

# CURRICULUM VITAE - REX A. HESS

*Date of Preparation: July 2008*

## TABLE OF CONTENTS

### 1.0 PERSONAL HISTORY AND PROFESSIONAL EXPERIENCE

#### 1.1 Mailing Address:

←Dr. Rex A. Hess

←Department of Veterinary Biosciences

University of Illinois

2001 S. Lincoln

Urbana, IL 61802- 6199

**Phone:** 217-333-8933 / 333-1696 (lab)

**Fax:** 217-244-1652

**Email:** [rexhess@illinois.edu](mailto:rexhess@illinois.edu)

**HomePage:** <http://www.cvm.uiuc.edu/~rexhess>

#### 1.2 Citizenship: United States of America

#### 1.3 Educational History:

←B.S. Education/Zoology cum laude, University of Missouri-Columbia 1971

←M.S. Physiology Area, University of Missouri-Columbia 1975

←Ph.D. Animal Physiology, Clemson University 1983

#### 1.4 List of Academic Positions since Final Degree

1983-1986 Postdoc; Health Effects Res. Lab, U.S. Environmental Protection Agency, RTP, N.C

1986-1992 Assistant Professor, University of Illinois-Urbana, Champaign; Faculty Director of Microscopic Imaging Laboratory

1992-1993 Interim Director; Center for Electron Microscopy, University of Illinois

1992-1995 Adjunct Scientist; Yerkes Regional Primate Research Center, Emory University Affiliate; Institute for Environmental Studies, University of Illinois

1992-1998 Associate Professor; Dept. of Veterinary Biosciences, University of Illinois

1995-2003 Director of Center for Microscopic Imaging, University of Illinois

1998- Professor; Department of Veterinary Biosciences, University of Illinois

Chair of Morphology Division, Department of Veterinary Biosciences

1998-2002 Director and PI, NIEHS Training Grant in Environmental Toxicology

2002- Associate Director, NIEHS Training Grant in Environmental Toxicology

2005- Affiliate member, Institute for Genomic Biology, University of Illinois

#### 1.5 Other Professional Employment

←1973-1976 Electron Microscopy; Veterans Administration Hospital, Columbia, MO

←1976-1979 Research Associate; Washington University School of Medicine, St. Louis, MO

←1979-1980 Electron Microscopy, Pulmonary Medicine; Mount Sinai Med Center, NY, NY

←1980-1983 Graduate Teaching Assistant; Clemson University

## **1.6 Honors, Recognition, and Outstanding Achievements**

- Sigma Xi (Research Honor Society)
- Gamma Sigma Delta (Honor Society of Agriculture)
- Phi Eta Sigma (National Freshmen Honor Fraternity)
- Certificate of Merit (College of Education-University of Missouri)
- Scholastic Honors (College of Education-University of Missouri)
- Fidelity Education Scholar (University of Missouri)
- Richard Higgins Scholar (University of Missouri)
- University of Missouri Scholar
- Editorial Board, Domestic Animal Endocrinology, 1996-1999
- Editorial Board, Journal of Andrology, 1997-2003
- Editorial Board, Tissue and Cell, 1996-Present
- Editorial Board, Reproductive Biology & Endocrinology, 2002-Present
- Board of Reviewing Editors, Biology of Reproduction, 2004-Present
- 1995 Levine Award for Research Excellence (College of Veterinary Medicine, Univ. of Illinois)
- 1995-1998 Secretary, American Society of Andrology
- 1996 Invited speaker, Gordon Research Conference on Reproductive Tract Biology, Plymouth State College, Plymouth, New Hampshire
- 1997 Research Excellence Award (College of Veterinary Medicine, Univ. of Illinois)
- 1998 Invited speaker, Gordon Research Conference on Reproductive Tract Biology, Plymouth State College, Plymouth, New Hampshire
- 1998-1999 NIH Fogarty Senior International Fellowship for research in Australia
- 1999 Symposium Lecturer, American Society of Andrology
- 1999 Plenary Lecture, International Workshop, Estrogens and Male Reproduction, Crotone, Italy.
- 2000 Symposium Lecture, Estrogens and male reproduction, 1st European Congress of Andrology, in L'Aquila, Italia, March 26
- Boden Research Conference 2000 on "Estrogens and Male Health," Sponsored by the Australian academy of Science, November 2000, in Sydney, NSW, Australia.
- 2000 Pfizer Award for Research Excellence, College of Veterinary Medicine, Univ. of Illinois
- 2000 Presidential Merit Award, American Society of Andrology
- Vice-President, Illinois Gamma Sigma Delta, 2001
- 2002 Invited speaker, Gordon Research Conference on Environmental Endocrine Disruptors at Mt. Holyoke College in South Hadley, Massachusetts.
- 2003 Invited Symposium Keynote Speaker, "Epididymal Toxicology," 1<sup>st</sup> European Congress of Toxicological Pathology, Hamburg, Germany, September 24-27, 2003.
- 2004 Nomination as International Educator of the Year, The International Biographical Centre of Cambridge, England.
- 2006 Co-Chair, Gordon Research Conference on Environmental Endocrine Disruptors to be held at Il Ciocco, Italy.
- 2005-2008. Elected as member of the Executive Council for the American Society of Andrology.

## **1.7 Invited Lectures and Invited Conference Presentations Since Last Promotion**

### **1990-1995**

- Invited speaker at the United Nations University Symposium on Environment and Human Health, held at the University of Ulm, Federal Republic of Germany, March 4-8, 1990.
- Speaker, 16th Annual Symposium, CL Davis, on Veterinary and Comparative Pathology, entitled, "Diagnostic Toxicologic Pathology," University of Illinois, Urbana, July 2, 1992.

Invited lecture for the Department of Physiology, Southern Illinois University Medical School, Carbondale. October 8, 1992.

Invited lecture for the Population Council, New York, NY. October 29, 1992.

Invited lecture for the LaJolla Cancer Research Foundation, LaJolla, CA. March 1, 1993.

Invited lecture for the Department of Physiology, Emory University, Atlanta, GA May 6, 1993.

Invited lecture for the Department of Ob/Gyn, University of Illinois, College of Medicine, Chicago, IL, November 17, 1993.

Invited speaker for the Symposium on Estrogens in the Environment III: Global Health Implications. Washington, D.C., January 9-11, sponsored by NIEHS, 1994.

Invited lecture for the Reproductive Toxicology Branch, Developmental Toxicology Division, United States Environmental Protection Agency, Research Triangle Park, NC, April 21, 1994.

Invited lecture for the School of Pharmacy, University of Wisconsin, Madison, WI, October 17, 1994.

Invited speaker for the Society of Toxicology, Annual Meeting, Baltimore, MD. Neonatal Thyroid Status as one Determinant of Adult Testis Size. March 8, 1995.

Invited lecture for the Department of Physiology/Pharmacology, College of Veterinary Medicine, Auburn University, Auburn, AL, April 27, 1995.

Invited lecture for the Department of Anatomy, College of Veterinary Medicine, Tuskegee University, AL, April 28, 1995.

Speaker at Ciba-Geigy Corporation, Department of Research-Pathology, Summit, NJ, May 15-16, 1995.

Speaker at Central States Microscopy Society Meeting, Champaign, IL, May 19, 1995.

Speaker at Pfizer, Inc., Department of Pathology, Groton, CT, July 25-26, 1995.

Speaker at Dow Chemical Company, Department of Pathology, Midland, MI, August 17-18, 1995.

### **1996-1998**

Speaker at Searle-Monsanto Company, Department of Pathology, Chicago, IL, May 15-16, 1996.

"Histopathological Evaluation of the Testis." Invited course, Pfizer, Inc., Centre de Recherche, Department of Pathology, Amboise, France, June 18-21, 1996.

Invited lecture at the Institute for Reproductive Biology, Prince Henry's Institute of Medical Research, Monash Medical Centre, Clayton, Victoria, Australia. June 26, 1996.

Invited speaker at the Gordon Research Conference on Reproductive Tract Biology, July 7 - 12, 1996, Plymouth State College, Plymouth, New Hampshire

Invited speaker at the fall meeting of the Great Lakes Discussion Group of the Society of Toxicologic Pathology. "Male Reproductive Toxicologic Pathology", University of Illinois, October 25, 1996.

Invited poster presentation, "The adult male estrogen receptor knock-out mouse has abnormal efferent ductules of the testis," at the Philippe Laudat Conferences sponsored by INSERM. November 10-14, 1996, Aix-le-Bains, France.

Invited seminar, "The role of estrogen in the male reproductive tract." Institut für Reproduktionsmedizin, Westfälische Wilhelms-Universität Münster, Germany. November 16, 1996.

Invited seminar, "Factors regulating testis size" Institut für Reproduktionsmedizin, Westfälische Wilhelms-Universität Münster, Germany. November 15, 1996.

Invited seminar, "Use of the estrogen receptor knock-out transgenic mouse to study male reproduction" Université de Rennes, Campus de Beaulieu, Rennes, France. November 18, 1996.

Invited Speaker at Parke-Davis Pharmaceutical Research, Ann Arbor, MI, June 5, 1997. "Histopathological Evaluation of the Testis."

Invited Speaker at the United States Environmental Protection Agency, Reproductive Toxicology Branch, Research Triangle Park, NC. "Histopathological evaluation of the testis." September 26, 1997.

Invited speaker, The Boden Conference on "The epididymis: cellular and molecular aspects," supported by the Australian Academy of Science, February 1998, in Robertson, NSW, Australia. "Effects of environmental toxicants on the efferent ducts, epididymis and fertility."

