professor, Southern Illinois University.
33. Brian Hawkins, Ph.D. - Neuroscience (Dissertation Director). 1999-2004.
34. Karin Witt-Sandoval, Ph.D. Pharmacology/Toxicology, 2000-2004. Graduated 2004.
35. Vincent Hau, M.D., Ph.D. - Pharmacology/Toxicology (Dissertation Director) Graduated May 10, 2005.
36. Sharon Hom, M.S. Ph.D. - Physiology (Dissertation Director). 1999-2006. Graduated August 10, 2006. Lecturer, University of Arizona College of Nursing.
37. Lori Buhlman, Ph.D., Neuroscience Graduate Program, (Chair, Ph.D. Committee). 2001-2007.
38. Melissa Seelbach Ph.D., Pharmacology/Toxicology, (Dissertation Director). 2003-2007. Graduated December 15, 2007. Medical Student, Marshall University, WV.
39. Christopher Campos, Ph.D., Medical Pharmacology, (Dissertation Director). 2003-2009. Graduated May 10, 2009. Post-doctoral Fellow, NIEHS, Research Triangle Park, NC. 2009-2014.
40. Jeff Lochhead, Ph.D., Neuroscience Graduate Program (Dissertation Director). 2004-2010. Post-doctoral fellow, University of Wisconsin with Robert Thorne, Ph.D.
41. Lucy Sanchez-Covarubias, Ph.D. Medical Pharmacology Graduate Program (Dissertation Director). 2007-2013. Graduated May 01, 2013. Post-Doctoral fellow, University of Arizona College of Medicine, Tucson, AZ. 2013 - 2014.
42. Crista Lickteig, M.Sc., Perfusion Sciences/Medical Pharmacology Masters Program. 2009 to 2011. Graduated 2011.
43. Gabriel Knudsen, Ph.D., Medical Pharmacology. 2006-2011. Graduated 2011.
44. Wexi Kong, Ph.D., Pharmacology/Toxicology Graduate Program. 2007-2012. Graduated 2012.

45. Tiffany Marie Robb, M.Sc. Medical Pharmacology M.Sc. Program. 2010-2012.
46. Molly Oldeen, M.Sc. Medical Pharmacology M.Sc. Program. 2010-2012.
47. Karissa Cottier, B.Sc. Ph.D., Medical Pharmacology Ph.D. program. 2014 – 2018.
48. Arturo D. Balajadia Jr, B.Sc., M.Sc. Perfusion Science/Medical Pharmacology Master's Program. 2015 - 2018.
49. Charles Schaefer, B.Sc., M.Sc. Medical Pharmacology. (Thesis Co-Director with Margaret Tome, Ph.D.). 2015 - 2017. Graduated 2017. Research Assistant, Physiology. Midwestern University, Phoenix, AZ.
50. Junzhi Yang, B.Sc. Medical Pharmacology Graduate Program (Ph.D. Dissertation Committee Member and Co-Mentor with Patrick Ronaldson) 2017-2023.
51. Erica Williams, B.Sc. Medical Pharmacology Graduate Program (Ph.D. Consultant, Co- Mentor with Patrick Ronaldson, and Dissertation Committee Member) 2018 – 2024.
52. Robert D. Betterton, B.Sc. Medical Pharmacology Graduate Program (PhD. Dissertation Committee Member and Co-Mentor with Patrick Ronaldson). 2019 – 2024.
53. Kelsey Nilles, B.Sc. Neuroscience Graduate Program (Ph.D. Dissertation Committee Member. Co-Mentor with Patrick Ronaldson). 2020 – 2025.

**E. EDITORIAL POSITIONS**

Editorial Advisory Board, *Life Sciences Journal*, 1984-1988.  
 Editorial Board, *Peptides*. 1990 to 2020.  
 Associate Editor, *Life Sciences Journal*, 1988-2007.  
 Editorial Board, *Journal of Pharmacology and Experimental Therapeutics*, 1999-2007.  
 Associate Editor, *Current Pharmaceutical Design*, 2008 to present.  
 Editorial Board, *Fluids and Barriers of the CNS*. 2010 to present.  
 Editorial Advisory Board, *Biochemical Pharmacology*, 2011 to present.  
 Editorial Advisory Board, *Tissue Barriers*, 2013 to present.  
 Editorial Advisory Board, *Journal of Addiction and Neuropharmacology*, 2014 to present.  
 Editorial Advisory Board, *Toxicology*, 2015 to present.

**F. GRANT STUDY SECTION SERVICE**

Ad Hoc Grant Review, National Science Foundation, 1981-1983, 1988-present.  
 Ad Hoc Grant Review, National Institute of Health, 1982-1983, 1988-1995, 2000-present.  
 Ad Hoc Grant Reviewer, Natural Sciences and Engineering, Research Council of Canada, 1989-present.  
Chartered Member, National Research Council (National Academy of Sciences) Fellowship Evaluation Panel in Cell Biology/Regulation and Neuroscience, National Research Council, Institute of Medicine. Washington, D.C., 1988-1991.  
Chairman, Veterans Administration Program Project Site Visit Team evaluating research program of Abba S. Kastin, M.D. Tulane University, VA Medical Center, New Orleans, LA., June 1-2, 1989.  
Grant Reviewer, Career Development Program Applications. Veterans Administration, Department of Medicine and Surgery, Washington, D.C. 20420. August 8, 1989, to 2001.  
Chartered Member, Neurological Sciences III Study Section, N.I.N.D.S./N.I.H., April 1, 1992-April 1, 1996.  
Member, NIH/NIA. Program Project Review Panel. University of Southern California, Department of Neurosurgery, 1998.  
Chartered Member, Brain Disorders Clinical Neurosciences 3 (BDCN 2 and 3) Study Sections, NINDS/N.I.H., July 1, 1996-July 1, 2003.  
Member, American Heart Association, Brain 2 Study Section, 2004 to 2005.  
Chartered Member, Brain Injury Neuropathology (BINP) Study Section, NINDS/NIH, August 1, 2002, to 2006.  
Ad Hoc Grant Reviewer, NIH Brain Disorders Clinical Neurosciences 2, 3 and 4, CDIN, CNBT, and MDCN- 3 and 5, Study Sections, November 2002 to 2012.  
Merit Reviewer, Department of Veterans Affairs, California. April 2002 to 2014.

Ad Hoc Grant Reviewer, Philip Morris External Research Program. October 2002 to 2012.  
Ad Hoc Grant Reviewer, American Heart Association Brain 2 Study Section. January 2004.  
Chartered Member, Acute Neural Injury and Epilepsy (ANIE) Study Section NINDS/NIH. July 2010 to July 2016.  
Ad Hoc Grant Reviewer, Natural Sciences and Engineering Research Council (NSERC) and the Canadian Institutes of Health Research (CIHR). January-April 2013.  
Ad Hoc Grant Reviewer, National Institute for Environmental Health Sciences. (NIEHS), Laboratory of Toxicology and Pharmacology. Research Triangle Park, N.C. April 14-16, 2013.  
Ad Hoc Grant Reviewer, BINP/ SEP - NINDS - NIH. Washington, DC. November 19 to 21, 2013. February / March 2017/ March 2018.  
Ad Hoc Grant Reviewer, BIO-5 Research Institute, University of Arizona. May/June 2016 & 2017.  
Ad Hoc Grant Reviewer, NINDS-NIH. R13 Scientific Meetings ZNS1 SRB-K (08). Nov 9, 2017, and June 21 and 22, 2018.  
Member, Grant Review Committee, Austrian Science Fund- YIRP Study Section. Vienna, AU. July 2019. December 2020.  
Ad Hoc Grant Reviewer, NIH. Special Emphasis Panel/Scientific Review Group ZTR1 TC-7. June 2019.  
Ad Hoc Member, Brain Injury Neuropathology (BINP) Study Section of the NINDS/NIH. October, 2019, 2020, February and October 2021. June and October 2022.  
Ad Hoc Grant Reviewer, Neurosciences and Engineering Research Branch of the MRC, COVID 19 Proposals. London, UK. June 20 to 26, 2020 to 2023.

#### **G. JOURNALS REFEREED**

*Journal of Chromatography*, 1981-present.  
*Analytical Biochemistry*, 1985-present.  
*Experimental Neurology*, 1983-present.  
*Peptides*, 1983-present.  
*Cancer Research*, 1985-present.  
*American Journal of Physiology*, 1985-present.  
*Toxicology and Applied Pharmacology*, 1985-present.  
*Journal of Pharmacology and Experimental Therapeutics*, 1985-present.  
*International Journal of Peptide and Protein Research*, 1986-present.  
*Biomedical Chromatography*, 1988-present.  
*Molecular Pharmacology*, 1988-present.  
*European Journal of Pharmacology*, 1986-present.  
*Journal of Micronutrient Analysis*, 1988-present.  
*Drug and Chemical Toxicology*, 1990-present.  
*Journal of Pharmaceutical Sciences*, 1990-present.  
*Journal of Andrology*, 1991-present.  
*Brain Research*, 1992-present.  
*Proceedings of the National Academy of Sciences*, 1992 – present.  
*Journal of Neurochemistry*, 1992-present.  
*Endocrinology*, 1993-present.  
*Journal of Infectious Diseases*, 1996-present.  
*Pharmaceutical Research*, 1996-present.  
*Journal of Neuroscience*, 1999-present.  
*Journal of Biological Chemistry*, 2003-present.  
*Stroke*, 2005-present.  
*Neuroscience Letters*, 2006-present.  
*Journal of Cerebral Blood Flow and Metabolism*, 2008-present.  
*Fluids and Barriers of the CNS*, 2010 - present.  
*Frontiers in Vascular Physiology*, 2011- present.

*Science Translational Medicine*, 2013- present.  
*Journal of Histochemistry*, 2013- present.  
*Tissue and Brain Barriers*, 2013- present.  
*Plos One*, 2012- present.  
*Frontiers in Neuroscience, Physiology, Biochemistry, Neurology*, 2014- present.  
*Neural Plasticity*, 2014- present.  
*Microvascular Research*, 2014-present.  
*Clinical and Experimental Metastasis*, 2015-present.  
*Neuroscience International*, 2017-present.

## **H. PROFESSIONAL BUSINESS APPOINTMENTS**

Advisor, Pharmacokinetics/Metabolism of Anti-Neoplastic Drugs. Lederle Labs, Pearl River, NY, 1980-83.  
Consultant, Analytical Toxicology and Pharmacology of Drugs of Abuse. Assoc. in Lab Medicine/Office of the Medical examiner, Tucson, AZ. 1981-85.  
Member, Board of Directors, Hansen Natural Inc. City of Industry, CA, 1987-88.  
Consultant, IPSEN Pharmaceuticals., Biomeasure Neuropharmaceutical Inc., Milford, Mass., 1992-2011.  
Chief Scientific Officer, Co-Founder & Senior VP Technical Affairs. Monster Energy Company, Corona, CA. 1990 - present.  
Consultant, Neurex Corporation/Elan Pharmaceutical, Menlo Park, CA, 1994-2001.  
Collaborator, Parke-Davis Pharmaceutical Research, Ann Arbor, MI, 1995-1999.  
Consultant, Nektar/Inhale Therapeutics/Shearwater Polymers.1997-2002.  
Member, Speakers Bureau, Smith-Kline Beecham Pharmaceutical, 2001-2004.  
Consultant, Socratech Biotechnology LLC., and ZZ Biotech LLC. Houston, Texas. 2006-present.  
Member, Scientific Advisory Board (SAB), ZZ Biotech LLC. Houston, TX. 2006-present.  
Consultant, Leading Brands, Inc., Vancouver, B.C., Canada, 2001-2003.  
Consultant, Nastech Pharmaceutical Co., Bothell, WA. 2005-2006.  
Member, International Life Sciences Institute (ILSI-North America) 2014-2017.  
Member, American Beverage Association (ABA), “Caffeine Science and Toxicology Working Group”, Washington, D.C., 2014 – 2022.

## **I. MEMBERSHIP IN PROFESSIONAL SOCIETIES**

Phi Beta Kappa Honorary  
Sigma XI Honorary  
Gamma Sigma Delta Honorary  
Society for Neuroscience (SN)  
American Physiological Society (APS)  
American College of Sports Medicine (ACSM)  
American Chemical Society (ACS)  
The Association of Official Analytical Chemists (AOAC)  
American Society for Pharmacology & Experimental Therapeutics (ASPET)  
American Society for Clinical Pharmacology and Therapeutics (ASCPT)  
American Society for Testing and Materials (ASTM)  
Gastroenterology Research Group (GRC)  
International Association for Vitamin and Nutritional Oncology (IAVNO)  
International Brain Research Organization (IBRO)  
Society of Environmental Toxicology and Chemistry (SETAC)  
American Peptide Society (APS)  
American Institute of Chemists (Fellow, 1986)  
The International Neuropeptide Society (Fellow, 1997)  
Controlled Release Society (CRC)  
American Diabetes Association (ADA)  
International Brain Barriers Society (IBBS Founding Member)

American Association of Pharmaceutical Scientists (AAPS)  
The Microcirculatory Society (MCS)  
The International Cerebral Blood Flow and Metabolism Society (ICBFM)  
American Association of Pharmaceutical Scientists (AAPS)  
Society of Toxicology (SOT)  
American Heart Association (AHA)

#### **J. SERVICE TO THE COMMUNITY**

Invited Lecture, Associates in Laboratory Medicine, Tucson, AZ. Therapeutic Drug Monitoring and Pharmacokinetics. June 1983.

Advisor, Analytical Toxicology and Pharmacology of Drugs of Abuse. Office of Medical Examiner, Pima County, Tucson, AZ, 1982-1986.

Invited Lecturer, Palo Verde Mental Hospital Medical Staff. Recent Advances in Therapeutic Drug Monitoring and Mental Disease. 1.5 Continuing Medical Education (CME) units. May 1985.

Speaker, Rincon Optimist Club, Tucson, AZ. Alzheimers Disease and Dementia-Chemical Changes and Aging, March 30, 1988.

Member, Science Advisory Group, Catalina Foothills School District, 1995-1997, Tucson, AZ. Redesign the K-12 Science Curricula for school district.

Assistant Scout Master, Catalina Council, Boy Scouts of America, Tucson, AZ. 1995-1998.

Head Coach, Canyon View Little League. Majors Division, 1996-1997. Juniors Division, 1997-1999.

Invited Lecturer, Green Fields Country Day School Issue Day, Tucson, AZ, The Brain and Central Nervous System, November 1997.

Member, Strategic Planning Committee, Salpointe Catholic High School, Tucson, AZ, 2000-2004.

Facilitator, Focus Group, 5-year Strategic Plan, Salpointe Catholic High School. February-March, 2001.

Invited Lecturer, Salpointe Catholic High School, Tucson, AZ. Senior Honors Biology Class. Present a series of invited lectures on Scientific Method, Blood Brain Barrier Research, Diabetes Research, Pain Research, Hypoxia/Stroke Research and Nicotine Research each Fall/Spring semester, 2002 to 2009.

Member, Board of Directors, Salpointe Catholic High School, Tucson, AZ., 2004-2005.

Member, Rotary International, Tucson Sunrise Rotary Club, 2003 to 2010.

Member, Jackson Hole Rotary, 2010 to 2013.

Member, International Program Committee, "BRAIN 2013", International Cerebral Blood Flow and Metabolism Society (ICBFM), Shanghai, China. May 21 – 25, 2013.

#### **K. SERVICE TO THE STATE**

Course Co-Director, Department of Public Safety (DPS) State Crime Laboratory. Basic Pharmacology Course, Phoenix, AZ. Presented course in Basic Pharmacology to staff chemists representing all DPS State Crime Lab satellites. May 21-June 11, 1981.

Advisor, State of Arizona Department of Health Services Environmental Pollutants Education Workshop Subcommittee, Bureau of Laboratory Services, Phoenix, AZ, 1983.

Invited Lecturer, Arizona Society of Medical Technologists. "Recent advances in neurochemistry of Alzheimers Disease." April 27, 1989. Continuing Education Units (CEU) given (0.10).

Director, Laboratory of Analytical and Peptide Chemistry. As founding director of this laboratory from 1980 to 2000 and formally trained in Gas Chromatography/Mass Spectrometry at the Finnegan Institute in Ohio, I provided forensic, poison control, toxicological, legal, water, beverage and environmental pollutant analyses and service to many citizens, city and state agencies in Arizona. This laboratory received state certification for the chemical analysis of public drinking water on 5/15/85.

#### **L. SERVICE TO REGULATORY AND LEGAL GROUPS**

Member, American Society for Testing and Materials (ASTM) National Committee F-2 on Flexible Barrier Materials, 1984-1998.

Expert Witness, Federal Arbitration for OCAW Union Case. Efficacy of Gas Chromatography/Mass Spectrometry Methods for Testing Drugs of Abuse by Employers. Bismarck, ND. January-November 1987.

Collaborator/Investigator, National Bureau of Standards, Micronutrient Analyses, Washington, DC. 1985-1990.

Invited Faculty Member, Federal Judicial Center, Education and Training Division, Defender Services Division, Washington, DC. Invited presentation on "Drug Analyses and Pharmacology for the Trial Lawyer." Phoenix, AZ. December 4, 1989.

Member, American Society for Pharmacology and Experimental Therapeutics National Subcommittee on Public Information, 1/1/90 - 12/31/96.

Organizer and Director of Conference, N.I.H., Office of Research Integrity. Colloquium on Management of Biomedical Research Laboratories: A National Conference. University of Arizona, Tucson, AZ, October 1-3, 1998.

Member, American Beverage Association, Caffeine Science and Toxicology Working Group. Washington, DC. 2014-2021.

Member, International Life Sciences Institute, Caffeine Working Group, Washington, DC. 2015-2018.

## VI. PUBLICATIONS

### A. SCHOLARLY MONOGRAPHS, ONLINE LECTURES AND BOOKS

1. Davis, T.P. *High performance liquid chromatography of biogenic amines in cattle: Effect of heat, cold, and dehydration*. Ph.D. Thesis, University of Missouri-Columbia, 1978.
2. Davis, T.P. *Management of Biomedical Research Laboratories: A National Conference*. Proceedings, 244 pp. Thomas P. Davis, Editor. University of Arizona Press. 1999.
3. Davis, T. P., 2009, "Blood-brain barrier in health and disease", Kastin, A. and Pan, W. (eds), In: *The Blood-Brain Barrier: Understanding the regulatory gatekeeper between brain and body*. The Biomedical & Life Sciences Collection, Henry Stewart Talks Ltd, London (online at <http://www.hstalks.com/?t=BL0381811-Davis>). 2009.
4. Davis, T. P. November 14, 2011. Founders Day Awardee and Lecture. "The Blood-Brain Barrier: Target or Obstacle for Drug Delivery to the Brain". (online at <http://opa.ahsc.arizona.edu/newsroom/news/2011/'-blood-brain-barrier-target-or-obstacle-drug-delivery-brain'-nov-16>).
5. Davis, T. P. Book Editor. *Advances in Pharmacology*. "Pharmacology of the Blood Brain Barrier: Targeting CNS Disorders". Thomas P. Davis, Editor. Academic Press. Volume 71. 550 pages and 15 Chapters. Published: October 10, 2014.

### B. INVITED PEER REVIEWED CHAPTERS IN SCHOLARLY TEXTBOOKS

1. Davis, T.P. and L.J. Kettel. Gas chromatography/mass spectrometry and medicine. *Arizona Medicine* 39, 529. 1982.
2. Davis, T.P., Gehrke, C.W. Jr., Gerhardt, K.O., Williams, C.H. and Gehrke, C.W. "Pre-column Derivatization, HPLC and Fluorescence Measurement of Biogenic Amines in Biological Materials." In: *Clinical Analysis of Exogenous and Endogenous Constituents by Liquid Chromatography*. Edited by Pokar Kabra and Laurence Marton, CRC Press, Inc., West Palm Beach, FL. 1983, pp. 53-64.
3. Alberts, D.S., Y-M. Peng, S. Leigh, T.P. Davis and D.L. Woodward. Pharmacokinetics of bisantrene in cancer patients. In: *Bisantrene* (C. Coltman, Ed.) Verlag, H. Egerman, Vienna, Austria 1983. pp. 1-5.
4. Alberts, D.S., Y-M Peng, S. Leigh, T.P. Davis and D.L. Woodward. Pharmacokinetics of mitoxantrone in patients. In: *Mitoxantrone* (I. Smith, Ed.), Verlag H. Egerman, Vienna, Austria. 1983. pp. 6-11.
5. Burks, T.F., T.P. Davis and J.N. McDougal. Metabolism and thermopharmacology of opioid peptides in rat brain. In: *Environmental Drugs and Thermoregulation*. Edited by

- P. Lomax, S. Schoenbaum and B. Cox. Karger Pub., Basel, Swz. pp. 94-97. 1983.
6. Goodman, G.E., D.S. Alberts, Y-M Peng, J. Beaudry, S. Leigh, F.L. Meyskens, Jr. and T.P. Davis. Pharmacokinetics and Phase I trial of retinol and 13-cis-retinoic acid. In: *Modulation and Mediation of Cancer by Vitamins*. F.L. Meyskens and K. Prasad, editors. S. Karger, Publishers, New York, NY. 1984. pp. 311-316.
  7. Alberts, D.S., C. Mackel, Y-M. Peng, and T.P. Davis. Phase I clinical investigation and preliminary pharmacokinetics of 9-10 anthracenedicarboxaldehyde bis (4,5-dihydro-1H-imidazole-2-yl) (hydrazone) dihydrochloride (bisantrene) with correlative *in vitro* human tumor clonogenic assay. In: *New Anthracene Drugs* (M. Rozenzweig, Ed.) Raven Press, New York, pp. 149-173. 1983.
  8. Alberts, D.S., L. Edwards, Y. Peng, R. Serokman, T.P. Davis, and F.L. Meyskens. Clinical toxicology pharmacokinetics of 13-cis retinoic acid administered chronically at low doses expected for cancer chemoprevention trials. In: *Vitamins and Cancer -Human Cancer Prevention by Vitamins and Micronutrient* (Edited by F.L. Meyskens and K.N. Prasad) Humana Press, Inc. pp. 245-255. 1985.
  9. Hameroff, S.R., R.C. Cork, J.L. Weiss, B.R. Crago, and T.P. Davis. Doxepin effects on chronic pain and depression: A controlled study. In: *Advances in Pain Research and Therapy*. (H. Fields, R. Dubner and F. Cervero, Eds.) Raven Press, New York. pp. 761-771. 1985.
  10. Davis, T.P. and M.K. Yousef. Sweat loss and voluntary dehydration during work in humid heat. In: *Adaptive Physiology to Stressful Environments*. Edited by S. Samueloff and M.K. Yousef. CRC Press, Inc., West Palm Beach, FL., pp. 103-112. 1987.
  11. Davis, T.P. and M.K. Yousef. Opioid peptides and adaptation to the environment. In: *Adaptive Physiology to Stressful Environments*. Edited by S. Samueloff and M.K. Yousef. CRC Press, Inc. West Palm Beach, FL., pp. 121-130. 1987.
  12. Davis, T.P. Methods of Measuring Neuropeptides and Their Metabolism. In: *Stress, Neuropeptides and Systemic Disease*. Edited by P.G. Kaufman, J.A. McCubbin and C.B. Nemeroff. Academic Press, Inc., Orlando, FL. Chapter 8., pp. 149-177. 1991.
  13. Rittenbaugh, M. Aickin, T. Moon, T. Davis, E. Surwit and F. Meyskens, Jr., Dietary Factors in Cervical Dysplasia. Chemoimmuno Prevention of Cancer, 1st International Conference, Vienna, Austria. Edited by Ugo Pastorino and Waun Ki Hong. Thieme Medical Publishers, Inc., New York, pp. 65-72. 1991.
  14. Knapp, R.J., T.P. Davis, T.F. Burks and H.I. Yamamura. Physiological and Pharmacological Evaluation of Peptide Analogues. In: *Peptide Pharmaceuticals: Approaches to the Design of Novel Drugs*. Chapter, 7 pp. 210-242. 1991.
  15. Davis, T.P. and R.B. Williams. Human Stress-Measurement and Consequences. In: *A Lunar-Based Chemical Analysis Laboratory*. Edited by: Cyril Ponnampertuma and Charles Gehrke. A. Deepak Publishing. Hampton, VA. pp. 204-208. 1992.
  16. Davis, T.P. and P. Konings. Peptidases in the CNS: Formation of Biologically Active Receptor Specific Peptide Fragments. In: *Critical Reviews in Neurobiology*. Edited by: C.B. Nemeroff and E.B. DeSouza CRC Press Inc. Volume 7 (3/4): 163-174. 1993.
  17. Davis, T.P. and S.L. Crowell. B-endorphin is metabolized *in vitro* by human small cell lung cancer to  $\gamma$ -endorphin which stimulates clonal growth. In: *Growth factors, peptides and receptors*. Edited by: Terry W. Moody. pp. 360-380. Plenum Press, N.Y. 1993.
  18. Mania-Farnell, B.L., B.J. Merrill, H.I. Yamamura and T.P. Davis. Second messenger activators regulate CCK mRNA in the human neuroepithelioma cell line SK-N-MCIXC. *Annals of the New York Academy of Sciences*. 713, 446-449. 1994.
  19. Waters, S.M., C.S. Konkoy and T.P. Davis. Micro slices from specific rat brain regions in neuropeptide metabolism. In: *Tissue Slices in Biological Research*. Edited by: Klaus Brendel. Chapter 35. Academic Press Inc. 1995.
  20. Davis, T.P., T. Abbruscato, E.A. Brownson, V.J. Hruby. Conformationally constrained peptide drugs targeted at the blood brain barrier. N.I.D.A. Technical Review on "Membranes and Barriers: Targeted Drug Delivery," NIDA Research Monograph 154. Editor, Rao S. Rapaka. pp. 47-60. 1995.
  21. Lung, F.-D., N. Collins, G. Li, J.-P. Meyer, B.-S. Lou, D. Stropova, P. Davis, T. Davis, F.

