Updated 1-4-24

Gail A. Cornwall, Ph.D.

PERSONAL

Address: Department of Cell Biology and Biochemistry
Texas Tech University Health Sciences Center
3601 4th Street
Lubbock, TX 79430
(806) 743-2687
Gail.Cornwall@ttuhsc.edu

Birthplace: Hudson, Wisconsin

EDUCATION

Ph.D. Reproductive Biology, The Johns Hopkins University Bloomberg School of Public Health and The Johns Hopkins Hospital, Departments of Population Dynamics and Urology. Thomas S.K. Chang, Ph.D., dissertation advisor, Larry Ewing, Ph.D., co-advisor. 1988.

M.S. Zoology/Cell Biology, Brigham Young University, Department of Zoology. William S. Bradshaw, Ph.D., thesis advisor. 1982.

B.S. Zoology, Brigham Young University, 1980.

POSITIONS

Professor, Department of Cell Biology and Biochemistry. Texas Tech University Health Sciences Center, Lubbock, TX. Sept 2010-present,

Graduate School of Biomedical Sciences, Translational Neuroscience and Pharmacology program appointment, Texas Tech University Health Sciences Center, Lubbock, TX. September 2021-present.

Graduate School of Biomedical Sciences, Biotechnology, Affiliate Member Appointment, Texas Tech University Health Sciences Center, Lubbock, TX. June 2009-present,

Associate Professor with tenure, Department of Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, Lubbock, TX. September 2001-August 2010,

Graduate School of Biomedical Sciences, Primary Appointment Biochemistry,,Cellular, and Molecular Biology program, Texas Tech University Health Sciences Center. Nov 1994-present.

Assistant Professor, Department of Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, Lubbock, TX. October 1994-August 2001,

Research Assistant Professor, Department of Cell Biology, Vanderbilt University School of Medicine, Nashville, TN. July 1991-October 1994:

Postdoctoral Fellow, Department of Cell Biology, Vanderbilt University School of Medicine, Nashville, TN. Stephen R. Hann, Ph.D., advisor. September 1990-July 1991:

Postdoctoral Fellow, Center for Reproductive Biology Research, Vanderbilt University School of Medicine, Nashville, TN. Marie-Claire Orgebin-Crist, Ph.D., advisor. February 1988-September 1990:

HONORS AND AWARDS

President's Excellence in Research Award, Texas Tech University Health Sciences Center (2023).

Dean's Distinguished Faculty Service Award, Texas Tech University Health Sciences Center. (2023).

Fellow, American Association for the Advancement of Science (2022).

Top 2% Scientists World Wide, Stanford University, (2022).

Unsung Hero's Award, Texas Tech University Health Sciences Center. (2019)

Dean's Scholarship Research Award. Texas Tech University Health Sciences Center. (2010).

President's Research Achievement Award. Texas Tech University Health Sciences Center. (2004).

NIH/NICHD. KO2 HD044669-01. PI. Research Career Development Award. The CRES Gene in Reproduction. 9/1/2003-8/31/2008.

Young Andrologist Award. The American Society of Andrology. (1997).

Research Award. The American Society of Andrology. (1991).

Research Award. The American Society of Andrology. (1989).

NIH T32 Postdoctoral National Research Service Award. Department of Health and Human Services. (1988).

Research Award. The American Society of Andrology. (1987).

NIH T32, Predoctoral National Research Service Award. Department of Health and Human Services. (1985-1987).

Paul Harper Award for excellence in graduate studies. The Johns Hopkins School of Hygiene and Public Health. (1986).

Predoctoral student fellowship. The Johns Hopkins School of Hygiene and Public Health. (1983).

FUNDING

Current

The John Templeton Foundation. PI. Sperm amyloids: Epigenetic carriers of inheritance. 9/1/21-8/31/24.

The Kayla Weitlauf Endowment. PI. Sex-specific differences in learning and memory in CRES null mice. 8/1/21-7/31/24.

The Newby Family. PI. Functional amyloids in the brain and their role in Alzheimer's Disease. 1/1/21-12/31/23.

Past

Garrison Institute on Aging, TTUHSC. PI. Host defense amyloids in the brain. 2/1/20-1/31/21.

The Newby Family. PI. Functional amyloids as tools to develop new therapies for Alzheimer's disease. 12/1/17-11/30/20.

TTUHSC Bridge Funding. 2018-2019.

The Wilson Foundation. PI. A Novel Strategy to Treat Alzheimer's Disease. 1/2/16-12/31/2017.

NIH/NICHD. R21HD078715. PI. Sperm prions: A Mechanism for Epigenetic Inheritance. 12/1/2013-11/30/2016.

NIH/NICHD. RO1HD056182. PI. Protein Amyloidogenesis in the Epididymis: Mechanism and Biological Significance. 12/1/2008-11/31/2015.

The CH Foundation PI. New Therapies for Neurodegenerative Diseases. 1/15/2014-12/31/2014.

NIH/NICHD. KO2 HD044669-01. PI. Research Career Development Award. The CRES Gene in Reproduction. 9/1/2003-8/31/2008.

TTUHSC. The CRES Gene in Reproduction. PI. 2/1/2008-1/31/2009.

TTUHSC/TTU Initiative, co-PI. (Niwayama, S., PI). A New Proteomic Method and Its Application to Chemical Biology. 5/1/2007-4/312008.

NIH/NICHD. RO1HD33903-11. PI. The CRES Gene in Reproduction. 4/1/2001-3/31/2008.

South Plains Foundation. PI. Novel Role of the Proprotein Processing Enzyme PC4 in Breast Cancer. 2/1/2006-7/31/2007.

NIH/NICHD. 2T32 HD07271-16. Stocco, PI, Cornwall, participating faculty. Regulation of Reproductive Processes. 05/01/1999-04/30/2004.

Texas Tech University Health Sciences Center Seed Grant. PI. CRES protein regulation by self-aggregation. 8/1/2003-7/31/2004.

Texas Tech University Health Sciences Center, Center of Excellence in Reproductive Sciences. Co-investigator. Effect of Environmental Toxicants on Human Sperm Function. 2/1/2000-1/31/2002.

South Plains Foundation/Houston Endowment Grant. PI. B-Myc and Prostate Cancer. 9/1/2001-8/31/2002.

NIH/NICHD. R29HD33903. PI. The CRES Gene in Male Reproduction. 4/1/ 1994-3/31/1999.

Texas Tech University Health Sciences Center. Seed Grant. PI. Generation and Examination of Transgenic Mice Lacking the CRES Gene. 9/1/1999-8/31/2000.

South Plains Grant. Cornwall, PI. Potential role of B-Myc as a Growth Inhibitor. 9/1/2000-8/31/2001.

Tobacco Research Council. Co-investigator. Transient expression of genes during high-density growth arrest. 9/1/1992-12/31/1994.

American Cancer Society Institutional Research Grant. PI.Identification of genes expressed during high-density growth arrest. 1/1/1993-12/31/1993.

NIH. F32 Postdoctoral Fellowship Grant. Department of Health and Human Services. PI. Mechanisms of Sperm-egg Binding. 1990-1991.

Pending

NIH/NIGMS. R01 GM152482-01 . multiPI, Cornwall (contact PI). Molecular Mechanisms of Host Defense Amyloid Assembly and Function. (resubmission, Feb 2024).

NSF 2320508. Equipment: MRI: Track 2 Acquisition of an 800 MHz Nuclear Magnetic Resonance Spectrometer with liquids and solids capability for Chemical, Biological, and Materials Research. Wylie (PI, TTU), Cornwall (co-PI, TTUHSC).

NIH/NINDS. R03NS139173, Cornwall (PI), Bailoo (Co-PI). A New Mouse Model to Study Sex-Specific Differences in Learning and Memory. Oct 2023.

NIH/NIA. R21AG089761, Cornwall (PI). Biological Amyloids in the Mammalian Brain Extracellular Matrix. Nov 2023.

Texas Alzheimer's Research and Care Consortium, Cornwall (PI). Biological Amyloids in Mammalian Brain Extracellular Matrix Function and Pathology. Jan 2024.

PROFESSIONAL AND HONORARY ORGANIZATIONS

Society for Neuroscience
American Society of Andrology
Association for the Advancement of Science

TEACHING

Combined Lecture and Lab

GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Science Center, Medical Education, Number Enrolled: 100+, Fall, 2015
GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Sciences Center, Medical Education, Number Enrolled: 100+, Fall, 2014.
GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Sciences Center, Medical Education, Number Enrolled: 100+, Fall, 2013.
GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Sciences Center, Medical Education, Number Enrolled: 100+, Fall, 2012.
GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Sciences Center, Medical Education, Number Enrolled: 100+, Fall, 2011.
GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Sciences Center, Medical Education, Number Enrolled: 100+, Fall, 2010.
GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Sciences Center, Medical Education, Number Enrolled: 100+, Fall, 2009.
GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Sciences Center, Medical Education, Number Enrolled: 100+, Fall, 2008.
GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Sciences Center, Medical Education, Number Enrolled: 100+, Fall, 2007.
GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Sciences Center, Medical Education, Number Enrolled: 100+, Fall, 2006.
GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Sciences Center, Medical Education, Number Enrolled: 100+, Fall, 2005
GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Science Center, Medical Education, Number Enrolled: 100+, Fall, 2004.
GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Sciences Center, Medical Education, Number Enrolled: 100+, Fall, 2003.
GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Sciences Center, Medical Education, Number Enrolled: 100+, Fall, 2002.
GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Sciences Center, Medical Education, Number Enrolled: 100+, Fall, 2001.
GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Sciences Center, Medical Education, Number Enrolled: 100+, Fall, 2000
GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Sciences Center, Medical Education, Number Enrolled: 100+, Fall, 1999.
GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Sciences Center, Medical Education, Number Enrolled: 100+, Fall, 1998.
GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Sciences Center, Medical Education, Number Enrolled: 100+, Fall, 1997.
GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Sciences Center, Medical Education, Number Enrolled: 100+, Fall, 1996.