- Invited speaker at the Environmental Horizons 98, University of Illinois-Urbana. "Estrogen, fungicides and male infertility." 1998
- Invited speaker at the Gordon Research Conference on Reproductive Tract Biology, "Hormonal effects in the epididymis," Plymouth State College, Plymouth, New Hampshire, July 5-10, 1998.
- Invited speaker, McGill University, Departments of Pharmacology & Therapeutics and Anatomy and Cell Biology, Montreal, Quebec, Canada, June 16, 1998.
- Invited speaker, University of Minas Gerais, Belo Horizonte, Brazil, July 15-23, 1998.
- Invited speaker, International Conference on Estrogens and Human Health, "Estrogen regulates fluid reabsorption in the head of the epididymis". University of Illinois, Champaign. October 2-3, 1998.
- Seminar, Dept of Biological Sciences, University of Newcastle, Australia, Nov. 27, 1998.

### 1999-2000

- Symposium Lecture, American Society of Andrology, Louisville, KY, April 12, 1999.
- Invited speaker, Chemical Industry Institute of Toxicology, Research Triangle Park, NC, May 17, 1999.
- Plenary Lecture, International Workshop, Estrogens and Male Reproduction, Crotone, Italy, Sept. 23-24, 1999.
- Invited speaker, Estrogens and Male Reproduction, Federal University of Minas Gerais, Belo Horizonte, Brazil, Oct 12, 1999.
- Symposium Lecture, Estrogens and Male Reproduction, Brazilian Society for Cell Biology, Oct. 13-15, 1999.
- Invited speaker, Histopathological evaluation of the testis, The National Institute of Nutrition, Mexico City, Mexico. November 15, 1999.
- Invited speaker, Estrogens and Male Reproduction, The National Institute of Perinatology, Mexico City, Mexico. November 16, 1999.
- Invited speaker, Symposium on Estrogen and male reproduction. 1st European Congress of Andrology, March 24-27, 2000. L'Aquila, Italy.
- Invited Discussant, Fourth Annual Workshop entitled *Frontiers in Estrogen Action*, Palm Beach, Florida, April 12-14, 2000.
- Invited speaker, Estrogens and Male Reproduction, Chinese Academy of Medical Sciences, Beijing, China, May 17-30, 2000. (cancelled due to illness)
- Invited speaker, Main lecture: Estrogen regulation of the male reproductive system. Congresso Integração da Morfologia Luso-Brasileira, held in Goiânia, Goiás, Brazil, on August 27-31, 2000.
- Symposium lecture, International Center for Biotechnology and Eurosterone Symposium on Nuclear Receptors in Health and Disease, Huddinge, Sweden, Sept. 24-27, 2000.
- Invited lecture, Estrogen and male reproduction, Centre for Reproductive Biology in Uppsala, Sweden, Sept. 29, 2000.
- Invited Symposium Lecture, "Does estrogen contribute to fertility in the male?" Bench to Bedside Seminars in Reproductive Health, Carle Foundation Hospital, October 4, 2000.
- Invited Lecture, Women in Nephrology Symposium, "Estrogen as a Modulator of Kidney and Urogenital Function," American Society of Nephrology, "Lessons from the estrogen receptor knockout mouse," Toronto, Canada, October 13, 2000.
- Invited speaker, The Boden Research Conference 2000 on "Estrogens and Male Health," Sponsored by the Australian academy of Science, the Australian Society of Reproductive Biology and Endocrine Society of Australia, November 2-3, 2000, in Sydney, NSW, Australia.
- Invited speaker. "Potential role of estrogens in male contraception." Cooperative research Centre for the Biological Control of Pest Animals. Canberra, Australia. November 7, 2000.
- Invited Speaker. "Estrogen and the male." Monash Institute of Reproduction and Development, Prince Henry's Institute of Medical Research Melbourne, Victoria 3168 Australia. November 9, 2000.

## **2001-2002**

- Invited Symposium Lecture, "Estrogen and male reproductive function." Society for Gynecologic Investigation, Toronto, Canada, March 16, 2001.
- Invited lecture, "The female hormone controls male fertility: estrogen and fluid reabsorption in the epididymis," Reproductive Biology Program, Colorado State University, Fort Collins, CO, April 30, 2001.
- Invited lecture, "The female hormone controls male fertility: estrogen and fluid reabsorption in the epididymis," Cell Biology Program, University of Idaho, May 4, 2001.
- Invited lecture, "Estrogens and Fertility in the Male," e.hormone 2001, Tulane University, New Orleans, LA. October 18-20.
- Invited lecture, Workshop on Genomic vs. Non-Genomic Steroid Actions: Encountered or Unified Views. Centre for International Meetings on Biology, Juan March Institute for Study and Research, Madrid, Spain, 17-19 December, 2001.
- Invited lecture. "Estrogen regulates male fertility: how toxicology led to this discovery." Dept. of Pharmacology and Toxicology, The University of Texas at Austin. January 30-31, 2002.
- Invited lecture. "Estrogen regulates male fertility through ion transport mechanisms." Dept. of Biochemistry, Università degli Studi di Bari, Bari, Italy. February 16-20, 2002.
- Invited lecture, "A role for estrogens in the male reproductive system: the impact of xenoestrogens." Gordon Research Conference on Environmental Endocrine Disruptors at Mt. Holyoke College in South Hadley, Massachusetts, July 14-19, 2002.
- Invited Speaker, Minisymposium on Effects of Estrogen on Gonadal Function, 35th Annual Meeting of the Society for the Study of Reproduction, Baltimore, MD, July 27-July 31, 2002.
- Invited Speaker, "Role of Herbicides and Pesticides on Endocrine Disruption," Society for Theriogenology Annual Conference, Colorado Springs, CO, August 7-11, 2002.
- Invited lecture, "Estrogen receptor, male fertility and contraception" The Population Council, Rockefeller University, NY, NY, Sept. 6, 2002.
- Invited Seminar, "Estrogen importance in the male: from a curiosity to absolute necessity," Dept. of Biochemistry & Molecular Biology, Mount Sinai Medical School, New York, NY, Sept. 7, 2002.
- Invited lecture, "Estrogen importance in the male: from a curiosity to absolute necessity," Contraception, Woman's Health Research Institute, Wyeth Research, Philadelphia, PA, Sept. 11, 2002.
- Invited Speaker, "Estrogens and Efferent Ducts," International Congress on Hormonal Steroids and Hormones and Cancer, Fukuoka City, Japan, October 21-25, 2002.
- Invited Speaker, "Estrogen and male reproduction: source, target, function and potential effects of environmental estrogens," University of Yokohama, Japan, October 28, 2002.
- Invited Speaker, "Estrogen importance in the male: from a curiosity to absolute necessity". Yamanouchi Pharmaceutical Co, Japan, October 29, 2002.

## **2003-2004**

- Invited Speaker, "Complexity of the Testis Made Simple and Fun," American Society of Andrology 28<sup>th</sup> Annual Meeting, Phoenix, AZ, March 29, 2003.
- Invited Speaker, "Estrogen importance in the male: from a curiosity to absolute necessity," Minisymposium at the Institute of Biological Sciences, Federal University, Belo Horizonte, Brazil. April 11.
- Invited Speaker, "Estrogen importance in the male," International Congress on Biology of Reproduction 2003, Ribeirão Preto, São Paulo, Brazil, April 12-15.
- Invited Speaker, "Estrogen in the male," Research Triangle Institute, North Carolina, May 9, 2003.
- Invited Speaker, "Evaluation of Spermatogenesis," Washington University School of Medicine, St. Louis, MO, July 25, 2003.

- Invited Symposium Keynote Speaker, "Epididymal Toxicology," 1<sup>st</sup> European Congress of Toxicological Pathology, Hamburg, Germany, September 24-27, 2003.
- Invited Symposium Keynote Speaker, "Estrogen and male fertility," 1<sup>st</sup> European Congress of Toxicological Pathology, Hamburg, Germany, September 24-27, 2003.
- Invited Speaker, "Estrogen importance in the male: from a curiosity to absolute necessity," Department of Endocrinology and Cell Biology, University Medical Center Utrecht, The Netherlands, September 29, 2003.
- Invited Speaker, "Histopathological evaluation of the testis," Abbott Laboratories, Chicago, February 10, 2004.
- Invited Speaker, "Estrogen in the male," Department of Animal Sciences and the Reproductive Biology Program, University of Missouri, Columbia, March 17, 2004.
- Invited Speaker, "Histopathological evaluation of testis and epididymis," College of Veterinary Medicine, Diagnostic Lab, University of Missouri, Columbia, March 18, 2004.

### **2005-2006**

- Invited Speaker, "Estrogen in the male," University of Kentucky, College of Medicine, Lexington, KY, Feb 21, 2005.
- Invited Speaker, "Male Fertility: Role of Oestrogens in Efferent Ductules and Epididymal Function." AstraZeneca R&D, Alderley Park, Safety Assessment, Cheshire, England. March 18, 2005.
- Invited Lecture, "Comparative biology of efferent ductules in the male reproductive tract." Klinik für Geburtshilfe, Gynäkologie und Andrologie, University of Giessen, Germany. April 25, 2005.
- Invited Lecture, "Estrogens in the male: source, target and function in the testis and epididymis." Graduate seminar cell-cell interactions in reproduction, Medical College, University of Giessen, Germany. April 26, 2005.
- Invited Lecture, "Histopathological evaluation of the testis." Graduate seminar in Molecular Veterinary medicine, University of Giessen, Germany. April 27, 2005.
- Invited Lecture, "The transcription factor ERM (ETV5) is Sertoli cell specific in the testis for spermatogonial stem cell self-renewal." College of Veterinary Medicine, University of Giessen, Germany. April 28, 2005.
- Invited Lecture, "Estrogens/Xenoestrogens and their impact on the male reproductive system." University Campus Zurich-Irchel, Winterthurerstr, Switzerland. June 30, 2005.
- Invited Lecture, "Estrogens/Xenoestrogens and their impact on the male reproductive system." University of Lausanne, Dorigny, Unité CIG Sciences, Bâtiment de Biologie, Switzerland. July 1, 2005.
- Invited Lecture, "Estrogens, epididymis and fertility" BioQual, Inc. NIH Contract Lab. Rockville, MD. Feb. 28, 2006.
- Invited Lecture, "Estrogens and the male reproductive tract." 1st International Symposium on Animal Biology of Reproduction: From Sex Differentiation to Reproductive Biotechnology. Belo Horizonte, Brazil. November 15-18, 2006.
- Invited Lecture, "Estrogens and the male reproductive tract." Abbott Laboratories, Chicago, IL. December 4, 2006.