- Porreca, H.I. Yamamura and V.J. Hruby. Synthesis, Opioid Activities and Binding Affinities of Dynorphin A Analogues with Position-3 Conformational Constraints. New Insights Into Requirements for  $\kappa$  Receptors. *Peptides* 1994, H.L.S. Maia and C. Schneider, eds., ESCOM Sci. Publ., Leiden, 634-635. 1995.
22. Hruby, V.J., G. Li, X. Qian, C. Haskell-Leuvano, F.-D. Lung, K. Kövér, A. Misicka, H.I. Yamamura, T. Davis and F. Porreca. Design, Synthesis and Conformation in Chi Space for Developing Selective Peptides for Types and Subtypes of Receptors. *Peptides* 1994, L.S. Maia, and C. Schneider, eds. ESCOM Sci. Publ. Leiden, 62-64. 1995.
  23. Waters, S.M. and T.P. Davis. Neuropeptides in development and aging. Alterations of Peptide Metabolism and Neuropeptidase Activity in Senile Dementia of the Alzheimer's Type. *Annals of the New York Academy of Sciences*, 814:30-39. 1997.
  24. Williams, S.A., T.J. Abbruscato, L. Szabo, R. Polt, V. Hruby and T.P. Davis. The effect of glycosylation on the uptake of an enkephalin analogue into the central nervous system. *Adv. Exp. Med. Biol. Series*. In: *Biology and Physiology of the Blood-Brain Barrier: Transport, Cellular Interaction and Brain Pathologies*. Editors: Couraud, P.O. and Scherman, D. Plenum Press, New York, USA, pp. 69-77. 1996.
  25. Polt, R.L., Szabò, V.J. Hruby, T.P. Davis, F. Porreca and H.I. Yamamura. Synthesis and pharmacology of o-linked glycopeptide enkephalin analogues: A new class of opioid analgesics. *Innovation and Perspectives in Solid Phase Synthesis and Combinatorial Libraries*. In: *Peptides, Proteins and Nucleic Acids. Small Molecule Organic Chemical Diversity*. Editor: Roger Epton. Mayflower Scientific Limited, Birmingham, pp. 277-280. 1996.
  26. Hruby, V. J., J.-P. Meyer, N. Collins, F.-D. Lung, D. Stropova, P. Davis, T. Davis, F. Porreca and H.I. Yamamura. Design of dynorphin A analogs with high potency and selectivity for  $\kappa$  or  $\delta$  receptors. Implications for opioid drug design. *Problems in Drug Dependence*, 1995, L.S. Harrid, Ed., NIDA Research Monograph 162, 155. 1996.
  27. Williams, S.A., T.J. Abbruscato, V.J. Hruby and T.P. Davis. Effects of halogenation on the CNS entry of DPDPE. *Problems in Drug Dependence*, 1995, L.S. Harris, Ed., NIDA Research Monograph 162, 256. 1996.
  28. Mania-Farnell, B. and T.P. Davis. Modulation of prohormone convertase mRNA by second messenger activators and drugs. *Ann. N.Y. Acad. Sci.*780:134-144. 1996.
  29. Hruby, V.J., T.P. Davis, D.F. O'Brien, F. Porreca and H.I. Yamamura. Design of peptides and peptidomimetics that are selective, stable and can cross membrane barriers. In: *Nature Biotechnology Short Reports, Advances in Gene Technology, Biomolecular Design, Form and Function*. F. Ahmad, D. Bernstein, H. Bialy, S. Black, K. Brew, M.P. Beutscher, S. Hassler, G.A. Petsko and W.J. Whelan, IRL at Oxford Press, England, Vol. (8)76: 1997.
  30. Eggleton, R.D., K.A. Witt and T.P. Davis. Enhancing peptide bioavailability to the brain. In: *Blood-Spinal Cord and Brain Barriers in Health and Disease*. Edited by: H.S. Sharma and Jan Westman, Uppsala University, Sweden, pages 107-116. 2003.Elsevier/Academic Press, Inc., London, England.
  31. Fleegal, M., S. Hom and T.P. Davis. Molecular Modulation of the Blood Brain Barrier during Stroke. In: *The Blood-Brain Barrier and its Microenvironment-Alterations in Neurological Diseases and Future Directions*. Edited by: Elga de Vries, VU Medical Center, The Netherlands. Marcel Dekker, Inc. Press, New York, New York. Chapter 16, pages 385-405. 2005.
  32. Eggleton, R.D., K.A. Witt and T.P. Davis. Opioid Peptides and the Blood Brain Barrier. In: *The Handbook of Biologically Active Peptides*, Edited by: Abba J. Kastin, M.D. Academic Press, Elsevier Inc., Chapter 199. pp 1429-1434. 2007.
  33. Witt, K.A. and T.P. Davis. CNS Drug Delivery: Opioid Peptides and the Blood Brain Barrier. In: *Drug Addiction*, Edited by: Rao S. Rapaka and Wolfgang Sadee. Springer Press, Chapter 30. pages 511-533.2008.
  34. Witt, K.A., P.T. Ronaldson, K.E. Sandoval and T.P. Davis. CNS delivery of peptides across the BBB. In: *Drug Delivery to the CNS*. Edited by: Kewal Jain. Springer Verlag Press, Inc., Chapter 11. 2009.
  35. Eggleton, R.D., K.A. Witt and T.P. Davis. Opioid Peptides and the Blood Brain Barrier

- (Opioids). In: *The Handbook of Biologically Active Peptides*, Second Edition. Edited by: Abba J. Kastin, M.D. Academic Press, Elsevier Inc., Chapter 232. Pages 1696-1701. 2013.
36. Davis, T.P., L. Sanchez - Covarubias and M.E. Tome. "P-glycoprotein trafficking as a therapeutic target for optimizing drug delivery to the CNS". Chapter 2. In: *The Pharmacology of the Blood Brain Barrier: Targeting CNS Disorders*. T.P. Davis, Editor. Academic Press. 550 pages. 15 Chapters. Published: October 10, 2014. *Adv Pharmacol.* 71: 25-44. 2014.
  37. Ronaldson, P.T. and T.P. Davis. Chapter 4. "Glial Support of Blood-Brain Barrier Integrity: Molecular Targets for Novel Therapeutic Strategies in Stroke". In : *Non-Neuronal Mechanisms of Brain Damage and Repair after Stroke*. Jun Chen Ph.D. John Zhang Ph.D., and Xiaoming Hu, Ph.D., Editors. pp. 45-80. Springer International Press. Published August 16, 2016.
  38. Ronaldson, P.T. and T.P. Davis. Chapter 45. "Mechanisms of Endothelial Injury and Blood-Brain Dysfunction in Stroke". In: *Primer on Cerebrovascular Diseases*. 2<sup>nd</sup> Edition. Lou Caplan, Eng Lo, Megan Leary, Ruth Thomas, Midori Yenari and John Zhang, Editors. Academic Press. Chapter 45. pp 220 - 227. 2016. Cover.
  39. Herndon, J., M. Tome and T.P. Davis. Chapter 9. "Development and Maintenance of the Blood Brain Barrier". In: *Primer on Cerebrovascular Diseases*. 2<sup>nd</sup> Edition. Lou Caplan, Eng Lo, Megan Leary, Ruth Thomas, Midori Yenari and John Zhang, Editors. Academic Press. Chapter 9. pp 51 - 57. 2016. Cover.
  40. Betterton, R.D., T.P. Davis and P.T. Ronaldson. Organic Cation Transporter (OCT/OCTN) Expression at Brain Barrier Sites : Focus on CNS Drug Delivery. IN: *Handbook of Experimental Pharmacology*. Springer, Chapter 5. Edited by: Lynette Dawes. 2021.
  41. Betterton, R.D., E. Williams, K. Niles, T.P. Davis and P.T. Ronaldson. Methods to study drug uptake at the blood-brain barrier following experimental ischemic stroke: in vitro and in vivo approaches. *Methods in Molecular Biology*. Volume 50. 2022.

**C. PEER REVIEWED JOURNAL ARTICLES (H-index, google scholar, 73. i10-index, 197)**

1. Davis, T.P., M.K. Yousef and H.D. Johnson. Respiratory activity and metabolic rate of burros, *Equus asinus*: Effect of age. *Comp. Biochem. Physiol.* 60A, 203-205, 1978.
2. Davis, T.P., M.K. Yousef and H.D. Johnson. Hormonal, hematologic, and other biochemical constituents in the burro, *Equus asinus*. *J. Equine Med. and Surgery* 2:389-392, 1978.
3. Davis, T.P., M.K. Yousef and H.D. Johnson. Partition of body fluids in the burro, *Equus asinus*. *J. Wildlife Management* 42(4):973-975, 1978.
4. Davis, T.P. and C.W. Gehrke, C.W. Gehrke, Jr., T.D. Cunningham, K.C. Kuo, K.O. Gerhardt, H.D. Johnson and C.H. Williams. High performance liquid chromatographic separation and fluorescence measurement of biogenic amines in plasma, urine, and tissue. *Clinical Chemistry* 24:1317-1324, 1978.
5. Davis, T.P., C.W. Gehrke, C.W. Gehrke, Jr., T.D. Cunningham, K.C. Kuo and K.O. Gerhardt. High performance liquid chromatographic analysis of biogenic amines in biological materials as 0-phthalaldehyde derivatives. *J. Chromatography* 162:292-310, 1979.
6. El-Nouty, F.C., I.M. Elbana, T.P. Davis and H.D. Johnson. Aldosterone and ADH Response to heat and dehydration in cattle. *J. Applied Physiol.* 48(2):249-255, 1980.
7. Musacchia, X.J., D.R. Deavers, G.A. Meininger and T.P. Davis. A model for hypokinesia: Effects on muscle atrophy in the rat. *J. Appl. Physiol.: Respirat. Environm. Exercise Physiol.* 48(3):479-486, 1980.
8. De Forrest, J.M., J.O. Davis, R.H. Freeman, G.A. Stephens, A.A. Seymour, B.P. Rowe, G.M. Williams, T.P. Davis and C. Gehrke. Effects of indomethacin and meclofenamate on renin release and renal hemodynamic function during chronic sodium depletion in conscious dogs. *Circulation Research* 47(1):99-107, 1980.
9. Peng, Y.M., T.P. Davis and D.S. Alberts. High performance liquid chromatography of a new anti-cancer drug, ADCA B physicochemical properties and pharmacokinetics. *Life Sciences* 29:361-369, 1981.
10. Davis, T.P., C.W. Gehrke, Jr., C.H. Williams, C.W. Gehrke and K.O. Gerhardt. Pre-

- column derivatization and HPLC of biogenic amines in blood of normal and malignant hyperthermic pigs. *J. Chromatography* 228:113-122, 1982.
11. Davis, T.P., A. Chen and H.I. Yamamura. High performance liquid chromatography of pharmacologically active amines and peptides in biological materials. Presented at Symposium on Liquid Chromatography as a Research Tool in Peptide and Amine Pharmacology. *Life Sciences* 30:971-987, 1982.
  12. Brothman, A.R., T.P. Davis, J.J. Duffy and T.J. Lindell. Development of an antibody to Actinomycin D and its application for the detection of serum levels by radioimmunoassay. *Cancer Research* 42:1184-1187, 1982.
  13. Davis, T.P., Y.M. Peng, G.E. Goodman and D.S. Alberts. High performance liquid chromatography mass spectrometry, and pharmacokinetics of melphalan, bisantrene and 13-cis retinoic acid. *J. Chrom. Science* 20(11):511-516, 1982.
  14. Lu-Steffes, M., G.W. Pittluck, M.E. Jolley, H.M. Pannas, D.L. Olive, C.H.J. Wang, D.D. Nystrom, C.L. Keegan, T.P. Davis, and S.D. Stroupe. Fluorescence polarization immunoassay - determination of phenytoin and phenobarbital in human serum and plasma. *Clinical Chemistry* 28(11):2278-2282, 1982.
  15. Gillespie, T.J., A.J. Gandolfi, T.P. Davis and R.A. Morano. Identification and quantification of methylfentanyl in postmortem specimens. *Analytical Toxicology* 6:139-142, 1982.
  16. Schoemaker, H., A. Chen, T.P. Davis and H.I. Yamamura. A study of the metabolism of des-tyrosine-gamma-endorphin using an improved HPLC system. *Psychopharmacology Bulletin* 18(4):144-148, 1982.
  17. Goodman, G.E., J.D. Einspahr, D.S. Alberts, T.P. Davis, S.A. Leigh, H.S.G. Chen and F.L. Meyskens. Pharmacokinetics of 13-cis-retinoic acid in patients with advanced cancer. *Cancer Research* 42:2087-2091, 1982.
  18. Schoemaker, H., T.P. Davis, N.W. Pedigo, A. Chen, E.S. Berens, J. Regan, N.C. Ling and H.I. Yamamura. Identification of  $\beta$ -endorphin 6-17 as the principal metabolite of des-tyrosine-gamma-endorphin (DT gamma E) *in vitro* and assessment of its activity in neurotransmitter receptor binding assays. *European J. of Pharmacology* 81:459-468, 1982.
  19. Peng, Y.M., D. Ormberg, D.S. Alberts and T.P. Davis. Improved high performance liquid chromatography of the new antineoplastic agents Bisantrene and Mitoxantrane. *J. Chromatography* 233:235-247, 1982.
  20. Hameroff, S.R., B.R. Crago, C. Neuman, J.R. Womble and T.P. Davis. Doxepin effects on chronic pain, depression and plasma opioids. *J. Clin. Psychiatry* 43(8):22-26, 1982.
  21. Russell, D.H., J.D. Ellingson and T.P. Davis. Analysis of polyamines and acetyl derivatives by a single automated amino acid analyzer technique. *J. Chromatography* 273:263-274, 1983.
  22. Peng, Y.M., J. Beaudry, D.S. Alberts and T.P. Davis. High performance liquid chromatography of provitamin A beta-carotene in plasma. *J. Chromatography* 273:410-414, 1983.
  23. Davis, T.P., S.K. Veggeberg, S.R. Hameroff and K.L. Watts. Sensitive and quantitative determination of plasma doxepin and desmethyl-doxepin in chronic pain patients by gas chromatography and mass spectrometry. *J. Chromatography* 273:436-441, 1983.
  24. Yamamura, H.I., K.W. Gee, R.E. Brinton, T.P. Davis, M. Hadley and J.K. Wamsley. Light microscopic autoradiographic visualization of (3H)-arginine vasopressin binding sites in rat brain. *Life Sciences* 32:1919-1924, 1983.
  25. Burks, T.F., L.D. Hirning, J.J. Galligan and T.P. Davis. Motility effects of opioid peptides in dog intestines. *Life Sciences* 31:2237-2240, 1983.
  26. Dill, D.B., M.K. Yousef, A. Goldman, S.P. Hillyard and T.P. Davis. Volume and composition of hand sweat of white and black men and women in desert walks. *Am. J. Physical Anthropology* 61:67-73, 1983.
  27. Brinton, R.E., S.H. Buck, P.P. Deshmukh, A. Chen, T.P. Davis, S. Hsiao and H.I. Yamamura. A non-equilibrium 24-hour vasopressin radioimmunoassay: Development and basal levels in the rat brain. *Brain Research* 266:344-347, 1983.
  28. Buck, S.H., J.H. Walsh, T.P. Davis, M.R. Brown, H.I. Yamamura and T.F. Burks.

- Characterization of the peptide and sensory neurotoxic effects of capsaicin in the guinea pig. *J. Neuroscience* 3:2064-2074, 1983.
29. Alberts, D.S. Y.-M. Peng, S. Leigh, T.P. Davis and D.L. Woodward. Disposition of Mitoxantrane in patients. *Cancer Treatment Reviews* 10:23-27, 1983.
  30. Davis, T.P., A.J. Culling, H. Schoemaker and J.H. Galligan.  $\beta$ -endorphin and its metabolites stimulate motility in the dog small intestine. *J. Pharmacol. Exp. Ther.* 227(2):499-507, 1983.
  31. Berens, M.E., S.E. Salmon and T.P. Davis. Quantitative analysis of prostaglandins in cell culture by high resolution gas chromatography with electron capture detection. *J. Chromatography* 307(2):251-260, 1984.
  32. Davis, T.P., H. Schoemaker, and A.J. Culling-Berglund. Centrally acting drugs alter *in vitro*  $\beta$ -endorphin processing in the rat. *European J. Pharmacol.* 100:249-251, 1984.
  33. Dray, A., R. Metsch, and T.P. Davis. Endorphins and the central inhibition of urinary bladder motility. *Peptides* 5(5):645-647, 1984.
  34. Hameroff, S.R., K.S. Watts, J.L. Weiss, B. Crago, T.C. Lerman, C.P. Neuman, R.C. Cork, J.R. Womble, T.P. Davis. Doxepin effects on chronic pain and depression: A controlled study. *J. Clinical Psychiatry* 45(3):47-52, 1984.
  35. Peng, Y.-M., D.S. Alberts, S.E. Salmon and T.P. Davis. A method for the simultaneous measurement of the new anthracycline derivative 4'-deoxydoxorubicin and its potential metabolites by reversed phase liquid chromatography. *J. Invest. New Drug* 2:277-280, 1984.
  36. Davis, T.P., H.D. Johnson, and C.W. Gehrke. Effect of temperature stress on circulating biogenic amines in bovine. *Comp. Biochem. and Physiol.* 79c(2):369-373, 1984.
  37. Davis, T.P., H. Schoemaker, and A.J. Culling-Berglund. Characterization of *in vitro* proteolytic processing of  $\beta$ -endorphin by reversed phase HPLC. *Peptides* 5:1037-1042, 1984.
  38. Schoemaker, H. and T.P. Davis. Differential *in vitro* metabolism of  $\beta$ -endorphin in schizophrenia. *Peptides* 5:1049-1054, 1984.
  39. Brinton, R.E., K.W. Gee, J.W. Wamsley, T.P. Davis, and H.I. Yamamura. Regional distribution of putative vasopressin receptors in rat brain pituitary by quantitative autoradiography. *Proc. Nat. Acad. Sci.* 81:7248-7252, 1984.
  40. Alberts, D.S., Y.M. Peng, S. Leigh, T.P. Davis, and D.L. Woodward. Disposition of Mitoxantrane in cancer patients. *Cancer Research* 46:1879-1884, 1985.
  41. Peng, Y.-M., D.S. Alberts, and T.P. Davis. *In vivo* and *in vitro* metabolism of the new anticancer drug bisantrene. *Cancer Chemotherapy and Pharmacology* 14:15-20, 1985.
  42. Davis, T.P., Porreca, F., T.F. Burks, and A. Dray. The Proenkephalin A fragment peptide E: Central processing and *in vivo* CNS activity. *European J. Pharmacology* 111:177-184, 1985.
  43. Davis, T.P. and A.J. Culling-Berglund. High performance liquid chromatographic analysis of *in vitro* central neuropeptide processing. *J. Chromatography* 327:279-292, 1985.
  44. Dray, A., and T.P. Davis. The Proenkephalin A fragment metorphamide shows supraspinal and spinal opioid activity *in vivo*. *Peptides* 6:217-221, 1985.
  45. Hameroff, S.R., R.C. Cork, J.L. Weiss, B.R. Crago, and T.P. Davis. Doxepin effects on chronic pain and depression: A controlled study. *Clin. J. of Pain* 1:171-176, 1985.
  46. Davis, T.P., A. Han, and M.K. Yousef. Central metabolism of  $\beta$ -endorphin in different species of temperature acclimated rodents. *Comp. Biochem. Physiol.* 84c(1):105-111, 1986.
  47. Davis, T.P., T.J. Gillespie, R. Yekta, and T.M. Hansen. Chromatographic characterization of nutritional components in a low calorie, juice based beverage. *Flussiges Obst.* 11:577-580, 1986.
  48. Davis, T.P., A.J. Culling-Berglund and H. Schoemaker. Specific regional differences of  $\beta$ -endorphin metabolism in schizophrenics. *Life Sciences* 39(26):2601-2609, 1986.
  49. Davis, T.P., A.J. Culling-Berglund, T.J. Gillespie and T.L. Smith. Ethanol treatment alters  $\beta$ -endorphin metabolism by purified synaptosomal membranes. *Peptides* 8:467-472, 1987.

50. Davis, T.P. and A.J. Culling-Berglund. Neuroleptic drug treatment alters *in vitro* central neurotensin metabolism. *Psychoneuroendocrinology* 12(4):253-260, 1987.
51. Conrad, K.A., T.C. Fagan, P. May Shar, T.P. Davis and D.G. Johnson. Anti-hypertensive effects of parenteral nicardipine alone and with captopril. *Clin. Pharm. and Therap.* 42(1):113-118, 1987.
52. Carrier, M., J.G. Copeland, D.H. Russell, M.J. Perrotta, T.P. Davis and R.W. Emery. Urinary polyamines are non-invasive markers of cardiac allograft rejection. *J. Heart Transplantation* 6:286-289, 1987.
53. Belyea, R.L., F.A. Martz, M. Madhisetty and T.P. Davis. Intake, digestibility and energy utilization of corrugated paper diets. *Animal Feed Sci. and Tech.* 17:57-64, 1987.
54. Carrier, M., D.H. Russell, T.P. Davis, R.W. Emery and J.G. Copeland. Urinary polyamines as markers of cardiac allograft rejection. *J. Thoracic Cardiovasc. Surgery* 96(5):806-810, 1988.
55. Margolis, S.A., and T.P. Davis. Stabilization of ascorbic acid in human plasma, and its liquid-chromatographic measurement. *Clinical Chemistry* 34:2217-2223, 1988.
56. Carrier, M., D.H. Russell, T.P. Davis, R.W. Emery and J.G. Copeland. Value of urinary polyamines as noninvasive markers of cardiac allograft rejection in the dog. *Ann. Thorac. Surg.* 45:158-163, 1988.
57. Culling-Berglund, A.J., S.A. Newcomb, M. Gagne, W.S. Morfitt and T.P. Davis. A sensitive and specific procedure for the analysis of  $\beta$ -carotene in human skin. *J. Micronutrient Analysis* 5:139-148, 1989.
58. Plezia, P.M., D.S. Alberts, Y.M. Peng, M.J. Xu, S. Sayers, T.P. Davis, E.A. Surwit and F.L. Meyskens. The role of serum and tissue pharmacology studies in the design and interpretation of chemoprevention studies. *Preventive Medicine* 18:680-687, 1989.
59. Davis, T.P., T.W. Moody, R. Liu, S. Crowell and H. Burgess.  $\beta$ -endorphin and neurotensin stimulate *in vitro* clonal growth of human SCLC cells. *Eur. J. Pharmacol.* 161:283-285, 1989.
60. Staley, J., G. Fiskum, T.P. Davis, and T.W. Moody. Neurotensin elevates cytosolic calcium in small cell lung cancer cells. *Peptides* 10:1217-1221, 1989.
61. Davis, T.P., T.J. Gillespie and F. Porreca. Peptide fragments derived from the  $\beta$ -chain of hemoglobin (hermorphins) are centrally active *in vivo*. *Peptides* 10:747-751, 1989.
62. Crowell, S.L., H.S. Burgess and T.P. Davis. Effect of mycoplasma on the autocrine stimulation of human small cell lung cancer *in vitro* by bombesin and  $\beta$ -endorphin. *Life Sciences* 45:2471-2476, 1989.
63. Rao, R.K., O. Koldovsky, P.F. Pollack, M. Korc, S. Wright and T.P. Davis. Processing and transfer of epidermal growth factor in developing rat jejunum and ileum. *Peptides* 11(6):1093-1102, 1990.
64. Rao, R.K., O. Koldovsky and T.P. Davis. Inhibition of intestinal degradation of somatostatin by rat milk. *American J. Physiology.* 258:G426-G431, 1990.
65. Newcomb, S.A., A.J. Culling-Berglund and T.P. Davis. Endogenous levels of carotenoids in human buccal mucosa cells by RP-HPLC. *J. Chromatography* 526(1):47-58, 1990.
66. Li, Z.W., K. Brendel, J. Van Nispen and T.P. Davis. Neuropeptide processing in regional brain slices: Effect of conformation and sequence. *J. Pharmacol. Exp. Ther.* 253(2):851-857, 1990.
67. Morrill, M., R. Louis and T.P. Davis. Haloperidol, chlorpromazine and apomorphine alter central regional neuropeptidase activity. *Eur. J. Pharmacol.* 183(6):2318-2319, 1990.
68. Davis, T.P., B. McInturff, T.W. Moody and S.L. Crowell. Protease inhibitors suppress *in vitro* clonal growth of human small cell lung cancer. *Eur. J. Pharmacol.* 183(2):194-195, 1990.
69. Davis, T.P., G. Hoyer, P. Davis and T.F. Burks. Proenkephalin A derived peptide E and its fragments alter opioid contractility in the small intestine. *Eur. J. Pharmacol.* 191:253-261, 1990.
70. Konings, P., A.J. Culling-Berglund and T.P. Davis. Chronic haloperidol and chlorpromazine treatment alters *in vitro*  $\beta$ -endorphin metabolism in rat brain. *Eur. J.*

- Pharmacol.* 191:115-128, 1990.
71. Davis, T.P., S. Crowell, B. McInturff, R. Louis and T. Gillespie. Neurotensin may function as a regulatory peptide in small cell lung cancer. *Peptides* 12:17-23, 1991.
  72. Davis, T.P., T. Gillespie, J. Shook, K. Hawkins, P. Davis, H.I. Yamamura and T.F. Burks. Changes in opioid receptor selectivity following processing of peptide E: Effect on gut motility. *Gastroenterology* 100:1603-1615, 1991.
  73. Knapp, R.J., S. Sharma, G. Toth, M. Duong, C. Bogert, T.P. Davis, V. Hruby and H.I. Yamamura. [D-Pen<sup>2,4</sup>I-Phe<sup>4</sup>,D-Pen<sup>5</sup>]enkephalin: A selective and high affinity radioligand for delta opioid receptors with exceptional specific activity. *J. Pharmacol. Exp. Ther.* 258(3):1077-1083, 1991.
  74. Rao, R.K., O. Koldovsky and T.P. Davis. Regional differences in the gastrointestinal processing of epidermal growth factor in suckling rats. *American J. Physiol.* 261:G790-G798, 1991.
  75. Weber, S.J., S. Sharma, G. Toth, L. Hersh, V. Hruby, D. Greene, H.I. Yamamura and T.P. Davis. Distribution and analgesia of [D-Pen<sup>2</sup>,D-Pen<sup>5</sup>] enkephalin and two halogenated analogues following intravenous administration. *J. Pharmacol. Exp. Ther.* 259(3):1109-1117, 1991.
  76. Davis, T.P., T.J. Gillespie and P.N.M. Konings. Specificity of neurotensin metabolism by regional rat brain slices. *J. Neurochemistry* 58:608-617, 1992.
  77. Weber, S., L. Trombley, P. Davis and T.P. Davis. Metabolic half-life of somatostatin and peptidase activities are altered in Alzheimer's disease. *J. Gerontology* 47(1):B18-B25, 1992.
  78. Davis, T.P., S. Crowell, J. Taylor, J.P. Moreau, D. Coy, J. Staley and T.W. Moody. Metabolic Stability and tumor inhibition of Bombesin/GRP receptor antagonists. *Peptides* 13:401-407, 1992.
  79. Weber, S.J., D.L. Greene, V.J. Hruby, H.I. Yamamura, F. Porreca and T.P. Davis. Whole body and brain distribution of [<sup>3</sup>H] DPDPE after I.P., I.V., P.O., and S.C. administration. *J. Pharmacol. Exp. Ther.* 263(3):1308-1316, 1992.
  80. Gillespie, T.J., P.N.M. Konings, B. Merrill and T.P. Davis. A specific enzyme assay for aminopeptidase M. in rat brain. *Life Sciences* 51(26):2097-2106, 1992.
  81. Banks, W.A., K.L. Audus and T.P. Davis. Permeability of the Blood-Brain Barrier to Peptides: An Approach to the Development of Therapeutically Useful Analogs. *Peptides* 13:1289-1294, 1992.
  82. Fang L., Knapp R.J., Matsunaga T., Weber S., T.P. Davis, Hruby V., Yamamura H.I. Synthesis of [4'-<sup>125</sup>I-Phe<sup>3</sup>,Glu<sup>4</sup>]deltorphin and characterization of its delta opioid receptor binding properties. *Life Sciences* 51:189-193, 1992.
  83. Rao, R.K., O. Koldovsky and T.P. Davis. Fate of intraduodenally administered somatostatin in rats *in vivo*. *Peptides* 14(6):1199-1203, 1993.
  84. Horan, P., W. Kazmierski, R. Ferguson, V.J. Hruby, S. Weber, T.P. Davis, L. Fang, R. Knapp, H.I. Yamamura, T. Kramer, T.F. Burks and F. Porreca. Unexpected antinociceptive potency of cyclic [D-Tca<sup>1</sup>]-CTAP: Potential for a novel mechanism of action. *Eur. J. Pharmacol.* 233:53-62, 1993.
  85. Konkoy, C., M.J. Oakes, and T.P. Davis. Chronic treatment with neuroleptics alters neutral endopeptidase 24.11 activity in rat brain regions. *Peptides* 14:1017-1020, 1993.
  86. Konings, P.N.M., Farnell, B., M.C. Beinfeld, B.J. Merrill, T.W. Moody, R. Day, N.G. Seidah, and T.P. Davis. Processing, release and metabolism of cholecystokinin in SK-N-MC1XC cells. *Neuropeptides* 25:19-30, 1993.
  87. Weber, S.J., T.J. Abbruscato, V.J. Hruby, H.I. Yamamura and T.P. Davis. Assessment of an *in vitro* Blood-Brain Barrier model using several [met]<sup>5</sup> enkephalin opioid analogs. *J. Pharmacol. Exp. Ther.* 266:1649-1655, 1993.
  88. Horan, P.J., K.D. Wild, A. Misicka, A. Lipkowski, V.J. Hruby, S.J. Weber, T.P. Davis, H.I. Yamamura and F. Porreca. Agonist and Antagonist Profiles of (D-Ala<sup>2</sup>, Glu<sup>4</sup>) Deltorphin and its (Cys<sup>4</sup>) - and (Ser<sup>4</sup>) Derivatives: Further evidence of opioid delta receptor multiplicity. *J. Pharmacol. Exp. Ther.* 265:896-902, 1993.
  89. Clark, D.A., R. Day, N. Seidah, T.W. Moody, F. Cuttitta and T.P. Davis. Protease inhibitors suppress *in vitro* growth of human small cell lung cancer. *Peptides* 14:1021-