GCMB 5611 001 Clinically Oriented Anatomy, Texas Tech University Health Sciences Center, Medical Education, Number Enrolled: 100+, Fall, 1995.

Laboratory

GBTC 7000 001, Research in Biotechnology, Texas Tech University Health Sciences Center, Number Enrolled: 3, Spring, 2015.

Laboratory (Research)

GBTC 6001003, Biotechnology Internship, Texas Tech University Health Science Center, Graduate Education, Number Enrolled: 1, 2016.

GBTC 6001003, Biotechnology Internship, Texas Tech University Health Sciences Center Graduate Education, Number Enrolled: 1, 2015

GBTC 6001003, Biotechnology Internship, Texas Tech University Health Sciences Center,Graduate Education, Number Enrolled: 1, 2009.

Lecture

GBTC 5020 001, Biotechnology Laboratory Methods, Texas Tech University Health Sciences Center, Number Enrolled: x, Fall, 2023.

GBTC 5020 001, Biotechnology Laboratory Methods, Texas Tech University Health Sciences Center, Number Enrolled: 5, Fall, 2020.

GBTC 5020 001, Biotechnology Laboratory Methods, Texas Tech University Health Sciences Center, Number Enrolled: 5, Fall, 2019.

GBTC 5020 001, Biotechnology Laboratory Methods, Texas Tech University Health Sciences Center, Number Enrolled: 5, Fall, 2017.

GBTC 5020 001, Biotechnology Laboratory Methods, Texas Tech University Health Sciences Center, Number Enrolled: 5, Fall, 2016.

GANM 5309 Biology of Reproduction, Texas Tech University Health Sciences Center, Graduate Education 2005.

GANM 5309 Biology of Reproduction, Texas Tech University Health Sciences Center Graduate Education 2004.

GANM 5309 Biology of Reproduction, Texas Tech University Health Sciences Center, Graduate Education 2003.

GANM 5309 Biology of Reproduction, Texas Tech University Health Sciences Center, Graduate Education 2002.

GANM 5309 Biology of Reproduction, Texas Tech University Health Sciences Center, Graduate Education 2001.

GANM 5309 Biology of Reproduction, Texas Tech University Health Sciences Center, Graduate Education 2000.

GANM 5309 Biology of Reproduction, Texas Tech University Health Sciences Center, Graduate Education 1999.

GANM 5309 Biology of Reproduction, Texas Tech University Health Sciences Center, Graduate Education 1998

GANM 5309 Biology of Reproduction, Texas Tech University Health Sciences Center, Graduate Education 1997.

GANM 5309 Biology of Reproduction, Texas Tech University Health Sciences Center, Graduate Education 1996.

GANM 5309 Biology of Reproduction, Texas Tech University Health Sciences Center, Graduate Education 1995.

GANM 5309 Biology of Reproduction, Texas Tech University Health Sciences Center, Graduate Education 1994.

GCMB 6340 Cell Structure and Function, Texas Tech University Health Sciences

Center, Graduate Education, 2000.
GCMB 6340 Cell Structure and Function, Texas Tech University Health Sciences Center, Graduate Education, 1999.
GCMB 6340 Cell Structure and Function, Texas Tech University Health Sciences Center, Graduate Education, 1998.
GCMB 6340 Cell Structure and Function, Texas Tech University Health Sciences Center, Graduate Education, 1996.
GCMB 6340 Cell Structure and Function, Texas Tech University Health Sciences Center, Graduate Education, 1995.

GBTC 5210**:**The Human Microbiome in Health and Disease. 2 contact hrs. 2022.
GBTC 5210**:**The Human Microbiome in Health and Disease. 2 contact hrs. 2021.
GBTC 5210**:**The Human Microbiome in Health and Disease. 2 contact hrs. 2020.

GBCM 7000 001 Research, Texas Tech University Health Sciences Center, Number Enrolled: 5, Fall, 2023.
GBCM 7000 001 Research, Texas Tech University Health Sciences Center, Number Enrolled: 5, Fall, 2022.
GBCM 7000 001, Research, Texas Tech University Health Sciences Center, Number Enrolled: 3 Summer, 2021.
GBCM 7000 001, Research, Texas Tech University Health Sciences Center, Number Enrolled: 5, Fall, 2021.
GBCM 7000 001, Research, Texas Tech University Health Sciences Center, Number Enrolled: 3 Summer, 2020.
GBCM 7000 001, Research, Texas Tech University Health Sciences Center, Number Enrolled: 5, Fall, 2020.
GBCM 7000 001, Research, Texas Tech University Health Sciences Center, Number Enrolled: 5, Spring, 2018 - 2021.
GBCM 7000 001, Research, Texas Tech University Health Sciences Center, Number Enrolled: 3, Summer, 2018. 2019.
GBCM 7000 001, Research, Texas Tech University Health Sciences Center, Number Enrolled: 4,Spring, 2017.
GBCM 7000 001, Research, Texas Tech University Health Sciences Center, Number Enrolled: 3 Summer, 2017
GBCM 7000 001, Research, Texas Tech University Health Sciences Center, Number Enrolled: 5, Fall, 2017.
GBCM 7000 001, Research, Texas Tech University Health Sciences Center, Number Enrolled: 5, Fall, 2016.

GBCM 5130 001, Research Presentation Skills, Texas Tech University Health Sciences Center, Number Enrolled: 5, Spring 2020.
GBCM 5130 001, Research Presentation Skills, Texas Tech University Health Sciences Center, Number Enrolled: 5, Spring 2019.
GBCM 5130 001, Research Presentation Skills, Texas Tech University Health Sciences Center, Number Enrolled: 10, Spring 2018.
GBCM 5130 001, Research Presentation Skills, Texas Tech University Health Sciences Center,Number Enrolled: 11, Spring, 2017.

GBCM 6135 001, Topics in Biochemistry, Texas Tech University Health Sciences Center, Number Enrolled: 1, Spring, 2021.

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GSBS 5098 001, Techniques in Biomedical Research, Texas Tech University Health Sciences Center, Number Enrolled: 3, Spring, 2021.
GSBS 5098 001, Techniques in Biomedical Research, Texas Tech University Health Sciences Center, Number Enrolled: 9, Summer, 2021.
GSBS 5099 003, Topics in Biomedical Sciences, Texas Tech University Health Sciences Center, Medical Education, Fall, 2014.

Cellular and Developmental Biology Laboratory, Brigham Young University. Three hour laboratory course for undergraduate zoology and preprofessional majors; fall and winter semesters. (1980-1982).

TRAINING OF STUDENTS AND POSTDOCTORAL FELLOWS

Supervisor/Advisor Graduate Students

Kimberly Garza, PhD Dissertation Advisor, Cell Biology and Biochemistry, TTUHSC, Jan 2023-present.

Alejandra Gomez, PhD Dissertation Advisor, Translational Neuroscience and Pharmacology, TTUHSC, May 2021-present.

Caitlyn Myers, PhD Dissertation Advisor, Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, 2017 - 2022.

Kellsie Beasley, PhD Dissertation Advisor, Cell Biology and Biochemistry, January 2015 - 2017.

Katy Basinger, Master's Thesis Advisor, Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, MS, 2015.

Trupti Kale, Master's Thesis Advisor, Cell Biology and Biochemistry, Texas Tech University, MS, 2009 - 2011.

Kim Chau, PhD Dissertation Advisor, Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, 2004 - 2009.

Nelson Hsia, PhD Dissertation Advisor, Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, 1997 - 2002.

H. Gayle Sutton, MD/PhD Dissertation Advisor, Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, 1996 - 2001.

Graduate Committee Memberships

Kseniia Orobets, PhD Dissertation Committee Member, Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, 2022-present.

Johanna Villarreal, M.D./PhD Dissertation Committee Member, Cell Physiology and Molecular Biophysics, Texas Tech University Health Sciences Center, 2022-present.

Matthew Dominguez, PhD Dissertation Committee Member, Cell Physiology and Molecular Biophysics, Texas Tech University Health Sciences Center, 2020-2023.

Isaac Scott, PhD Dissertation Committee Member, Cell Physiology and Molecular Biophysics, Texas Tech University Health Sciences Center, 2020-2023.

Sarah Kader, PhD Dissertation Committee Member, Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, 2018 – 2022.