### **2007-2008**

- Invited Lecture, Univ. Calif San Francisco Summit on Environmental Challenges to Reproductive Health and Fertility; January 28, 2007.
- Invited Lecture, "The Maestro: Sertoli cell and regulation of spermatogonial stem cell niche." University of Pennsylvania, Center for Animal Transgenesis and Germ Cell Research, New Bolton Center, Kennett Square, PA. March 20, 2007.

Invited Lecture, "The Maestro: Sertoli cell and regulation of spermatogonial stem cell niche." University of Pennsylvania, Center for Research on Reproduction and Women's Health, Philadelphia, March 21, 2007.

←Total number of Invited Scientific Lectures since 1990 (as of July 1, 2008): 89

←Total number of lectures in foreign countries since 1990: 49

←Foreign Countries (14): Austria, Australia, Brazil, Canada, England, France, Germany, Italy, Japan, Mexico, Netherlands, Sweden, Spain, Switzerland

---

## **1.8 Activities in Professional Societies**

### **1.8.1 Memberships (current and past)**

Society for the Study of Reproduction (present)

American Society of Andrology (present)

The Endocrine Society (present)

International Society for Stem Cell Research

Society of Toxicology (present)

Microscopy Society of America

### **1.8.2 Offices Held**

1979-1980 Treasurer, Central-States Electron Microscopy Society

1995-1998 Secretary, American Society of Andrology

### **1.8.3 Editorial Boards**

1996-1999 Domestic Animal Endocrinology, Published by Elsevier Science, Inc. 1997-  
Journal of Andrology, Published by American Society of Andrology

1996- Tissue and Cell

2002- Reproductive Biology & Endocrinology, by BioMed Central

2003- Animal Reproduction

2002- Biology of Reproduction

## **1.9 Editorships of Journals or other Learned Publications**

None

## **1.10 Grants Received Since Last Promotion at UIUC**

NIH # 5-R29-ESO5214. PI, Rex **Hess** (50% effort). "Mechanisms of pesticide-induced testicular atrophy." 1989-1995. \$481,339.

NIH # 2-R01-HD21692. PI: Floyd Dunn; Co-I, Rex **Hess**; "Effects of ultrasound radiation on fetal gonads." 1991-1995. \$449,804. .

Inter-institutional Collaboration Grant. PI: Rex **Hess**; Through the Office of the Vice Chancellor for Academic Affairs. 1992-1993. \$500.

USAID. PI, Rex **Hess**; "Testicular development and Sertoli cell proliferation in the bull." 1991-1993 \$15,000.

USDA. Paul Cooke, Co-PI, Rex **Hess**, Co-PI; "Control of Sertoli cell proliferation and testicular growth in the bull." 1992-1994. \$70,361.

SELECT SIREs, Inc. "PI: Paul Cooke; Co-PI Rex **Hess**; "Bull Sertoli cell proliferation." 1992-1994. \$36,000.

- MillerComm 94 Lecture. PI, Rex **Hess**; "Estrogens in the Environment: Mechanisms and Global Health Implications." April 28, 1994. \$2,000. Lecture by Dr. John McLachlan, Director of Intramural Research, NIEHS.
- Research Board. PI, Rex **Hess**; "Epididymal Regulation: The Role of Estrogen" 1994-1995. \$12,000.
- UI Computer Fund, PI: Ron Smith, Co-I, Rex **Hess**; "Enhanced Computer Technology to Support Problem-Oriented Instruction in Veterinary Medicine," 1994-1995. \$60,000.
- Ed. Technol. Board. PI: Rex **Hess**, Co-I: Paul Cooke; "Computer-Assisted Interactive Review Program in Histology." 1994-1995. \$5,000.
- NIH. PI: Richard Peterson, University of Wisconsin, Collaborator/Subcontract, Paul Cooke and Rex **Hess**, Co-I; "Reproductive and developmental toxicity of dioxin." 1991-1996. \$726,723. \$24,340, Total Direct costs on subcontract.
- USDA. Janice Bahr, Co-PI; Rex **Hess**, Co-PI; David Bunick, Co-PI; "Epididymal region of the rooster: production and target site for estrogen." 1993-1996. \$268,020.
- USDA. PI: Rex **Hess**; "Increasing testis size and sperm production in the fowl." 09/01/95-08/31/98. \$40,000, Subcontract with J.D. Kirby, PI, University of Arkansas.
- Computer Assisted Instructional Grants. PI: George Foley, Co-PI: Rex **Hess**; "Interactive laser disk work stations in Veterinary Medical Instruction." 1995. \$8,479.
- Chlorinated Chemical Council. PI: James Crissman, Dow Chemical; Rex **Hess**, Co-I; Paul Cooke, Co-I; "The effect of neonatal iodine deficiency on the testes of the adult rat." 01/96-12/97; \$140,000.
- Research Board, University of Illinois. "The Effect of Environmental Estrogens on Male Reproductive Tract." Rex **Hess**, PI. 01/97 to 12/97. \$17,680.
- NIH #PHS R01 ES07832-01A1. "Microtubules in testicular toxicity of carbendazim." PI, Rex **Hess** (15% effort), Subcontract. 9/97-8/00. \$203,460.
- USDA AG 9301956 "Efferent ductules of the rooster: Target and production site for estrogen" Bahr, Co-PI; Rex **Hess**, Co-PI (10%); David Bunick, Co-PI. 10/97-9/00. \$258,300.
- Environmental Council University of Illinois. "Development of a course entitled Reproductive and Endocrine Toxicology." PI: Rex **Hess**. 07/97 to 06/98. \$5,000.
- NIH #PHS R01 HD35126. "The role of estrogen in the male reproductive tract." \$723,339. 4/98 to 03/02. PI: Rex **Hess** (25%). NIH Fogarty Senior International Fellowship. "Role of estrogen in regulating efferent ducts of the testis." \$12,000. 10/98 to 03/99.
- Kenneth A. Scott Charitable Trust. "Inhibition of estrogen receptor function in the male as a mechanism of contraception in the dog and cat." PI: Rex **Hess** \$77,547. 10/1998 to 12/2000.
- C-Far (University of Illinois). "A Confocal Laser Scanning Microscope." Co-PI: Roberto Docampo and Rex Hess \$52,000. 08/01/99 to 07/31/2000.
- Research Board, UIUC. "A Confocal Laser Scanning Microscope." Co-PI: Roberto Docampo and Rex Hess \$15,000. 11/20/99 to 11/20/2000
- Research Board, University of Illinois. "Estrogen regulation of cell polarity in male reproductive tract" Rex Hess, PI. 01/2000 to 12/2000. \$13,055.
- NIH. "Research Training Program in Environmental Toxicology," Total \$1,263,054. PI: Rex Hess; Co-I(s) (Preceptors): Janice Bahr, Val Beasley, Paul Cooke, Bill Helferich, Elizabeth Jeffery, Benita Katzenellenbogen, John Katzenellenbogen, Ann Nardulli, Michael Plewa, Sue Schantz, Indrani Bagchi, Milan Bagchi; 7/1/00 - 6/30/10.
- NIH. "Program of Research Training in Reproductive Biology" Total \$747,142; PI: David Sherwood; Co-I(s) (Preceptors): Paul S. Cooke, David Bunick, Janice M. Bahr, Gary Jackson, Benita Katzenellenbogen, David Miller, Ann Nardulli, Walt Hurley, Victor Ramirez, David Shapiro, Matthew Wheeler, Romana Nowak, Geoffrey Dahl, Philip Dziuk; 9/01/00-8/30/05.
- CVM Governor's Venture Technology Program, Individual. "Development of immortalized cell lines for the study of Endocrine disruptors in male reproduction." Total \$18,000; PI: Rex Hess, .01/2002 to 12/2002.

CVM Governor's Venture Technology Program-Collaborative. "Contraception in male feral dogs and cats." Total \$36,000; PI: Rex Hess, Co-PI: Sheila M. McCullough, Clifford Fred Shipley, John A. Katzenellenbogen; 01/2002 to 12/2002.

The Conrad Program. "Estrogen receptor alpha as a target for male contraception." Total \$400,918; PI: Rex Hess. 02/2002 to 05/2007.

Abbott Laboratories, "In vitro analysis of spermatogenesis." Total \$66,088; PI: Rex Hess. 11/2004-10/2005.

AstraZeneca. "Technical Testing Agreement." Efferent ductule function on sperm maturation and testicular pathology using an estrogen receptor antagonism model." Total: \$102,000. 1/2006-2007.

Carle Foundation, Urbana, IL. Molecular and cellular differences in coronary bypass grafts. Total \$40,000; PI: Rex Hess; Co-PI: David Gross, Scott Cook, Fred Kummerow. 12/2005-12/2007.

USDA Hatch. "Determination of factors regulating Sertoli cell proliferation in the boar." PI: Sherrie Clark; Co-PI: Rex A. Hess. Total \$40,000. 01/2005-12/2006.