- 1028, 1993.
90. Horan, P., A. Mattia, E.J. Bilsky, S. Weber, T.P. Davis, V.J. Hruby, and F. Porreca. Antinociceptive profile of biphalin, a dimeric enkephalin analog. *J. Pharmacol. Exp. Ther.* 265:1446-1454, 1993.
  91. Farnell, B., P.N.M. Konings, B. Merrill, and T.P. Davis. Differential regulation of CCKmRNA in the human neuroblastoma cell line SK-N-MC-9c in response to second messenger activators. *FEBS Letters* 335(1):65-68, 1993.
  92. Rao, R.K., H.-H. Chang, S. Levenson, F. Porreca, P. Brannon, T.P. Davis, and O. Koldovsky. Ontogenic differences in the inhibition of gastric acid secretion by epidermal growth factor. *J. Pharmacol. Exp. Therap.* 266(2):647-654, 1993.
  93. Quay T., Slaughter C., Davis T.P., Merrill B.J., Hersh L.B. Positional effects in the neutral endopeptidase (enkephalinase) reaction. *Archives in Biochemistry and Biophysics* 308(1):133-136, 1994.
  94. Oakes, M.G., and T.P. Davis. The ontogeny of enzymes involved in the post-translational processing and metabolism of neuropeptides. *Developmental Brain Research* 80:127-136, 1994.
  95. Polt, R., Porreca, F., Lajos Z.S., Bilsky, E.J., Davis, P., Davis, T.P., Horvath, R., McCormick, J.M., Yamamura, H., Hruby, V. Glycopeptide enkephalin analogues cross the blood-brain barrier *in vivo* to produce analgesia in mice. *Proc. Nat. Acad. Sci. USA* 91:7114-7118, 1994.
  96. Konkoy, C.S., S.M. Waters and T.P. Davis. Acute administration of neuroleptics decreases neurotensin metabolism on intact regional rat brain slices. *J. Pharmacol. Exp. Ther.* 269(2):555-563, 1994.
  97. Brownson, E.A., T.J. Abbruscato, T.J. Gillespie and T.P. Davis. Effect of peptidases at the blood brain barrier on the permeability of enkephalins. *J. Pharmacol. Exp. Ther.* 270(2):675-680, 1994.
  98. Haaseth, R.C., P.J. Horan, E.J. Bilsky, P. Davis, T. Zalewska, J. Slaninova, H.I. Yamamura, S. Weber, T.P. Davis, F. Porreca and V.J. Hruby. [L-Ala<sup>3</sup>] DPDPE: A new enkephalin analog with a unique opioid receptor activity profile. Further evidence of delta opioid receptor multiplicity. *J. Medicinal Chemistry* 37:1572-1577, 1994.
  99. Mania-Farnell, B.L., B.J. Merrill, H.I. Yamamura and T.P. Davis. Second messenger activators regulate CCK mRNA in the human neuroepithelioma cell line SK-N-MCIXC. *Annals of the New York Academy of Sciences* 713:446-449, 1994.
  100. Hruby, V.J., A. Misicka, A.W. Lipkowski, R.C. Haaseth, H. Bartosz-Beechowski, X. Qian, N. Collins, J.P. Meyer, L. Szabo, R. Polt, F. Porreca, T.P. Davis and H.I. Yamamura. New opioid compounds in analgesia. *Regulatory Peptides* S71-S72, 1994.
  101. Slaninova, J., R.J. Knapp, S.J. Weber, T.P. Davis, S.N. Fang, V.J. Hruby, H.I. Yamamura. [<sup>125</sup>I]SNF-8702: A selective radioligand for cholecystokinin B receptors. *Peptides* 16(2):221-224, 1995.
  102. Waters, S.M., C. Konkoy and T.P. Davis. Neuropeptide metabolism on intact, regional brain slices: Effect of dopaminergic agents on substance P, cholecystokinin and Met-enkephalin degradation. *J. Pharmacol. Exp. Ther.* 274: 783-789, 1995.
  103. Schetz, J.A., C. Mayr, J.-P. Moreau, J. Taylor, and T.P. Davis. Distribution and pharmacokinetics of a potent peptide antagonist of parathyroid hormone and parathyroid hormone related protein in the rat. *J. Pharmacol. Exp. Ther.* 274(3):1456-1462, 1995.
  104. Waters, S.M., and T.P. Davis. Alterations of substance P metabolism and neuropeptidases in Alzheimer's disease. *J. Gerontology* 50A: B315-B319, 1995.
  105. Konkoy, C.S. and T.P. Davis. Regional metabolism of met-enkephalin and CCK on intact rat brain slices: Characterization of specific peptidases. *J. Neurochemistry.* 65(1):2773-2782, 1995.
  106. Meyer, J.-P., T.J. Gillespie, V.J. Hruby, and T.P. Davis. *In vitro* stability of some reduced peptide bond pseudopeptide analogs of dynorphin A. *Peptides* 16(7):1215-1219, 1995.
  107. Mania-Farnell, B.L., I. Botros, and T.P. Davis. Modulation of CCK mRNA in cell lines in response to isoproteranol and retinoic acid. *Neuropeptides* 29:221-227, 1995.
  108. Hruby, V.J., T.P. Davis, R. Polt, F. Porreca, D. O'Brien, H.I. Yamamura, H. Bartosz, L.

- Szabo, T.J. Gillespie, A. Misicka, A. Lipkowski, X. Qian, G. Li, D. Patel and G. Bonner. Design and synthesis of peptide ligands with unique biochemical and biological profiles at opioid receptors that cross the blood brain barrier. *Analgesia* 1:469-472, 1995.
109. Hruby, V.J., N. Collins, F.-D. Lung, J.-P. Meyer, T.P. Davis, H.I. Yamamura and F. Porreca. Design of peptides and peptidomimetics for delta and kappa opioid receptor subtypes. *Regulatory Peptides* 54:123-124, 1995.
110. Rao, R.K., M Shantaon, S. Levenson, A. Raja, T.P. Davis, and A. Rao. Molecular variants of epidermal growth factor in malignant astrocytoma. *Peptides* 17(1):179-181, 1996.
111. Mania-Farnell, B.L., I. Botros, R. Day, and T.P. Davis. Differential modulation of prohormone convertase mRNA by second messenger activators in two cholecystokinin producing cell lines. *Peptides* 17:47-54, 1996.
112. Williams, S., T.S. Abbruscato, V.J. Hruby, and T.P. Davis. The passage of a delta opioid receptor selective enkephalin, DPDPE, across the blood-brain and blood CSF barriers. *J. Neurochemistry* 66:1289-1299, 1996.
113. Bell, I.R., G.E. Schwartz, R.R. Bootzin, V. Hau, and T.P. Davis. Time-dependent sensitization of plasma beta-endorphin in community elderly with self-reported environmental chemical odor intolerance. *Biological Psychiatry* 40:134-143, 1996.
114. Konkoy, C.S., S.M. Waters and T.P. Davis. Subchronic haloperidol administration decreases aminopeptidase N activity and met-enkephalin metabolism in rat striatum and cortex. *European J. Pharmacol.* 297:47-51, 1996.
115. Abbruscato, T.J., S.A. Williams, V.J. Hruby and T.P. Davis. Blood-to-CNS entry and stability of biphalin, a unique double-enkephalin analog, and its halogenated derivatives. *J. Pharmacol. Exp. Ther.* 276:1049-1057, 1996.
116. Greene, D.L., V.S. Hau, A. Misicka, R. Lipkowski, T. Abbruscato, T. Gillespie, V. J. Hruby and T.P. Davis. Enkephalin analog pro-drugs: An assessment of *in vitro* conversion, enzyme cleavage characterization and blood-brain barrier permeability. *J. Pharmacol. Exp. Ther.* 277:1366-1375, 1996.
117. Waters, S., Konkoy, C.S. and T.P. Davis. Haloperidol and Apomorphine differentially affect neuropeptidase activity. *J. Pharmacol. Exp. Ther.* 277:113-120, 1996.
118. Konkoy, C.S. and T.P. Davis. Ectoenzymes as sites of peptide regulation. *Trends in Pharmacological Sciences* 17(8) : 288-294, 1996.
119. Moreau, J.-P., S. Kim, J.Z. Dong, F. Ignatious, S. Jackson, S.C. Moreau, B.A. Morgan, F. Touraud, J.E. Taylor, B. Tissier, M. Pellet, W. Murphy, and T.P. Davis. Improved analogs and novel delivery systems for somatostatin octapeptides. *Metabolism*, Vol. 45, No. 8, Suppl. 1, pp 24-26, 1996.
120. Abbruscato, T.J., S.A. Williams, V.J. Hruby, and T.P. Davis. Blood-brain barrier permeability and bioavailability of a highly potent and mu-selective opioid receptor antagonist, CTAP: Comparison with morphine. *J. Pharmacol. Exp. Ther.* 280(1):402-409, 1997.
121. Thomas, S.A., T.A. Abbruscato, V.J. Hruby, and T.P. Davis. The entry of [D-Penicillamine<sup>2-5</sup>] enkephalin into the central nervous system: Saturation kinetics and specificity. *J. Pharmacol. Exp. Ther.* 280(3):1235-1240, 1997.
122. Abbruscato, T.J., S.A. Williams, V.J. Hruby and T.P. Davis. Brain and spinal cord distribution of biphalin, correlation with opioid receptor density and mechanism of CNS entry. *J. Neurochemistry* 69(3):1236-1245, 1997.
123. Thomas, S.A., T.J. Abbruscato, V.S. Hau, V.J. Hruby and T.P. Davis. Structure-activity relationships of a series of [D-ALA<sup>2</sup>] deltorphin I and II analogues; *in vitro* blood-brain barrier permeability and stability<sup>1</sup>. *J. Pharmacol. Exp. Ther.* 281(2):817-825, 1997.
124. Waters, S.M., M.P. Rounseville and T.P. Davis. Effect of dopaminergic drugs on processing and degradative neuropeptidase mRNA in rat frontal cortex and caudate putamen. *Brain Research* 754:28-34, 1997.
125. Bell, I.R., G.E. Schwartz, R.R. Bootzin, V. Hau and T.P. Davis. Elevation of plasma beta-endorphin levels of shy elderly in response to novel laboratory experiences. *Behavioral Medicine* 22(4):168-173, 1997.
126. Egleton, R.D. and T.P. Davis. Bioavailability and transport of peptides and peptide drugs

- into the brain. *Peptides* 18(9):1431-1439, 1997.
127. Moody, T.W., Mayr, C.A., T. Gillespie and T.P. Davis. Neurotensin is metabolized by endogenous proteases in prostate cancer cell lines. *Peptides* 19(2):253-258, 1998.
  128. Slaninova, J., Appleyard, S., A. Misicka, A.W. Lipkowski, T. Abbruscato, T.P. Davis, V.J. Hruby and H.I. Yamamura. (<sup>125</sup>I-Tyr<sup>1</sup>) Biphalin binding to opioid receptors of rat brain and NG 108-15 cell membranes. *Life Sciences* 62, 14: PL199-PL204, 1998.
  129. Li, G., W. Haq, L. Xiang, B.-S. Lou, R. Hughes, I.A. DeLeon, P. Davis, T.J. Gillespie, M. Romanowski, X. Zhu, A. Misicka, A.W. Lipkowski, F. Porreca, T.P. Davis, H.I. Yamamura, D.F. O'Brien and V.J. Hruby. Modifications of the 4,4'-residues and SAR Studies of Biphalin, a highly potent opioid receptor active peptide. *Bioorganic & Medicinal Chemistry Letters* 8(5):555-560, 1998.
  130. Gillespie, T, J. Erenberg, J.E. Taylor, S. Kim, J. Dong, V. Hau and T.P. Davis. Novel somatostatin analogs for the treatment of acromegaly and cancer exhibit improved *in vivo* stability and distribution. *J. Pharmacol. Exp. Ther.* 285(1):95-104, 1998.
  131. Egleton, R.D., Abbruscato, T.J., S. Williams, and T.P. Davis. Transport of opioid peptides into the central nervous system. *J. Pharm. Sci.* 87(11):1433-1439, 1998.
  132. Kline, J.P., I. Bell, G.E. Schwartz, V. Hau and T.P. Davis. Repressive and defensive coping styles predict resting plasma endorphin levels in the elderly. *Biological Psychology* 49:295-302, 1998.
  133. Abbruscato, T.J. and T.P. Davis. Combination of hypoxia/aglycemia compromises *in vitro* blood-brain barrier integrity. *J. Pharmacol. Exp. Ther.* 289(2):668-675, 1999.
  134. Egleton, R.D. and T.P. Davis. Transport of the opioid receptor agonist [D-Pen<sup>2</sup>, D-Pen<sup>5</sup>] enkephalin across the blood-brain barrier involves transcytosis. *J. Pharm. Sci.*, 88(4):392-397, 1999.
  135. Rao, R.K., O. Koldovsky, C. Williams and T.P. Davis. Milk inhibits somatostatin degradation in suckling rat jejunum *in vivo*. *J. Pediatric Gastroenterology and Nutrition*, 28(1):84-94, 1999.
  136. Gentry, C.L., R.D. Egleton, T. Gillespie and T.P. Davis. The effect of halogenation on blood-brain barrier permeability of a novel peptide drug. *Peptides* 20(10):1229-1238, 1999.
  137. Abbruscato, T.J. and T.P. Davis. Protein expression of brain endothelial cell E-cadherin after hypoxia/aglycemia: Influence of astrocyte contact. *Brain Research* 842(2):277-286, 1999.
  138. Rounseville, M., and T.P. Davis. Prohormone convertase and autocrine growth factor mRNAs are coexpressed in small cell lung carcinoma. *J Molecular Endocrinology* 25(1):121-128, 2000.
  139. Newcomb, R., T. Abbruscato, T. Singh, L. Nadasdi, T. P. Davis and G. Miljanich. Bioavailability of ziconotide in brain: Influx from blood, stability and diffusion. *Peptides* 21:491-501, 2000.
  140. Egleton, R.D., S.A. Mitchell, R. Polt, V.J. Hruby, J.D. Huber and T.P. Davis. Improved bioavailability to the brain of glycosylated Met-enkephalin analogs. *Brain Research* 881(1):37-46, 2000.
  141. Witt, K.A., R.D. Egleton, C. Slate, V.J. Hruby, and T.P. Davis. Assessment of stereoselectivity of trimethylphenylalanine analogs of  $\delta$ -opioid [D-Pen<sup>2</sup>, D-Pen<sup>5</sup>]-enkephalin. *J. Neurochemistry* 75(1):424-435, 2000.
  142. Bilsky, E.J., R.D. Egleton, J.D. Huber, H. Jones, H.I. Yamamura, J. Janders, T.P. Davis, P. Davis, F. Porreca, V.J. Hruby, S.A. Mitchell, M.M. Palian, R. Polt. Enkephalin glycopeptide analogs produce analgesia with reduced dependence liability. *J. Med. Chem.* 43(13):2586-2590, 2000.
  143. Mark, K.S., and T.P. Davis. Stroke: Development, prevention and treatment with peptidase inhibitors. *Peptides* 21(12):1965-1973, 2000.
  144. Witt, K.A., R.D. Egleton, J.D. Huber and T.P. Davis. Insulin enhancement of opioid peptide transport across the blood-brain barrier and assessment of analgesic effect. *J. Pharmacol. Exp. Therap.* 295(3):972-978, 2000.
  145. Huber, J.D., K.A. Witt, S. Hom, R.D. Egleton, K.S. Mark, and T.P. Davis. Inflammatory pain alters blood-brain barrier permeability and tight junctional protein expression.

- American J. Physiology-Heart and Circulatory Physiology*. 280:H1241-H1248, 2001.
146. Moody, T.W., J. Chiles, M. Casibang, E.L. Moody, D. Chan and T.P. Davis. SR48692 is a neurotensin receptor agonist which inhibits the growth of small cell lung cancer cells. *Peptides* 22:109-115, 2001.
  147. Egleton, R.D., S.A. Mitchell, J. Huber, M.M. Palian, R. Polt, and T.P. Davis. Improved Blood-Brain Barrier Penetration and Enhanced Analgesia of an Opioid Peptide by Glycosylation. *J. Pharmacol. Exp. Therap.* 299(3):967-972, 2001.
  148. Hom, S, R.D. Egleton, T.J. Abbruscato and T.P. Davis. Effect of reduced flow on blood-brain barrier transport systems. *Brain Research* 890(1):38-48, 2001.
  149. Witt, K.A., T.J. Gillespie, R.D. Egleton, J.D. Huber and T.P. Davis. Peptide drug modification to enhance bioavailability and blood brain barrier permeability. *Peptides* 22:2329-2243, 2001.
  150. Witt, K.A., J.D. Huber, R.D. Egleton, M.J. Roberts, M.D. Bentley, L. Guo, H. Wei, H.I. Yamamura and T.P. Davis. Pharmacodynamic and pharmacokinetic characterization of poly(ethylene glycol) conjugation to Met-enkephalin analogue DPDPE. *J. Pharmacol. Exp. Therap.* 298(2):848-856, 2001.
  151. Huber, J.D., R.D. Egleton and T.P. Davis. Molecular physiology and pathophysiology of blood-brain barrier tight junction. *Trends in the Neurosciences* 24(12):719-725, 2001.
  152. Abbruscato, T.J., K.S. Mark, B. Hawkins and T.P. Davis. Nicotine and cotinine modulate cerebral microvascular permeability and protein expression of ZO-1 through nicotinic acetylcholine receptors expressed on brain endothelial cells. *J. Pharm. Sci.* 91(12):2525-2538, 2002.
  153. Mark, K.S. and T.P. Davis. Cerebral microvascular changes in permeability and tight junctions induced by hypoxia- reoxygenation. *American J. Physiology-Heart and Circulatory Physiology* 282(4):H1485-H1494, 2002.
  154. Brown, R.C. and T.P. Davis. Calcium modulation of adherens and tight junction function: a potential mechanism for blood-brain barrier disruption after stroke. *Stroke* 33(6):1706-1711, 2002.
  155. Hau, V., J. Huber, R. Egleton and T.P. Davis. The effect of guanidino modification and proline substitution on the *in vitro* stability and BBB permeability of endomorphin II. *J. Pharm. Sci.* 91(10):2140-2149. 2002.
  156. Huber, J.D., V.S. Hau, C.R. Campos, R.D. Egleton and T.P. Davis. Blood-brain barrier tight junctions are altered during a 72-h exposure to lambda-carrageenan-induced inflammatory pain. *American J. Physiology-Heart and Circulatory Physiology* 283(4):H1531-H1537, 2002.
  157. Hawkins, B.T., R.C. Brown and T.P. Davis. Smoking and ischemic stroke: A role for nicotine? *Trends in Pharmacological Sciences* 23(2):78-82, 2002.
  158. Witt, K.A. and T.P. Davis. Pluronic P85 block copolymer enhances opioid peptide analgesia. *J. Pharmacol. Exp. Ther.* 303(2):760-767, 2002.
  159. Huber, J., V.S. Hau, K.S. Mark, R.C. Brown, C.R. Campos and T.P. Davis. Viability of microvascular endothelial cells to direct exposure of formalin, lambda-carrageenan and complete Freund's adjuvant. *European J. Pharmacology* 450(3):297-304, 2002.
  160. Huber, J.D., R.D. Egleton and T.P. Davis. Conjugation of low molecular weight polyethylene glycol to biphalin enhances antinociceptive profile. *J. Pharm. Sci.* 92:1377-1385, 2003.
  161. Egleton, R.D., C.R. Campos, J.D. Huber, R.C. Brown and T.P. Davis. Differential effects of diabetes on rat choroid plexus ion transporter expression. *Diabetes* 52:1496-1501, 2003.
  162. Ritchie, J.C., T.P. Davis, and C.B. Nemeroff. Action of three ectopeptidases on corticotropin-releasing factor: Metabolism and functional aspects. *Neuropsychopharmacology* 28(1):22-33, 2003.
  163. Witt, K.A., K.S. Mark, S. Hom and T.P. Davis. Effect of Hypoxia/Reoxygenation on rat blood-brain barrier permeability and tight junctional protein expression. *American J. Physiology-Heart and Circulatory Physiology* 285(6):H2820-2831, 2003.
  164. Brown, R.C., K.S. Mark, R.D. Egleton, J.D. Huber, A.R. Burroughs and T.P. Davis. Protection against hypoxia-induced increase in blood-brain barrier permeability: Role of

- Tight Junction Proteins and NF kappa B. *Journal of Cell Science* 116(4):693-700, 2003.
165. Wolka, A., J.D. Huber and T.P. Davis. Pain and the Blood Brain Barrier: obstacles to drug delivery. *Advanced Drug Delivery Reviews* 55(8):987-1006, 2003.
166. Brown, R.C., R.D. Egleton and T.P. Davis. Mannitol opening of the blood brain barrier: regional variation of sucrose, 86-Rb, or albumin. *Brain Research* 1014(1-2):221-227, 2004.
167. Mark, K.S., A. Burroughs and T.P. Davis. Nitric oxide mediates hypoxia-induced changes in paracellular permeability of cerebral microvasculature. *American J. Physiology-Heart and Circulatory Physiology* 286(1):H174-180, 2004.
168. Brown, R.C., K.S. Mark and T.P. Davis. Protection against hypoxia-induced blood brain barrier disruption: Changes in intracellular calcium. *American Journal of Physiology-Cell Physiology* 286(5):C1045-1052, 2004.
169. Hawkins, B.T., T.J. Abbruscato, R.D. Egleton, R.C. Brown, J.D. Huber, C.R. Campos, and T.P. Davis. Nicotine increases *in vivo* blood-brain barrier permeability and alters cerebral microvascular tight junction protein distribution. *Brain Research* 1027(1-2):48-58, 2004.
170. Landen, J.W., V. Hau, M. Wang, T.P. Davis, B. Celiac, B.H. Wainer, E.G. Glass, H.C. Joshi and D.R. Archer. Noscapine crosses the blood-brain barrier and inhibits glioblastoma growth. *Clinical Cancer Research* 10(15):5187-5201, 2004.
171. Hau, V.S., J.D. Huber, C.R. Campos, R.T. Davis and T.P. Davis. Effect of lambda carrageenan induced inflammatory pain on brain uptake of codeine and antinociception. *Brain Research* 1018(2):257-264, 2004.
172. Doolittle, N., L.E. Abrey, W. Bleyer, S. Brem, T.P. Davis, P. Dore-Duffy, L. Drewes, W. Hall, J. Hoffman, A. Korfel, R. Martuza, L. Muldoon, D. Peereboom, D. Peterson, S. Rabkin, Q. Smith, G. Stevens and E. A. Neuwelt. New Frontiers in Translational Research in Neuro-Oncology and the Blood-Brain Barrier: Report of the Tenth Annual Blood- Brain Barrier Disruption Consortium Meeting. *Clinical Cancer Research* 11:421-428, 2005.
173. Witt, K.A., K.S. Mark, J.D. Huber and T.P. Davis. Hypoxia Inducible Factor and Nuclear Factor Kappa-B Activation in Blood Brain Barrier Endothelium under Hypoxic/Reoxygenation Stress. *J. Neurochemistry* 92(1):203-214, 2005.
174. Brown, R.C. and T.P. Davis. Hypoxia/Aglycemia alters expression of occludin and actin in brain endothelial cells. *Biochemical and Biophysical Research Communications* 327(4):1114-1123, 2005.
175. Egleton, R.D. and T.P. Davis. Development of Neuropeptide Drugs that Cross the Blood-Brain Barrier. *NeuroRx*. Jan; 2(1), 44-53. 2005.
176. Brooks, T.A., B.T. Hawkins, J.D. Huber, R.D. Egleton and T.P. Davis. Chronic inflammatory pain leads to increased blood-brain barrier permeability and tight junction protein alterations. *American J. Physiology (Heart and Circulatory)* 289(2):H738-H743. 2005.
177. Hawkins, B.T., R.D. Egleton and T.P. Davis. Modulation of cerebral microvascular permeability by endothelial nicotinic acetylcholine receptors. *American J. Physiology (Heart and Circulatory)* 289(1): H212-H219. 2005.
178. Hawkins, B. T. and T.P. Davis. The blood-brain barrier/neurovascular unit in health and disease. *Pharmacological Reviews* 57(2):173-185, 2005.
179. Fleegal, M.A., S. Hom, L.K. Borg and T.P. Davis. Hypoxia and post-hypoxic reoxygenation modulate PKC activity and protein expression in endothelial cells of the blood-brain barrier. *American J. Physiology (Heart and Circulatory)* 289(5):H2012-2019.2005.
180. Seelbach, M.J., J.D. Huber, T. Brooks, R.D. Egleton, K.A. Witt and T.P. Davis. Effect of lambda carrageenan-induced inflammatory pain on brain uptake of morphine and the potential role of P-glycoprotein. *J. Neurochemistry* . 102,5.1677-1690. 2007.
181. Witt, K.A., K.S. Mark , K. Sandoval and T.P. Davis. Reoxygenation stress on Blood Brain Barrier Paracellular Permeability and Edema in the Rat. *Microvascular Research* 75(1):91-96. 2008.
182. Hom, S., M.A. Fleegal, R.D. Egleton, C.R. Campos, B. Hawkins and T.P. Davis.