Nazmul Khan, PhD Dissertation Defense Committee Member, Chemistry and Biochemistry, Texas Tech University, January 2020 - May 2020.

Lisa Welch, PhD Dissertation Committee Member, Animal Sciences, Texas Tech University, 2007 - 2009.

Nathaly Cormier, PhD Dissertation Committee Member, Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, 2004 - 2009.

Matthew Dyson, PhD Dissertation Committee Member, Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, 2003 - 2008.

Savitha Sharma, PhD Dissertation Committee Member, Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, 2003 - 2008.

Sundara Uppuluri, PhD Dissertation Committee Member, Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, 2002 - 2007.

Heather Vartorella, PhD Dissertation Committee Member, Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, 2002 - 2003.

Demet Nalbant, PhD Dissertation Committee Member, Cell Biology and Biochemistry, Texas Tech University Health Sciences Center,1997 - 2002.

Brinda Dass, PhD Dissertation Committee Member, Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, 1996 - 2001.

Danny Kainer, PhD Dissertation Committee Member, Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, 1994 - 1998.

Sunday Crider, PhD Dissertation Committee Member, Cell Biology and Biochemistry, Texas Tech University Health Sciences Center,1994 - 1997.

Rotating Graduate Students

Kimberly Garcia, PhD Student, TTUHSC, October 2022-Jan 2023.
Nhi Nguyen, PhD Student, August 2021-May 2022.
Alejandra Gomez, PhD Student, TTUHSC, May 2021-Aug 2021.
Sofia Altamirano, MD/PhD student, TTUHSC, June 2021-Aug 2021.
Caitlyn Myers, PhD Student, TTUHSC, Lubbock, Texas, 2018.
Kellsie Beasley, PhD Student, TTUHSC, Lubbock, Texas, January 2015 - 2017.

Katy Nicholson, MS student, TTUHSC, January 2014 - 2015.
Eric Edwards, PhD student, TTUHSC, January 2012 - August 2012.
Trupti Kale, MS student, TTU, 2009 - 2011.
Souvik K., PhD student, TTUHSC, July 2011 - November 2011.
Leah Quisenberry, PhD student, TTUHSC, January 2010 - May 2010.
Sangeetha Gattam, PhD student, TTUHSC, June 2009 - September 2009.
Kim Chau, PhD student, TTUHSC, June 2004 - September 2009.
Marlyn Pachoo, PhD student,TTUHSC, August 2008 - December 2008.
Ramiya Vutukuru, PhD student, TTUHSC, August 2008 - December 2008.
Neha Kamari, PhD student, TTUHSC, March 2008 - May 2008.
Gurvinder Kaur, PhD student, TTUHSC, August 2007 - December 2007.
Jhuma Sata, PhD student, TTUHSC, October 2006 - December 2006.
Douglas Swartz, PhD student,TTUHSC, July 2006 - October 2006.
Rachel Hirsch, PhD student,TTUHSC, 2002.
Nelson Hsia, PhD student, TTUHSC, 1997 - 2002.
H. Gayle Sutton, MD/PhD student, TTUHSC, 1996 - 2001.
Audra Day, PhD student, TTUHSC, 2000.
Malini Mansharamani, PhD student, TTUHSC, 1997.
Ming Bei, PhD student, TTUHSC, 1996.

Postdoctoral Fellows, Research Associates, Residents and Fellows
Uyen Tran, Ph.D. research associate, TTUHSC, 2021-present.
Aveline Hewetson, Ph.D.,senior research associate, TTUHSC, 2013 - Present.
Gunadharini Dharmalingam Nandagopal, Ph.D. TTUHSC, 2022.
Hoa Do Quynh, Ph.D., postdoctoral fellow, TTUHSC, Lubbock, Texas, 2016 - 2019.
Benoit Guyonnet, Ph.D., postdoctoral fellow, TTUHSC, September 2009 - 2013.
Steve Tardif, Ph.D., postdoctoral fellow, TTUHSC, 2009 - 2011.
Alma Sanchez, Ph.D., postdoctoral fellow, TTUHSC, October 2005 - July 1, 2006.
Hans Henning von Horsten, Ph.D., postdoctoral fellow, TTUHSC, October 2002 - March 2006.
Gaiane Serobian, Ph.D.,postdoctoral fellow, TTUHSC, January 2004 - May 2005.
Michael Wassler, Ph.D.,postdoctoral fellow, TTUHSC, February 2000 - February 2002.
Patrick Syntin, Ph.D.,postdoctoral fellow, TTUHSC, 1996 - 1998.

Medical Students
Rebecca Kusko, TTUHSC, SOM, Lubbock, Texas, January 2019 - 2020.
Clinton Borchardt, TTUHSC, SOM, July 2010 - August 2010.
Mohammad Abedi, TTUHSC, SOM, June 2008 - August 2008.
Jimmy Stocks, TTUHSC, SOM June 2006 - July 2006.

Undergraduate Students
Jack Phan, TTU, 2023-present.
Daniel Vo, TTU, 2023-present.
Jordan Reaves, TTU, 2023.
Ethan Edwards, TTU, 2023.
Ricky Martinez, TTU, 2021-2023.
Luke Bierwagen, TTU, CISR student, 2022-2023.
Collin Guilbeau, TTU, 2021-2022.
Georgia Ray Atkins, TTU CISR student, 2020 - 2021.
Keegan Dunn, TTU Honors College, 2019 - 2020.

Izaak Aguilar, TTU, Lubbock, TX 2018 - 2020.
Daniel Cherkowsky, TTU, 2016 - 2018.
Caitlyn Myers, TTU, June 2015 - 2018.
Vy Lan Ho, TTU, October 2016 - 2017.
Louis Simley, TTU, June 2014 - 2016.
Gregory Alberts, TTU, June 2015 - August 2016.
Gage Rowden, TTU CISR student, June 2015 - July 2016.
Maggie Cheney, Reed College, SABR student, June 2014 - August 2014.
Caitlyn Wallen, TTUHSC, 2010 - 2013.
Nathan Egge, November 2013 - July 2014.
Amy Niles, Drake University, SABR student, June 2012 - August 2012.
Nikki Polk, TTU, June 2009 - June 2011.
Nissar Vahora, SABR student, June 2008 - August 2008.
Seethal Johnson, TTU, June 2005 - May 2008.
Mattie Wilson, TTU HHMI student, June 2006 - September 2006.
Hari Bodireddy, TTU HHMI student, July 2003 - January 2005.
Ryan Foresman, TTU HHMI student, June 2003 - June 2004.
Shivawn Bilberry, TTU, SABR student, June 2002 - August 2002.
Ellen Zwank, Eastern New Mexico State University, SABR student, June 1999 - August 1999.
Rebecca Collis, SABR student, June 1998 - August 1998.
Angelina Fusco, TTU HHMI student, 1995 - 1996.

Mentoring of Faculty
Jeremy Bailoo, Ph.D., Assistant Professor, Department of Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, 2023-present.

Manisha Tripathi, Ph.D., Assistant Professor, Department of Cell Biology and Biochemistry, Texas Tech University Health Sciences Center,2019 - Present.

Srinivas Nandana, Ph.D., Assistant Professor, Department of Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, 2019 - Present.

Michaela Jansen, Pharm D., Associate Professor, Department of Cell Physiology and Molecular Biophysics, TTUHSC Lubbock, 2016 - 2019.

Jannette Dufour, Ph.D., Associate Professor, Department of Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, 2015 - 2018.

NATIONAL SCIENTIFIC COMMITTEES AND SERVICES

NIH, Special Emphasis Panel, ZRG1 EMS-K (02)- Reproductive Sciences Study Section, November 2023.
Program Committee, American Society of Andrology Annual Meeting (2021-2023).
NIH, Special Emphasis Panel ZRG1 EMS-K (11) Study section. Co-chair, November 2022.
NIH, Special Emphasis Panel ZRG1 EMNR-K (11) B. Study section, reviewer April 2022.
Editorial Board, *Andrology*, (2014-2023).