NIH. 1 R13 ES014771. "2006 Environmental Endocrine Disruptors Gordon Conference." Total \$8,000. PI: Rex A. Hess. 6/4/06-6/9/06

EPA. "Gordon Research Conference Environmental Endocrine Disruptors, 2006." Total \$10,000. PI: Rex A. Hess. 6/4/06-6/9/06

NIH. Kirschstein-NRSA Predoctoral Fellowship (F31), 1F31HD05330, Avenel Joseph, PhD candidate. "Novel signaling molecules in Wolffian duct development and differentiation." Sponsor and Major Advisor: Rex A. Hess. 9/1/06-8/31/09

NIH. U54 HD 055787. "Hormone-Regulated Pathways Controlling Implantation and Fertility." Total: \$6,000,000. PI: Milan Bagchi; Co-PI: Benita Katzenellenbogen, Indrani Bagchi, Paul Cooke, Robert Taylor, Francesco DeMayo; Co-I (Co-Director of Core B, Microscopy): Rex A. Hess. 04/01/08-03/30/13

**Total funding since arriving at the University of Illinois (1986 to 04/01/2009), including co-investigator status: \$53,846,770**

**Total number of grant proposals submitted as PI since 1992 (as of 2/01/2007): 36**

**Total number of NIH, NSF or USDA grant proposals submitted as PI since 1992 (as of 2/01/2007): 26**

### **1.11 Grants Pending or Proposed (total costs)**

None

### **1.12 Review Panels (e.g., for Governmental Agencies, Educational Institutions)**

- NIH. Contraceptive Research, Special review panel (NICHD), 1989; 2001
- NIH. Toxicology Study Section (NIEHS). Outsider Reviewer, 1998.
- NIEHS. Review Panel for T32 Toxicology Training Grants. 2001.
- USDA. CSREES/NRICGP. Panelist for the Enhancing Reproductive Efficiency Program. Served twice on this Study Section between 1996-2000

## **2.0 PUBLICATIONS AND CREATIVE WORKS**

No mark indicates the publication has undergone stringent editorial review by peers.

\* Denotes any publication derived from the candidate's thesis.

~ Denotes publication that was invited and carries special prestige and recognition.

^ Denotes a bulletin, report or uninvited presentation.

**Citations Index:** 1990-2007: as of January 2007, there have been 3,102 citations of papers authored/co-authored by Rex A. Hess, with an average of 24.82 citations per manuscript, resulting in an h-index

of 32. Of these papers, 8 have received over 100 citations and one received 360 citations (Nature 1997).

### **2.1. Doctoral thesis title**

“Biochemical and Endocrine Parameters of Semen Production in the Turkey” 1983.

### **2.2. Books Authored or Co-Authored (in print or accepted)**

none

### **2.2. Books Edited or Co-Edited (in print or accepted)**

None

### **2.4. Chapters in Books (in print or accepted)**

2.~Hess RA, Moore BJ. 1993 Histological Methods for the Evaluation of the Testis. In: Methods in Reproductive Toxicology, Chapin RE and Heindel JJ (eds). Academic Press: San Diego, CA, pp. 52-85.

3.~Cooke PS, Hess RA, Kirby JD, Bunick D, Hardy MP. 1994 Neonatal propylthiouracil (PTU) treatment as a model system for studying factors controlling testis growth and sperm production. In: *Function of Somatic Cells in the Testis*, Bartke A (ed). Springer-Verlag: New York, pp. 400-407.

4.~Hess RA, Bunick D, Bahr JM. 1995. Sperm, a source of estrogen. *Environ Health Perspect.* 103: Suppl 7, 59-62.

5.Bahr JM, Kwon W, Hess RA, Bunick D. 1997. Estrogens and male reproduction: aromatase in sperm and estrogen receptors in the epididymal region. In: Harvey S, Etches RJ (eds), *Perspectives in Avian Endocrinology*, J. Endocrinology Ltd, Bristol, UK, pp. 183-192.

6.Klinefelter, G.R. and Hess, RA. 1998. Toxicity of the excurrent ducts and accessory organs in the male. In: *Reproductive and developmental toxicology.* (eds. K. S. Korach), Marcel Dekker, Inc., New York, 553-591.

7.Hess RA 1998 Spermatogenesis, Overview. In: *Encyclopedia of Reproduction.* vol. 4 (eds. E. Knobil and J. D. Neill), Academic Press, San Diego, 539-545.

8.~Hess RA. 2000. Estrogen and the male reproductive tract. In: Francavilla F, Francavilla S, Forti G, editors. The First European Congress of Andrology. L'Aquila, Italy: Litografia Brandolini. p 279-298.

9.Cooke PS, Peterson RE, Hess RA. 2002. Handbook of Toxicologic Pathology. In: Haschek WM, Rousseaux CG, Wallig M (eds) Endocrine Disruptors, 2nd ed. Academic Press, San Diego, pp 501-528

10.Hess RA. 2002. The Efferent Ductules: Structure and Functions. In: The Epididymis: from molecules to clinical practice (eds. B. Robaire and B. Hinton), Plenum Publishing Corporation, New York. p. 49-80.

11.Hess RA, Zhou Q, Nie R. 2002. The role of estrogens in the endocrine and paracrine regulation of the efferent ductules, epididymis and vas deferens. In: The Epididymis: from molecules to clinical practice (eds. B. Robaire and B. Hinton), Plenum Publishing Corporation, New York. p. 317-338.

12.Hess R, França LR. 2005. History of the Sertoli Cell Discovery. In: *Sertoli Cell Biology.* M. Griswold and M. Skinner. New York, Academic Press: 2-13.

13.Hess R, França LR. 2005. Structure of the Sertoli cell. In: *Sertoli Cell Biology.* M. Griswold and M. Skinner. New York, Academic Press: 19-40.

14.Hess RA, Franca LR. 2007. Spermatogenesis and Cycle of the Seminiferous Epithelium. In: Cheng CY, editor. *Molecular Mechanisms in Spermatogenesis.* N.Y.: Landes Bioscience: 1-15.

### **2.5 Invited Reviews and Monographs (in print or accepted)**

1.Chapin RE, Stevens JT, Hughes CL, Kelce WR, Hess RA, Daston GP. 1996. Endocrine modulation of reproduction. *Fundam. Appl. Toxicol.* 29:1-17.

2.Cooke PS, Arambepola NK, Kirby JD, Hardy MP, Hess RA and Bunick D. 1997. Thyroid hormone regulation of the development of the testis and its constituent cell types. *Polish J Endocrinol.* 48, 43-58.

3. **Hess RA.** 1998. Effects of environmental toxicants on the efferent ductules, epididymis and fertility. *J. Reprod. Fertil. Suppl.* 53:247-259.
4. **Hess RA,** Zhou, Q., Nie, R., Oliveira, C., Cho, H., Nakai, M. and Carnes, K. 2001. Estrogens and epididymal function. *Reprod Fertil Dev.* 13:273-283.
5. **Hess RA,** Bunick D, Bahr J. 2001. Oestrogen, its receptors and function in the male reproductive tract-a review. *Mol. Cell. Endocrinol.* 178:29-38.
6. **Hess, RA.** 2003. Estrogen in the adult male reproductive tract: A review. *Reprod Biol Endocrinol.* 1, 52.
7. **Hess RA.** and Carnes K. 2004. The role of estrogen in testis and the male reproductive tract: a review and species comparison. *Animal Reprod.* 1:5-30.
8. **Hess RA.** 2004. Estrogen in the Adult Male: From a Curiosity to Absolute Necessity. *Ann Rev Biomed Sci* 6:1-12.
9. **Hess RA.** 2005. Is time on your side? *J Androl* 26, 308-9.
10. **Hess RA,** Cooke PS, Hofmann MC and Murphy KM. 2006. Mechanistic insights into the regulation of the spermatogonial stem cell niche. *Cell Cycle* 5(11): 1164-1170.
11. **Hess RA.** 2008. Developmental origins environmental reproductive health and fertility compromise. *Fertil Sterility* 89: Suppl. 1, e43.

## **2.6 Articles in Peer-reviewed Journals (in print or accepted)**

### **1975**

01. Adshear PC, Martinez JR, Hess RA, Kilburn KH. 1975 Ciliary inhibition and axonemal microtubule alterations in freshwater mussels. *Ann. N.Y. Acad. Sci.* 253:192-212.
02. Thurston RJ, **Hess RA,** Biellier HV, Adldinger HK, Solorzano RF. 1975 Ultrastructural studies of semen abnormalities and herpesvirus associated with cultured testis cells from domestic turkeys. *J. Reprod. Fert.* 45:235-241.
03. Thurston RJ, **Hess RA,** Kilburn KH, McKenzie WN. 1976 Ultrastructure of lungs fixed in inflation using a new osmium-fluorocarbon technique. *J. Ultrastruct. Res.* 56:39-47.
04. \***Hess RA,** Thurston RJ, Biellier HV. 1976 Morphology of the epididymal region and ductus deferens of the turkey, (*Meleagris gallopavo*). *J. Anatomy* 122:241-252.
05. \***Hess RA,** Thurston RJ. 1977 Ultrastructure of the epithelial cells in the epididymal region of the turkey (*Meleagris gallopavo*). *J. Anatomy* 124:765-778.
06. Kilburn KH, **Hess RA,** Thurston RJ, Smith T. 1977 Ultrastructural features of osmotic shock in mussel gill cilia. *J. Ultrastruct. Res.* 60:34-43.
07. Menton DN, **Hess RA,** Lichtenstein JR, Eisen AZ. 1978 The structure and tensile properties of the skin of Tight-Skin (Tsk) mutant mice. *J. Invest. Derm.* 70:4-10.