- Comparative changes in the blood brain barrier and cerebral infarction of SHR and WKY rats. *American Journal of Physiology (Regulatory, Integrative and Comparative Physiology)* 292 (5):1881-1892. 2007.
183. Huber, J.D., C.R. Campos, K.S. Mark and T.P. Davis. Alterations in blood-brain barrier ICAM-1 expression and microglial activation following lambda carrageenan induced inflammatory pain. *American Journal of Physiology (Heart and Circulatory)* 290(2):H732-740. 2006.
  184. Witt, K.A. and T.P. Davis. CNS Drug Delivery: Opioid Peptides and the Blood Brain Barrier. *The AAPS Journal* 7 (4) 9. 2006.
  185. Brooks, T.A., C.R. Campos, R.D. Egleton, M. Seelbach, N. Nametz and T.P. Davis. Biphasic cytoarchitecture and functional changes in the BBB induced by chronic inflammatory pain. *Brain Research* 1120(1):172-182. 2006.
  186. McCaffrey, G., W. Staatz, R. Egleton, M. Seelbach, C. Campos and T.P. Davis. Tight Junctions contain Oligomeric protein assembly critical for maintaining blood brain barrier integrity *in vivo*. *J. Neurochemistry* 103:2540-2555. 2007.
  187. Campos, C.R., S. Ocheltree, S. Hom, R.D. Egleton and T.P. Davis. Nociceptive inhibition prevents inflammatory pain induced changes in the blood brain barrier. *Brain Research* 1221: 6-13. 2008.
  188. Neuwelt, E., N. Joan Abbott, L. Abrey, W. A. Banks, B. Blakley, T.P. Davis, B. Engelhardt, Grammas, M. Nedergard, J. Nutt, W. Pardridge, G. Rosenberg, Q. Smith and L. Drewes. Strategies to advance translational research into brain barriers. *Lancet Neurology* 7(1): 84-96, 2008.
  189. Brooks, T.A., N. Nametz, R. Charles and T.P. Davis. Diclofenac attenuates the regional effect of carrageenan on BBB function and cytoarchitecture. *J. Phar Exp. Ther.* 325(2): 665- 673. 2008.
  190. Willis, C.L., T. A. Brooks and T.P. Davis. Chronic inflammatory pain and the neurovascular unit: a central role for maintaining BBB integrity? *Current Pharmaceutical Design* 14(16): 1625-1643, 2008
  191. McCaffrey, G.W., M.J. Seelbach, W.D. Staatz, N. Nametz, C. Quigley, C.R. Campos, T.A. Brooks and T.P. Davis. Occludin oligomeric assembly at tight junctions of the blood-brain barrier is disrupted by peripheral inflammatory hyperalgesia. *J. Neurochemistry.* 106(6):2395-2409. 2008.
  192. McCaffrey, G.W., C. Willis, W. Staatz, N. Nametz, C. Quigley, S. Hom, J. Lochhead and T.P. Davis. Occludin oligomeric assemblies at tight junctions of the blood brain barrier dynamically respond to hypoxia and reoxygenation stress. *J. Neurochemistry* 110,1:58-71.2009.
  193. Wang, Y., M. Thiyagarajan, N. Chow, I. Singh, H. Guo, T.P. Davis and B. Zlokovic. Differential Neuroprotection and Risk for Bleeding from Activated Protein C with varying degree of Anticoagulant Activity. *Stroke* 40, 5. 1864-1869. 2009.
  194. Ronaldson, P.T., K.M. DeMarco, L. Sanchez-Covarubias, C.M. Solinsky and T.P. Davis. Transforming growth factor Beta signaling alters permeability and tight junction protein expression at the blood brain barrier during inflammatory pain. *J. Cerebral Blood Flow and Metabolism* 29,6. 1084-1098.2009.
  195. Willis, C.L., D. S. Meske, and T.P. Davis. Protein kinase C activation modulates reversible increase in cortical blood-brain barrier permeability and tight junction protein expression during hypoxia and post-hypoxic reoxygenation. *J. Cerebral Blood Flow and Metabolism.* 30,11. 1847-1859.2010.
  196. Lochhead, J. J., G. McCaffrey, C. E. Quigley, J. Finch, K. DeMarco and T.P. Davis. Oxidative stress increases blood-brain barrier permeability and induces alterations in occludin during hypoxia-reoxygenation. *J. Cerebral Blood Flow and Metabolism.* 30,9.1625-1636. 2010.
  197. Ronaldson, P.T., J. D. Finch, K.M. DeMarco, C.M. Solinsky, C. E. Quigley and T.P. Davis. Inflammatory Pain signals an increase in functional expression of organic anion transporting polypeptide 1a4 at the blood brain barrier. *J. Pharmacology Experimental Therapeutics.* 336,3. 827-839.2011.
  198. Lochhead, J.J., G. McCaffrey, C. Quigley, J. Finch, K. DeMarco, T.P. Davis and P. T. Ronaldson. Tempol modulates changes in xenobiotic permeability and occludin oligomeric assemblies at the blood brain barrier during inflammatory pain. *Amer. J. of Physiology: Heart and Circ Physiology.* 302, 3 :H582-H593. 2011.
  199. Ronaldson, P.T. and T.P. Davis. Targeting Blood Brain Barrier Changes during Inflammatory Pain: An Opportunity for Optimizing CNS Drug Delivery. *Therapeutic Delivery.* 2, 8 :1015-1041. 2011.

200. Mc Caffrey, G., Staatz, W., Ronaldson, P.T., Finch, J.D., DeMarco, K.M., Laracuate, M., and T.P. Davis. P-glycoprotein trafficking at the blood brain barrier altered by peripheral inflammatory hyperalgesia. *J. Neurochemistry*. 122,5. 962-975. 2012.
201. Williams, P.D., Zlokovic, B.V., Griffin, J.H., Pryor, K.E., and T. P. Davis. Preclinical safety and pharmacokinetic profile of 3K3A-APC, a novel, modified Activated Protein C for Ischemic Stroke. *Current Pharmaceutical Design*. 18, 27. 4215-4222. 2012.
202. Ronaldson, P.T. and T. P. Davis. Blood –Brain Barrier Integrity and Glial Support: Mechanisms that can be targeted for novel therapeutic approaches in stroke. *Current Pharmaceutical Design*. 18 , 25. 3624-3644. 2012.
203. Wang, Y., Z. Zhang, N. Chow, T.P. Davis, J.H. Griffin, M. Chopp, and B.V. Zlokovic. An activated protein C analog with reduced anticoagulant activity enhances tPA treatment for ischemic stroke in rodents. *Stroke*. 43: 2444-2449. 2012.
204. Mc Caffrey, G., and T.P. Davis. Physiology and pathophysiology of the blood brain barrier : P-glycoprotein and occludin trafficking as therapeutic targets to optimize CNS drug delivery. *Journal of Investigative Medicine*. 60:8. 1131-1140. 2012.
205. Ronaldson, P.T. and T.P. Davis. Targeted drug delivery to treat pain and cerebral hypoxia. *Pharmacological Reviews*. 65,1. 291-314. 2013.
206. Slosky, L.M., B.J. Thompson, L. Sanchez-Covarubias, Y. Zheng, M. Laracuate, T. W. Vanderah, P.T. Ronaldson and T. P. Davis. Acetaminophen modulates P- glycoprotein functional expression at the blood-brain barrier by a constitutive androstane receptor–dependent mechanism. *Molecular Pharmacology*. 84,5. 774-786. 2013.
207. Guo, H., R.D. Bell, S. Wang, A. Sagare, N. Chow, T.P. Davis, J.H. Griffin, S.A. Goldman and B.V. Zlokovic. An activated protein C analog stimulates neuronal production by human neuronal progenitor cells via PAR1-PAR3-S1P-Akt pathway. *J. Neuroscience*. 33,14. 6181-6190. 2013.
208. Mosnier, L.O., J.A. Fernandez, T.P. Davis, B.V. Zlokovic and J.H. Griffin. Influence of the 3K3A-activated protein C variant on the plasma clot lysis activity of tPA and of tPA on the variant’s anticoagulant activity. *J Thrombosis Haemostasis*. 11,11.2059-2062.2013.
209. Ronaldson, P.T., and T.P. Davis. Gabapentin and diclofenac reduce opioid consumption in patients undergoing tonsillectomy: A result of altered CNS delivery? *Arch Trauma Res*. 2, 2. 97-98. 2013.
210. Lyden, P., H. Levy, S. Weymer, K. Pryor, W. G. Kramer, J. H. Griffin, T. P. Davis and B.V. Zlokovic. Phase 1 Safety, Tolerability and Pharmacokinetics of 3K3A-APC in Healthy Adult volunteers. *Current Pharmaceutical Design*. 19. 2010-2016. 2013.
211. Sanchez-Covarrubias, L., L.M. Slosky, P.T. Ronaldson, and T.P. Davis. P-glycoprotein modulates morphine uptake into the CNS: a role for the non-steroidal anti-inflammatory drug diclofenac. *PLoS One*. 10: 9 (2). 2014.
212. Sanchez-Covarubias, L., T.P. Davis and P.T. Ronaldson. Drug transporters at CNS Barrier Sites: Obstacle or Opportunity for drug delivery? *Current Pharmaceutical Design*. 20,10.1422-1449. 2014.
213. Davis, T.P., L. Sanchez-Covarubias and M.E. Tome. P-glycoprotein trafficking as a therapeutic target to optimize CNS drug delivery. *Advances in Pharmacology*. 71: 25-44. 2014.
214. Tome, M.E., C.P. Schaefer, J.M. Herndon, L. Jacobs, Yifeng Zhang, F.O. Matty and T.P. Davis. Identification of P-glycoprotein co-fractionating proteins and specific binding partners in rat brain microvessels. *Journal of Neurochemistry* 134, 200-210. 2015.
215. Ronaldson, P. T. and T. P. Davis. Targeting Transporters: Promoting Blood-Brain Barrier Repair in Response to Oxidative Stress Injury. *Brain Research*. 1623, 39-52. 2015.
216. Davis, T.P., T.J. Abbruscato and R.D. Egleton. Peptides at the Blood Brain Barrier: Knowing me knowing you. *Peptides*. 72, 50-56. 2015.
217. Tome, M.E., J.M. Herndon, C.P. Schaefer, L. Jacobs, Yifeng Zhang, C.K. Jarvis, and T.P. Davis. P-glycoprotein traffics from the nucleus to the plasma membrane in rat brain endothelium during inflammatory pain. *Journal Cerebral Blood Flow and Metabolism*. 36,11.1913-1928. 2016. Cover.
218. Bosetti, F., Z.S. Galis, M.S. Bynoe, M. Charette, J.I. Koenig, G.A. Luty, C. Maric-Bilkan, T. Stevens, E. Tolunay, W. Koroshetz , on behalf of the “Small Blood Vessels:Big Health Problems” Workshop Participants including T.P. Davis. “Small Blood Vessels; Big Health Problems?”: Scientific Recommendations of the National Institutes of Health Workshop. *J. Amer Heart Assoc*. November 4, 2016. doi:JAHA.116.004389
219. Sandweiss, A. J., K.E. Cottier, D.P. Skinner, G. Dussor, T.P. Davis, T. Vanderah and T.M.

- Largent-Milnes. 17-Beta-estradiol induces spreading depression and pain behavior in alert female rats. *Oncotarget* 8. 114109–114122. 2017.
220. Lochhead, J.J., P. T. Ronaldson and T.P. Davis. Hypoxic stress and inflammatory pain disrupt blood brain barrier tight junctions: implications for drug delivery to the central nervous system (CNS). *AAPS Journal* 19.4. 910-920. 2017.
221. Abdullahi, W., H. Brzica, K. Ibbotson, T. P. Davis, and P.T. Ronaldson. Transforming Growth Factor Beta Signaling via the Activin Receptor-Like Kinase-1 Receptor Increases Expression of Organic Anion Transporting Polypeptide 1a4 at the Blood-Brain Barrier. *Journal Cerebral Blood Flow and Metabolism*. 37.7 2340-2345. 2017.
222. Abdullahi, W., T.P. Davis, and P.T. Ronaldson. Functional Expression of P-glycoprotein and Organic Anion Transporting Polypeptides at the Blood-Brain Barrier: Understanding Transport Mechanisms for Improved CNS Drug Delivery? *AAPS Journal* 19.4. 931-939. 2017.
223. Schaefer, C. P., M.E. Tome and T.P. Davis. The opioid epidemic: A central role for the Blood Brain Barrier in opioid analgesia and abuse. *Fluids and Barriers of the CNS*. 14,1. 32-42. 2017.
224. Schaefer, C. P. L.M. Jacobs, N. Arkwright, C. K. Jarvis, T.M. Largent–Milnes., K.C. Hunn, M.E. Tome and T.P. Davis. Chronic morphine exposure potentiates p-glycoprotein trafficking from nuclear reservoirs in cortical brain microvessels . *PLoS One*. 13 (2). e0192340. 2018.
225. Tome, M.E., C.K. Jarvis , C.P. Schaefer, L.M. Jacobs, J.M. Herndon, K.C. Hunn, N. B. Arkwright, K.L. Kellohen, P.C. Mierau, and T.P. Davis. Acute pain alters P-glycoprotein-containing protein complexes in rat cerebral complexes: Implications for P-glycoprotein trafficking. *Journal Cerebral Blood Flow and Metabolism*. 38 (12) . 2209-2222. 2018.
226. Cottier, K., E. Galoway, J. Kim, M. E. Tome, T. P. Davis, T. Vanderah and T. Largent-Milnes. Loss of Blood-Brain Barrier Integrity in a KCl induced model of Episodic Headache enhances CNS drug delivery. *eNEuro* NWR-0116-18. 2018.
227. Yang, J., B. G. Reilly, T.P. Davis and P.T. Ronaldson. Modulation of CNS transport of opioids by altered ATP-binding cassette transporter activity and expression at the Blood - Brain Barrier. *Pharmaceutics* . 10 (4) E192. 2018.
228. Lyden, P., Pryor, K.E., Coffey, C.S., Cudkowicz, M., Levy, H., Conwit, R., Yankey, J., Magee, K., Haacke, E.M., Fawaz, M., T.P. Davis, Toga, A.W., Griffin, J.H., and Zlokovic , B.V. Randomized, controlled, dose escalation trial of a protease-activated receptor -1 agonist in acute ischemic stroke: Final Results of the RHAPSODY trial. A multi-center, Phase 2 study using a continual reassessment method to determine the safety and tolerability of 3K3A-APC, a Recombinant Variant of Human Activated Protein C, in combination with tissue plasminogen activator, mechanical thrombectomy or both in moderate to severe acute ischemic stroke. *Annals of Neurology* 85: 125 - 136. 2019.
229. Lochhead, J.J., K. Kellohen, P.T. Ronaldson and T.P. Davis. Distribution of insulin in trigeminal nerve and brain after intranasal administration. *Scientific Reports*. Feb 22. 9,1. 2621. 2019.
230. Sweeney, M. , A. Montagne, A. Sagare, D.Nation, L.Schneider, H Chui, M G. Harrington, J Pa, M Law, D J.J. Wang, R E. Jacobs, F N. Doubal, Joel Ramirez, S E. Black, M Nedergaard, H. Benveniste, M. Dichgans, C. Iadecola, S. Love, H. Markus, R. A. Salman, S. M. Allan, T. Quinn, R. Kalaria, D. Werring, R. Carare, R. Touyz, Steve C. Williams, M. A. Moskowitz, Z. S. Katusic, S. E. Lutz, O.Lazarov, R. D. Minshall, J. Rehman, T. P. Davis, C. Wellington, H.González, C. Yuan, S. Lockhart, T. M. Hughes, C.L.H. Chen, P Sachdev, J.T. O'Brien, I. Skoog, L.Pantoni, D. R. Gustafson, G.Jan Biessels, A. Wallin, E. E. Smith, V. Mok, A. Wong, P. Passmore, F. Barkof, M. Muller, M.B. Breteler, G. C. Román, E. Hamel, S. Seshadri, R. F. Gottesman, M. A. van Buchem, Z.Arvanitakis, J. A. Schneider, L. Drewes, V.Hachinski, C. E. Finch, A. W. Toga, J. M. Wardlaw, B. V. Zlokovic. Vascular Dysfunction -The disregarded partner of Alzheimers Disease. *Alzheimers and Dementia*. 15,1, 158-167. 2019.
231. Lochhead, J.J. and T. P. Davis. Perivascular and perineural pathways involved in brain delivery and distribution of drugs after intranasal administration. *Pharmaceutics* 11, 11. 598. 2019.
232. Liktov-Busa, E. K. T. Blawn, K. L. Kellohen, B. M. Wiese, V. Verkhovsky, J. Wahl, A. Vivek, T. P. Davis, T. W. Vanderah and T. M. Largent-Milnes. Functional NHE1 expression is critical to blood brain barrier integrity and sumatriptan blood to brain uptake. *PLoS One*. DOI:10.1101/2019.12.20.884247. 2019.
233. Williams E.I. , R.D. Batterton, T.P. Davis and P.T. Ronaldson. Transporter-mediated delivery of small molecule drugs to the brain: A critical mechanism that can advance therapeutic development for ischemic stroke. *Pharmaceutics*. 12,2.154-172. 2020.

234. Mukherjee, P., P.D. Lyden, J.A. Fernandez, T.P. Davis, K. Pryor, B. V. Zlokovic and J.H. Griffin. 3K3A – activated protein C variant does not interfere with the plasma clot lysis activity of tenecteplase. *Stroke*. 51: 2236 – 2239. 2020.
235. Lochhead, J. J., J. Yang, P.T. Ronaldson, and T.P. Davis. Structure, Function and Regulation of the Blood Brain Barrier Tight Junction in CNS Disorders. *Frontiers in Physiology*. 6,11: 914. 2020.
236. Ronaldson, P.T., and T.P. Davis. Regulation of Blood - Brain Barrier Integrity by Microglia in Health and Disease: A Therapeutic Opportunity. *Journal of Cerebral Blood Flow and Metabolism*. doi.10.1177/0271678. 2020.
237. Lyden, P.D., K.E. Pryer, J.L. Minigh, T.P. Davis, J.H. Griffin and B. V. Zlokovic. Stroke Treatment with PAR-1 Agents to decrease Hemorrhagic Transformation. *Frontiers in Neurology*. 12: 593 - 582. 2021.
238. Ronaldson P.T., H. Brzica , W. Abdullahi , B.G. Reilly and T.P. Davis. Transport properties of statins by OATP1A2 and regulation by transforming growth factor Beta (TGF-Beta) signaling in human endothelial cells. *Journal of Pharmacology and Experimental Therapeutics* 376, 2.148-160. 2021.
239. Campbell, B. C. V. , M. Lansberg, J.P. Broderick, C.P. Derdeyn, P. Khatri, A. Sarraj, T.P. Davis, J.L. Saver, et al. Acute Stroke Imaging Research Roadmap IV: Imaging Selection and Outcomes in Acute Stroke Clinical Trials and Practice . *Stroke* 52,8. 2021.
240. Niles, K., E. I. Williams, R.D. Betterton, T.P. Davis, and P.T. Ronaldson. Blood-Brain Barrier Transporters: Opportunities for Therapeutic Development in Ischemic Stroke. *International Journal of Molecular Sciences*. 23,3. 2022.
241. Yang, J., R.D. Betterton, E. I. Williams, T.P. Davis, J. J. Lochhead and P.T. Ronaldson. High-Dose Acetaminophen Alters the Integrity of the Blood-Brain Barrier and leads to Increased CNS Uptake of Codeine in Rats. *Pharmaceutics*. 14,5.949. 2022.
242. Betterton, R.D., W. Abdullah, E.I. Williams, H. Brzica, J. Stanton, T.P. Davis and P. T. Ronaldson. Regulation of Blood-Brain Barrier Transporters by Transforming Growth Factor- $\beta$ /Activin Receptor-Like Kinase 1 (TGF- $\beta$ /ALK1) Signaling: Relevance to the Brain Disposition of 3-Hydroxy-3-Methylglutaryl Coenzyme A (HMG-CoA) Reductase Inhibitors (i.e., Statins). *Drug Metabolism and Disposition*. 50.7. 2022.
243. Ronaldson, P.T. and T.P. Davis. Transport Mechanisms at the Blood-Brain Barrier and in Cellular Compartments of the Neurovascular Unit: Focus on CNS Delivery of Small Molecule Drugs *Pharmaceutics* 14, 7. 1501. 2022.
244. Stanton, J.A., B. Betterton, E.I. Williams, T.P. Davis, and P.T. Ronaldson. Targeting Organic Cation Transporters at the Blood Brain Barrier to Treat Ischemic Stroke in Rats. *Experimental Neurology*. 357. 7. 2022.
245. Williams, E.I., R.D. Betterton, K.L. Niles, T.P. Davis. P.T. Ronaldson. In Situ Brain Perfusion for the Study of Blood Brain Barrier Transporters in Stroke. In: Karamyan, V.T., Stowe, A.M. (eds) Neural Repair. Methods in Molecular Biology, vol 2616. Humana, New York, NY. 2023.
246. Lochhead, J.J., E. Williams, E. Dorn, Elizabeth Reddell, P T. Ronaldson, and T.P. Davis. High resolution multiplex confocal imaging of the neurovascular unit in health and experimental ischemic stroke. *Cells*. 12. 645. 2023.
247. Williams E. I., Lochhead J. J., Abdullahi W, T.P. Davis, Ronaldson PT. Atorvastatin in ischemic stroke: Neuroprotection by an Organic Anion Transporting Polypeptide (Oatp)-Mediated Transport. *Stroke (In Press)*. 2023).
248. Schleicher, R., P. Vorasayan, M. McCabe, M. Bevers, T. P. Davis, J. Griffin, A. Hinduja, A. Jadhav, J. Lee, R. Sawyer, B. Zlokovic, K. Sheth, J. Fedler, P. Lyden, and W. T.Kimberly. Analysis of Brain Edema in RHAPSODY. *International Journal of Stroke*. IJS-01-23-10620 (In Press. 2023).
249. Betterton, R.D., T.P. Davis, and P.T. Ronaldson. Endoglin is a critical regulator of Organic Anion Transporting Polypeptide 1a4 (OATP1a4) by transforming growth factor – Beta signaling. *J. Pharm. and Exp. Ther.* (In Preparation, 2023).

#### D. CONFERENCE PROCEEDINGS MANUSCRIPTS

1. Burks, T.F., L.D. Hirning, J.J. Galligan and T.P. Davis. Motility effects of opioid peptides in dog intestine. *Proc. Int. Narcotics Review Council*, June, 1982.
2. Burks, T.F., T.P. Davis and J.N. McDougal. Metabolism and thermo-pharmacology

- of opioid peptides in rat brain. *Proc. 6th International Meeting on Pharmacology of Thermoregulation*, France, 1983. (Karger, Ed.) Basel, Swz. pp. 94-97.
3. Davis, T.P., H. Schoemaker, A. Chen, A. Culling and H.I. Yamamura. Isolation and characterization of *in vitro* endorphin metabolism in the brain. *Proc. West. Pharm. Society* 25, 101-105, 1982.
  4. Davis, T.P., H. Schoemaker, A.J. Culling and H.I. Yamamura. Isolation and characterization of *in vitro* central  $\beta$ -endorphin metabolism in schizophrenia. *Proc. West. Pharm. Soc.* 26, 89-94, 1983.
  5. Hynes, M.R., A.J. Culling, H. Schoemaker, J.J. Galligan, H.I. Yamamura, T.F. Burks and T.P. Davis. Processing of  $\beta$ -endorphin in the dog intestine: Regional specificity. *Proc. West. Pharm. Soc.* 26, 95-99, 1983.
  6. Davis, T.P., A.J. Culling, J.J. Galligan, and H. Schoemaker. Characterization of  $\beta$ -endorphin processing by reversed phase liquid chromatography. In: *Proc. 8th American Peptide Symposium* (V. Hruby, Ed.), Pierce Chem. Co. Pub., Rockford, IL, USA. 1983. pp. 743-746.
  7. Chen, A.D., T.P. Davis and H.I. Yamamura. Demonstration and partial characterization of a bovine cerebral cortical factor which interacts competitively at the benzodiazepine receptor. *Proc. West. Pharmacol. Soc.* 26, 225-230, 1983.
  8. Davis, T.P., A. Dray and F. Porreca. The pro-enkephalin A derivative, peptide E, is centrally processed to active fragments. *Proc. West. Pharm. Society* 27, 577-581, 1984.
  9. Yousef, M.K. and T.P. Davis. Fluid replacement in women during exercise in heat. *Proc. Seventh Conf. on Biometeorology and Aerobiology.* pp. 360-362, 1985.
  10. Davis, T.P., and M.K. Yousef. Involuntary dehydration in men during exercise in heat. *Proc. Seventh Conf. on Biometeorology and Aerobiology.* pp. 363-364, 1985.
  11. Davis, T.P., J.E. Shook, T.J. Gillespie, A.J. Culling-Berglund, H.M. Papietro, and F. Porreca. The proenkephalin A fragment peptide E is metabolized centrally to a novel peptide with opioid activity. *Proc. West. Pharm. Soc.*, 30, 1987.
  12. Li, Z.W., K. Brendel, A.J. Culling-Berglund and T.P. Davis. Regional specificity of  $\beta$ -endorphin metabolism in brain slices of the rat. *Proc. West. Pharm. Soc.*, 31, 67-70, 1988.
  13. Mania-Farnell, B.L., B.J. Morrill, H.I. Yamamura and T.P. Davis. Regulation of CCK mRNA in the human neuroepithelioma cell line SK-n-MCIXC in response to second messenger activators. *Proc. CCK Int. Symposium* Chatham, MA, June 1993.
  14. Hruby, V.J., Misicka, Lipkowski, A., Haaseth, R., Bartosz, H., Qian, X., Collins, N., Meyer, J.P., Szabo, L., Polt, R., Porreca, F., Davis, T., Yamamura, H.I. New Opioid Compounds in Analgesia. *Proceeding of the INRC.*, 1993.
  15. Hruby, V.J., Li, G., Qian, X., Haskell-Luevano, C., Lung, F.-D., Kövér, Misicka, A., Yamamura, H.I., Davis, T., and Porreca, F. Design, Synthesis and Conformation in Chi Space for Developing Selective Peptides for Types and Subtypes of Receptors. *Proceedings of the 23rd European Peptide Symposium*, 1994.
  16. Lung, F.-D.T., N. Collins, G. Li, J.-P. Meyer, B.-S. Lou, D. Stropova, P. Davis, T. Davis, F. Porreca, H.I. Yamamura and V.J. Hruby. Synthesis, opioid activities and binding affinities of dynorphin A analogues with position-3 conformational constraints: New insights into requirements for  $\kappa$  receptors. *Proc. 13th American Society of Peptides Meeting*, 1994.
  17. Hruby, V.J., T.P. Davis, R. Polt, H. Bartosz-Bechowski, A. Misicka, A. Lipkowski, S.D. Sharma, G. Li, G. Bonner, J.-P. Meyer, D. Patel, X. Qian, M. Romanowski, H.I. Yamamura, F. Porreca, and D.F. O'Brien. A systematic investigation of factors that enhance penetration of peptides across the blood brain barrier. *Proc. 14th American Peptide Society*, 1995.
  18. Mania-Farnell, B., T.P. Davis. Modulation of Prohormone Convertase mRNA by Second Messenger Activators and Drugs. *Annals of the New York Academy of*

*Sciences*, 1995.