External reviewer, promotion to Professor, Christina O'Flaherty, Ph.D., McGill University. (Nov 2020).
NIH, Special Emphasis Panel ZRG1 EMNR-P (56) R. Study section, Chair. (August 2019).
FASEB meeting session chair. *Functional amyloids.* The Protein Aggregation Conference: From Structure to In vivo Sequelae. Snowmass, CO. (June 2019).
NIH, Special Emphasis Panel/ ZRG1 BCMB-A (51), Study section, reviewer. The Common Fund's NIH Director's Transformative Research Award. (Feb 2019).
Journal Oversight Committee, American Society of Andrology, (2013-2019).
Chair, Awards Committee, American Society of Andrology, (April 2016-2018).
External reviewer, promotion and tenure, Matthew Marcello, Ph.D., Pace University (2018)
NIH/NICHD, CMIR study section, ad-hoc reviewer (Feb 2018)
NIH/NICHD, CMIR study section, ad-hoc reviewer (Oct 2017)
Endowment and Development committee, American Society of Andrology, 2016-2018.
Canada 150 Research Chair, reviewer (Oct 2017)
External reviewer, promotion, Budhan S. Pukazhenthi, Ph.D, Smithsonian's National Zoo and Conservation Biology Institute (2017)
External reviewer, promotion to Professor, Brett Nixon, Ph.D., University of Newcastle, Australia (2016).
American Heart Association grant review panel (Feb 2016)
External reviewer, promotion to Professor, Janice Evans, Ph.D., Johns Hopkins University Bloomberg School of Public Health, (2015).
NIH/NICHD, CMIR study section, ad-hoc reviewer (Oct 2015)
External reviewer, promotion and tenure, Jeffrey Lysiak, Ph.D., University of Virginia (2014).
Program Organizing Committee, Chair, International Congress of Andrology, Copenhagen, Denmark May 2017. (2013-2017).
External reviewer, promotion to Professor, Curt Pfarr, Ph.D., Paul Foster School of Medicine, TTUHSC El Paso, (2013).
Nominations Committee, American Society of Andrology, (2013-2014).
Associate Editor*, Andrology*, (2012-2014).
Editorial Board, *Biology of Reproduction*, (2009-2013).
External reviewer, promotion to Professor, Jacques Tremblay, Ph.D., University of Laval, (2012)
External reviewer, promotion and tenure, Michael Palladino, Ph.D., Monmouth University (2012).
NIH/NICHD, CMIR study section, ad-hoc reviewer, (Oct 2011).
President (elected), American Society of Andrology, (2011-2012).
NIH/NICHD, CMIR study section, ad-hoc reviewer. Bethesda, MD, (Feb 2011).
Gordon Research Conference Discussion Chair: Proprotein Processing, Trafficking and Secretion, Colby Sawyer College, New London, NH. (July 18-23, 2010).
Vice President, (elected), American Society of Andrology, (2010-2011).
Opponent, PhD dissertation defense for Jessica Frygelius, Virpi Tohonen, Ph.D., Anna Wedell, MD.Ph.D, mentors. Dept Molecular Medicine and Surgery, Karolinska Institute, Stockholm, Sweden March (2009).
Program Committee/Meeting Organizer, Chair, 2008, American Society of Andrology annual meeting, Albuquerque, NM (2006-2008).
External reviewer, promotion and tenure, Prabu Reddi, Ph.D. University of Virginia (2007)

NIH/NICH, CMIR study section, ad-hoc reviewer. (2006)
Department of Defense, Breast Cancer Research Program, Grant reviewer. (2005).
Department of Defense, Breast Cancer Research Program, Grant reviewer. (2004).
Department of Defense, Breast Cancer Research Program, Grant reviewer. (2002).
The Mellon Foundation Reproductive Biology Center program through the CONRAD foundation. Grant reviewer. (1998-2003).
Long-Range Planning Committee. American Society of Andrology. (1994-2000).
Treasurer (elected position), American Society of Andrology. (2001-2005).
Program Committee, member. American Society of Andrology (2002-2003).
Executive Council (elected position, governing board for the society), American Society of Andrology. (1998-2001).
NICHD/NIH, Special RFA Review Panel Synthesis and Testing of Non-Steroidal and Non Hormonal Male Contraceptive Agents, reviewer, (2000).
NIH/NICHD, Special Emphasis Panel, Potential Targets for Non-Steroidal Male Contraceptive Development. Reviewer, (2000).
Gordon Research Conference. Session Chair on Male Reproduction, Reproductive Tract Biology, Plymouth College, Plymouth, NH. (1996).
Editorial Board, *Journal of Andrology*, (1996-1998).
Program Committee member. American Society of Andrology. (1996-1999).
Student Affairs Committee. American Society of Andrology (1994-1996).

Journal Review: *Advanced Biology*, *Andrology, Antioxidants and Redox Signaling, Biology of Reproduction*, *BioFactors*, *Cell*, *Cell Tissue Research, Endocrinology*, *eLIFE*, *Epigenome, Experimental Cell Research*, *FASEB J*, *Gene*, *Human Reproduction*, *J. American Physiological Society, J. Andrology, J. Bacteriology, J. Biological Chemistry, J. Cell Science, J. Cellular Physiology, J Cystic Fibrosis, J. Extracellular Vesicles, J . Reproduction and Fertility, J Reproductive Immunology, J. Urology, Microscopy Research and Technique, Molecular and Cellular Proteomics, Molecular Endocrinology, Molecular Reproduction and Development, Nature Comm, PNAS, PLoS ONE, Protein Purification and Expression, Reproduction, Scientific Reports, Urology.*

ACADEMIC RESPONSIBILITIES

Departmental:
Chair, Faculty Mentoring Committee, (May 2022-present).
Chair, Faculty Search Committee, (Dec 2014-2018).
Space committee (2009-2016).
Executive committee (2008-2009).
Chair, Executive Committee (2002-2003) (2002-2004).
Chair, Equipment Committee (2002-2003).
Graduate Student Recruitment Committee. (1994-2000).
Organizer, Reproductive Biology Training Grant Seminar Series. (1996-1999).
Faculty Recruitment Committee. (1997-1998).

Institutional:
Tenure & Promotion Committee, ad-hoc (Nov 2023)
Basic Sciences IT committee, Chair, (2018-present).
President's Committee for Women in Health Sciences, Chair, (2009-present).
TTUHSC Research Space Renovation Task Force (2022-2023).
TTUHSC IT Task Force (2022-2023).

Tenure & Promotion Committee, ad-hoc (Nov 2022)
Post-Tenure Review committee, Vice-Chair. TTUHSC. (2019-2021).
Panel Interview, Search for Senior VP for Research and Innovation, TTUHSC. (2019-2021).
School of Medicine, Admissions Interview 2019-2021.
Tenure & Promotion committee. (Sept 2019).
Tenure & Promotion committee, ad-hoc, (Oct 2018).
Faculty Council Executive Committee, (Sept 2016-2019).
Faculty Council Executive Committee, Chair, (2017-2018).
Basic Science Chairs meeting, FCEC representative. (2018-2019).
Faculty Senate SOM representative, (2017-2019).
Hearing Committee, (Sept 2016).
Presidential Lecturer Committee, Chair, (Jan 2015-2018).
Search committee for TTUHSC Veterinarian (2015).
Search committee for Chair, Department Cell Biology and Biochemistry, TTUHSC. (Feb-Dec 2013).
Preliminary Data Seed Grant Committee. (Sept 2012-2013).
Search committee for Dean of the Graduate School. (July 2012-Jan 2013).
Committee for Evaluation of Commercial grants (2012-2013).
Post tenure Review Committee (2009-2013)
Steering Committee, Institute for Clinical and Epidemiological Health (2011).
Executive council, The Laura W. Bush Institute for Women's Health (2008-2009).
MD/PhD Committee (2007-2008).
Physiology Program Review (2007-2008).
Department of Physiology Chair Search Committee (2004).
Institutional Animal Care and Use Committee. (1996-2003).
Radiation Safety Committee. (1995-2004).
Graduate Council (elected position). (1996-2003).
M.D/Ph.D. recruitment committeee (2001-2005).
Howard Hughes Medical Institution Sponsored Program. (1996, 1997).
Department of Pharmacology Chair Search Committee (2002).
TTUHSC Fundraising. (1995-1998).
TTUHSC committee to develop multidisciplinary graduate programs in the Health Sciences Center. (1998).
Transgenic Core Facility Committee. (1995).

INVITED PAPERS, TALKS, BOOK CHAPTERS

Invited Papers:

Myers C and **Cornwall GA**. Host Defense Amyloids: Biosensors of the Immune System? *Andrology* (2023) Nov 14. doi: 10.1111/andr.13555.

Hewetson A, Do HQ, Myers C, Muthusubramanian A, Sutton RB, Wylie BJ, **Cornwall GA**. Functional Amyloids in Reproduction**.** *Biomolecules.* (2017) 7(3). pii: E46.

Cornwall, **G.A**. New Insights into Epididymal Biology and Function. *Human Reproduction Update* (2009) 1; 1-15.

Cornwall, G.A., von Horsten HH, Swartz D, Johnson S, Chau K, Whelly S. Extracellular quality control in the epididymis. *Asian J Androl* (2007) 9:500-507.

Cornwall, G.A. and Hsia, N. A new subgroup of the family 2 cystatins. Cutting Edge Reviews; *Molecular and Cellular Endocrinology*. (2003) 200:1-8.

Cornwall, G.A. and Hsia, N. CRES gene regulation and function. *National Journal of Andrology*. (2002) 8:313-318.

Cornwall, **G.A**. and Hann, S.R. Specialized gene expression in the epididymis. *J. Androl*. 16:379-383. (1995).

Invited Talks:

Amyloids as Functional Scaffolds in the Reproductive Tract and Brain, North American Testis Workshop, Denver, CO. May 2024.

Biological Amyloids in the Reproductive Tract and Brain, Obesity Research Institute, TTU, Nov 2023.

Host Defense Functions of the Epididymal Amyloid Matrix, 8th International conference on the Epididymis, Geissen, Germany. Sept 2022.

Host Defense Functions of the Epididymal Amyloid Matrix, 5th Symposium on Biology of Reproduction, Mexico. May 2022.

The Epididymal Amyloid Matrix: A New Host Defense Structure. NIH/NHLBI. October 2019.