### **1980**

08. Menton DN, **Hess RA.** 1980 Ultrastructure of collagen in the dermis of the Tight-Skin (Tsk) mutant mice. *J. Invest. Derm.* 74:139-147.
09. **Hess RA,** Thurston RJ, Biellier HV. 1982 Morphology of the epididymal region of turkeys producing abnormal yellow semen. *Poult. Sci.* 61:531-539.
10. Kilburn KH, **Hess RA.** 1982 Neonatal deaths and pulmonary dysplasia due to D-penicillamine in the rat. *Teratology* 26:1-9.
11. Kilburn KH, **Hess RA,** Lesser M, Oster G. 1982 Perinatal death and respiratory apparatus dysgenesis due to a bis (dichloroacetyl) diamine. *Teratology* 26:155-162.
12. Thurston RJ, **Hess RA,** Hughes BL, Froman DP. 1982 Ultrastructure of the guinea fowl (*Numidia meleagris*) spermatozoon. *Poult. Sci.* 61:1738-1743

13. Thurston RJ, Hess RA, Hughes BL, Froman DP. 1982 Seminal plasma free amino acids and seminal and blood plasma proteins of the guinea fowl (*Numidia meleagris*). *Poult. Sci.* 61:1744-1747.
14. Thurston RJ, Hess RA, Froman DP, Biellier HV. 1982 Elevated seminal plasma protein: A characteristic of yellow turkey semen. *Poult. Sci.* 61:1905-1911.
15. Jones JE, Hughes BL, Thurston RJ, Hess RA, Froman DP. 1982 The effects of red and white light during the pre-breeder and breeder periods on egg production and feed consumption in large white turkeys. *Poult. Sci.* 61:1930-1932.
16. \*Hess RA, Thurston RJ. 1984 Detection and incident of yellow turkey semen on commercial breeder farms. *Poult. Sci.* 63:2084-2086.
17. \*Hess RA, Birrenkott GP, Thurston RJ. 1984 Seminal plasma androgen binding protein activity in turkeys with normal white or abnormal yellow semen. *J. Reprod. Fert.* 71:403-409.
18. \*Hess RA and Thurston RJ. 1984 Protein, cholesterol, acid-phosphatase and aspartate aminotransaminase in the seminal plasma of turkeys producing normal white or abnormal yellow semen. *Biol. Reprod.* 31:239-243.

### 1985

19. Hess RA, Hughes BL, Thurston RJ. 1986 Frequency and structure of macrophages and abnormal sperm cells in the semen of guinea fowl (*Numidia meleagris*). *Reprod. Nutr. Develop.* 26:39-51.
20. Linder RE, Hess RA, Strader L. 1986 Testicular toxicity and infertility in male rats treated with 1,3-dinitrobenzene. *J. Toxicol. Environ. Health* 19:477-489.
21. Carter SD, Hess RA, Laskey JW. 1987 Infertility in male Sprague-Dawley rats after exposure to carbendazim. *Biol. Reprod.* 37:709-717.
22. Thurston RJ and Hess RA. 1987 Ultrastructure of spermatozoa from domesticated birds: Comparative study of turkey, chicken and guinea fowl sperm. *Scanning Microsc.* 1:1829-1838.
23. Linder RE, Hess RA, Perreault S, Strader L. 1988 Acute effects and long-term sequelae of 1,3-dinitrobenzene on male reproduction in the rat: I. General effects on the testis, epididymis, sperm, and fertility. *J. Androl.* 9:317-326.
24. Hess RA, Linder RE, Strader L, Perreault S. 1988 Acute effects and long-term sequelae of 1,3-dinitrobenzene on male reproduction in the rat: II. Quantitative and qualitative histopathology of the testis. *J. Androl.* 9:327-342.

### 1990

25. Kirby JD, Froman DP, Engel HN, Bernier PE and Hess RA. 1990 Decreased spermatozoal survivability associated with aberrant morphology of the ductuli efferentes proximales of the chicken (*Gallus domesticus*). *Biol. Reprod.* 42:383-389.
26. Hess RA. 1990 Quantitative and qualitative characteristics of the stages and transitions in the cycle of the rat seminiferous epithelium: light microscopic observations of perfusion-fixed and plastic-embedded testes. *Biol. Reprod.* 43:525-542.
27. Hess RA, Schaeffer DJ, Eroschenko VP and Keen JE. 1990 Frequency of stages in the cycle of the seminiferous epithelium in the rat testis. *Biol. Reprod.* 43:517-524.
28. Hess RA, Thurston RJ, Gist DH. 1991 Ultrastructure of the turtle spermatozoon. *Anat. Rec.* 229:473-481.
29. Cooke PS, Young P, Hess RA, Cunha GR. 1991 Estrogen receptor expression in developing epididymis, efferent ductules and other male reproductive organs. *Endocrinology* 128:2874-2879.
30. Cooke PS, Hess RA, Porcelli J, Meisami E. 1991 Increased sperm production in adult rats following transient neonatal hypothyroidism. *Endocrinology* 129:244-248.
31. Carnes KI, Hess RA, Dunn F. 1991 Effects of *in utero* ultrasound exposure on the development of the fetal mouse testis. *Biol. Reprod.* 45:432-439.

32. Hess RA, Moore BJ, Forrer J, Linder RE, Abuel-Atta A. 1991 The fungicide benomyl [methyl 1-(butylcarbamoyl)-2-benzimidazole carbamate] causes testicular dysfunction by inducing the sloughing of germ cells and occlusion of efferent ductules. *Fund. Appl. Toxicol.* 17:733-745.
33. Cooke PS, Porcelli J, Hess RA. 1992 Induction of increased testis growth and sperm production in adult rats by transient early hypothyroidism: the critical period. *Biol. Reprod.* 45:146-154.
34. Guttroff R, Cooke PS, Hess RA. 1992 Blind-ending tubules and branching patterns of the rat ductuli efferentes. *Anat. Rec.* 232:423-431.
35. Hess RA, Chen P. 1992 Computer tracking of germ cells in the cycle of the seminiferous epithelium and prediction of changes in cycle duration in animals commonly used in reproductive biology and toxicology. *J. Androl.* 13:185-190.
36. Hofmann M-C, Narisawa S, Hess RA, Millán JL. 1992 Immortalization of germ cells and somatic testicular cells using the SV40 large T antigen. *Exp. Cell Res.* 201:417-435.
37. Kirby JD, Jetton AE, Cooke PS, Hess RA, Bunick D, Ackland JF, Turek FW, Schwartz NB. 1992 Hormonal correlates of the neonatal hypothyroidism induced increase in adult testis size and sperm production in the rat. *Endocrinology* 131:559-565.
38. Ilio KY, Hess RA. 1992 Localization and activity of sodium-potassium adenosine triphosphatase (Na<sup>+</sup>,K<sup>+</sup>-ATPase) in the ductuli efferentes. *Anat. Rec.* 234:190-200.
39. Thurston RJ, Hess RA, Korn N. 1992 Seminal plasma protein concentration as a predictor of fertility and hatchability in large white domestic turkeys. *J. Appl. Poultry Res.* 1:1-4.
40. Nakai M, Hess RA, Moore BJ, Guttroff R, Strader LF, Linder RE. 1992 Acute and long-term effects of a single dose of the fungicide carbendazim (methyl 2-benzimidazole carbamate) on the male reproductive system in the rat. *J. Androl.* 13:507-518.
41. Gist DH, Hess RA, Thurston RJ. 1992 Cytoplasmic droplets of painted turtle spermatozoa. *J. Morphol.* 214:153-158.
42. Nakai M, Moore BJ, Hess RA. 1993 Epithelial reorganization and irregular growth following carbendazim-induced injury of the efferent ductules of the rat testis. *Anat. Rec.* 235:51-60.
43. Nitta H, Bunick D, Hess RA, Janulis L, Newton SC, Millette CF, Osawa Y, Shizuta Y, Toda K, Bahr JM. 1993 Germ cells of the mouse testis express aromatase, the estrogen synthesizing enzyme. *Endocrinology* 132:1396-1401.
44. Hess RA, Miller LA, Kirby JD, Margoliash E., Goldberg E. 1993 Immunoelectron microscopic localization of testicular and somatic cytochromes c in the seminiferous epithelium. *Biol. Reprod.* 48:1299-1308.
45. Hess RA, Cooke PS, Bunick D, Kirby JD. 1993 Adult testicular enlargement induced by neonatal hypothyroidism is accompanied by increased Sertoli and germ cell numbers. *Endocrinology* 132:2607-2613.
46. Hardy MP, Kirby JD, Hess RA, Cooke PS. 1993 Leydig cells increase their numbers but decline in steroidogenic function in the adult rat after neonatal hypothyroidism. *Endocrinology* 132:2417-2420.
47. Ohsako S, Bunick D, Hess RA, Nishida T, Kurohmaru M, Hayashi Y. 1994 Characterization of a testis specific protein localized to endoplasmic reticulum of spermatogenic cells. *Anat. Rec.* 238:335-348.
48. ~Cooke PS, Hess RA, Kirby JD. 1994 A model system for increasing testis size and sperm production: potential application to animal science. *J. Ani. Sci.* 72 (Suppl. 3):43-54.
49. Ilio KY and Hess RA. 1994 Structure and function of the ductuli efferentes: A review. *Microsc. Res. Techniq.* 29:432-467.
50. Hofmann M.-C., Hess RA, Goldberg E, Millán JL. 1994 Immortalized germ cells undergo meiosis *in vitro*. *Proc. Natl. Acad. Sci.* 91:5533-5537.
51. Bunick D, Kirby J, Hess RA, Cooke PS. 1994 Developmental expression of testis mRNAs in the rat following propylthiouracil-induced neonatal hypothyroidism. *Biol. Reprod.* 51:706-713.