19. Li, G., W. Haq, L. Xiang, A. DeLeon, P. Davis, R. Hughes, B. Lou, T.J. Gillespie, F. Porreca, T. Davis, M. Romanowski, X. Zhu, A. Misicka, A. Lipkowski, H.I. Yamamura, D.F. O'Brien and V.J. Hruby. Structure-Activity Relationship and Synthetic Study of Biphalsins C1,1'-Stereochemical and Truncation Modifications, *Peptides: Chemistry, Structure and Biology*, P.T.P. Kaumaya and R.S. Hodges, Eds., ESCOM Sci. Publ., Leiden, 1995.
20. Hruby, V.J., T.P. Davis, R. Polt, H. Bartosz-Bechowski, A. Misicka, A. Lipkowski, S.D. Sharma, G. Li, G. Bonner, J.-P. Meyer, D. Patel, H.I. Yamamura, F. Porreca and D.F. O'Brien. A Systematic Investigation of Factors that Enhance Penetration of Peptides Across the Blood Brain Barrier, *Peptides: Chemistry, Structure and Biology*, P.T.P. Kaumaya and R.S. Hodges, Eds., ESCOM Sci. Publ., Leiden, 1995.
21. Meyer, J.-P., P. Davis, I. Dillon, T. Gillespie, T.P. Davis, F. Porreca, H.I. Yamamura and V.J. Hruby. Synthesis and Biological Activities of Enzymatically Stable and Highly Selective Dyn A(1-11)-NH<sub>2</sub> Analogs, *Peptides: Chemistry, Structure and Biology*, P.T.P. Kaumaya and R.S. Hodges, Eds., ESCOM Sci. Publ., Leiden, 1995.
22. Haaseth, R.C., P. Davis, T. Zalewska, J. Slaninová, T.H. Kramer, H.I. Yamamura, P.J. Horan, F. Porreca, T.O. Matsunaga, K.E. Kövér, N. Collins, R. Horvath, S.J. Weber, T.P. Davis and V.J. Hruby. Surprisingly Potent and Selective 3-Position Analogs of DPDPE for The Delta Opioid Receptor, *Peptides 1992*, C.H. Schneider and A.N. Eberle, eds., ESCOM Sci. Publ., Leiden, 659-660 (1993).
23. Hruby, V.J., T.P. Davis, R. Polt, H. Bartosz-Bechowski, A. Misicka, A. Lipkowski, S.D. Sharma, G. Li, G. Bonner, J.-P. Meyer, D. Patel, X. Qian, M. Romanowski, H.I. Yamamura, F. Porreca and D.F. O'Brien. A systematic investigation of factors that enhance penetration of peptides across the blood-brain barrier. *Peptides: Chemistry, Structure and Biology, Proceedings of the Fourteenth American Peptide Symposium*, P.T.P. Kaumaya and R.S. Hodges, Eds., Mayflower Scientific Ltd., Kingswinford, England, 154-156, 1996.
24. Meyer, J.-P., F.D. Lung, P. Davis, I. DeLeon, T. Gillespie, T.P. Davis, F. Porreca, H.I. Yamamura and V.J. Hruby. Synthesis and biological activities of enzymatically stable and highly selective Dyn A (1-11)-NH<sub>2</sub> analogs. *Peptides: Chemistry, Structure and Biology. Proceedings of the Fourteenth American Peptide Symposium*, P.T.P. Kaumaya and R.S. Hodges, Eds., Mayflower Scientific Ltd., Kingswinford, England, 625-626, 1996.
25. Hruby, V.J., T.P. Davis, D.F. O'Brien, F. Porreca and H.I. Yamamura. Advances in Gene Technology: Biomolecular Design, Form and Function. *Proceedings of the 1997 Miami Nature Biotechnology Winter Symposium*, published by IRL Press at Oxford University Press, Editors: F. Ahmad, D. Bernstein, H. Bialy, S. Black, K. Brew, M.P. Beutscher, S. Hassler, G.A. Petsko and W.J. Whelan, 1997.
26. Brownson, E.A., M. Langston, A.G. Tsai, T. Gillespie, T. Davis, M. Intaglietta, and M.B. Sankaram. Biodistribution During Sustained Release from Multivesicular Liposomes. *Proceedings of the Controlled Release Society Meeting*, Las Vegas, Nevada, June, 1998.
27. Egleton, R.D., S.A. Thomas and T.P. Davis. Opioid peptide prodrugs: *in vitro* blood-brain barrier permeability and conversion rates. *Proceedings of the Controlled Release Society Meeting*, Las Vegas, Nevada. June 1998.

**E. ABSTRACTS TO PROFESSIONAL MEETINGS-1975 to 2003.**

1. Davis, T.P. Resting energy metabolism of the immature feral burro, *Equus asinus*. Presented at the American Mammalogists Annual Meeting, Missoula, Montana, June 16-19, 1975.
2. Davis, T.P., G.L. Hahn and H.D. Johnson. Heat adaptation as related to metabolism in Herefords. Jefferson City, Missouri. *J. Animal Sci.* 43:1, 1976.

3. Davis, T.P., M.K. Yousef and H.D. Johnson. Plasma hormonal values of the burro, *Equus asinus*. *Trans. Mo. Acad. Sci.* 20:252, 1977.
4. Davis, T.P., C.W. Gehrke, Jr., C.W. Gehrke, K.C. Kuo, C.H. Williams, H.D. Johnson and K.O. Gerhardt. A sensitive fluorometric assay of biogenic amines by reversed-phase high pressure liquid chromatography. *Fed. Proc.* 36:3, 1977, Chicago, Illinois.
5. Davis, T.P., M.K. Yousef, C.L. Douglas, J.D. Stockman III and H.D. Johnson. Hematological responses of the feral burro, *Equus asinus* - field and laboratory. *Trans. Mo. Acad. Sci.* 11:298, 1977.
6. Davis, T.P., C.W. Gehrke, Jr., T.D. Cunningham, C.W. Gehrke, K.C. Kuo and K.O. Gerhardt. High pressure liquid chromatography of biogenic amines as o-phthalaldehyde derivatives: Presented at American Chemical Society Midwest Regional Meeting. Rolla, Missouri, November 3-4, 1977.
7. Williams, C.H., T.P. Davis, C.W. Gehrke, Jr. C.W. Gehrke, K.C. Kuo and K.O. Gerhardt. The fulminant hyperthermia - stress syndrome. Biogenic amine levels in the blood of susceptible and normal pigs. *J. Animal Sci.* 46:5, 1978.
8. Belyea, R.L., F.A. Martz, M. Madhisetty and T.P. Davis. Digestibility and net energy of maintenance of diets containing corrugated paper. *J. Animal Sci.* 46:5, 1978.
9. De Forrest, J.M., J.O. Davis, R.H. Freeman, G.A. Stephens, A.A. Seymour, B.P. Rowe, G.M. Williams, T.P. Davis and C. Gehrke. Effect of indomethacin on PRA, renal function, and salt and water excretion in conscious, sodium depleted dogs. *Fed. Proc.* 38:3496, 1979
10. Deavers, D.R., X.J. Musacchia, G.A. Meininger and T.P. Davis. Nitrogen mineral and water metabolism during antiorthostatic hypokinesia. *Fed. Proc.* 38, 4352, 1979.
11. Davis, T.P., H.D. Johnson and C.W. Gehrke. Effect of acute heat and cold exposure on biogenic amines in cattle. *Fed. Proc.* 38:5654, 1979.  
Davis, T.P., and H.D. Johnson. Differences in metabolic responses to heat and cold in cattle. *Fed. Proc.* 40:6, 1981.
12. Goodman, G.E., J.G. Einspahr, S.A. Leigh, H.-S.G. Chen, T.P. Davis, F.L. Meyskens, S.Y. Chang and D.S. Alberts. High performance liquid chromatographic analysis and human pharmacokinetics of 13-cis-retinoic acid. *Proc. ASCO & AACR*, 1981.
13. Peng, Y.M., D.S. Alberts, T.P. Davis and D. Wood. High performance liquid chromatography of 9,10-anthracenedicarboxaldehyde bis [(4,5-dihydro-1H-imidazole 2-YL)hydrazonol] dihydrochloride (ADCA) - physicochemical properties and pharmacokinetics. *Proc. ASCO & AACR*, 1981.
14. Davis, T.P., C.W. Gehrke, Jr. and C.H. Williams. The fulminant hyperthermic-stress syndrome - possible role for norepinephrine in stress susceptible pigs. *Society for Neurosciences Annual Meeting*, Los Angeles, CA 1981.
15. Davis, T.P. High performance liquid chromatography, mass spectrometry and pharmacokinetics of melphalan, bisantrene and 13-cis retinoic acid. Presented at Western Chromatography Symposium, Waters Associates, Newport Beach, CA. October 15 and 16, 1981.
16. Davis, T.P. High performance liquid chromatography of pharmacologically active amines and peptides in biological materials. Presented at ASPET Fall Meeting, Calgary, Canada. August 16 to 20, 1981.
17. Davis, T.P. and L. Hirning. Dopamine metabolites as markers of melanoma. Third Annual Conference on Melanoma, Chiricahua Mountains, AZ April 8-10, 1981.
18. Schoemaker, H., A. Chen, T.P. Davis and H.I. Yamamura. A study of the metabolism of  $\beta$ -endorphin related peptides by an improved HPLC system. Presented at American College of Neuropsychopharmacology Annual Meeting, San Diego, CA. December 16-18, 1981.

19. Davis, T.P., H. Schoemaker, J. Galligan, A. Culling, A. Chen, T.F. Burks and H.I. Yamamura. Isolation, characterization and motility effects of B-LPH fragments in the isolated perfused intestine. *Fed. Proc.* 41:5, 1982.
20. Davis, T.P., H. Schoemaker, A. Chen and H.I. Yamamura. Isolation and characterization of *in vitro*  $\beta$ -endorphin metabolism in the brain. Presented at Western Pharm. Society Annual Meeting, Santa Fe, NM. January 14-18, 1982.
21. Goodman, G.E., D.S. Alberts, J.G. Einspahr, T.P. Davis, S.A. Leigh and F.L. Meyskens. Pharmacokinetics of 13-cis-retinoic acid (13-cRA) in patients with advanced cancer. Presented at International Conference on the Modulation and Mediation of Cancer by Vitamins, University of Arizona College of Medicine, February 22-25, 1982.
22. Schoemaker, H., A. Chen, H.I. Yamamura and T.P. Davis. *In vitro* endorphin metabolism in the rat and human brain. Presented at 6th European Neuroscience Congress, Paris, France. Sept. 5-10, 1982.
23. Galligan, J.J., Schoemaker, T.F. Burks and T.P. Davis. Motility effects of  $\beta$ -endorphin fragments in the dog intestine. *Digestive Diseases and Sciences* 25:7, 1982.
24. Banner, W., K. McCoy, S. Seidner, L. Taussig and T.P. Davis. Pharmacokinetics of chloramphenicol in cyst fibrosis patients. Society for Pediatric Research Annual Meeting, 1982.
25. Schoemaker, H., H.I. Yamamura and T.P. Davis. *In vitro* central  $\beta$ -endorphin metabolism in schizophrenia. Society for Neuroscience Annual Meeting, Minneapolis, MN, 1982.
26. Buck, S.H., J.H. Walsh, S.P. Duckles, T.P. Davis, H.I. Yamamura and T.F. Burks. Characterization of the peptide neurotoxic effects of capsaicin in the guinea pig. Society for Neuroscience Annual Meeting, Minneapolis, MN, 1982.
27. Hameroff, S.R., B.R. Crago, D. Neuman, J.R. Womble and T.P. Davis. Doxepin effects on chronic pain, depression and serum opioids. I.A.R.S. 56th Annual Congress, Budapest, Hungary, 1982.
28. Russell, D.H., J.D. Ellingson, T.P. Davis, D.S. Alberts and E.A. Surwit. Separation of the polyamines and acetyl derivatives by a single automated amino acid analyzer technique: Implications as cancer markers. Am. Soc. Clin. Pharm. and Therap. Annual Meeting, San Diego, CA, 1983.
29. Davis, T.P., H. Schoemaker, M.R. Hynes, J.J. Galligan, H.I. Yamamura and T.F. Burks. Endorphin metabolism in brain and gut: Regional specificity. *Fed. Proc.* 42:3, 1983.
30. Davis, T.P., Schoemaker, A.J. Culling and H.I. Yamamura. Isolation and characterization of *in vitro* central  $\beta$ -endorphin metabolism in schizophrenia. Presented at Western Pharmacology Society Annual Meeting, Puerto Vallarta, Mexico, January 19-22, 1983.
31. Davis, T.P., A.J. Culling, J.J. Galligan, H. Schoemaker, M.R. Hynes, H.I. Yamamura and T.F. Burks. Isolation and characterization of  $\beta$ -endorphin metabolism by reversed phase liquid chromatography. Presented at Eighth American Peptide Symposium, Tucson, AZ, May 22-27, 1983.
32. Davis, T.P., A.J. Culling, J.J. Galligan, H. Schoemaker and T.F. Burks.  $\beta$ -endorphin and its metabolites stimulate gastrointestinal motility. American Physiological Society Fall Meeting, Honolulu, HI, 1983.
33. Peng, Y-M., D.S. Alberts, J.G. Einspahr, C. Ludwig and T.P. Davis. *In vitro* metabolism studies of anticancer drugs under hypoxic and oxic conditions using human tumor clonogenic assay (HTCA) and high performance liquid chromatography (HPLC). American Physiological Society Fall Meeting, Honolulu, HI, 1983.
34. Davis, T.P., A.J. Culling and Hans Schoemaker. Characterization of *in vitro*  $\beta$ -

- endorphin processing in the brain and gut: Implications. Presented at 13th Annual Meeting of the Society for Neuroscience, Boston, MA, 1983.
35. Hoyer, G., L.D. Hirning, T.F. Burks and T.P. Davis. Proenkephalin A fragments stimulate motility of the canine isolated intestine. *Fed. Proc.*, 1984.
  36. Dunshee, C.J., A.J. Culling, H.I. Yamamura, and T.P. Davis. *In vitro*  $\beta$ -endorphin metabolism by human cerebrospinal fluid. Presented at American Federation of Clinical Research Annual Meeting, Carmel, CA, 1984.
  37. Han, A.P., T.P. Davis, and M.K. Yousef. Central  $\beta$ -endorphin processing in temperature acclimated animals. Presented at 7th International Endocrinology Congress, Quebec, Canada, June 27-30, 1984.
  54. Hirning, L.D., G.L. Hoyer, T.P. Davis, and T.F. Burks. Motility effects and processing of proenkephalin A fragments in the canine isolated small intestine. Presented at American Gastroenterological Association Annual Meeting, New Orleans, LA., May 20-23, *Gastroenterology* 86:1351, 1984.
  55. Davis, T.P. Central processing of brain peptides and adaptation to the environment. Presented at International Union of Physiological Sciences Meeting, Jerusalem, Israel, August 26-31, 1984.
  56. Davis, T.P., A. Culling, H. Schoemaker, A. Dray, and G.L. Hoyer. Implications of *in vitro* central and peripheral endorphin processing. I.U.P.H.A.R. 9th International Congress of Pharmacology, London, England, July 29-August 3, 1984.
  57. Davis, T.P., H. Schoemaker, and A.J. Culling. Effect of antipsychotics on *in vitro* central  $\beta$ -endorphin processing in the rat. Presented at 4th Annual Meeting of the Society for Neurosciences, Anaheim, CA, October 10-15, 1984.
  58. Hoyer, G. and T.P. Davis (Spon: J. Angevine). A comparison of peptide E and  $\beta$ -endorphin processing and motility in the canine small intestine. Presented at 14th Annual Meeting of the Society for Neurosciences, Anaheim, CA, October 10-15, 1984.
  59. Davis, T.P., and M.K. Yousef. Sweat loss and voluntary dehydration during work in humid heat. Presented at International Union of Physiological Sciences Meeting, Jerusalem, Israel, August 26-31, 1984.
  45. Davis, T.P. and A.J. Culling-Berglund. Use of reversed-phase HPLC in analysis of peptide processing. Presented at Fourth International Symposium on HPLC of Proteins, Peptides and Polynucleotides, Baltimore, MD, Dec. 10-12, 1984.
  46. Peng, Y.M., D.S. Alberts, S. Leigh, R. Serokman, L. Edwards, T.P. Davis, and F.L. Meyskens, Jr. Clinical toxicology and pharmacokinetics of 13-cis-retinoic acid (13cRA) administered chronically at low doses expected for cancer chemoprevention trials. Presented at American Association for Cancer Research (AACR) Annual Meeting, Houston, TX. May 22-25, 1984.
  47. Hoyer, G.L. and T.P. Davis. Processing of the proenkephalin A fragment peptide E by regions of the small intestine. *Fed. Proc.*, 44:3, 1985.
  48. Davis, T.P., H. Schoemaker and A.J. Culling-Berglund. *In vitro* central  $\beta$ -endorphin metabolism in schizophrenia: regional specificity. *Fed. Proc.*, 44:3, 1985.
  49. Nunan, L., W. Wire, A. Dray and T.P. Davis. The amidated proenkephalin A fragment metorphamide shows selective opioid activity *in vivo*. *Fed. Proc.* 44:3, 1985.
  50. Davis, T.P., F. Porreca, A. Culling-Berglund and A. Dray. Central processing and *in vivo* activity of opioid peptides. Presented at Washington spring Symposium on neural and endocrine peptides and receptors, Washington, DC, May 28-31, 1985.
  51. Davis, T.P. and G.L. Hoyer. Effect of proenkephalin A and proopioidmelanocortin processing fragments on motility in the small intestine. Presented at 10<sup>th</sup> International Symposium on Gastrointestinal Motility, Rochester, MN, September 8-11, 1985.
  52. Hoyer, G.L., and T.P. Davis. Characterizing the site of *in vitro* central and peripheral

- processing of peptide E to active fragments. 15th Annual Meeting of the Society for Neuroscience, Dallas, TX, Oct. 20-25, 1985.
53. Davis, T.P., and A.J. Culling-Berglund. Effect of centrally acting drugs on  $\beta$ -endorphin processing by brain synaptic membrane and microsomal associated peptidase. 15th Annual Meeting of the Society Neuroscience, Dallas, TX, Oct. 20-25, 1985.
  54. Hameroff, S., J. Weiss, R. Cork, B. Crago, and T.P. Davis. Doxepin effects on chronic pain and depression. Int. Symposium on Pain and Depression, Stockholm, Sweden, May, 1986.
  55. Davis, T.P. and A.J. Culling-Berglund. Neuroleptic drugs alter *in vitro* neurotensin and  $\beta$ -endorphin metabolism by purified brain synaptic membranes. 17th International Congress of the ISPNE, Bergen, Norway, June 29-July 4, 1986.
  56. Davis, T.P., T.J. Gillespie, J.E. Shook, and T.F. Burks. Novel fragments of proenkephalin A stimulate motility in the small intestine. 16th Annual Meeting for Neuroscience, Washington, DC, November 9-14, 1986.
  57. Davis, T.P. and T.L. Smith. Effect of chronic ethanol treatment on  $\beta$ -endorphin metabolism by purified synaptosomal plasma membranes (pSPM). Presented at International Society for Alcohol Research meeting in Helsinki, Finland, July 1986.
  58. Davis, T.P. and F. Porreca. Opioid activity of a novel fragment of proenkephalin A: Studies with Peptide E 15-25 (P-E 15-25). Presented at American Society for Pharmacology, and Experimental Therapeutics Annual Meeting, Baltimore MD, August 17-21, 1986.
  59. Carrier, M., N. Perrotta, J.G. Copeland, T.P. Davis, D.H. Russell and R.W. Emery. Urinary polyamines are non-invasive markers of cardiac allograft rejection. American College of Cardiology 36th Annual Meeting, New Orleans, LA, March 8-12, 1987.
  60. Davis, T.P., L.L. Trombley and H.M. Papietro. Central Metabolism of somatostatin and substance P is altered in Alzheimer's disease. Xth International Congress of Pharmacology, Sydney, Australia, August 23-September 4, 1987.
  61. Davis, T.P. and F. Porreca. Peptide fragments derived from the B-chain of hemoglobin (Hemorphins) are centrally active. 17th Annual Meeting for the Society for Neuroscience, New Orleans, LA, November 15-21, 1987.
  62. Alberts, D.S., Y.-M. Peng, P. Plezia, S. Sagers, M.J. Xu and T.P. Davis. Serum and tissue pharmacology of vitamin A and  $\beta$ -carotene. Third International Conference on Prevention of Human Cancer: Chemo-prevention, January 10-15, 1988, Tucson, AZ.
  63. Culling-Berglund, A.J., S.A. Newcomb, W.S. Morfitt and T.P. Davis. A sensitive and specific HPLC procedure for the analysis of  $\beta$ -carotene in human skin. Third International Conference on Prevention of Human Cancer: Chemoprevention, January 10-15, 1988, Tucson, AZ.
  64. Margolis, S.A., and T.P. Davis. The stabilization of ascorbic acid in serum and its measurement by HPLC, *FASEB Journal* 2(4):A1433, 1988.
  65. Davis, T.P., K.N. Hawkins, T. Gillespie, A.J. Culling-Berglund and H.I. Yamamura. A new proenkephalin A-derived peptide lacks an amino terminal tyrosine but binds with high affinity to the delta opioid receptor. *FASEB Journal* 2(4):A785, 1988.
  66. Culling-Berglund, A.J., T.J. Gillespie, R.K. Rao, O. Koldovsky, J. Grimes and T.P. Davis. Milk inhibits the proteolytic metabolism of SS-14 by luminal fluid of the small intestine. *FASEB Journal* 2(4):A650, 1988.
  67. Rao, R.K., J. Grimes, T.P. Davis and O. Koldovsky. Processing of  $^{125}\text{I}$ -(Tyr<sup>11</sup> or Tyr<sup>0</sup>) somatostatin by the isolated jejunum of suckling rat small intestine. *FASEB Journal*, 2: 4, A650, 1988.
  68. Rao, R.K., J. Grimes, T.P. Davis and O. Koldovsky. Somatostatin degradation by luminal flushings and tissue homogenates of the rat gastrointestinal tract. *Gastroenterology*, 94:A368, 1988.
  69. Davis, T.P., P. Davies, A.J. Culling-Berglund, E. Malek and T. Gillespie. Central

- metabolism of somatostatin 14 and 28 is altered in Alzheimer 's disease. Society for Neuroscience 18th Annual Meeting, Toronto, Canada, Nov. 13-18, 1988.
70. Davis, T.P., T.F. Burks and T.H. Kramer. Analgesic and gastrointestinal opioid effects of the peptide E fragment 15-25: Further evidence for delta selectivity. *Pharmacologist* 30:2, 1988.
  71. Rao, R.K., T.P. Davis, J. Grimes and O. Koldovsky. Gastrointestinal absorption of epidermal growth factor by suckling rats: Dose dependency and regional differences. *Pediatric Research* 25:123A, 1989.
  72. Davis, T.P., H.I. Yamamura, T.F. Burks, K.N. Hawkins, T.H. Kramer, T. Gillespie, and A.J. Culling-Berglund. Processing of proenkephalin A-derived peptide E alters central and peripheral opioid receptor selectivity. American College of Neuropsychopharmacology Annual Meeting, December 11-16, 1988. San Juan, Puerto Rico.
  73. Li, Z.W., K. Brendel and T.P. Davis. The use of brain slices for the study of regional neuropeptide metabolism. *The FASEB Journal* 3, 3:A729, 1989.
  74. Rao, R.K., T.P. Davis, A.J. Culling-Berglund, and O. Koldovsky. Casein and soluble fractions of rat milk inhibit luminal degradation of 125-I(Tyr<sup>11</sup>) somatostatin in suckling rat intestine. *The FASEB Journal* 3, 4:A1151, 1989.
  75. Rao, R.K., Davis, T.P., Berglund, A.J., Koldovsky, O. Casein and soluble fractions of rat milk inhibit luminal degradation of somatostatin in suckling rat intestine. *Pediatric Research* 25:122A, 1989.
  76. Rao, R.K., T. Gillespie, O. Koldovsky, and T.P. Davis. Metabolism and absorption of somatostatin by suckling rat jejunum *in vivo*. *Gastroenterology* 96:A408, 1989.
  77. Li, Z.W., T.J. Gillespie, E.D. Malek, D.J. Merrill and T.P. Davis. The correlation between regional peptide metabolism and specific enzyme activity in rat brain. *Pharmacologist* 31, 3:168, 1989.
  78. Davis, T.P., S.L. Crowell, H.S. Burgess, T.W. Moody, A.J. Culling-Berglund. Small cell lung cancer (SCLC) contains the autocrine peptide  $\beta$ -endorphin. *Pharmacologist* 31, 3:122, 1989.
  79. Li, Z.W., K. Brendel and T.P. Davis. Effect of peptide structure on peptide degradation: Des-enkephalin gamma-endorphin metabolism by rat brain. 19th Annual Meeting Society for Neuroscience, Phoenix, AZ, Oct. 29-Nov. 3, 1989.
  80. Davis, T.P. and T.J. Gillespie. Chronic haloperidol alters regional  $\beta$ -endorphin metabolism in the rat brain. 19th Annual Meeting Society for Neuroscience, Phoenix, AZ, Oct. 29-Nov. 3, 1989.
  81. Davis, T.P., R. Louis, and T.J. Gillespie. Chronic haloperidol alters regional peptidases associated with central  $\beta$ -endorphin and neurotensin processing. American College of Neuropsychopharmacology (ACNP) Annual Meeting. Maui, HI, Dec. 10-15, 1989.
  82. Rao, R.K., Davis, T.P., Grimes, J., Koldovsky O. Gastrointestinal absorption of epidermal growth factor by suckling rats: Dose dependency and regional differences. International Symposium on Epidermal Growth Factor and Related Protein in Development, Iowa State Univ., Ames, Iowa, 1989.
  83. Rao, R.K., Davis T.P., Grimes J., Koldovsky O. Processing and transfer of EGF by rat jejunum and ileum *in vitro*. International Symposium on Epidermal Growth Factor and Related Protein in Development, Iowa State University, Ames, Iowa, 1989.
  84. Davis, T.P., B. McInturff, T.W. Moody and S.L. Crowell. Protease inhibitors suppress *in vitro* clonal growth of human small cell lung cancer. XI International Congress of Pharmacology. Amsterdam, The Netherlands. July 1-6, 1990.
  85. Morrill, M., R. Louis and T.P. Davis. Haloperidol, chlorpromazine and apomorphine alter central regional neuropeptidase activity. XI International Congress of Pharmacology. Amsterdam, The Netherlands. July 1-6, 1990.
  86. Davis, T.P. Neurotensin and  $\beta$ -endorphin may function as regulatory peptides in small