The Functional Mammalian CRES (Cystatin-Related Epididymal Spermatogenic) Amyloid is Antiparallel β-Sheet Rich and Forms a Metastable Oligomer During Assembly, FASEB Protein Aggregation: From Structure to In vivo Sequelae. June 2019. Selected from submitted abstract.

Functional Amyloid in the Epididymis: A Protective Mammalian Biofilm. Keynote symposium speaker. American Society of Andrology annual meeting, Chicago, IL April 2019.

Amyloid function in the epididymis. 7th International conference on the Epididymis, Montreal, Quebec Canada. Sept 2018.

Epididymal maturation: from physiology to pathology. 11th International Congress of Andrology, Copenhagen, Denmark May 2017.

Functional Amyloids in the Reproductive Tract. Keynote speaker, Reproductive Health Research Day. Baylor College of Medicine, Houston, TX. Oct 2016.

Amyloid Properties of the Mouse Zona Pellucida: Implications for Mechanism of Sperm-ZP Binding. Fertilization and Activation of Development Gordon Research Conference, Holderness School, Plymouth, NH. July 2015.

Amyloids in the epididymis. Spermatology meeting, Newcastle, Australia, August 2014.

Good amyloid and fertility. Society for the Study of Reproduction annual meeting, Grand Rapids, MI July 2014.

Prions as Functional Scaffolds in the Male Reproductive Tract. TTUHSC, Graduate School of Biomedical Sciences Annual Retreat Keynote Speaker. September 2013.

Protein Aggregation in the Epididymis, The International Congress of Andrology Meeting, Melbourne, Australia, 2013.

Amyloidosis in the Reproductive Tract, American Society of Andrology annual meeting, San Antonio, TX 2013.

Unexpected Functions of Two Cystatin Proteins in Sperm Function and Male Fertility. Fertilization Gordon Research Conference. Holderness School, Plymouth, NH. July 2011.

CRES Aggregation in the Epididymis: A New Functional Amyloid? , The Epididymis V, fifth international meeting on the epididymis. Sao Paulo, Brazil, October 2010.

Amyloid in the Reproductive Tract: Pathology or Biological Function? American Society of Andrology annual meeting, Philadelphia, PA. April 2009.

Amyloidogenesis in the Epididymis. Reproductive Tract Biology Gordon Research Conference. Andover, NH. August 2008.

Extracellular Protein Quality Control and Reproductive Function. The Epididymis IV, fourth international meeting on the epididymis. Chatel-Guyon, France. December 2006.

Sperm Maturation in the Epididymis: Role of Segment-Specific Microenvironments. The Utah Symposium on the Genetics of Male Infertility. Salt Lake City, UT. January 2006.

The Cystatin-Related Epididymal Spermatogenic (CRES) subgroup of family 2 cystatins. The 17th Annual Testis Workshop. Phoenix, AZ. March 2003.

CRES Inhibits the Serine Protease PC2. Hormonal and Neural Peptide Biosynthesis Gordon Research Conference. Colby-Sawyer College, NH. July 2002.

CRES Function and Regulation. The Epididymis III, third international meeting on the epididymis. Charlottesville, VA, May 2002.

Gene Expression in the Male Reproductive Tract. Postgraduate Course, American Society of Andrology Annual Meeting. 1994)

Seminar speaker:

Texas Tech University Health Sciences Center, Department of Cell Physiology and Molecular Biophysics, Spring 2024.
Texas Tech University Health Sciences Center, Department of Internal Medicine. February 2020.
Texas Tech University Health Sciences Center, Department of Microbiology. March 2016.

Texas Tech University Health Sciences Center, Department of Physiology. February 2012.
Texas A&M, College Station, TX. November 2010
The Population Council, NY, NY April 2009
University of Laval, Quebec City, Canada, February 2009
University of Kentucky, Department of Clinical Sciences, July 2006.
Clark Atlanta University, Department of Biological Sciences, 2006.
Johns Hopkins Bloomberg School of Public Health, Dept. Molecular Biology and Biochemistry, 2005.
University of Lund, Sweden, 2003.
University of Arkansas, Dept. Biology, 2001.
University of Virginia School of Medicine, Dept. Cell Biology, 2000.
MD Anderson/UT, Houston, School of Medicine. 2000.
Emory University School of Medicine, Dept. Physiology, 1994.
University of Minnesota School of Medicine, Dept. Cell Biology, 1994.
Johns Hopkins University School of Public Health, 1994.
University of Southern Illinois, 1994.
University of Houston, Dept. Biology, 1994.
Texas Tech University Health Sciences Center, Dept. Cell Biology, 1994.
Georgetown University School of Medicine, 1994.

Invited Book Chapters:

Cornwall, G.A., *Epididymis: Sperm Maturation and Motility. Encyclopedia of Reproduction.* Elsevier, (2024).

Cornwall, G.A. *Epididymis: Sperm Maturation and Motility*. Encyclopedia of Reproduction. Elsevier, (2017).

Cornwall, G.A. *Role of Posttranslational Protein Modifications in Epididymal Sperm Maturation and Extracellular Quality Control.* In: Posttranslational Protein Modifications in the Reproductive System. (Sutovsky, P, Ed) Springer. (2014).

Cornwall, G.A. and von Horsten, HH. *Sperm Maturation in the Epididymis: Role of Segment-Specific Microenvironments.* In: The Genetics of Male Infertility. (Carrell, D. Ed). Humana Press. (2006).

Cornwall, G.A., Layere, J.J., Matusik, R., Hinton, B.T., and Orgebin-Crist, M.C. *Gene Expression and Epididymal Function*. In: The Epididymis. (Robaire, B., and Hinton, B.T., eds). Plenum Press, NY, NY. (2002).

Cornwall, G.A. *Ductus Epididymis*. In: Introduction to Mammalian Reproduction. Ed. D. Tulsiani. Kluwer Academic Publishers, (2003) pp 41-60.

Cornwall, G.A., Hsia, N. *CRES gene regulation and function*. In: The Third International Conference on the Epididymis. (Hinton, B.T. and Turner, T.T., eds). The Van Doren Co. (2003) pp94-102.

COLLABORATIONS

Behavioral studies of CRES Gene Knockout Mice. Jeremy Bailoo, Department of Cell Biology and Biochemistry, TTUHSC, 2021-present.

Altered Behavior as an Indicator of Prion Inheritance in Rats Exposed to Vinclozolin in utero. Jeremy Bailoo, Department of Cell Biology and Biochemistry. TTUHSC, 2021-present.

Molecular Mechanisms of Functional Amyloid Assembly. R. Bryan Sutton, Ph.D., Department of Cell Physiology and Membrane Biophysics, TTUHSC, Benjamin J. Wylie, Ph.D., Department of Chemistry and Biochemistry, TTU; Michael Latham, Ph.D., Department of Biochemistry, Molecular Biology and Biophysics, University of Minnesota. 2013-present.

PUBLICATIONS

Myers C, Atkins GR, Villarreal J, Sutton RB, **Cornwall GA.** (2023). The Mouse Epididymal Amyloid Matrix: A Mammalian Counterpart of a Bacterial Biofilm. bioRxiv 2023.11.15.567275. doi: https://doi.org/10.1101/2023.11.15.567275

Myers C and **Cornwall GA**. (2023). Host Defense Amyloids: Biosensors of the Immune System?. *Andrology* Nov 14. doi: 10.1111/andr.13555.

Myers C, Hastert MC, and **Cornwall GA**. (2022). Host defense functions of the epididymal amyloid matrix. *Mol Human Reprod* 30;28(12):gaac038. doi: 10.1093/molehr/gaac038.

Do HQ, Hewetson A., Borcik CG, Hastert MC, Whelly S, Wylie BJ. Sutton RB, **Cornwall GA**. (2021). Cross seeding between the functional amyloidogenic CRES and CRES3 family members and their regulation of Aβ assembly. *J Biol Chem*, Dec 31:jbc.RA120.015307. doi: 10.1074/jbc.RA120.015307.

Hewetson A, Khan NK, Dominguez MJ, Do QD, Kusko RE, Borcik CG, Rigden DJ, Keegan RM, Sutton RB, Latham MP, Wylie BJ, **Cornwall GA**. (2020). Maturation of the functional mouse CRES amyloid from globular form. *Proc Natl Acad Sci,* USA. 117(28):16363-16372. doi: 10.1073/pnas.2006887117.

Do HQ, Hewetson A, Myers C, Khan N, Hastert MC, Harsini F, Latham M, Wylie BJ, Sutton RB, **Cornwall GA**.(2019).The functional mammalian CRES (cystatin-related epididymal spermatogenic) amyloid is antiparallel β-sheet rich and forms a metastable oligomer during assembly. *Sci Rep* 25;9(1):9210. doi: 10.1038/s41598-019-45545-w.

Cornwall GA, Do HQ, Hewetson A, Muthusubramanian A, Myers C. (2019). The epididymal amyloid matrix: structure and putative functions. *Andrology*. Jan 20. doi: 10.1111/andr.12586.

Hewetson A, Do HQ, Myers C, Muthusubramanian A, Sutton RB, Wylie BJ, **Cornwall GA.** (2017). Functional amyloids in reproduction. *Biomolecules*. 7(3). pii: E46.