52. Nakai M, **Hess RA**. 1994 Morphological changes of the rat Sertoli cells by the microtubule poison carbendazim. *Tissue and Cell* 26:917-927.

### 1995

53. Russell LD, de Franca LR, Hess RA, Cooke PS. 1995 Characteristics of mitotic cells in developing and adult testes with observations on cell lineages. *Tissue & Cell* 27:105-128.
54. de Franca LR, **Hess R**, Cooke P, Russell LD. 1995 Neonatal hypothyroidism causes delayed Sertoli cell maturation in rats treated with propylthiouracil: evidence that the Sertoli cell dictates testis growth. *Anat. Rec.* 242:57-69.
55. Khan SA, Ghosh S, Wickstrom M, Miller LA, **Hess RA**, Haschek WM, Beasley VR. 1995 Comparative pathology of microcystin-LR in cultured hepatocytes, fibroblasts, and renal epithelial cells. *Natural Toxins* 3:119-128.
56. Kirby JD, Cooke PS, Bunick D, **Hess RA**, Kirby YK, Turek FW. 1995. Does TSH potentiate the effects of neonatal PTU treatment on testis growth in the rat? *Advanced Reproductive Technologies - Andrology* 7:171-187.
57. Kwon S, **Hess RA**, Bunick D, Nitta H, Janulis L, Osawa Y, Bahr JM. 1995 Rooster testicular germ cells and epididymal sperm contain P450 aromatase. *Biol. Reprod.* 53:1259-1264.
58. Carnes KI, **Hess RA**, Dunn F. 1995 The effect of ultrasound exposure *in utero* on the development of the fetal mouse testis: adult consequences. *Ultrasound Med. & Biol.* 21:1247-1257.
59. Foley GL, Bassily N, **Hess RA**. 1995 Intratubular spermatic granulomas of the canine efferent ductules. *Toxicologic Pathology* 23:731-734.
60. Nakai M, **Hess RA**, Netsu J, Nasu T. Deformation of the rat Sertoli cells by oral gavage of carbendazim. 1995 *J. Androl.* 16:410-416.

### 1996

61. Janulis L, **Hess RA**, Bunick D, Nitta H, Janssen S, Osawa Y, Bahr JM. 1996 Mouse epididymal sperm contain active P450 aromatase which decreases as sperm traverse the epididymis. *J. Androl.* 17:111-116.
62. Hardy MP, Sharma RS, Arambepola NK, Sottas CM, Russell L, Bunick D, **Hess RA**, Cooke PS. 1996 Increased proliferation of Leydig cells induced by neonatal hypothyroidism in the rat. *J. Androl.* 17:231-238.
63. Ohl MW, Ott RS, Faulkner DB, Hornbuckle T, **Hess RA**, Cmarik GF, Zinn GM. 1996 Effects of rate of gain on scrotal circumference and histopathological features of the testes of half-sib yearling beef bulls. *Am J Vet Res* 57:844-847.
64. Janulis L, Bahr JM, **Hess RA**, Bunick D. 1996 P450 aromatase messenger ribonucleic acid expression in male rat germ cells: detection by reverse transcription-polymerase chain reaction amplification. *J. Androl.* 17:651-658.
65. Nakai M, Hess RA. 1996 Effects of carbendazim (methyl 2-benzimidazole carbamate; MBC) on meiotic spermatocytes and the subsequent spermiogenesis in the rat testis. *Anat Rec* 247:379-387.

### 1997

66. Nakai M, **Hess RA**. 1997 Effects of carbendazim (methyl 2-benzimidazole carbamate; MBC) on meiotic spermatocytes and the subsequent spermiogenesis in the rat testis. *Anat Rec* 247:379-387.
67. Kwon S, **Hess RA**, Bunick D, Kirby JD, Bahr JM. 1997 Estrogen Receptors are present in the epididymis of the rooster. *J. Androl.* 18:378-384.
68. **Hess RA**, Gist DH, Bunick D, Lubahn DB, Farrell A, Bahr J, Cooke PS, and Greene GL. 1997. Estrogen receptor ( $\alpha$  &  $\beta$ ) expression in the excurrent ducts of the adult male rat reproductive tract. *J. Androl.* 18:602-611.

69. Hess RA, Bunick D, Korach KS, Taylor JA, Bahr J, Lee K-H, Lubahn DB. 1997. Estrogen regulates fluid reabsorption in the head of the epididymis. *Nature* 390:509-512.
70. Nakai M, Hess RA, Nasu T. 1997. Further observations on carbendazim-induced abnormalities of spermatid morphology in rats. *Tissue and Cell* 29:477-487.
71. Cooke PA, Arambepola NK, Kirby JD, Hardy MP, Hess RA, Bunick D. 1997. Thyroid hormone regulation of the development of the testis and its constituent cell types. *J. Endocrinol.* 48 (Suppl. 3): 43-58.

### 1998

72. Chen YC, Bunick D, Bahr J, Klinefelter GR, Hess RA. 1998. Isolation and culture of epithelial cells from rat efferent ductule and initial segment epididymidis. *Tissue and Cell* 30:1-13.
73. Jewell WT, Hess RA, Miller MG. 1998. Testicular toxicity of molinate in the rat: metabolic activation via sulfoxidation. *Toxicol Appl Pharmacol.* 149:159-166.
74. Nakai M, Toshimori K, Yoshinaga K, Nasu T, Hess RA. 1998. Carbendazim-induced abnormal development of the acrosome during early phases of spermiogenesis in the rat testis. *Cell Tissue Res.*, 294:145-152.
75. Wenz JR, Hess, RA. 1998. Characterization of stage specific tyrosinated  $\alpha$ -tubulin immunoperoxidase staining patterns in Sertoli cells of rat seminiferous tubules by light microscopic image analysis. *Tissue and Cell* 30:492-501.
76. Janulis L, Bahr JM, Hess RA, Janssen S, Osawa Y, Bunick D. 1998. Rat testicular germ cells and epididymal sperm contain active P450 aromatase. *J Androl.* 19:65-71.
77. Janssen SJ, Bunick D, Finnigan-Bunick C, Chen YC, Hess R, Bahr JM. 1998. Morphology and function of rooster efferent ductule epithelial cells in culture. *Tissue Cell.* 30:554-561.
78. Nakai M, Toshimori K, Yoshinaga K, Nasu T, Hess RA. 1998. Spermatids of prepubertal male rats are susceptible to carbendazim during early spermiogenesis. *Arch Histol Cytol.* 61:433-437.

### 2000

79. Hess RA and Nakai M. 2000. Histopathology of the male reproductive system induced by the fungicide benomyl. *Histol. Histopathol.* 15:207-224.
80. Hess RA, Bunick D, Lubahn DB, Zhou Q, Bouma J. 2000. Morphologic changes in efferent ductules and epididymis in estrogen receptor-alpha knockout mice. *J Androl.* 21:107-121.
81. Crissman JW, Cooke PS, Hess RA, Marty MS, Liberacki AB. 2000. Postulated human sperm count decline may involve historic elimination of juvenile iodine deficiency: a new hypothesis with experimental evidence in the rat. *Toxicol Sci.*, 53, 400-410.
82. ~Hess RA. 2000. Oestrogen in fluid transport and reabsorption in efferent ducts of the male reproductive tract. *Reviews of Reproduction.* 5:84-92.
83. Janssen, SJ, Kirby, JD, Hess, RA, Rhoads, M, Bunick, D, Bailey, KL, Parsons, CM, Wang, H, Bahr, JM. 2000. Identification of epididymal stones in diverse rooster populations. *Poult Sci.* 79:568-574.
84. Rosenfeld CS, Cooke PS, Welsh Jr. TH, Simmer G, Hufford MG, Gustafsson J-A, Hess RA, Lubahn DB. 2000. The differential fate of mesonephric tubular-derived efferent ductules in estrogen receptor-A knockout versus wild-type female mice. *Endocrinology* 141:3792-8.
85. Lee KH, Hess RA, Bahr JM, Lubahn DB, Taylor J, Bunick D 2000. Estrogen receptor alpha has a functional role in the mouse rete testis and efferent ductules. *Biol Reprod.* 63:1873-1880.

### 2001

86. Nakai M, Bouma J, Nie R, Zhou Q, Carnes K, Jassim E, Lubahn DB, Hess RA. 2001. Morphological analysis of endocytosis in efferent ductules of estrogen receptor- $\alpha$  knockout ( $\alpha$ ERKO) male mouse. *Anat. Rec.* 263:10-18.

87. Zhou, Q., Clarke, L., Nie, R., Carnes, K., Lai, L.W., Lien, Y.H., Verkman, A., Lubahn, D., Fisher, J.S., Katzenellenbogen, B.S. and **Hess**, RA. 2001. From the Cover: Estrogen action and male fertility: Roles of the sodium/hydrogen exchanger-3 and fluid reabsorption in reproductive tract function. *Proc Natl Acad Sci U S A.* 98, 14132-14137.
88. Oliveira CA, Carnes K, França LR, **Hess** RA. 2001. Infertility and testicular atrophy in the antiestrogen-treated adult male rat. *Biol. Reprod.* 65, 913-920.
89. Choi I, Ko C, Park-Sarge O-K, Nie R, **Hess** RA, Graves C, Katzenellenbogen BS. 2001. Human estrogen receptor beta-specific monoclonal antibodies: characterization and use in studies of estrogen receptor beta protein expression in reproductive tissues. *Mol Cell Endocrinol.* 181, 139-150.