- cell lung cancer. XI Winter Neuropeptide Conference. Breckenridge, Colorado. February 5-9, 1990.
87. Kong, W., O. Koldovsky, T.P. Davis and R.K. Rao. Intravenously administered 125I-EGF is secreted into bile and lumen of suckling rat stomach and intestine. *Gastroenterology*, May 13-16, 1990.
  88. Davis, T.P., H.I. Yamamura, T.F. Burks and T.J. Gillespie. CNS metabolism of preproenkephalin A-derived peptide E alters opioid receptor selectivity. Satellite Symposium of the XI IUPHAR Congress dedicated to David de Wied. University of Utrecht, The Netherlands. June 30, 1990.
  89. Davis, T.P. The effect of conformation and sequence of neuropeptide processing in regional brain slices. XI Annual Conference of Indian Academy of Neurosciences. Lucknow, India, March 16-18, 1990.
  90. Gillespie, T.J. and T.P. Davis. Evidence for regional specificity of neurotensin metabolism by intact brain slices. 20th Annual Meeting Society for Neurosciences. St. Louis, MO, October 28-November 2, 1990.
  91. Konings, P.N.M., T.J. Gillespie, D. Spall, S. Fang, V.J. Hruby and T.P. Davis. Metabolism of CCK-8 and its analogue by brain slices of frontal cortex and hippocampus. 20th Annual Meeting Society for Neurosciences. St. Louis, MO, October 28-November 2, 1990.
  92. Weber, S.J., G. Toth, S. Sharma, V.J. Hruby and T.P. Davis. Distribution of [<sup>3</sup>H] DPDPE and [<sup>3</sup>H] [p-C<sup>1</sup>Phe<sup>4</sup>] DPDPE following intravenous administration. ASPET Annual Meeting. Milwaukee, Wisconsin, August 12-16, 1990. *Pharmacologist* 1990.
  93. Davis, T.P., and S.J. Weber. Somatostatin metabolism and peptidase activities are altered in Alzheimer's disease. American College of Neuropsychopharmacology Annual Meeting. San Juan, Puerto Rico. December 10-14, 1990.
  94. Weber, S.J., R.B. Louis, L. Trombley, G. Bissette, P. Davies, and T.P. Davis. Metabolic half-life of somatostatin and peptidase activities are altered in Alzheimer's disease. American Society for Pharmacology and Experimental Therapeutics. San Diego, CA. August 16-20, 1991.
  95. Konings, P.N.M., M.C. Beinfeld, T.W. Moody, and T.P. Davis. Cholecystokinin and gastrin-releasing peptides are secreted from human neuroepithelioma cells SK-N-MCIXC. 11th International Symposium on Neurosecretion: The Peptidergic Neuron, Amsterdam, The Netherlands. June 10-14, 1991.
  96. Konings, P.N.M., M.C. Beinfeld, T.W. Moody, and T.P. Davis. Release of cholecystokinin and gastrin-releasing peptide, and their precursors from the human neuroepithelioma cell line SK-N-MCIXC. Society for Neuroscience Annual Meeting. November 10-15, 1991.
  97. Weber, S.J., D. Greene, V.J. Hruby, H.I. Yamamura and T.P. Davis. *In vivo* mouse brain localization of [<sup>3</sup>H]DPDPE to delta opioid receptors. Society for Neuroscience Annual Meeting. November 10-15, 1991.
  98. Rao, R.K., H.-H. Chang, F., F. Porreca, P. Brannon, T.P. Davis and O. Koldovsky. Epidermal growth factor inhibits gastric acid secretion more potently in developing than in mature rats. American Gastroenterological Association Annual Meeting. May 10-13, 1992.
  99. Morrill-Oakes, M.G., P.N.M. Konings and T.P. Davis. Ontogeny of carboxypeptidase H and endopeptidase-24.11 involved in the post-translational processing and metabolism of neuropeptides in the rat hypothalamus, cerebral cortex, and cerebellum. Winter Neuropeptide Conference, Breckenridge, CO. February 1-5, 1992.
  100. Chronwall, B.M., T.P. Davis, M.D. Hirsch, W.R. Millington, K.E. Moore and P.J. Williams. Cellular and molecular approaches to the pro-opiomelanocortin (POMC) neural and endocrine systems. Winter Neuropeptide Conference, Breckenridge, CO. February 1-5, 1992.

101. Weber, S.J. and T.P. Davis. Opioid peptide BBB penetration improvement by halogenation: *in vitro* and *in vivo* evidence. INRC (CPDD Annual Meeting, Keystone, CO. June 20-27, 1992.
102. Davis, T.P., S.J. Weber, D.L. Greene and V.J. Hruby. *In vivo* [<sup>3</sup>H]DPDPE localizes to central regional delta opioid receptors and shows high biliary excretion. INRC/CPDD Annual Meeting. Keystone CO. June 20-27, 1992.
103. Rao, R.K., M. Shantaram, A.R. Aroor, A. Raja, T.P. Davis and A. Rao. Immunoreactive epidermal growth factor and transforming growth factor- $\alpha$  in brain tumors. Growth Factors, Peptides and Receptors XIIth Washington International Spring Symposium. Washington, DC. June 1-10, 1992.
104. Rao, R.K., H.-H. Chang, F. Porreca, P. Brannon, T.P. Davis and O. Koldovsky. Epidermal growth factor inhibits gastric acid secretion more potently in developing than in mature rats. Growth Factors, Peptides and Receptors '92 XIIth Washington International Spring Symposium. Washington, DC. June 1-10, 1992.
105. Weber, S.J., P.J. Horan, A. Mattia, A. Misicka, A. Lipkowski, V.J. Hruby, F. Porreca and T.P. Davis. Analgesia, distribution and stability of the unique enkephalin analog biphalin. American Society for Pharmacology and Experimental Therapeutics Annual Meeting. Orlando, FL. August 5-10, 1992.
106. Haaseth, R.C., P. Davis, T. Zalewska, J. Slaninova, E. Malatynska, A. Lee, T.H. Kramer, H.I. Yamamura, F. Porreca, S.J. Weber, T.P. Davis and V. H. Hruby. Surprisingly potent and selective 3-position analogs of DPDPE for the delta opioid receptor. 22nd European Peptide Symposium. Interlaken, Switzerland. September 13-19, 1992.
107. Davis, T.P., M. Oakes, and P.N.M. Konings. Haloperidol and chlorpromazine treatment alters neutral endopeptidase 24.11 activity in nucleus accumbens and caudate putamen. 22nd Annual Meeting Society for Neuroscience. Anaheim, CA. October 25-30, 1992.
108. Oakes, M.G., P.N.M. Konings and T.P. Davis. The ontogeny of enzymes involved in the post-translational processing and metabolism of peptides in the brain. 22nd Annual Meeting Society for Neuroscience. Anaheim, CA. October 25-30, 1992.
109. Clark, D.A., N.G. Seidah, and T.P. Davis. Proteolytic enzyme inhibitors suppress *in vitro* growth of small cell lung cancer which contains prohormone convertase 1 and 2 mRNA. 22nd Annual Meeting Society for Neuroscience. Anaheim, CA. October 25-30, 1992.
110. Weber, S.H., and T.P. Davis. Conformationally constrained peptides and the blood-brain barrier. 22nd Annual Meeting Society for Neuroscience. Anaheim, CA. October 25-30, 1992.
111. Konings, P.N.M., M.C. Beinfeld, M.J.C. Hendrix, R. Day, N.G. Seidah, B.J. Merrill, and T.P. Davis. Processing of cholecystokinin in the SK-N-MCIXC cell line. 22nd Annual Meeting Society for Neuroscience. Anaheim, CA. October 25-30, 1992.
112. Knapp, R.J., J. Fang, T. Metsunaga, S. Weber, T.P. Davis, V.J. Hruby, and H.I. Yamamura. Binding of [4-<sup>125</sup>I-PHE<sup>3</sup>,Glu<sup>4</sup>] Deltorphin to  $\delta$  opioid receptors of rat brain. 22nd Annual Meeting Society for Neuroscience. Anaheim, CA. October 25-30, 1992.
113. Weber, S.J., V.J. Hruby, R.C. Haaseth, A. Misicka, A. Lipkowski, and T.P. Davis. Transport of Opioid Peptide Drugs Across the Blood-Brain Barrier: Effect of Structure. International Conference on the Blood Brain Barrier, Amsterdam, The Netherlands. October 8-12, 1992.
114. Greene, D.L., V.S. Hau, V.J. Hruby, T.P. Davis. *In Vitro* Conversion of Pro-drug Forms of {D-Pen<sup>2</sup>, D-Pen<sup>5</sup>} Enkephalin and {D-Pen<sup>2</sup>, L-Cys<sup>5</sup>} Enkephalin. Medical Research Program, University of Arizona, 1992 and American Society for Medical Student Research, Carmel, CA. 1993.
115. Weber, S.J., P.J. Horan, A. Mattia, A. Misicka, A. Lipkowski, V.J. Hruby, F. Porreca, T.P. Davis. Analgesia, Distribution, and Stability of the Unique Enkephalin Analog

- Biphalin. Pharmacology 92, ASPET at Orlando, FL. May 4, 1992.
116. Rao, R.K., Davis, T.P., and Porreca, F. C-Terminal Truncation of Epidermal Growth Factor (EGF) in Mouse Jejunal Lumen: Regulation by Luminal Irritants, American Gastroenterological Association, American Association for the Study of Liver Diseases. Annual Meeting. Boston, MA. May 16-19, 1993.
  117. Rao, R.K., Levenson, S., Porreca, F., Brannon, P.M., Davis, T.P., and Koldovsky, O. Ontogenic Differences in the Effects of Epidermal Growth Factor on Gastric Acid Secretion. American Gastro-enterological Association, American Association for the Study of Liver Boston, MA. May 16-19, 1993.
  118. E.A. Brownson, T.J. Abbruscato, T.P. Davis. Peptidases at the Blood Brain Barrier: Effect on Permeability. Society for Neuroscience 23rd Annual Meeting, Washington, DC. November 7-12, 1993.
  119. B.L. Mania-Farnell, B.J. Merrill, R. Day, N.G. Seidah, and T.P. Davis. Second Messenger Effects on CCK, PC1 and mRNA in the Human Neuroblastoma Cell Line SK-N-MCIXC. Society for Neuroscience, Washington, DC. November 7-12, 1993.
  120. C.A. Mayr, G. Powis and T.P. Davis. Neurotensin Inhibits Growth and Stimulates Intracellular Calcium Release in the Human Prostatic Carcinoma Cell Line LNCaP. Society for Neuroscience 23rd Annual Meeting, Washington, DC. November 7-12, 1993.
  121. C. Konkoy, and T.P. Davis. Time-Course Administration of Neuroleptics Decreases Regional Neurotensin Metabolism in Intact Rat Brain Slices. Society For Neuroscience 23rd Annual Meeting, Washington, DC. November 7-12, 1993.
  122. M.G. Oakes, M.C. Beinfeld and T.P. Davis. Effect of Development on Carboxypeptidase H and Levels of Cholecystokinin in the Rat Hypothalamus and Cortex. Society For Neuroscience, Washington, DC. November 7-12, 1993.
  123. D.A. Clark, J.E. Taylor, D. Alberts and T.P. Davis. Inhibition of human small cell lung cancer growth by growth factor receptor antagonists and protease inhibitors. Amer. Assoc. for Cancer Research (AACR). San Francisco, CA. March, 1994.
  124. D.L. Green, V.S. Hau, S.J. Weber, T.J. Abbruscato, V.J. Hruby and T.P. Davis. Metabolic Conversion and *In Vitro* Blood-Brain Barrier Permeability of an Enkephalin Analog Pro-Drug. Society for Neuroscience Annual Meeting, Miami, FL. November 13-18, 1994.
  125. K. Gohil, T.J. Abbruscato, Jr., T. Singh, D. Silva, G. Miljanich, R. Newcomb, L. Nadasdi, and T.P. Davis. Blood-Brain Barrier Permeation and *In Vivo* Brain Receptor Occupancy of the Calcium Channel Blocker, SNX-111 (Synthetic  $\omega$ -Conopeptide MV11A). Society for Neuroscience Annual Meeting, Miami, FL. November 13-18, 1994.
  126. T.J. Abbruscato, S.J. Weber, V.J. Hruby, and T.P. Davis. *In Vitro* and *In Vivo* Blood-Brain Barrier Permeability of MU Selective, Opioid Antagonist CTAP and Agonists DPDPE and Biphalin: Evidence for Improved Permeability by Halogenation. Society for Neuroscience Annual Meeting, Miami, FL. November 13-18, 1994.
  127. R. Day, W. Dong, T.P. Davis, T.G. Sherman, R.C. Thompson, N.G. Seidah. Hypothalamic Expression of the Prohormone Convertases: *In Situ* Hybridization Colocalization Studies. Society for Neuroscience Annual Meeting, Miami, FL. November 13-18, 1994.
  128. B.L. Mania-Farnell, I.W. Botros, and T.P. Davis. Regulation of Cholecystokinin mRNA by Retinoic Acid and  $\beta$ -Adrenergic Agents in Cell Lines. Society for Neuroscience Annual Meeting, Miami, FL. November 13-18, 1994.
  129. C.S. Konkoy and T.P. Davis. Regional Metabolism of Met-Enkephalin and CCK on Intact Rat Brain Slices: Characterization of Specific Peptidases. Society for Neuroscience Annual Meeting, Miami, FL. November 13-18, 1994.
  130. S.M. Waters, C.S. Konkoy and T.P. Davis. Substance P Metabolism on Intact Regional Brain Slices: Effect of Neuroleptic Administration. Society for

- Neuroscience Annual Meeting, Miami, FL. November 13-18, 1994.
131. G. Li, W. Haq, I.A. Dillon, L. Xiang, R. Hughes, B. Lou, P. Davis, F. Porreca, T. Davis, M. Romanowski, X. Zhu, A. Misicka, A. Lipkowski, H.I. Yamamura, D.F. O'Brien, and V.J. Hruby. Structure-Activity Relationships and Synthetic Study for a Super Antinociceptive Peptide, Analogue Biphalin. Fourteenth American Peptide Symposium, Columbus, OH. June 18-23, 1995.
  132. J.-P. Meyer, F.-D. Lung, K. Lee, P. Davis, T. Gillespie, H.I. Yamamura, T.P. Davis, F. Porreca, and V.J. Hruby. Synthesis and Biological Activities of Enzymatically Stable and Highly Selective Dyn A(1-11)-NH<sub>2</sub> Analogs. Fourteenth American Peptide Symposium, Columbus, OH. June 18-23, 1995.
  133. V.J. Hruby, T.P. Davis, R. Polt, H. Bartosz-Bechowski, A. Misicka, A. Lipkowski, S.D. Sharma, X. Qian, G. Li, H.I. Yamamura, F. Porreca, and D.F. O'Brien. A Systematic Investigation of Factors that Enhance Penetration of the Blood Brain Barrier. Fourteenth American Peptide Symposium, Columbus, OH. June 18-23, 1995.
  134. T.J. Abbruscato, S.A. Williams, V.J. Hruby, and T.P. Davis. Blood-Brain Barrier Permeability of Novel Opioid Peptides using Brain Microvessel Endothelial Cells. Fifty-Seventh Annual Scientific Meeting of the College on Problems of Drug Dependence, Scottsdale, AZ. June 10-15, 1995.
  135. S.A. Williams, T.J. Abbruscato, V.J. Hruby, and T.P. Davis. Effect of Halogenation on the CNS Entry of DPDPE. Fifty-Seventh Annual Scientific Meeting of The College on Problems of Drug Dependence, Scottsdale, AZ. June 10-15, 1995.
  136. V.J. Hruby, N. Collins, J.-P. Meyer, F.-D. Long, D. Stropova, P. Davis, T. Davis, F. Porreca and H.I. Yamamura. Design of dynorphin A analogs with high potency and selectivity for  $\kappa$  or  $\delta$  or  $\mu$  receptors implications for opioid drug design. Fifty-Seventh Annual Scientific Meeting of the College on Problems of Drug Dependence, Scottsdale, AZ. June 10-15, 1995.
  137. S.A. Williams, S.A., T.J. Abbruscato, L. Szabo, V. Hruby and T.P. Davis. Does glycosylated DCDC-enkephalin use the GLUT I carrier to enter the CNS? Cerebral Vascular Biology Conference, Paris, France. July 1995.
  138. R.L. Polt, V. J. Hruby, F. Porreca, T. P. Davis, H. I. Yamamura and L. Szabo. Glycopeptide enkephalin analogs penetrate the blood-brain barrier to produce potent analgesia in mice after peripheral administration. Western Biotech Conference, October 18-21, 1995.
  139. T.P. Davis, A. Erenberg, S.C. Moreau, J.E. Taylor, and T.J. Gillespie. Comparative distribution of somatostatin analogs to target tissues. Society of Neuroscience 26th Annual Meeting, Washington, DC. November 16-21, 1996.
  140. T.J. Abbruscato, S.A. Williams, V.J. Hruby, T.P. Davis. Brain and spinal cord distribution of biphalin, correlation with opioid receptor density and mechanism of CNS entry. Society of Neuroscience 26th Annual Meeting, Washington, DC. November 16-21, 1996.
  141. S.A. Williams, T.J. Abbruscato, V. Hau, T.J. Gillespie, J. Zsigo, V.J. Hruby and T.P. Davis. *In vitro* blood-brain barrier permeability and stability of a series of [D-ALA<sup>2</sup>] deltorphin I and II analogues<sup>1</sup>. Society of Neuroscience 26th Annual Meeting, Washington, DC. November 16-21, 1996.
  142. S.M. Waters, M.P. Rounseville and T.P. Davis. Effect of dopaminergic drugs on regional neuropeptidase activity and mRNA levels. Society of Neuroscience 26th Annual Meeting, Washington, DC. November 16-21, 1996.
  143. S.M. Waters and T.P. Davis. Alterations of peptide metabolism and neuropeptidase activity in senile dementia of the Alzheimer's type. Joint meeting of the European Neuropeptide Club and the 17th Winter Neuropeptide Conference, Breckenridge CO. February 3-6, 1996.

144. T.J. Abbruscato and T.P. Davis. Protection of brain endothelial cell integrity by nifedipine during hypoxia. Society for Neuroscience 27th Annual Meeting, New Orleans, LA. October 25-30, 1997.
145. M.P. Rounseville and T.P. Davis. Differential expression of prohormone convertase genes in neuroendocrine tumors. Society for Neuroscience 27th Annual Meeting, New Orleans, LA. October 25-30, 1997.
146. R.D. Egleton and T.P. Davis. Endocytosis: A potential role in the transport of opioid peptides across the blood-brain barrier (BBB). Society for Neuroscience 27th Annual Meeting, New Orleans, LA. October 25-30, 1997.
147. T.P. Davis. The saturation kinetics of carrier mediated transport of peptide drugs to the CNS. Conference on Formulations and Drug Delivery II. Sponsored by: The American Chemical Society Division of Biochemical Technology, Controlled Release Society, Inc., La Jolla, CA. Oct. 5-8, 1997.
148. R.D. Egleton and T.P. Davis. The enkephalin analog [D-Pen<sup>2</sup>, D-Pen<sup>5</sup>]enkephalin is transported into the brain by endocytosis. Conference on Formulations and Drug Delivery II. Sponsored by: The American Chemical Society Division of Biochemical Technology, Controlled Release Society, Inc., La Jolla, CA. October 5-8, 1997.
149. T.P. Davis and T.J. Abbruscato. Rapid hypoxia/aglycemia compromises *in vitro* blood-brain barrier integrity. Conference on Cerebral Vascular Biology, Gleneden Beach, Oregon. March, 1998.
150. T.P. Davis and R.D. Egleton. Transport of the delta-opioid receptor analgesic DPDPE across the BBB by endocytosis. Conference on Cerebral Vascular Biology. Gleneden Beach, Oregon. March, 1998.
151. T.J. Abbruscato, M.P. Rounseville and T.P. Davis. Alterations in endothelial cell / blood-brain barrier (BBB) phenotype after hypoxia/aglycemia. Society for Neuroscience 28th Annual Meeting. Los Angeles, CA. October, 1998.
152. R.D. Egleton, S.A. Mitchell, V.J. Hruby and T.P. Davis. Glycosylation improves the blood-brain barrier (BBB) permeability of an enkephalin analog. Society for Neuroscience 28th Annual Meeting. Los Angeles, CA. October, 1998.
153. M. P. Rounseville and T.P. Davis. C-MYB trans-activates the transcription of autocrine growth factor genes in small cell lung cancer. Society for Neuroscience 28th Annual Meeting. Los Angeles, CA. October, 1998.
154. T.J. Gillespie, J.E. Taylor, and T.P. Davis. Halogenation of opioid peptides alters their blood-brain barrier (BBB) permeabilities and octanol/saline distribution coefficients. Society for Neuroscience 28th Annual Meeting. Los Angeles, CA. October, 1998.
155. V.S. Hau, A. Lipkowski, V.J. Hruby, R.J. Huxtable and T.P. Davis. Effect of cationization on the *in vitro* stability and blood-brain barrier permeability of endomorphins. Society for Neuroscience 28th Annual Meeting. Los Angeles, CA. October, 1998.
156. C.L. Gentry, R.D. Egleton, V.J. Hruby, T.J. Gillespie and T.P. Davis. Halogenated enkephalin analogs show enhanced blood -brain barrier (BBB) permeability in an *in vitro* system. Society for Neuroscience 28th Annual Meeting. Los Angeles, CA. October, 1998.
157. K.A. Witt, R.D. Egleton and T.P. Davis. Insulin potentiates enkephalin analog permeability across the blood-brain barrier. Society for Neuroscience 28th Annual Meeting. Los Angeles, CA. October, 1998.
158. V.S. Hau, C. Campos, A. Lipokowski, V.J. Hruby and T.P. Davis. Endothelial cell uptake, blood-brain barrier permeability and *in vitro* stability of the cationic endomorphins. Experimental Biology 99, Washington, DC, April, 1999.
159. V.S. Hau, C. Campos, K. Hoshata, H. Yamamura, V. Hruby and T.P. Davis. Guanidino cationization effects on the blood-brain barrier permeability, *in vitro* stability and receptor binding of endomorphins. American Society for Medical

- Student Research, Carmel, CA, 1999.
160. T.W. Moody, J. Childs, E. Moody and T.P. Davis. SR48692 is a neurotensin receptor antagonist for small cell lung cancer cells. Society for Neuroscience 29<sup>th</sup> Annual Meeting. Miami, Florida, June, 1999.
  161. S. Hom, R.D. Egleton, T.J. Abbruscato, P.A. St. John and T.P. Davis. Increased cerebrovascular permeability in an *in situ* model of hypoxia/aglycemia. Society for Neuroscience 29<sup>th</sup> Annual Meeting. Miami Beach, FL, October, 1999.
  162. T.J. Abbruscato and T.P. Davis. Hypoxia/Aglycemia alterations in cytoskeletal and tight junctional proteins at the blood-brain barrier (BBB).
  163. K.A. Witt, R.D. Egleton, and T.P. Davis. Effect of poly(oxyethylene)-poly(oxypropylene) block copolymer on opioid transport in the *in vitro* blood-brain barrier. Society for Neuroscience 29<sup>th</sup> Annual Meeting. Miami Beach, FL, October, 1999.
  164. C.L. Gentry, T.J. Abbruscato and T.P. Davis. Nicotine and cotinine increase *in vitro* blood-brain barrier permeability. Society for Neuroscience 29<sup>th</sup> Annual Meeting. Miami Beach, FL, October, 1999.
  165. R.D. Egleton, S.A. Mitchell, T.J. Gillespie and T.P. Davis. Glycosylation improves the blood-brain barrier (BBB) penetration of a linear opioid peptide analog. Society for Neuroscience 29<sup>th</sup> Annual Meeting. Miami Beach, FL, October, 1999.
  166. T.J. Abbruscato, K.M. Venisnik and T.P. Davis. Hypoxia/Aglycemia alterations in junctional proteins at the blood-brain barrier (BBB). 43<sup>rd</sup> Annual Meeting of the Western Pharmacology Society, Westward Look Resort & Spa, Tucson, Arizona, January, 2000.
  167. R.D. Egleton, S.A. Mitchell, J. Huber, T.J. Gillespie, R. Polt, and T.P. Davis. Glycosylation improves peptide bioavailability to the brain. 43<sup>rd</sup> Annual Meeting of the Western Pharmacology Society, Westward Look Resort & Spa, Tucson, Arizona, January, 2000.
  168. K.A. Witt, R.D. Egleton, and T.P. Davis. Effect of block copolymer micellar microcontainers on opioid transport in the *in vitro* blood-brain barrier. 43<sup>rd</sup> Annual Meeting of the Western Pharmacology Society, Westward Look Resort & Spa, Tucson, Arizona, January, 2000.
  169. V.S. Hau, K. Hosohata, A.W. Lipkowski, H.I. Yamamura, V.J. Hruby, and T.P. Davis. Cationic endomorphins: Assessment of *in vitro* stability, BBB permeability and endothelial cell uptake. 43<sup>rd</sup> Annual Meeting of the Western Pharmacology Society, Westward Look Resort & Spa, Tucson, Arizona, January, 2000.
  170. K.M. Venisnik, T.J. Abbruscato, B.T. Hawkins, and T.P. Davis. Nicotine and cotinine modulate *in vitro* and *in situ* blood-brain barrier permeability. 43<sup>rd</sup> Annual Meeting of the Western Pharmacology Society, Westward Look Resort & Spa, Tucson, Arizona, January, 2000.
  171. R.D. Egleton, J.D. Huber, C.R. Campos and T.P. Davis. Alteration of blood-brain barrier (BBB) transporter expression during diabetes in the rat. Society for Neuroscience, 30<sup>th</sup> Annual Meeting, New Orleans, LA, November 4-9, 2000.
  172. K.S. Mark and T.P. Davis. Re-oxygenation following hypoxia induces changes in brain endothelial cell architecture. Society for Neuroscience, 30<sup>th</sup> Annual Meeting, New Orleans, LA, November 4-9, 2000.
  173. J.D. Huber, K.A. Witt, S. Hom, R.D. Egleton, and T.P. Davis. Blood-brain barrier tight junction alteration induced by peripheral inflammatory pain. Society for Neuroscience, 30<sup>th</sup> Annual Meeting, New Orleans, LA, November 4-9, 2000.
  174. K.A. Witt, R.D. Egleton, J.D. Huber, M.J. Roberts, M.D. Bentley, L. Guo, and T.P. Davis. Assessment of pegylation and methylation as brain delivery methodologies. Society for Neuroscience, 30<sup>th</sup> Annual Meeting, New Orleans, LA, November 4-9, 2000.
  175. S. Hom, R.D. Egleton, T.J. Abbruscato, J.D. Huber and T.P. Davis. Effects of reduced perfusion flow on blood-brain barrier (BBB) transport systems. Society for