Whelly, S., Muthusubramanian A, Powell, J., Johnson, S., Hastert, M. C., and **Cornwall, G.A.** (2016). CRES (cystatin-related epididymal spermatogenic) subgroup members are part of an amyloid matrix and associated with extracellular vesicles in the mouse epididymal lumen. *Mol Human Reprod* 22:729-744.

Egge, N., Muthusubramanian A, and **Cornwall**, **G.A**. (2015). Amyloid properties of the mouse egg zona pellucida. *PLoS One*. 4;10(6):e0129907. Doi 10.1371/journal.pone.0129907. eCollection 2015.

Cornwall GA. (2014). Role of posttranslational protein modifications in epididymal sperm maturation and extracellular quality control. *Adv Exp Med Biol*. 759:159-80. doi: 10.1007/978-1-4939-0817-2_8. Review.

Guyonnet, B., Egge N, and **Cornwall, G.A**. (2014). Functional amyloids in the mouse sperm acrosome. *Mol Cell Biol*. 34:2624-34.

Whelly, S., Serobian G., Borchardt C., Powell, J., Johnson, S., Hakansson, K., Lindstrom, V., Abrahamson, M., Grubb, A., and **Cornwall G.A.** (2014). Fertility defects in mice expressing the L68Q variant of human cystatin C:a role for amyloid in male infertility. *J Biol Chem* 14;289(11):7718-29. doi: 10.1074/jbc.M113.515759. Epub 2014

Ferrer, M., **Cornwall, G.A.,** Oko, R. (2013). A population of CRES resides in the outer dense fibers of spermatozoa. *Biol Reprod* 88:1-9.

Guyonnet, B., Zabet-Moghaddam, M., SanFrancisco, S., and **Cornwall G.A.** (2012). Isolation and proteomic characterization of the mouse sperm acrosomal matrix. *Mol Cell Proteomics* 11:758-774.

Song, H.W., Dann, C.T., McCarrey, J.R., Meistrich, M.L., **Cornwall, G.A.,** and Wilkinson, M.F. (2012). Dynamic expression pattern and subcellular localization of the Rhox10 homeobox transcription factor during early germ cell development. *Reproduction* 143:611-24.

Whelly, S., Johnson, S.S., Powell, J., Borchardt C., Hastert, M-C, and **Cornwall**, **G.A**. (2012). Nonpathological extracellular amyloid is present during normal epididymal sperm maturation. *PLoS ONE,* 0.1371/journal.pone.0036394.

Tardif, S. Guyonnet, B. and **Cornwall**, **G.A**. (2012). Alteration in the processing of the ACRBP/sp32 protein and sperm head/acrosome malformations in proprotein convertase 4 (PCSK4) null mice. *Mol Human Reprod*. 18:298-307. Cover photo.

Cornwall, **G.A**, von Horsten, H.H., and Whelly, S. (2011). Cystatin-related epididymal spermatogenic aggregates in the epididymis. *J. Androl*.32:679-85.

Parent, A.D., **Cornwall**, **G.A**., Liu, L.Y., Smith, C.E., and Hermo, L. (2011). Alterations in the testis and epididymis associated with loss of function of the cystatin related epididymal spermatogenic (CRES) protein. *J Androl* 32; 444-63.

Chau, K. and **Cornwall**, **G.A**. (2011). Impaired fertility in vitro in mice lacking the cystatin CRES (cystatin-related epididymal spermatogenic): rescue by exposure of spermatozoa to dibutyryl cAMP/IBMX *Biol Reprod.* 84:140-52.

Cornwall, **G.A**. (2009). New insights into epididymal biology and function. *Human Reproduction Update* 1;1-15.

von Horsten, H.H., Johnson. S.S., SanFrancisco S.K., Hastert, M.C., Whelly, S., and **Cornwall**, **G.A**. (2007). Oligomerization and transglutaminase crosslinking of the cystatin CRES in the mouse epididymal lumen: Potential mechanism of extracellular quality control. *J. Biol. Chem.* 282:32912-32923.

Cornwall, G.A., von Horsten HH, Swartz D, Johnson S, Chau K, Whelly S. (2007). Extracellular quality control in the epididymis. *Asian J Androl* 9:500-507.

Yuan, Q., Guo, Q.S., **Cornwall**, **G.A**., Xu, C., Wang, Y.F. (2007). Age-dependent expression of the cystatin-related epididymal spermatogenic (Cres) gene in mouse testis and epididymis. *Asian J. Androl*. 9:305-11.

Sutton-Walsh, H.G., Whelly S, and **Cornwall**, **G.A**. (2006). Differential effects of GnRH and androgens on *Cres* (cystatin-related epididymal spermatogenic) mRNA and protein expression in male mouse anterior pituitary gonadotroph cells. *J. Andrology* 27:802-815.

Hsia, N., Brousal, J., Hann, S.R., and **Cornwall, G.A**., (2005). Recapitulation of germ cell and pituitary-specific expression with 1.6 kb of the cystatin-related epididymal spermatogenic (*Cres*) gene promoter in transgenic mice. *J. Andrology* 26:249-257.

Kirby, J.L., Yang, L., Labusm J.C., Lye, R.J., Hsia, N. Day, R., **Cornwall**, **G.A**., and Hinton, B.T. (2004). Characterization of epididymal epithelial cell-specific gene promoters by in vivo electroporation. *Biol. Reprod*. 71: 613-619.

Hsia, N. and **Cornwall**, **G.A**. (2004) Microarray analysis of region-specific gene expression in the mouse epididymis. *Biol. Reprod.*70: 448-457.

Cooper TG**,** Wagenfeld A**, Cornwall GA,** Hsia N, Chu ST, Orgebin-Crist MC, Drevet J, Vernet P, Avram C, Nieschlag E, Yeung CH. (2003). Gene and protein expression in the epididymis of infertile c-ros receptor tyrosine kinase-deficient mice. *Biol. Reprod.* 69:1750-62

Cornwall, G.A. and Hsia, N. (2003). A new subgroup of the family 2 cystatins. Cutting Edge Reviews; *Molecular and Cellular Endocrinology*. 200:1-8.

Cornwall, G.A., Cameron, A., Lindberg, I., Hardy, D., Cormier, N., and Hsia, N. (2003). CRES protein inhibits the serine protease prohormone convertase PC2. *Endocrinology* 144:901-908.

Hsia, N and **Cornwall, G.A**. (2003). *Cres2* and *Cres3*: New members of the CRES subgroup of family 2 cystatins. *Endocrinology* 144:909-915.

Wayne, C.M., MacLean, J.A., **Cornwall**, **G.A**., and Wilkinson, M.F. (2002). Two novel human X-linked homeobox genes, *hPEPP1* and *hPEPP2*, selectively expressed in the testis. *Gene* 310:1-11.

Cornwall, G.A. and Hsia, N. (2002). CRES gene regulation and function *Zhonghua Nan Ke Xue*. 8:313-318.

Wassler, M., Syntin, P., Sutton, H.G., Hsia, N., Hardy, D.M., and **Cornwall, G.A.** (2002). Identification and characterization of cystatin-related epididymal spermatogenic protein in human spermatozoa: localization in the equatorial segment. *Biol. Reprod*. 67:795-803.

Hsia, N. and **Cornwall, G.A**. (2001). CCAAT/Enhancer binding protein β regulates expression of the cystatin-related epididymal spermatogenic (*Cres*) gene. *Biol. Reprod.* 65:1452-1461.

Cornwall, **G.A**., Collis, R., Xiao, Q, Hsia, N., and Hann, S.R. (2001). B-Myc, a proximal caput epididymal protein, is dependent on androgens and testicular factors for expression. *Biol. Reprod.* 64:1600-1607.

Gregory, M.A., Xiao, Q., **Cornwall**, **G.A**., Lutterbach, B. and Hann, S.R. (2000). B-Myc is preferentially expressed in hormonally-dependent tissues and inhibits cellular proliferation. *Oncogene* 42:4886-4895.

Syntin, P., and **Cornwall**, **G.A**. (1999) Immunolocalization of CRES protein in the acrosomes of mouse spermatozoa. *Biol. Reprod*. 60:1542-1552.

Sutton, H.G., Fusco, A., and **Cornwall**, **G.A**. (1999) CRES protein colocalizes with LHβ protein in the mouse anterior pituitary gonadotropes. *Endocrinology* 140:2721-2732

Cornwall, **G.A.,** Hsia, N., and Sutton, H.G. (1999) Structure, alternative splicing, and chromosomal localization of the Cystatin-Related Epididymal Spermatogenic (CRES) gene. *Biochem. J.* 340:85-93.

Sutton KA, Sourinda M, Tribley W, Lindsey JS, Meistrich ML, Bucana CD, Sanborn, BM, Joseph DR, Griswold MD, **Cornwall**, **GA,** and Wilkinson MF. (1998) Androgen regulation of the *Pem* homeodomain gene in Sertoli and epididymal cells. *J. Andrology* 19: 21-30.

Cornwall, **G.A**. and Hsia, N. (1997) ADAM7, A member of the ADAM (A Disintegrin and Metalloprotease) gene family is specifically expressed in the mouse anterior pituitary and epididymis. *Endocrinology* 138:4262-4272.