## 2002

90. Nie R, Zhou Q, Jassim E, Saunders PTK and **Hess** RA. 2002. Differential expression of estrogen receptors  $\alpha$  and  $\beta$  in the reproductive tracts of adult male dogs and cats. *Biol Reprod.* 66:1161-1168
91. Oliveira, C.A., Carnes, K., Zhou, Q., Nie, R., Kuehl, D.E., Jackson, G.L., França, L.R., Nakai, M. and **Hess** RA. 2002. Estrogen receptor function in the adult male rat: short and long-term effects of the antiestrogen ICI 182,780 on the testis and efferent ductules, without changes in testosterone. *Endocrinology* 143:2399-2409.
92. Lin M, **Hess** R, and Aitken RJ, 2002. Induction of sperm maturation in vitro in epididymal cell cultures of the tammar wallaby (*Macropus eugenii*): disruption of motility initiation and sperm morphogenesis by inhibition of actin polymerization. *Reproduction* 124:107-117.
93. Zhou, Q, Nie, R, Prins, GS, Saunders, PT, Katzenellenbogen BS and **Hess** RA. 2002. Localization of androgen and estrogen receptors in adult male mouse reproductive tract. *J Androl.* 23, 870-881.
94. Nakai M, Miller MG, Carnes K and **Hess** RA. 2002. Stage specific effects of the fungicide carbendazim on Sertoli cell microtubules in the rat testis. *Tissue and Cell* 34, 73-80.
95. Correa LM, Nakai M, Strandgaard CS, **Hess** RA and Miller MG. 2002. Microtubules of the Mouse Testis Exhibit Differential Sensitivity to the Microtubule Disruptors Carbendazim and Colchicine. *Toxicol Sci.* 69:175-182.
96. Mahecha, GA, Oliveira, CA, Balzuweit, K and **Hess**, RA. 2002. Epididymal lithiasis in roosters and efferent ductule and testicular damage. *Reproduction.* 124: 821-834.

## 2003

97. Witzmann FA, Bobb A, Briggs GB, Coppage HN, **Hess** RA, Li J, Pedrick NM, Ritchie GD, Rossi J, Still KR, 2003. Analysis of rat testicular protein expression following 91-day exposure to JP-8 jet fuel vapor. *Proteomics* 3:1016-1027.
98. Frasor, J., Barnett, D.H., Danes, J.M., **Hess**, R., Parlow, A.F. and Katzenellenbogen, B.S. 2003. Response-Specific and Ligand Dose-Dependent Modulation of Estrogen Receptor (ER) alpha Activity by ERbeta in the Uterus. *Endocrinology.* 144, 3159-3166.
99. Cho HW, Carnes K, Nie R, Zhou Q, Sharief NAQ, **Hess** RA, 2003. The antiestrogen ICI 182,780 induces early effects on the adult male mouse reproductive tract and long-term decreased fertility without testicular atrophy. *Reprod Biol Endocrinol.* 1, 57.
100. Oliveira C, Nie R, Carnes K, Franca LR, Prins GS, Saunders PTK, **Hess** RA. 2003. The antiestrogen ICI 182,780 decreases the expression of estrogen receptor-alpha but has no effect on estrogen receptor-beta and androgen receptor in rat efferent ductules. *Reprod Biol Endocrinol.* 1, 75.

## 2004

101. DuTeaux SB, Berger T, **Hess** RA, Sartini BL and Miller MG. 2004. Male Reproductive Toxicity of Trichloroethylene: Sperm Protein Oxidation and Decreased Fertilizing Ability. *Biol Reprod* 70:1518-1526.

102. Kuster CE, **Hess** RA and Althouse GC. 2004. Immunofluorescence reveals ubiquitination of retained distal cytoplasmic droplets on ejaculated porcine spermatozoa. *J Androl* 25:340-347.
103. Oliveira CA, Mahecha GA, Carnes K, Prins GS, Saunders PT, Franca LR, **Hess** RA. 2004. Differential hormonal regulation of estrogen receptors ERalpha and ERbeta and androgen receptor expression in rat efferent ductules. *Reproduction* 128:73-86.

## 2005

104. Oliveira CA, Carnes K, Franca LR, Hermo L, **Hess** RA. 2005. Aquaporin-1 and -9 are differentially regulated by estrogen in the efferent ductule epithelium and initial segment of the epididymis. *Biology of the Cell* 97:385-395.
105. Chen C, Ouyang W, Grigura V, Zhou Q, Carnes K, Lim H, Zhao G-Q, Arber S, Kurpios N, Murphy TL, Cheng AM, Hassell JA, Chandrashekar V, Hofmann M-C, **Hess** RA, Murphy KM. 2005. ERM is required for transcriptional control of the spermatogonial stem cell niche. *Nature* 436:1030-1034.
106. Holsberger DR, Buchold GM, Leal MC, Kiesewetter SE, O'Brien D A, **Hess** RA, Franca LR, Kiyokawa H, Cooke PS (2005) Cell-cycle inhibitors p27Kip1 and p21Cip1 regulate murine Sertoli cell proliferation. *Biol Reprod* 72:1429-36.

## 2006

107. Ruz R, Gregory M, Smith CE, Cyr DG, Lubahn DB, **Hess** RA, Hermo L. 2006. Expression of aquaporins in the efferent ductules, sperm counts, and sperm motility in estrogen receptor-alpha deficient mice fed lab chow versus casein. *Mol Reprod Dev.* 73:226-237.
108. Khor B, Bredemeyer AL, Huang CY, Turnbull IR, Evans R, Maggi LB, Jr., White JM, Walker LM, Carnes K, **Hess** RA, Sleckman BP. 2006. Proteasome activator PA200 is required for normal spermatogenesis. *Mol Cell Biol* 26:2999-3007.
109. Surace, EI, Strickland, AM, **Hess**, RA, Gutmann, DH and Naughton, CK. 2006. Tslc1 (nectin-like molecule-2) is essential for spermatozoa motility and male fertility. *J Androl* 27: 816-825.
110. Cooke PS, **Hess** RA, Simon L, Schlessner HN, Carnes K, Tyagi G, Hofmann M-C and Murphy KM. 2006. The transcription factor Ets-related molecule (ERM) is essential for spermatogonial stem cell maintenance and self-renewal. *Anim Reprod* 3(2): 98-107.
111. Picciarelli-Lima P, Oliveira AG, Reis AM, Kalapothakis E, Mahecha GA, **Hess** RA and Oliveira CA. 2006. Effects of 3-beta-diol, an androgen metabolite with intrinsic estrogen-like effects, in modulating the aquaporin-9 expression in the rat efferent ductules. *Reprod Biol Endocrinol* 4(1): 51.

## 2007

112. Gist, DH, Bradshaw, S, Morrow, CM, Congdon, JD and **Hess**, RA. 2007. Estrogen response system in the reproductive tract of the male turtle: An immunocytochemical study. *Gen Comp Endocrinol* 151(1): 27-33.
113. Hild, SA, Marshall, GR, Attardi, BJ, **Hess**, RA, Schlatt, S, Simorangkir, DR, Ramaswamy, S, Koduri, S, Reel, JR and Plant, TM. 2007. Development of l-cdb-4022 as a nonsteroidal male oral contraceptive: Induction and recovery from severe oligospermia in the adult male cynomolgus monkey (*macaca fascicularis*). *Endocrinology* 148(4): 1784-1796.
114. Simon, L, Ekman, GC, Tyagi, G, **Hess**, RA, Murphy, KM and Cooke, PS. 2007. Common and distinct factors regulate expression of mRNA for ETV5 and GDNF, Sertoli cell proteins essential for spermatogonial stem cell maintenance. *Exp Cell Res* 313(14): 3090-3099.
115. Oliveira, AG, Telles, LF, **Hess**, RA, Mahecha, GA and Oliveira, CA. 2007. Effects of the herbicide roundup on the epididymal region of drakes *Anas platyrhynchos*. *Reprod Toxicol* 23(2): 182-191.
116. Oliveira, AG, Coelho, PH, Guedes, FD, Mahecha, GA, **Hess**, RA and Oliveira, CA. 2007. 5alpha-androstane-3beta,17beta-diol (3beta-diol), an estrogenic metabolite of 5alpha-dihydrotestosterone, is a

potent modulator of estrogen receptor ERbeta expression in the ventral prostate of adult rats. *Steroids* 72(14): 914-922.

117. Martin, LJ, Chen, H, Liao, X, Allayee, H, Shih, DM, Lee, GS, Hovland, DN, Jr., Robbins, WA, Carnes, K, **Hess**, RA, Lulis, AJ and Collins, MD. 2007. Fk506, a calcineurin inhibitor, prevents cadmium-induced testicular toxicity in mice. *Toxicol Sci* 100(2): 474-485.

118. Dornas, RA, Oliveira, AG, Kalapothakis, E, **Hess**, RA, Mahecha, GA and Oliveira, CA. 2007. Distribution of vitamin D3 receptor in the epididymal region of roosters (*Gallus domesticus*) is cell and segment specific. *Gen Comp Endocrinol* 150(3): 414-418.

119. Dass, B, Tardif, S, Park, JY, Tian, B, Weitlauf, HM, **Hess**, RA, Carnes, K, Griswold, MD, Small, CL and Macdonald, CC. 2007. Loss of polyadenylation protein tauCstF-64 causes spermatogenic defects and male infertility. *Proc Natl Acad Sci U S A* 104(51): 20374-20379.

120. Morrow, C, Hostetler, C, Griswold, M, Hofmann, MC, Murphy, K, Cooke, PS and **Hess**, RA. 2007. ETV5 is required for continuous spermatogenesis in adult mice and may mediate blood-testes barrier function and testicular immune privilege. *Ann N Y Acad Sci* 1120: 144-151.

## 2008

121. Zhou Q, Nie R, Li Y, Friel P, Mitchell D, **Hess** RA, Small C and Griswold MD. 2008. Expression of Stimulated by Retinoic Acid Gene 8 (Stra8) in Spermatogenic Cells Induced by Retinoic Acid: an in vivo Study in Vitamin A Sufficient Postnatal Murine Testes. *Biol Reprod.* 79:35-42.