- Neuroscience, 30<sup>th</sup> Annual Meeting, New Orleans, LA, November 4-9, 2000.
176. B.T. Hawkins, R.D. Egleton, J.D. Huber, C.R. Campos, and T.P. Davis. Acute and chronic effects of nicotine on <sup>86</sup>Rb<sup>+</sup> uptake across the *in situ* blood-brain barrier of the rat. Society for Neuroscience, 30<sup>th</sup> Annual Meeting, New Orleans, LA, November 4-9, 2000.
  177. R.D. Egleton, J.D. Huber, C.R. Campos, R.C. Brown and T.P. Davis. Alteration of ion transporter expression at the choroid plexus of diabetic rats. Society for Neuroscience, 31<sup>st</sup> Annual Meeting, San Diego, CA, November 10-16, 2001.
  178. K.S. Mark, S. Hom, R.C. Brown, T.P. Davis. Blood-brain barrier, cytoarchitecture, immunofluorescence, hypoxia. Society for Neuroscience, 31<sup>st</sup> Annual Meeting, San Diego, CA, November 10-16, 2001.
  179. R.C. Brown, K.S. Mark, R.D. Egleton and T.P. Davis. Role of calcium in modulating blood-brain and blood-CSF barrier integrity after hypoxia/aglycemia. Society for Neuroscience, 31<sup>st</sup> Annual Meeting, San Diego, CA, November 10-16, 2001.
  180. K.A. Witt, K.S. Mark and T.P. Davis. Hypoxia/Re-oxygenation increases sucrose permeability at rat blood-brain barrier. Society for Neuroscience, 31<sup>st</sup> Annual Meeting, San Diego, CA, November 10-16, 2001.
  181. S. Hom, R.D. Egleton, K.S. Mark and T.P. Davis. Comparison of blood-brain barrier function and protein expression in SD, SKY and SHR rats. Society for Neuroscience, 31<sup>st</sup> Annual Meeting, San Diego, CA, November 10-16, 2001.
  182. B.T. Hawkins, R.C. Brown and T.P. Davis. Effects of chronic nicotine on blood-brain barrier ion transporter expression. Society for Neuroscience, 31<sup>st</sup> Annual Meeting, San Diego, CA, November 10-16, 2001.
  183. R.D. Egleton, C.R. Campos, J.D. Huber, S. Hom and T.P. Davis. Diabetes induces phosphorylation of choroid plexus NA<sup>+</sup>/K<sup>+</sup> ATPASE. Society for Neuroscience, 32<sup>nd</sup> Annual Meeting, Orlando, FL, November 2-7, 2002.
  184. J.D. Huber, C.R. Campos, R.D. Egleton and T.P. Davis. Pain and the blood-brain barrier: Potential targets for tight junction modulation. Society for Neuroscience, 32<sup>nd</sup> Annual Meeting, Orlando, FL, November 2-7, 2002.
  185. K.S. Mark, A.R. Burroughs, T.P. Davis. Changes in nitric oxide (NO) levels during hypoxia and post-hypoxic reoxygenation in cerebral microvasculature. Society for Neuroscience, 32<sup>nd</sup> Annual Meeting, Orlando, FL, November 2-7, 2002.
  186. R.C. Brown and T.P. Davis. Does calcium modulate tight junction protein expression at the blood-brain barrier after hypoxia? Society for Neuroscience, 32<sup>nd</sup> Annual Meeting, Orlando, FL, November 2-7, 2002.
  187. K.A. Witt, K.S. Mark, J.D. Huber, R.D. Egleton and T.P. Davis. Hypoxia treatment shows enhanced *in vivo* blood-brain barrier tight junction permeability associated with a shift in occludin protein band expression. Society for Neuroscience, 32<sup>nd</sup> Annual Meeting, Orlando, FL, November 2-7, 2002.
  188. B.T. Hawkins, R.C. Brown, R.D. Egleton, Y.P. Kuo, R.J. Lukas and T.P. Davis. Rat cerebral microvessels express nicotinic Acetylcholine receptors. Society for Neuroscience, 32<sup>nd</sup> Annual Meeting, Orlando, FL, November 2-7, 2002.
  189. S. Hom, R.D. Egleton, J.D. Huber and T.P. Davis. Alterations in blood-brain barrier permeability and cerebral blood flow induced by hypoxia-aglycemia with low flow brain perfusion. Society for Neuroscience, 32<sup>nd</sup> Annual Meeting, Orlando, FL, November 2-7, 2002.
  190. V.S. Hau, J.D. Huber and T.P. Davis. A cellular fractionation method to investigate blood-brain barrier tight junction protein translocation and post-translational modification. Society for Neuroscience, 32<sup>nd</sup> Annual Meeting, Orlando, FL, November 2-7, 2002.
  192. K.A. Witt, K.S. Mark, S. Hom and T.P. Davis. Acute hypoxia enhances blood-brain barrier tight junction permeability associated with inflammation and vasogenic edema in a biphasic manner. Society for Neuroscience, 33<sup>rd</sup> Annual Meeting, New Orleans,

- LA, November 8-12, 2003.
193. K.S. Mark, A. Burroughs and T.P. Davis. Hypoxia-induced changes in brain microvessel endothelial cell nitric oxide synthase. Society for Neuroscience, 33<sup>rd</sup> Annual Meeting, New Orleans, LA, November 8-12, 2003.
  194. J.D. Huber, C.R. Campos and T.P. Davis. Immunohistochemical study of Cerebrovascular changes following carrageenan-induced inflammatory pain in the rat. Society for Neuroscience, 33<sup>rd</sup> Annual Meeting, New Orleans, LA, November 8-12, 2003.
  195. B.T. Hawkins, R.D. Egleton, and T.P. Davis. Peripheral nicotinic antagonism blocks nicotine-induced increases in blood-brain barrier permeability. Society for Neuroscience, 33<sup>rd</sup> Annual Meeting, New Orleans, LA, November 8-12, 2003.

#### **F. BOOK REVIEWS**

1. Davis, T.P., American Institute of Biological Sciences, "Heat Shock: From Bacteria to Man," by Schlessinger, Ashburner and Tissieris, 1983. *BioScience* 34, 9:590, 1984.
2. Davis, T.P., "Peptide Hormones as Prohormones: Processing, Biological Activity, Pharmacology." Edited by Jean Martinez. Review written for *Trends in Pharmacological Sciences* Vol. 10:424, 1989.

### **VII. MEDIA**

#### **A. INTERVIEWS**

- 1981 Interview, NBC Television, "Effect of Heat on Your Health."
- 1982 Interview, KNXT Radio Station, "Effect of Tucson's Heat on Your Health."
- 1983 Interview KUAT Educational Television, "Effect of Heat on Non-Acclimated Individuals."
- 1987 Interview, KUAT Television, "Effect of Heat on Human Performance."
- 1988 Interview, KAET Television - Phoenix, "Alzheimers Disease Research - Advances in Neurochemistry."
- 1989 Interview, KUAT Radio - Tucson. "Neurochemistry of Alzheimer's Disease."

#### **B. VIDEOTAPES-ONLINE**

- 1987 Deans Clinical Rounds. "Neurochemistry of Alzheimers Disease." March 10, 1987. University of Arizona College of Medicine Clinical Conference.
- 1988 KAET Television - Phoenix. "Alzheimers Disease Research - Advances in Neurochemistry." 1988.
- 1999 University of Washington Medical School Colloquium Series on Biomedical Research Integrity - Seattle, WA. "Skills Integral to Good Laboratory Management." July 8, 1999.
- 2009 Henry Stewart Lecture Series. Davis, T. (2009), "Blood-brain barrier in health and disease", in Kastin, A. and Pan, W. (eds), *The Blood-Brain Barrier: Understanding the regulatory gatekeeper between brain and body*, The Biomedical & Life Sciences Collection, Henry Stewart Talks. London. <http://www.hstalks.com/?t=BL0381811-Davis>

### **VIII. SCHOLARLY PRESENTATIONS**

#### **A. COLLOQUIA**

- 1981 Colloquium, Lederle Pharmaceuticals, Pearl River, New York. Invited presentation on, "Pharmacology of Antineoplastic Drugs."
- 1989 Invited NASA Colloquium Speaker, "Requirements for Measuring Indices of Human Stress on a Lunar-Based Chemical Analysis Laboratory (LBCAL)." IX College Park Colloquium, University of Maryland, College Park, MD, October 30-31, 1989.

#### **B. INVITED SEMINARS**

- 1980 Invited Speaker, Perkin-Elmer Corp., Norwalk, Conn. Invited Seminar on, "Biogenic amine analysis using reversed-phase liquid chromatography."

- 1981 Invited Speaker, University of Arizona, Alpha Epsilon Delta. "Alternate Careers in Biomedical Research."
- 1981 Department of Physiology, University of Arizona Health Sciences Center, Tucson, Arizona. Seminar on, "Exercise in the Desert: Effect of Heat on Thermoregulation."
- 1982 Invited Speaker, Department of Biological Sciences, University of Nevada, Las Vegas. Invited seminar on, "Peptides and Amines: Function in Thermoregulation."
- 1982 Invited Seminar, Lederle Pharmaceuticals, Pearl River, New York. Invited presentation on, "Pharmacology of Antineoplastic Drugs."
- 1982 Department of Biological Sciences, University of Arizona, Tucson, Arizona. Invited Seminar on, " $\beta$ -endorphin Processing in the Brain: Thermoregulation Effects."
- 1982 Department of Pharmacology/Toxicology, University of Arizona College of Pharmacy, Tucson, AZ. Invited Seminar on, "Peptide Research Advances."
- 1983 Animal Physiology Graduate Group, University of Arizona, Tucson, Arizona. Invited Seminar on " $\beta$ -endorphin Processing in the Gut: Motility Effects."
- 1984 Invited Seminar, Abbott Laboratories, Dallas, Texas. January 26-28, Invited seminar/lecture on "Characterization of *In Vitro* Central  $\beta$ -endorphin Metabolism in Neuropsychiatric Diseases."
- 1984 Invited Seminar, Hansen's Natural Foods, Inc., Los Angeles, CA, February 28-29. Invited lecture on, "Isolation of Proteins and Peptides from Plants by Liquid Chromatography."
- 1984 Invited Seminar, University of Nevada. June 25, Invited lecture on, "Central Processing of  $\beta$ -endorphin: Effect of Neuroleptic Drugs."
- 1984 Invited Speaker, AKRAS Chemical Co., Vienna, Austria. July 19-20, Invited seminar on the "Use of Chromatographic Techniques in the Isolation of Pharmaceutical and Food Flavors."
- 1984 Invited Seminar, Laboratoires D'Etudes t de Recherches Synthelabo, Paris, France. July 27-30, Invited by Dr. Hans Schoemaker to discuss, "Effect of centrally acting drugs on endorphin processing in normal and diseased tissue."
- 1985 Invited Speaker, University of Nevada, March 1. "Implications of Central Processing of Opioid Peptides."
- 1985 Invited Seminar, Department of Neurology, University of Arizona College of Medicine. "Implications of Central Peptide Processing and Mental Illness." September 6, 1985.
- 1985 Invited Seminar, University of Arizona Center for Separation Sciences, May 13, 1985. Invited lecture on, "Peptide Separations in Biological Tissues."
- 1985 Invited Seminar, National Bureau of Standards, Washington, DC, April 10-12, on "Ascorbic Acid Analysis in Stabilized and Non-stabilized Samples."
- 1986 Invited Seminar, Organon Pharmaceutical Company, Scientific Development Group, OSS - The Netherlands. "Effect of Centrally Acting Drugs on  $\beta$ -endorphin Processing." June 20, 1986.
- 1986 Invited Seminar, Rudolf Magnus Institute for Pharmacology, University of Utrecht, The Netherlands. "Effect of Centrally Acting Drugs on *In Vitro* Central  $\beta$ -endorphin Metabolism." June 23-27, 1986.
- 1987 Invited Seminar, Department of Chemical Engineering, University of Arizona. "Bioseparation Techniques for Chemical Engineers." March 16, 1986.
- 1988 Invited Seminar, University of Arizona College of Medicine. "Implications of Neuropeptide Processing." February 18, 1987.
- 1988 Invited Speaker, Rincon Optimist Club, Tucson, Arizona. March 30, 1988. "Alzheimer's Disease and Dementia - Chemical Changes and Aging."
- 1990 Invited Seminar, Analytical Biochemistry Labs, Columbia, Missouri, March 1, 1990. "Strategies for New Analytical Programs in Peptides and Proteins."
- 1990 Invited Seminar, Rudolf Magnus Institute for Pharmacology, University of Utrecht, The Netherlands, July 12, 1990. "Neuropeptide Processing."

- 1990 Invited Seminar, Duke University Medical Center, Department of Pharmacology. "Neuropeptide Regulation by Peptidases," Durham, NC, August 27-29, 1990.
- 1991 Invited Seminar, University of Arizona College of Medicine Committee on Aging Research. "Alterations in Specific Regional Neuropeptidases in Alzheimers Disease - Effect of Post-Mortem Interval." November 5, 1991.
- 1992 Invited Seminar. Barrow Neurological Institute, Phoenix, AZ. "Effect of Antipsychotics on Neurotensin and  $\beta$ -Endorphin Metabolism." March 12, 1992.
- 1992 Invited Seminar. "Effect of Protease Inhibitors on Small Cell Lung Cancer Growth." National Cancer Institute, Bethesda, MD. May 29, 1992.
- 1993 Invited Seminar Speaker. "Metabolic Half-Life of Somatostatin and Substance P are Altered in Alzheimers Disease". Synthelabo Research Institute, Paris, France. March 29, 1993.
- 1993 Invited Seminar Speaker. "Conformationally Constrained Enkephalin and the Blood Brain Barrier." Neurex Corporation, Palo Alto, CA. July 9, 1993.
- 1993 Invited Seminar. "Gastrointestinal Processing of Neuropeptides: Effect on Function." Department of Physiology. University of Arizona College of Medicine. Tucson, AZ. October 8, 1993.
- 1994 Invited Seminar Speaker. "Metabolic Stability and Tumor Inhibition of Bombesin/GRP Receptor Antagonists." Selectide Corporation, Oro Valley, AZ. April 7, 1994.
- 1994 Invited Seminar Speaker. "Neurotensin as a Negative Autocrine Factor in Prostate Cancer." National Cancer Institute, NIH, Bethesda, MD. May 23, 1994.
- 1995 Invited Seminar Speaker. "*In Vitro-In Vivo* Blood Brain Barrier Permeability Correlations of Receptor Selective Opioid Peptides." Parke-Davis Pharmaceutical Research, Ann Arbor, MI. March 23, 1995.
- 1997 Invited Seminar Speaker. "The Saturation Kinetics of Carrier Mediated Transport of peptides to the CNS." Emory University School of Medicine, Department of Biochemistry, Atlanta, GA. May 8, 1997.
- 1997 Invited Seminar Speaker. "Peptide drug distribution across the blood-brain and blood-cerebrospinal fluid barrier." Parke-Davis Pharmaceutical Research, Ann Arbor, MI. July 23, 1997.
- 1998 Invited Seminar Speaker. "Anatomy, Physiology and Pharmacology of the Blood-Brain Barrier." Iowa State University, Ames, Iowa. May 14, 1998.
- 1998 Invited Seminar Speaker. "Peptide pharmaceuticals and their delivery across the blood-brain barrier." Washington State University College of Pharmacy, Pullman, WA. July 9-11, 1998.
- 1998 Invited Seminar Speaker. "Transport of peptide pharmaceuticals across the blood-brain barrier." University of Nebraska College of Medicine, Omaha, Nebraska. October 15-17, 1998.
- 2001 Invited Seminar Speaker. "Advances in the delivery of peptide neuropharmaceuticals to the brain." Biomeasure Neuropharm. Boston, MA. April 12-13, 2001, 2001.
- 2001 Invited Seminar Speaker. "Use of biopolymers for the delivery of protein therapeutics to the brain." Elan Pharmaceutical. Dublin, Ireland. August 6-9, 2001.
- 2002 Invited Seminar Speaker. "The Importance of Scientific and Research Integrity in Biomedical Investigations." Research Institute of Children's Hospital, U.S.C., Los Angeles, California. August 16, 2002.
- 2004 Invited Seminar Speaker. "Responsible Conduct in Research in Biomedical Investigations." Texas Tech University Health Sciences Center, College of Pharmacy. Amarillo, Texas. September 6-7, 2004.
- 2005 Invited Seminar Speaker. "Hypoxia/Aglycemia/Stroke and the Neurovascular Unit-Importance of the blood brain barrier". Texas A & M College of Medicine, College Station, Texas. April 14, 2005.
- 2005 Invited Speaker. "Mentoring: The Currency of an Academic Researcher". Tucson

- Sunrise Rotary Club, Tucson, Arizona. July 21, 2005.
- 2006 Invited Seminar Speaker, " The blood brain barrier in health and disease". The Department of Medical Physiology, University of Missouri, Columbia, Missouri. November 8, 2006.
- 2007 Invited Speaker, "The Blood- Brain Barrier and Biomedical Research", Jackson Rotary Club, Jackson, WY. August 28, 2007.
- 2010 Invited Speaker, " The Blood Brain Barrier in Health and Disease". St. Jude's Children's Hospital , Memphis, TN. April 22, 2010.
- 2010 Invited Speaker, "Etiology of Alzheimers Disease", Jackson Rotary Club, Jackson, WY. July 15, 2010.
- 2010 Invited Speaker, " Role of 3K3A-Activated Protein C as a Cytoprotectant in the Brain", Laureate Pharmaceutical LLC., Princeton, New Jersey. September 9, 2010.
- 2012 Invited Speaker, " Protein trafficking of P-glycoprotein and occludin as targets for drug delivery at the neurovascular unit", Harvard University Neuroscience Program, Mass. General Hospital. June 14, 2012.
- 2012 Invited Speaker, "PgP Trafficking at the BBB: Effect of Pain and Target for Therapy". Gordon Research Conference, " Barriers of the CNS". Colby-Sawyer College. June 21, 2012.
- 2015 Invited Speaker, "Trafficking of transporter proteins at the BBB/NVU as targets for drug delivery to the CNS – Effect of Pain on PgP ". Department of Neurosurgery and Neuroscience, MGH/Harvard Medical School. Sept. 23, 2015.
- 2016 Invited Honorary Speaker, Colloquium. Department of Pharmaceutical Sciences, Division of New Drug Development and Delivery. Univ. of Wisconsin-Madison, WI. April 21 to 23, 2016. "PgP trafficking as a target for drug delivery ".
- 2018 Invited Seminar Speaker. "How pain influences the blood brain barrier". Mass General Hospital / Harvard Medical School. Department of Neurology. June 22, 2018.
- 2019 Invited Seminar Speaker and Consultant. "How pain influences drug delivery at the blood brain barrier". Alkermes Pharmaceutical Company. Waltham, MA. June, 2019.
- 2022 Invited Attendee. Cerebrovascular Complications Conference (3C). June 25-29, 2022. Jackson Hole, WY.

### C. SYMPOSIA-INVITED AND CHAIRED

- 1981 Invited Speaker, Waters Associates, Western Chromatography Symposium. "Mass Spectrometry and Pharmacokinetics of Anti-Cancer Drugs," Newport Beach, CA.
- 1981 Symposium Chairman, "Liquid Chromatography as a Research Tool in Peptide and Amine Pharmacology." American Society of Pharmacology and Experimental Therapeutics, Fall Meeting, Calgary, Alberta, Canada.
- 1983 Invited Symposium Presentation, 8th American Peptide Symposium, Tucson, AZ.
- 1984 May 22-27. "Characterization of  $\beta$ -endorphin Processing by Reversed-Phase Liquid Chromatography."
- 1984 Symposium Chairman, "Endorphins and Enkephalins." American Society for Pharmacology and Experimental Therapeutics Meeting, Chicago, IL. April 11, 1983. FASEB.
- 1984 Invited Symposium Speaker, American Industrial Hygiene Association, Arizona Center for Occupational Safety and Health, School of Health Related Professions. April 9-12, "Principles of Gas Chromatography for Real Time Air Monitoring in the Industrial Environment."
- 1984 Invited Symposium Speaker, International Union of Physiological Sciences (IUPS) Symposium, Jerusalem, Israel. August 26-31. "Central Processing of Brain Peptides and Adaptation to the Environment."
- 1985 Invited Symposium Speaker. "Use of reversed-phase HPLC in analysis of peptide processing." Presented at Fourth International Symposium on HPLC of Proteins, Peptides and Polynucleotides, Baltimore, MD. Dec. 10-12, 1984.

- 1985 Invited Symposium Speaker. "Effect of proenkephalin A and proopioidmelanocortin processing fragments on motility in the small intestine." Presented at Tenth International Symposium on Gastrointestinal Motility." Rochester, MN. September 8-11, 1985.
- 1985 Invited Symposium Speaker. "Central processing and *in vitro* activity of opioid peptides." Presented at Washington Spring Symposium on Neural and Endocrine Peptides and Receptors, Washington, DC. May 28-31, 1985.
- 1986 Invited Symposium Speaker, National Bureau of Standards. Washington, D.C. "Advantages and Disadvantages of Single - and Multi-Vitamin Analytical Methods." May 28-29, 1986.
- 1987 Invited Symposium Speaker, Committee on Gerontology Research Forum. University of Arizona, College of Nursing, December 4, 1987. "Neurochemical Alterations in Alzheimer's Disease."
- 1988 Symposium Chairman, Session on "Measurement and Pharmacology of Chemoprevention," January 12-15, 1988. Tucson, AZ.
- 1988 Symposium Chairman, Session on "Milestones in Environmental Physiology," International (IUPS) Symposium on Age, Body Hydration and Stressful Environments. April 30 to May 1, 1988. Las Vegas, NV.
- 1988 Invited Symposium Speaker, International Union of Physiological Sciences (IUPS). "Symposium on Age, Body Hydration and Stressful Environments." April 30 - May 1, 1988. Las Vegas, NV.
- 1989 Invited Symposium Speaker, Arizona Society of Medical Technologists Annual Meeting, Tucson, AZ. "Recent Advances in Neurochemistry of Alzheimer's Disease." April 27, 1989. Tucson, AZ.
- 1989 Symposium Chairman, "Endorphins and Enkephalins: Peripheral Functions." American Society for Pharmacology and Experimental Therapeutics Annual Meeting, Salt Lake City, UT. August 14-19, 1989.
- 1989 Invited NASA Symposium Speaker, "Requirements for Measuring Indices of Human Stress on a Lunar-Based Chemical Analysis Laboratory (LBCAL)." IX College Park Colloquium, University of Maryland, College Park, MD. October 30-31, 1989.
- 1990 Invited Symposium Speaker, XI Winter Neuropeptide Conference, February 5-9, 1990. "Neurotensin and  $\beta$ -endorphin May Function as Regulatory Peptides in Small Cell Lung Cancer." Breckenridge, CO.
- 1990 Invited Symposium Presentation, XI Annual Conference of Indian Academy of Neurosciences, March 16-18, 1990. "The Effect of Conformation and Sequence on Neuropeptide Processing in Regional Brain Slices," Central Drug Research Institute, Lucknow, India.
- 1990 Invited Symposium Presentation, Satellite Symposium of the XI<sup>th</sup> International Congress of Pharmacology, June 30, 1990. "CNS Effects of Stress Hormones and Neuropeptides," De Forumzaal, RAI Congress Center, Amsterdam, The Netherlands.
- 1992 Invited Panel Discussant, 3rd Biology of Neurological Disease Symposium. "Parkinson's Disease and Related Disorders: Prevention, Pathogenesis and Treatment." April 15, 1992. University of Arizona College of Medicine.
- 1992 Symposium Co-Chairman and Speaker, 13th Annual Winter Neuropeptide Conference, February 1-5, 1992. "The Effect of Peptide Structure on Blood Brain Barrier Distribution." Breckenridge, CO.
- 1992 Symposium Chairman and Member of Program Committee, Spring Symposium on "Growth Factors, Peptides and Receptors." George Washington University, Washington University, Washington DC. June 1-5, 1992.
- 1992 Invited Chairman, Session on "Peptides: Biosynthesis, and Metabolism." 22nd Annual Society for Neuroscience Meeting, Anaheim, CA. October 25-30, 1992.
- 1993 Invited Session Chair, Symposium on "Peptides and the Blood-Brain Barrier." 14th

- Annual Winter Neuropeptide Conference February 6-9, 1993. Breckenridge, CO.
- 1993 Invited Chair, Session on "Peptides: Receptor Physiology." 23rd Annual Society For Neuroscience Meeting, Washington DC. November 7-12, 1993.
- 1994 Invited Chair, Session on "Peptides, Biosynthesis and Metabolism." 24th Annual Society for Neuroscience Meeting, Miami Beach, FL. November 13-18, 1994.
- 1994 Invited Chair, Session on "Peptides: Receptor Physiology." 25th Annual Society for Neuroscience Meeting, San Diego, CA. Nov. 15-20, 1995.
- 1996 Invited Chair, Session on "Peptides, Biosynthesis and Metabolism." 26th Annual Society for Neuroscience Meeting. San Diego, CA. November 20-25, 1996.
- 1997 Invited Chair, Session on "Peptides, Biosyntheses and Metabolism." 27th Annual Society for Neuroscience Meeting. New Orleans, LA. October 25-30, 1997.
- 1997 Invited Chair, Session on "Peptides: Receptor Up & Down Regulation." 27th Annual Society for Neuroscience Meeting. New Orleans, LA. October 25-30, 1997.
- 1999 Invited Session Chair, "Neuropharmaceutical drug delivery across the blood-brain barrier - Advances and current concepts." Summer Neuropeptide Conference, Key West, FL, June 27 to July 1, 1999.
- 1999 Invited Session Chair, Gordon Research Conference, "Barriers of the Central Nervous System." Tilton, NH. August 15-20, 1999.
- 2001 Invited Session Chair, "Pathologies and the Blood-Brain Barrier." Fourth International Meeting of Cerebral Vascular Biology, Cambridge University, Cambridge, England. April 5-10, 2001.
- 2002 Invited Session Chair, Gordon Research Conference, "Barriers of the Central Nervous System." Tilton, NH. July 10-16, 2002.
- 2003 Invited Session Chair, Fifth International Conference of Cerebral Vascular Biology, "Cell Biology and BBB Regulation." Texas Tech University, Amarillo, TX. June 15-19, 2003.
- 2004 Invited Session Chair, Gordon Research Conference, "Barriers of the Central Nervous System". Tilton, N.H. June 29 to July 2, 2004.
- 2006 Vice Chair, Gordon Research Conference, " Barriers of the Central Nervous System". June 25-30, 2006. Tilton School, Tilton, N.H.
- 2007 Invited Session Chair and Speaker, International Society for Stroke Research, San Francisco, California. "Proteins of the Tight Junction at the BBB" April, 2007.
- 2008 Elected Meeting Chair, Gordon Research Conference, " Barriers of the CNS" Tilton, New Hampshire. June 17-22, 2008.
- 2010 Invited Session Chair , Spring Brain Conference. " Matrix and Neurovascular Biology of the Stressed Brain". Omni Tucson National, Tucson, Arizona. March 17 to 18, 2010.
- 2010 Invited Session Chair. Gordon Research Conference. " Barriers of the Central Nervous System." Colby-Sawyer College, New Hampshire. June 20-25, 2010.
- 2013 Invited Session Chair, ISCBFM. Brain 2013, " Tools to Study the Blood Brain Barrier/Neurovascular Unit ". Shanghai, China. May 20 to 25, 2013.
- 2014 Invited Symposium Chairman. "Interweaving Advances in Brain-Barriers Pharmacology with Clinical Problems : Implications for Treatment". 20<sup>th</sup> Annual Blood-Brain Barrier Consortium Meeting. March 20 to 22, 2014. Sunriver, Oregon.
- 2014 Invited Workshop Panelist. " Small Blood Vessels: Big Health Problems ? " NIH/NINDS Workshop. John Edward Porter Neuroscience Research Center, Bethesda, MD. September 18 and 19, 2014.
- 2015 Invited Speaker and Panelist. International Cerebral Blood Flow and Metabolism Meeting . "Brain 2015", June 27-30, 2015. Vancouver, BC.
- 2016 Invited Plenary Speaker . American Association of Pharmaceutical Scientists (AAPS) "Transporters at the BBB" Symposium. Baltimore, MD. April 18-20, 2016. "Trafficking of PgP in Pain States".
- 2017 Invited Session Organizer and Speaker. International Cerebral Blood Flow and

Metabolism (ICBFM) Meeting. Brain 2017. "Neurovascular transporter mechanisms targeted for drug delivery". April 1 to 4, 2017. Berlin, Germany.