Cornwall, **G.A**. and Hann, S.R. (1995) Specialized gene expression in the epididymis. *J. Androl.* 16:379-383.

Cornwall, **G.A**. and Hann, S.R. (1995) Transient appearance of the CRES protein during spermatogenesis and caput epididymal sperm maturation. *Mol. Reprod. Dev.* 41:37-46.

Cornwall, G.A., Orgebin-Crist, M.-C., and Hann, S.R. (1992). The CRES gene: A unique testis-regulated gene related to the cystatin family is highly restricted in its expression to the proximal region of the mouse epididymis. *Mol. Endocrinol.* 6:1653-1664.

Cornwall, **G.A**., Orgebin-Crist, M.-C., and Hann, S.R. (1992). Differential expression of the mouse mitochondrial genes and the mitochondrial RNA-processing endoribonuclease RNA by androgens. *Mol. Endocrinol***.** 6:1032-1042.

Cornwall, **G.A.**, Orgebin-Crist, M.-C., and Hann, S.R. (1992). Expression of an endogenous MLV-related proviral sequence is androgen-regulated and primarily restricted to the epididymis/vas deferens and oviduct/uterus. *Biol. Reprod.* 47:665-675.

Tulsiani, D.R.P., Nagdas, S.K., **Cornwall**, **G.A**., and Orgebin-Crist, M.-C. (1992). Evidence for the presence of high-mannose/hybrid oligosaccharide chain(s) on the mouse ZP2 and ZP3. *Biol. Reprod*. 46:93-100.

Vreeburg, J.T., Holland, M.K., **Cornwall**, **G.A**., Rankin, T.L., Orgebin-Crist, M-C. (1991). Secretion of epididymal proteins and their interaction with spermatozoa. *Bulletin de l Association des Anatomistes*. 75:171-173.

Cornwall, **G.A**., Tulsiani, D.R.P., and Orgebin-Crist, M.-C. (1991). Inhibition of the mouse sperm surface α-D-mannosidase inhibits sperm-egg binding in vitro. *Biol. Reprod.* 44:913-921.

Orgebin-Crist, M.-C., **Cornwall**, **G.A**., Holland, M.K., Rankin, T.L., and Vreeburg, J.T.M. (1991). Characterization and regulation of murine epididymal secretory proteins. In: Hormonal Communicating Events in the Testis, A. Isidori, A. Fabbri and M. Dufau, Raven Press. pp 277-283.

Clevenger, W.R., **Cornwall**, **G.A**., Carter, M.W., and Bradshaw, W.S. (1991). Diethylstilbesterol-induced perinatal lethality in the rat. I. Relationship to reduced maternal weight gain. *Biol. Reprod*. 44:575-582.

Cornwall, **G.A**., Vreeburg, J.T., Holland, M.K., and Orgebin-Crist, M.-C. (1990). Interactions of labeled epididymal secretory proteins with spermatozoa after injection of ^{35}S-methionine in the mouse**.** *Biol. Reprod*. 43:121-129.

Vreeburg, J.T.M., Holland, M.K., **Cornwall**, **G.A**., and Orgebin-Crist, M.-C. 1990). Secretion and transport of mouse epididymal proteins after injection of ^{35}S-methionine. *Biol. Reprod*. 43:113-120.

Tulsiani, D.R.P., Skudlarek, M.D., **Cornwall, G.A**., and Orgebin-Crist, M.-C. (1989). Epididymal sperm maturation: Potential role of glycoprotein modifying enzymes. Development & Function of the Reproductive Organs, Vol. III, N. Josso, Ed., pp. 119-226.

Cornwall, **G.A**., and Chang, T.S.K. (1989). Characterization of sulfhydryl proteins involved in the maintenance of flagellar straightness in spermatozoa. *J. Androl.* 11:168-181.

Cornwall, **G.A**., Vindivich, D., Tillman, S.L., and Chang, T.S.K. (1988). The effect of sulfhydryl oxidation on the morphology of immature hamster epididymal spermatozoa induced to acquire motility in vitro. *Biol. Reprod.* 39:141-155.

Cornwall, **G.A**., Smyth, T.B., Vindivich, D., Harter, C., Robinson, J., and Chang, T.S.K. (1986). Induction and enhancement of progressive motility in hamster caput epididymal spermatozoa. *Biol. Reprod*. 35:1065-1074.

Cornwall, **G.A**., Carter, M.W., and Bradshaw, W.S. (1984). The relationship between prenatal lethality or fetal weight and intrauterine position in rats exposed to diethylstilbestrol, zeranol, 3,4,3',4'-tetrachlorobiphenyl, or cadmium. *Teratology* 30:341-349.

POSTER PRESENTATIONS

*presenter
All peer-reviewed.

Tran U, Garza K, Gomez A, Hewetson A, Bailoo J and **Cornwall GA***. Sperm Amyloids: Epigenetic Carriers of Inheritance? 4th symposium "Epigenetic Inheritance: Impact for Biology and Society" Zürich, Switzerland, August 23-25,2023,

Gomez A*, Grozdanov P, Bailoo J, Hewetson A, and **Cornwall GA**. Functional CRES Amyloids in the Brain: Role in Sex-specific Learning and Memory. FASEB meeting: The Protein Aggregation Conference: Exploring Rugged Landscapes, June 11, 2023 - June 15, 2023, Malahide, Ireland.

Gomez A*, Grozdanov P, Bailoo J, Hewetson A, and **Cornwall GA**. CRES and CRES subgroup members as functional amyloids in the brain. Society for Neuroscience Annual meeting, San Diego, CA, Nov 2022. (Award for best trainee poster).

Myers, C*, Hastert MC, **Cornwall GA**. New Mechanisms of Host Defense in the Epididymis. American Society of Andrology Annual Meeting. San Diego CA, May 2022.

Myers C*, **Cornwall GA.** Antimicrobial Functions of the Epididymal Amyloid Matrix. American Society of Andrology Annual Meeting (Virtual, April 23-25, 2021) (Research Merit Award Finalist).

Atkins GR*, Myers C, Hewetson A, **Cornwall GA**. The Epididymal Amyloid Matrix Displays Key Properties of Bacterial Biofilms. American Society of Andrology Annual Meeting (Virtual, April 23-25, 2021).

Myers C*, **Cornwall GA**. Antimicrobial Functions of the Epididymal Amyloid Matrix. 26th Annual Texas Forum for Reproductive Sciences (Virtual, June 17-18, 2021).

Atkins GR*, Myers C, Hewetson A, **Cornwall GA**.The Epididymal Amyloid Matrix Displays Key Properties of Bacterial Biofilms. 26th Annual Texas Forum for Reproductive Sciences (Virtual, June 17-18, 2021).

Myers C*, **Cornwall GA**. Antimicrobial Functions of the Epididymal Amyloid Matrix. The

Protein Aggregation Conference: Function, Dysfunction, and Disease (FASEB) (Virtual, June 23-25, 2021).

Myers C*, **Cornwall GA**. Antimicrobial Functions of the Epididymal Amyloid Matrix. Gametes meet in the time of COVID-19 (Substitute for scheduled 2021 Fertilization and Activation of Development Gordon Research Conference) (Virtual, July 25-30, 2021).

Cornwall GA*, Myers C. The Epididymal Amyloid Matrix is a Novel Host Defense Structure, Fertilization and Activation of Development. Gordon Research Conference, Gordon Research Conference, Plymouth, New Hampshire, July 2019.

Myers C*, **Cornwall GA.** The Epididymal Amyloid Matrix is a Novel Host Defense Structure. Protein Aggregation: From Structure to In vivo Sequelae, Federation of American Societies for Experimental Biology (FASEB), Snowmass, Colorado, June 2019.

Guyonnet B*, Whelly S, **Cornwall G**. Amyloids are a Constituent of the Sperm Acrosomal Matrix Core XXII North American Testis Workshop, San Antonio, TX, 2013.

Guyonnet B*, Whelly SM, **Cornwall GA**. Amyloid-like Structures are Present in the Mouse Acrosomal Matrix. Fertilization & Activation of Development, Gordon Research Conference, Holderness, July 2011.

Guyonnet B*, Whelly SM, **Cornwall GA**. CRES Protein is Associated With Amyloid-like Structures in Mouse Spermatozoa. Epididymis V, Águas de São Pedro, São Paulo Brazil, October 25, 2010.

Chau KM* and **Cornwall GA**. Characterizing the Biological Function of Cystatin-Related Epididymal Spermatogenic (CRES) Protein using a Knockout Mouse Model. 41st Annual Meeting of the Society for the Study of Reproduction, Kailua-Kona, HI, 2008.

Johnson SS*, Swartz DJ, Chau KM, von Horsten HH, Whelly SM, Hastert MK, **Cornwall GA**. CRES (Cystatin-related epididymal spermatogenic) is amyloidogenic. 41st Annual Meeting of the Society for the Study of Reproduction, Kailua-Kona, HI, 2008.

Chau K* and **Cornwall GA**. Characterizing the Biological Function of Cystatin-Related Epididymal Spermatogenic (CRES) Protein using a Knockout Mouse Model. American Society of Andrology annual meeting. American Society of Andrology annual meeting. Tampa FL 2007.

Johnson SS*, Swartz DJ, Chau KM, von Horsten HH, Whelly SM, **Cornwall GA**. The CRES Protein is amyloidogenic. American Society of Andrology annual meeting. Tampa FL 2007.

Chau K* and **Cornwall GA**. Characterization and biological function of cystatin-related epididymal spermatogenic (CRES) protein using a knockout mouse model. American Society of Andrology annual meeting, Chicago IL 2006.

Foresman R*, Hsia N, **Cornwall GA**. CRES4: A New Member of the CRES (Cystatin-Related Epididymal Spermatogenic) Subgroup of Family 2 Cystatins. American Society of Andrology annual meeting, Baltimore MD, May 2004.

von Horsten HH*, Pena A, Whelly SM, Phelps B, Cormier N, **Cornwall GA**. TRANSGLUTAMINASE MEDIATED CROSSLINKING OF CRES PROTEIN. American Society of Andrology Annual Meeting, Baltimore, MD, May 2004.

Hardy DM*, Cheung, TL, Wassler MJ, **Cornwall GA**. Multiple intra-species variants of human zonadhesin. American Society of Andrology annual meeting. Phoenix AZ 2003.

Cornwall GA*, Cameron A, Lindberg I, Hardy D, Hsia N. The cystatin-related epididymal spermatogenic (CRES) protein is an inhibitor of the prohormone processing serine protease PC2. American Society of Andrology annual meeting. Seattle, WA. 2002.

Hsia N*, Brousal JP, Hann SR, and **Cornwall GA**. Germ cell-specific expression of a cystatin-related epididymal spermatogenic (CRES) promoter-CAT transgene. American Society of Andrology annual meeting. Seattle, WA. 2002.

Hsia N*, **Cornwall GA**. CCAAT/enhancer binding protein beta regulates expression of the cystatin-related epididymal spermatogenic (Cres) gene. Society for the Study of Reproduction annual meeting. Madison, WI. 2000.

Sutton HG*, Fusco A, **Cornwall GA**. Cystatin-Related Epididymal Spermatogenic Protein Colocalizes with LHβ Protein in Mouse Anterior Pituitary Gonadotropes. American Society of Andrology annual meeting.1999.

Sutton HG*, Fusco A, **Cornwall GA.** Expression of the Novel CRES Gene in the Anterior Pituitary Gonadotropes. American Society of Andrology annual meeting. Long Beach, CA.1998.

Syntin P*, **Cornwall GA.** Immunolocalization of CRES protein in the acrosomes of spermatozoa from rat, mouse, and human. Society for the Study of Reproduction annual meeting, 1998.

Sutton HG*, Hsia N, **Cornwall GA**. Potential Regulation of the Novel CRES Gene by Alternative Splicing. Society for the Study of Reproduction annual meeting, 1998.

CONFERENCES ATTENDED

Conference Attendance, 4th symposium “Epigenetic Inheritance: Impact for Biology and Society”, Zürich, Switzerland, August 23-25, 2023.

Conference Attendance, FASEB meeting: The Protein Aggregation Conference: Exploring Rugged Landscapes, June 11, 2023 - June 15, 2023, Malahide, Ireland.

Conference Attendance, Epididymis VIII International Meeting, Giessen, Germany, Sept 2022.

Conference Attendance, American Society of Andrology, San Diego, CA, May 2022.

Conference Attendance, North American Testis Workshop, San Diego, CA, May 2022.

Conference Attendance, American Society of Andrology, virtual, April 2021.

Conference Attendance, Texas Forum for Reproductive Sciences, virtual, April 2021.

Conference Attendance, Protein Aggregation: Function, Dysfunction, and Disease, Federation of American Societies for Experimental Biology (FASEB), virtual, June 2021.

Conference Attendance, Fertilization and Activation of Development, Gordon Research Conference, Plymouth, NH, July 2019.

Conference Attendance, Protein Aggregation: From Structure to In vivo Sequelae, Federation of American Societies for Experimental Biology (FASEB), Snowmass, CO, June 2019.

Conference Attendance, American Society of Andrology, Chicago, IL, April 2019.

Conference Attendance, XXV North American Testis Workshop, Chicago, IL, April 2019.

Conference Attendance, Epididymis VII International Meeting, Montreal, Quebec, Canada, September 2018.

Conference Attendance, American Society of Andrology, Portland, OR, April 2018.

Conference Attendance, Fertilization and Activation of Development, Gordon Research Conference, Plymouth, New Hampshire, July 2017.

Conference Attendance, Protein Aggregation, Federation of American Societies for Experimental Biology (FASEB), Steamboat Springs, Colorado, June 2017.

Conference Attendance, 11th International Congress of Andrology, International Society of Andrology, Copenhagen, May 2017.

Conference Attendance, American Society of Andrology, Miami, Florida, April 2017.

Conference Attendance, XXIV North American Testis Workshop, Miami, FL, April 2017.

Conference Attendance, Mammalian Reproduction, Gordon Research Conference, ME, July 2016.

Conference Attendance, American Society of Andrology, New Orleans, LA, April 2016.

Conference Attendance, American Society of Andrology, Salt Lake City, UT, April 2015.

Conference Attendance, XXIII North American Testis Workshop, Salt Lake City, UT, April 2015.

Conference Attendance, Fertilization and Activation of Development, Gordon Research Conference, Plymouth, NH, July 2015.

Conference Attendance, Spermatology, Newcastle, Australia, August 2014.

Conference Attendance, Society for the Study of Reproduction, Grand Rapids, MI, July 2014.

Conference Attendance, American Society of Andrology, San Antonio, TX, 2013.

Conference Attendance, 10th International Congress of Andrology, International Society of Andrology, Melbourne, Australia, 2013.

Conference Attendance, XXII North American Testis Workshop, San Antonio, TX, April 2013.

Conference Attendance, American Society of Andrology, Tucson, AZ, April 2012.

Conference Attendance, Fertilization and Activation of Development, Gordon Research Conference, Plymouth, NH, July 2011

Conference Attendance, American Society of Andrology, Montreal, Quebec, Canada, April 2011.

Conference Attendance, XXI North American Testis Workshop, Montreal, Quebec, Canada, April 2011.

Conference Attendance, Epididymis V International meeting, Sao Paulo, Brazil, October 2010.

Conference Attendance, Proprotein processing, Gordon Research Conference, New London, NH, July 2010.

Conference Attendance, American Society of Andrology, Houston, TX, April 2010.

Conference Attendance, American Society of Andrology, Philadelphia, PA, April 2009.

Conference Attendance, XX North American Testis Workshop, Philadelphia, PA, April 2009.

Conference Attendance, Reproductive Tract Biology, Gordon Research Conference, Andover, NH, August 2008.

Conference Attendance, American Society of Andrology, Albuquerque, NM, April 2008.

Conference Attendance, American Society of Andrology, Tampa, FL, April 2007.

Conference Attendance, XIX North American Testis Workshop, Tampa, FL, April 2007.

Conference Attendance, American Society of Andrology, Chicago, IL, April 2006,

Conference Attendance, Proprotein processing, Gordon Research Conference, New London, NH, July 2006.

Conference Attendance, Epididymis IV International meeting, Chatel-Guyon, France, December 2006.

Conference Attendance, Utah Symposium on the Genetics of Male Infertility, Salt Lake City, UT, January 2006.

Conference Attendance, American Society of Andrology, Seattle, WA, April 2005.

Conference Attendance, XVIII North American Testis Workshop, Seattle, WA, April 2005.

Conference Attendance, Proprotein Processing, Gordon Research Conference, NH, July 2004.

Conference Attendance, American Society of Andrology, Baltimore, MD, April 2004.

Conference Attendance, American Society of Andrology, Phoenix, AZ, April 2003.

Conference Attendance, XVII North American Testis Workshop, Phoenix, AZ, March 2003.

Conference Attendance, Society for the Study of Reproduction, Baltimore, MD, 2002.

Conference Attendance, Hormonal and Neural Peptide Biosynthesis, Gordon Research Conference, NH, July 2002.

Conference Attendance, Epididymis III International meeting, Charlottesville, VA, May 2002.

Conference Attendance, American Society of Andrology, Seattle, WA, April 2002.

Conference Attendance, American Society of Andrology, Montreal, Quebec, April 2001.

Conference Attendance, Society for the Study of Reproduction, Madison, WI, July 2000.

Conference Attendance, American Society of Andrology, Boston, MA, April 2000.

Conference Attendance, American Society of Andrology, Louisville, KY, April 1999.

Conference Attendance, XV North American Testis Workshop, Louisville, KY, April 1999.

Conference Attendance, Society for the Study of Reproduction, College Station, TX, July 1998.

Conference Attendance, American Society of Andrology, Long Beach, CA, April 1998.

Conference Attendance, American Society of Andrology, Baltimore, MD, April 1997,

Conference Attendance, American Society of Andrology, Minneapolis, MN, April 1996.

Conference Attendance, American Society of Andrology, Raleigh, NC, April 1995.

Conference Attendance, American Society of Andrology, Springfield, IL, April 1994.