2019 Invited Speaker. Gordon Research Conference (GRC). "Translating multifaceted molecular mechanisms into pharmacological interventions for advancing global health." "Chronic Morphine and Pain alter trafficking of P-glycoprotein at the BBB/NVU - A Mechanism for Enhanced Drug Delivery." Luca, Barga. Italy. April 28 - May 3, 2019.

2019 Invited Symposium Organizer, Symposium Chair, Education Platform Program Moderator and Platform Speaker. International Cerebral Blood Flow and Metabolism (ICBFM) Meeting. Brain 2019. "Interrogation of Pericyte Function in CNS Physiology and Pathophysiology" July 4 - 7, 2019. Yokohama, Japan.

#### **D. INVITED CONFERENCES/PLENARY SPEAKER**

- 1981 Invited Conference Participant, "Dopamine metabolites as markers of melanoma." Third Annual Conference on Melanoma, Chiricahua Mountains, AZ. April 8-10, 1981.
- 1982 Invited Conference Presentation, "Pharmacokinetics of 13-cis-retinoic acid (13-cRA) in patients with advanced cancer." Presented at International Conference on the Modulation and Mediation of Cancer by Vitamins, University of Arizona College of Medicine, February 22-25, 1982.
- 1982 Panel Member, University of Arizona Medical Center Forum, "Tucson's Heat and Your Health." University of Arizona College of Medicine, Tucson, AZ.
- 1983 Invited Participant, Gordon Research Conference on Medicinal Chemistry. August 1-5, Colby-Sawyer College, New London, NH.
- 1986 Invited Plenary Speaker, Fruchtasft - Woche 1986. Boblingen, West Germany. "Development of Novel Low Calorie Beverages." April 8-10, 1986.
- 1986 Invited Conference Presentation, "Peptide E is mu selective and metabolized to a novel fragment which lacks an amino terminal tyrosine but is delta opioid selective." International Narcotics Research Conference, Adelaide, Australia, August 31-September 4, 1987.
- 1987 Invited Plenary Speaker and Panel Member, The Dean's Clinical Rounds. "Neurochemistry of Alzheimers Disease." March 10, 1987. The University of Arizona College of Medicine Clinical Conference.
- 1988 Invited Conference Presentation and Co-Chairman, "Serum and tissue pharmacology of vitamin A and  $\beta$ -carotene." Third International Conference on Prevention of Human Cancer: Chemoprevention, January 10-15, 1988. Tucson, AZ.
- 1990 Invited Conference Speaker, XI Winter Neuropeptide Conference, February 5-9, 1990. "Neurotensin and  $\beta$ -endorphin May Function as Regulatory Peptides in Small Cell Lung Cancer. Breckenridge, CO.
- 1990 Invited Plenary Speaker, Conference Presentation, XI Annual Conference of Indian Academy of Neurosciences, March 16-18, 1990. "The Effect of Conformation and Sequence on Neuropeptide Processing in Regional Brain Slices," Central Drug Research Institute, Lucknow, India.
- 1991 Invited Conference Speaker, Joint FASEB Summer Conference/International Narcotic Research Conference. "Metabolism of Opioid Peptides in CNS and Periphery." Copper Mountain, CO. June 30-July 5, 1991.
- 1992 Invited Plenary Speaker, XII Annual Washington Spring Symposium on "Growth Factors, Peptides and Receptors." George Washington University, Washington, DC. June 1-5, 1992.
1993. Invited Plenary Speaker, "Biodistribution of Peptides Stabilized against Biodegradation". Keystone Symposium on "Prospects and Progress in Drug Design Based on Peptides and Proteins. Taos, NM. March 8-14, 1993.
- 1993 Invited Plenary Speaker, "Stress, Neuropeptides and The Long Term Effect of Stress". International Conference on Space Exploration and the Future of Man in Space. Dijon, France. March 30-April 4, 1993.

- 1993 Invited Plenary Speaker, "Conformationally Constrained Peptide Drugs Targeted at the Blood Brain Barrier". N.I.D.A Technical Review Meeting on "Membranes and Barriers: Targeted Drug Delivery. N.I.H Bethesda, MD. September 28-29, 1993.
- 1995 Invited Plenary Speaker, "In Vitro-In Vivo Blood Brain Barrier Permeability Correlations of Receptor Selective Opioid Peptides." Congress on In Vitro Biology. Denver, CO. May 20-24, 1995.
- 1995 Invited Plenary Speaker and Chairman, "Blood-Brain barrier permeability of conformationally constrained peptides." IBC Conference on Peptides and Proteins Targeted at the Blood-Brain Barrier. San Diego, CA. Sept., 1995.
- 1997 Invited Plenary Speaker, "Saturation Kinetics of Carrier Mediated Transport of Peptide Drugs to the CNS." Conference on Formulations and Drug Delivery II. La Jolla, CA. October 5-8, 1997.
- 1999 Invited Plenary Speaker, "Chromatography of Drugs that Cross the Blood-Brain Barrier." National A.C.S. Meeting, Anaheim, CA, March 24, 1999.
- 1999 Invited Plenary Speaker, "Management and the Recording of Research Data," Biomedical Research Integrity (BRI) Series, University of Washington School of Medicine, Seattle, WA, July 8-9, 1999.
- 2000 Invited Plenary Moderator, "Session on Laboratory Management." Burroughs - Wellcome Fund Annual Meeting, Coronado, CA, July 22-24, 1999.
- 2001 Invited Plenary Speaker, "Optimizing Peptide Drugs for CNS Delivery." Fourth International Conference on Cerebral Vascular Biology, Cambridge University, Cambridge, England, April 1-5, 2001.
- 2003 Invited Plenary Speaker, "Model Systems in Animals to Study Drug Delivery to the Brain." Fifth International Conference on Cerebral Vascular Biology, Texas Tech University, Amarillo, Texas. June 15-19, 2003.
- 2004 Invited Plenary Speaker, New Frontiers in Translational Research in Neuro-Oncology and the Blood-Brain Barrier. "Effect of hypoxia/reoxygenation on the blood brain barrier". Sunriver, Oregon. March 17-20, 2004.
- 2007 Invited Plenary Speaker, International Society for Stroke Research Annual Meeting. "Proteins of the Tight Junction of the Blood Brain Barrier". San Francisco, CA. April, 2007.
- 2007 Invited Plenary Speaker, International Meeting of Cerebral Blood Flow and Metabolism Society, "The Blood Brain Barrier and Neurovascular Unit" Osaka, Japan. May, 2007.
- 2009 Invited Plenary Speaker, International Meeting on "Signal Transduction at the Blood Brain Barrier". "Pathology at the Blood Brain Barrier." University College, London, England. September 9-11, 2009.
- 2010 Invited Plenary Speaker and Chair of Session, International Stroke Meeting of the American Heart Association. "Physiology and Pathology of the Blood Brain Barrier". San Antonio, Texas. February 24 - 27, 2010.
- 2011 Invited Symposium Speaker, American Society for Neurochemistry. "Blood Brain Barrier Dysfunction in Neurological Disease". St. Louis, MO. March 19-23, 2011.
- 2011 Invited Plenary Speaker. "The Neurovascular Unit", Teaching Session for Brain - Brain 2011-- International Congress, Barcelona, Spain. May 24-28, 2011.
- 2012 Invited, Featured Symposia Speaker, EB 2012, American Physiological Society (APS) and American Society for Medical Research (AFMR). "The Neurovascular Unit in Health and Disease" (APS). "A Leaky BBB: Occludin Oligomeric Assemblies altered by Pain and Hypoxic Stress" (AFMR). San Diego, CA. April 21-25, 2012.
- 2012 Invited Symposium Speaker, EB 2012, American Society for Pharmacology and Experimental Therapeutics, (ASPET), "Drug Delivery across the BBB in Disease States". San Diego, CA. April 21-25, 2012.
- 2012 Invited Keystone Speaker, Gordon Research Conference, "Barriers of the CNS".

- “The Blood Brain Barrier : Obstacle or Target for Drug Delivery to the Brain “. Colby-Sawyer College. New London, NH. June 16, 2012.
- 2013 Invited Conference Speaker, 22nd European Stroke Conference 2013. “ Phase one Safety, Tolerability and Pharmacokinetics of 3K3A-Activated Protein C in Healthy Adult Volunteers.” London, England.
- 2014 Invited Symposium Speaker. “P-glycoprotein and occludin trafficking as therapeutic targets to optimize CNS drug delivery”. 20<sup>th</sup> Annual Blood-Brain Barrier Consortium Meeting. March 21 to 23, 2014. Sunriver Resort and Conference Center, Oregon.
- 2016 Invited Gordon Research Conference (GRC) Conferee at , “Barriers of the CNS”, Colby Sawyer College, New London, NH. “Post translational Pgp regulation at the BBB in response to acute peripheral pain ”. June 25 to 29, 2016.
- 2017 Invited Symposium Speaker, International Stroke Conference. American Heart Association. “Penetrating the Blood Brian Barrier”. Houston, Texas. February 22, 2017.
- 2018 Invited Participant and Presenter. “Pgp Trafficking in Pain”. Gordon Research Conference. Barriers of the CNS. Colby-Sawyer College. NH. June 17 to 20, 2018.
- 2019 Invited Symposium Chair and Speaker. American Neurological Association (ANA). “How pain influences function of the blood brain barrier”. Atlanta ,GA. October 20-23.
- 2020 Invited Conference Attendee and Roundtable Participant. STAIR XI (Stroke Treatment Academic Industry Roundtable). On Line by ZOOM. October 1 and 2, 2020.
- 2021 Invited Keynote Speaker. “Leaky barriers, Efflux motion, and drug interaction at the BBB: Past successes and the road ahead.” Texas Tech University Research Days. June 11/12 , 2021.
- 2022 Invited Attendee. Cerebrovascular Complications Conference (3C). June 25 - 29, 2022. Jackson Hole, WY.
- 2023 Invited Speaker. Department of Neurosurgery, Neuroprotection Laboratories. MGH/Harvard Neuroscience. Boston, MA. June 5,6. 2023.

## IX. N.I.H. GRANTS & CONTRACTS WON (\$40 Million in Direct Costs)

### A. GOVERNMENT (Continuously Funded 40 years as a NIH PI from 1985 – 2025):

#### 1. INACTIVE

**\$5,000. N.I.H. 1980-1981.** Cancer Center Core Developmental Grant. Thomas P. Davis, P.I. Analytical Pharmacology Laboratory Start-up.

**\$15,000. N.I.H. 1981-1982.** Biomedical Research Support Grant. Thomas P. Davis, P.I. Develop Analytical Laboratory to Pursue Neuropeptide Research Projects in Gastrointestinal System and Brain.

**\$370,950. N.I.H. - P01-CA 23074.** 1981-1987. Cancer Center Core Program Project Grant. Analytical Chemistry Cancer Core Reference Laboratory. Thomas P. Davis, P.I. of Core. Develop Research Analytical Methodology for Anticancer drugs and Metabolites. Isolate and Characterize Micronutrient Markers in Chemoprevention Studies from patients.

**\$19,587. N.I.H. - N.I.A R-21- AG-04439. 1984-1985.** Errors in Substance P Metabolism in Aging. **Thomas P. Davis, P.I.** Study the effect of Alzheimer's disease on the metabolism of substance P in post-mortem human tissue from various regions of the brain known to be affected.

**\$6,530. N.I.H. - B.R.S.G. 1985-1986.** Synthesis and Characterization of Pharmacologically Active Neuropeptides. **Thomas P. Davis, P.I.** This grant is to provide support for the synthesis of biologically active peptides for our research projects.

**\$9,967. Walter Reed Army Institute, Washington, D.C. 1988-1990.** Thomas P. Davis and Frank Porreca, P.I.'s. Isolation and characterization of CSF proteins implicated in seizures.

**\$28,000. N.I.H. 1989-1990.** Biomedical Research Support Grant; Small Instrumentation Grant Program; Multi-User Liquid Scintillation Counting System. Thomas P. Davis, Co-investigator.

**\$250,340. N.I.H. R-01-CA 44869. 1988-1992. Thomas P. Davis, P.I.** Metabolism of Autocrine Peptides in Small Cell Lung Cancer. This grant was designed to study and develop potential inhibitors of small cell lung cancer growth by inhibiting the formation of specific autocrine peptide hormones produced by the SCLC cells.

**\$5,000. University of Arizona Foundation.** 1988-1989. Thomas P. Davis, P.I. Central Metabolism of Somatostatin and Substance P is Altered in Alzheimer's Disease. This grant is designed to study the alterations in enzymatic metabolism in Alzheimer's disease.

**\$150,000. N.I.H. P01-CA 17094.** 1988-1993. Medical Oncology Program Project Grant. Sydney E. Salmon, P.I., Thomas P. Davis, Co-investigator. Study Pharmacokinetics of New Antineoplastic Agents (drugs).

**\$528,587. N.I.H. P01-DK 36289.** 1986-1994. Gastrointestinal Pharmacology and Peptide Processing. **Thomas P. Davis, P.I.** of Section and Co-Director of Program Project Grant. Grant funded to study gastrointestinal control by neuropeptides. My project was to study the regulation of CCK and GRP mRNA, processing and metabolism by steroid hormones, peptides and drugs in the CNS and periphery.

**\$58,500. N.I.D.A. P01-DA06284-02S1.** 1990-1994. **Thomas P. Davis, P.I.** and Sponsor. Pre-doctoral Fellowship to Mary Morrill-Supplement for Underrepresented Minorities in Biomedical Research.

**\$72,000. Arizona Disease Control Research Commission (ADCRC).** 1991-1994. Thomas P. Davis, P.I. This grant studied the alterations of somatostatin and substance P metabolism and peptidase activity in Alzheimer's Disease. Post-mortem human tissues were used.

**\$195,000. N.I.H. - P01-CA 27502.** 1981-1997. Chemoprevention of Skin Cancer Program Project Grant. Thomas P. Davis, Co-investigator. David Alberts, M.D. P.I. of grant (Cancer Center) To Study Pharmacology of Micronutrients as Chemopreventive Agents in Man and Animals.

**\$720,800. N.I.H. 2-R-01-MH 42600-10.** 1989-1998. **Thomas P. Davis, P.I.** Effect of Neuroleptic Drugs on Neurotensin and  $\beta$ -endorphin. This grant was designed to study the effect of centrally acting drugs on the processing, metabolism and levels of specific neuropeptides in discrete brain regions.

**\$300,000. N.I.H. P-01-HD26013.** 1991-1999. Thomas P. Davis, Co. Investigator of Section. This grant is to study the metabolism and distribution of milk-borne, biologically active, growth promoting, proteins and peptides in suckling rats.

**\$150,000. ADCRC #9706.** 1996-1999. Thomas P. Davis, P.I. Regulation of Neutral Endopeptidase in Small Cell Lung Cancer. Role in Smokers. Arizona Disease Control Research Commission.

**\$18,388. N.I.H. #97T226189.** 1999. **Thomas P. Davis, P.I.** "Conference on Management of Biomedical Research Laboratories." Tucson, Arizona. October 1-3, 1998.

**\$99,000. N.I.H. F32-NS10580.** 1997-2000. Thomas P. Davis, Sponsor. NRSA Post-doctoral Fellowship. Awarded to Dr. Thomas Abbruscato to study hypoxia induced injury in a *in vitro* endothelial cell model of the blood brain barrier.

**\$140,000. N.I.H. R01-DA04248.** 1993-2001. Victor Hruby, P.I., Thomas P. Davis, co-investigator. Opioid Receptor Specific Peptides and the Blood Brain Barrier - Effect of Structure. In this grant I study the stability of specific peptides in blood and brain tissue and their passage across the BBB using an *in vitro* method.

**\$150,000. ADCRC #1341.** 1998-2001. Thomas P. Davis, P.I. Nicotine effects on blood-brain barrier integrity, function and permeability. Arizona Disease Control Research Commission.

**\$829,000. N.I.D.A. 1-P01-DA06284.** 1982-2002. Thomas P. Davis, P.I. of Section. Victor Hruby, P.I. of grant (Chemistry). Opioid Peptide Drug Analysis, Distribution and Metabolism. This grant is designed to study newly developed opioid peptide drugs in both *in vitro* and *in vivo* models in an effort to design a novel opioid peptide drug for treating drug dependent individuals.

**\$345,000. ADCRC #1-543.** 2000-2003. Thomas P. Davis, P.I. of Section 1. Stroke and the Blood-Brain Barrier, Nicotine and Nicotinic Acetylcholine Receptors. Arizona Disease Control Research Commission. In this grant/contract, I study the role nicotine plays on BBB integrity and endothelial cell cytoarchitecture.

**\$129,000. N.I.H. F32-NS11175.** 2000-2003. Thomas P. Davis, Sponsor, NRSA fellowship to Karen S. Mark, Ph.D. to study "Hypoxia reoxygenation effects on the blood-brain barrier."

**\$172,000. N.I.H. F32-DA06037.** 2000-2003. Thomas P. Davis, Sponsor, NRSA fellowship to Jason D. Huber, Ph.D. to study "Various pain states on opioid transport across the BBB."

**\$84,000. N.I.H. F32-NS43052.** 2001-2004. Thomas P. Davis, Sponsor. NRSA fellowship to Rachel C. Brown, Ph.D. to study "Molecular biology of calcium effects on tight junctions of the blood-brain barrier."

**\$129,000. N.I.H. F32-NS43046. 2002-2005.** Thomas P. Davis, Sponsor. NRSA fellowship to Ken A. Witt, Ph.D. to study “Blood-brain barrier changes via hypoxia/re-oxygenation.”

**\$135,000. N.I.H. F32-NS49894. 2004-2006.** Thomas P. Davis, Sponsor. NRSA fellowship to Melissa Fleegal, Ph.D., to study the “Effects of angiotensin II and hypoxia on the blood brain barrier.”

**\$98,224. N.I.H. F32-NS52983. 2005-2007.** Thomas P. Davis, Sponsor. NRSA fellowship to Tracy Brooks, Ph.D., to study the "Modulation of BBB TJ proteins with chronic inflammation."

**\$102,000. N.I.H. F31-DA19744. 2006-2009.** Thomas P. Davis, Sponsor. NRSA Pre-doctoral fellowship to Melissa Seelbach, B.Sc., to study "Effects of peripheral inflammation on opioid transport".

**\$182,661. N.I.H. R01 CA 09820-02S1. 2005-2007.** Research Supplement to Promote Reentry into Biomedical Research. Thomas P. Davis, P.I. of project entitled: Role of HIF-1 and Thioredoxin in Regulating Serotonin Transporter Gene. This Research Supplement to Promote Reentry into Biomedical Research was made to Gwen McCaffrey, Ph.D., to continue her studies on the effects of hypoxia on serotonin transporter expression in brain vascular endothelial cells.

**\$20,000. N.I.H. R13- NS62445. 2008. Thomas P. Davis, P.I.** Conference grant for Gordon Research Conference, “Barriers of the CNS”, held at Tilton School, Tilton, NH, June 17-21, 2008.

**\$176,564. N.I.H. DA11271- 06S1. 2004-2009.** Thomas P. Davis, Sponsor. Research Supplement for Underrepresented Minorities, Pre-doctoral fellowship awarded to Christopher C. Campos, to study, “Mechanisms Associated with Alterations in the Blood Brain Barrier during Peripheral Inflammatory Pain States” for his Ph.D. program.

**\$3,518,000. N.I.H. R01-NS39592-06-10. 2000-2010. Thomas P. Davis, P.I.** Disruption of the blood brain barrier during hypoxia/reoxygenation. This grant was designed to study the permeability of the BBB after ischemic/hypoxic stress and the specific PKC enzyme mechanisms associated with maintaining tight junction protein structure during hypoxia/reoxygenation insult, *in vivo*.

**\$114,000. N.I.H. NS42652-06S1. 2008-2011.** Thomas P. Davis, Sponsor. Research Supplement for Underrepresented Minorities, Pre-Doctoral fellowship awarded to Lucy Sanchez-Covarubias, B.S. to study, “Effect of peripheral pain on the function and trafficking of PgP at the Blood Brain Barrier”.

**\$3,421,103. N.I.H. 5 R01-DA11271-17. 1998-2017. Thomas P. Davis, P.I.** Blood to CNS Drug Uptake in Pain states. In this grant we studied pain and opioid versus non-opioid drug effects on claudin-5 and occludin tight junction protein “leak” at the BBB. We also observed *in vivo*, drug-drug interaction (DDI) mechanisms associated with paracellular leak at BBB tight junctions during acute and chronic (L4/L5) pain.

**\$3,487,500. N.I.H. 5 R01-NS42652-12-17. 2001-2019. Thomas P. Davis, P.I.** Blood Brain Barrier Changes Induced by Pain. This grant was designed to study the molecular signaling mechanisms associated with P-glycoprotein (PgP) trafficking at the BBB, as effected by chronic morphine and acute versus chronic pain. Our results reported PgP-associated and neighboring proteins signal PgP activation, via pCAV1, for PgP trafficking. Increases in PgP trafficking were confirmed to take place via the phosphorylation of caveolin 1. This process may well regulate PgP trafficking from the endothelial nucleus to the lumen, where we confirmed a decrease in analgesic morphine delivery. Our recent findings also suggest PgP trafficking events in morphine tolerant animals contribute to opioid drug escalation and challenges to opioid management.

#### **ACTIVE GRANTS - Recent N.I.H. Grants Funded -TP Davis - NIH MPI (2020 to 2025):**

**N.I.H. R01- DA 051812-01. 2020 - 2025. Thomas P. Davis, P.I. at 4.0 man months of effort / year.**

**Patrick Ronaldson Co - P.I. Increased CNS Opioid exposure by an Acetaminophen - Induced Blood Brain Barrier Mechanism.** This successful NIDA submission implicates the “over the counter” pain therapeutic acetaminophen (APAP), in drug/drug interactions (DDI) via alterations in BBB drug-transporter and tight junction protein dysregulation leading to “TJ paracellular leak” of opioids into the CNS, when co-administered with high levels of APAP. Many pain patients use Tylenol at 4 to 6 grams per day which can alter drug uptake This grant funded for 5 years, June 01, 2020 to May 31, 2025

**N.I.H. R01- NS 084941-06A1. 2020 - 2024. Patrick Ronaldson, P.I. Thomas P. Davis, Co-Investigator at 2.4 man months of effort / year. Targeting Blood-Brain Barrier Transporters to Treat Ischemic Stroke.** This NINDS competitive renewal application focuses on beneficial effects of endogenous blood-brain barrier (BBB) transporters for delivering targeted neuroprotectants to treat ischemic stroke using a rat model of the

transient middle cerebral artery occlusion (tMCAO). We propose that the neuroprotective effectiveness of statins, in stroke patients, results from efficient paracellular transport across the BBB that is mediated by the BBB uptake transporter OATP 1a4. This grant funded for 5 years, May 1, 2020 to December 31, 2024.

<http://www.ncbi.nlm.nih.gov/sites/myncbi/thomas.davis.1/bibliography/40850852/public/?sort=date&direction=ascending>. H Factor (google scholar) of 73; i10 factor of 197. 18,800 citations.

## **B. INDUSTRY/FOUNDATIONS**

### **1. Inactive (Completed Total Direct Costs \$960,000):**

**\$19,000. Lederle Labs, Nutley, New Jersey. 1981-1983.** Pharmacokinetics of Mitoxantrane and Bisantrone in cancer patients-New Antineoplastic Agents. Thomas P. Davis and David L. Alberts.

**\$13,000. Pharmaceutical Manufacturers Association Foundation Grant, Washington, D.C. 1982-1984.** Thomas P. Davis, P.I. Study the neuropharmacology and pharmacokinetics of neuropeptides in the gastrointestinal system and brain through the processing of novel peptides.

**\$23,900. Robert S. Flinn Foundation for Medical Research, Phoenix, Arizona. 1985-1986.** Effect of centrally acting drugs on  $\beta$ -endorphin processing in the brain. Thomas P. Davis, P.I. This grant is designed to study the effects of specific drugs such as haloperidol and chlorpromazine on peptide metabolism at the synaptic membranes.

**\$6,500. 1985-1986. Syntex Research, Inc., Palo Alto, California.** Double Blind Evaluation of the Effect of Captopril When Added to Niacardipine Hydrochloride in Patients with Hypertension.

Thomas P. Davis and Tim Fagan, MD, P.I.'s.

**\$125,000. 1983-1987. Beverage Company, Inc., Los Angeles, California.** Isolation, purification and biological characterization of natural products from biological materials. Thomas P. Davis, P.I. Study the activity of specific natural proteins and peptides in central and peripheral bioassay models after ion exchange isolation from biological materials.

**\$34,000. 1984-1989. Akzo Pharmaceutical Inc. Organon Scientific Development Group, Oss, The Netherlands.** Effect of peripheral drug therapy on central  $\beta$ -endorphin processing. Thomas P. Davis, P.I. Study the effect of drug therapy on specific central neuropeptide processing in animals.

**\$65,000. 1994-1998. Neurex Corporation, Menlo Park, California.** Contract for omega conotoxin/ziconotide / SNX 111, peptide drug delivery research. Thomas P. Davis, P.I.

**\$5,000. 1995.** Gift from *Parke-Davis/Warner Lambert* for contributions in the field of peptide drug delivery to the CNS.

**\$30,000. 1995-1998. Parke-Davis Pharmaceutical Research, Ann Arbor, MI.** Contract in Peptide drug research. Thomas P. Davis, P.I.

**\$640,000. 1990-2011. IPSEN Neuropharmaceutical Inc., Biomeasure Neuropharmacology Laboratory, Milford, MA.** Thomas P. Davis, P.I. Radiolabeling and purification of novel/proprietary peptide drugs for radioligand binding and pre-clinical biodistribution studies.

(Revised April 02, ,2023)