122. Schlessner HN, Simon L, Hofmann MC, Murphy KM, Murphy T, **Hess** RA, Cooke PS. 2008. Effects of ETV5 (Ets Variant Gene 5) on testis and body growth, time course of spermatogonial stem cell loss, and fertility in mice. *Biol Reprod.* 78:483-489.

123. Stutler, SA, Johnson, EW, Still, KR, Schaeffer, DJ, **Hess**, RA and Arfsten, AD. 2008. Effect of method of euthanasia on sperm motility of mature sprague-dawley rats. *J Am Assoc Lab Anim Sci* 46(2): 13-20.

124. Oliveira, AG, Dornas, RA, Kalapothakis, E, **Hess**, RA, Mahecha, GA and Oliveira, CA. 2008. Vitamin D3 and androgen receptors in testis and epididymal region of roosters (*Gallus domesticus*) as affected by epididymal lithiasis. *Anim Reprod Sci.*(in press).

125. Netzel-Arnett S, Bugge TH, **Hess** RA, Carnes K, Stringer BW, Scarman AL, Hooper JD, Tonks ID, Kay GF and Antalis TM. (2008) The glycosylphosphatidylinositol (GPI)-anchored serine protease Testisin directs epididymal sperm cell maturation and fertilizing ability (submitted)

126. Morrow C, Gaurav T, Simon L, Carnes K, Murphy T, Murphy K, Cooke PS, Hofmann MC and **Hess**, RA. 2008. Murine Sertoli cell Claudin-5 expression depends upon the presence of germ cells and Sertoli cell Ets-Variant Gene 5 (ETV5) and contributes to blood-testis barrier function. (submitted).

## 2.7 Creative Works (Exhibitions, Commissions, Competitions, Performances, Art, etc)

### 2.7.1 Computer Programs:

STAGES™ computer program to track germ cells of the testis in time. Used by toxicologists and pathologist in numerous countries. Available for both the PC and MAC.

### 2.7.2 Publications Selected For Journal/Book Covers or receiving special recognition:

• **Hess** RA; Thurston RJ; Gist DH. 1991 Ultrastructure of the turtle spermatozoon. *Anat. Rec.* 229:473-481.

• Hofmann M-C, Narisawa S, **Hess** RA, Millán JL. 1992 Immortalization of germ cells and somatic testicular cells using the SV40 large T antigen. *Exp. Cell Res.* 201:417-435.

• Ohsako S; Bunick D; **Hess** RA; Nishida T; Kurohmaru M; Hayashi Y. 1994 Characterization of a testis specific protein localized to endoplasmic reticulum of spermatogenic cells. *Anat. Rec.* 238:335-348.

•Franca LR, **Hess R**, Cooke P, Russell LD. 1995 Neonatal hypothyroidism causes delayed Sertoli cell maturation in rats treated with propylthiouracil: evidence that the Sertoli cell dictates testis growth. *Anat. Rec.* 242:57-69.

•Janulis L, **Hess RA**, Bunick D, Nitta H, Janssen S, Osawa Y, Bahr JM. 1996 Mouse epididymal sperm contain active P450 aromatase which decreases as sperm traverse the epididymis. *J. Androl.* 17:111-116.

•Kuster CE, **Hess RA** and Althouse GC. 2004. Immunofluorescence reveals ubiquitination of retained distal cytoplasmic droplets on ejaculated porcine spermatozoa. *J Androl* 25:340-347.

•**Hess R**, França LR. 2005. Structure of the Sertoli cell. In: Griswold M, Skinner M, editors. *Sertoli Cell Biology*. New York: Academic Press. The book cover was designed by Rex Hess.

•Oliveira CA, Carnes K, França LR, Hermo L, **Hess RA**. 2004. Aquaporin-1 and -9 are differentially regulated by estrogen in the efferent ductule epithelium and initial segment of the epididymis. *Biology of the Cell* 97: 385-395. [This is a special edition dedicated to Peter Agre, who received the 2003 Nobel Prize in Chemistry for his discovery of water channels in membranes. All manuscript are by special invitation of the editor.]

### **2.7.3 Patent Application/Awards**

2002. US Provisional Application for Patent, Serial Number 60/300,564

### **2.7.4 Bulletins, Reports, or Conference Proceedings (in print or accepted)**

1.^**Hess RA**, Thurston RJ, Kilburn KH. 1975. Enzyme digestion of epon-embedded akinetic cilia. In: *Proceed. Electron Microscopy Soc. of Amer.*, Bailey GW (ed), Baton Rouge, LA, Claitor's Publ. Div. 688-689.

2.^**Hess RA**, Thurston RJ, Kilburn KH. 1976. Preservation of the glycocalyx and mucin granules by rapid dehydration and embedding. In: *Proceed. Electron Microscopy Soc. of Amer.*, Bailey GW (ed), Baton Rouge, LA, Claitor's Publ. Div. 343-344.

3.^**Hess RA** and Thurston RJ. 1984. The effect of exogenous dihydrotestosterone (DHT) on protein concentration, plasma color, and DHT-binding activity in seminal plasma from Meleagris gallopavo. In: *Proceed. X Int. Congr. Ani. Reprod. & A.I. (Urbana-Champaign, IL)*, Vol. III, 281-282

4.~**Hess RA**, Bunick D, Bahr JM. 1995. Sperm, a source of estrogen. *Environ. Health Persp.* 103 (Suppl 7):59-62.

5.~Chapin RE, Stevens JT, Hughes CL, Kelce WR, **Hess RA**, Daston GP. 1996. Endocrine Modulation of Reproduction. *Fund. Appl. Toxicol.* 29:1-17.

## **2.8 Abstracts (in print or accepted)**

### **1972**

1. Bercovitz AB, Thurston RJ, **Hess RA**, Biellier HV. 1972. Technique for in situ photography of avian gonads. *Poult. Sci.* 51:1783.
2. Northrop S, McKenzie W, Thurston RJ, **Hess R**, Kilburn K. 1975. Aflatoxin effects on airway cells of rodents. *Fed. Proceed.* 34:839.
3. Kilburn K, Adshear P, Thurston R, **Hess R**. 1975. Ultrastructural basis for ciliary dyskinesia. *Fed. Proceed.* 34:428.

### **1980**

4. **Hess RA** and Thurston RJ. 1982. Incidence and biochemistry of yellow turkey semen. *Poult. Sci.* 61:1381.
5. **Hess RA**, Hughes BL, Thurston RJ. 1982. Frequency and structure of macrophages and abnormal sperm cells in guinea fowl. *Poult. Sci.* 61:1478.

6. **Hess** RA, Birrenkott GP, Thurston RJ. 1983. Binding of dihydrotestosterone by protein in turkey seminal plasma. *Poult. Sci.* 62:1434.
7. **Hess** RA, Birrenkott G, Smoak KD, Smith AM. 1984. Using the statistical analysis system with full screen product (SAS/ESP) for bibliographic filing. *Poult. Sci.* 63 (Suppl 1):5.
8. **Hess** RA and Thurston RJ. 1984. The effect of exogenous dihydrotestosterone (DHT) on protein concentration, plasma color, and DHT-binding activity in abnormal seminal plasma from Meleagris gallopavo. X Int. Congr. Ani. Reprod. & A.I. (Urbana-Champaign, IL), vol. III, 281.
9. Carter SD, **Hess** RA and Laskey JW. 1984. Effects of a microtubule inhibitor on spermatogenesis and fertility in male Sprague Dawley rats. *Biol. Reprod.* 30 (Suppl. 1):184.
10. **Hess** RA, Linder RE, Strader L. 1985. Sequential changes in testes, epididymides and spermatozoa after acute exposure to m-dinitrobenzene (DNB). *Toxicologist* 5:139.
11. **Hess** RA, Linder RE, Strader L. 1985. Sloughing of spermatids and residual cytoplasm causes epididymal occlusion and testicular swelling: An acute study of carbendazim and benomyl, benzimidazole derivatives. *J. Androl. (Suppl)* 6:58-P.
12. Carter SD, **Hess** RA, Laskey JW. 1985. Carbendazim causes infertility in rats. *J. Androl. (Suppl)* 6:62-P.
13. Perreault SD, Linder RE, **Hess** RA, Strader LE. 1986. Infertility and partial recovery after a single exposure to 1,3-dinitrobenzene (DNB) in the male rat. *Toxicologist* 6:287.
14. **Hess** RA and Ilio KY. 1987. Chemotaxis of polymorphonuclear leukocytes into the efferent ductules of the testis. *Biol. Reprod. (Suppl 1)* 36:86.
15. **Hess** RA and Bassily N. 1988. Structure of the ductuli efferentes in the dog. *Anatomia Histologia Embryologia* 17:85.
16. **Hess** RA, Froman DP, Kirby JD, Bernier PE. 1989. Morphometric analysis of ductuli efferentes from low-fertility Delaware roosters. *Poult. Sci.* 68 (Suppl 1):66.
17. Ohl MW, Ott RS, Faulkner DB, Hornbuckle T, **Hess** RA, Cmarik GF, Zinn GM. 1989. Beef bulls fed high or low energy rations: growth, scrotal circumference, and measurements of reproductive tissues. Conference of Research Workers in Animal Disease, Chicago, Illinois, November 6-7.
18. Kucera SP, **Hess** RA and Kennedy JR. 1989. Effects of benomyl on dog tracheal epithelium. Joint Annual Meeting, Southeastern Pharmacology Society, Society of Toxicology and Am. College of Clinical Pharmacology, Sept. 14-15, Medical College of Georgia, Augusta.

## 1990

19. **Hess** RA, Chen P, Schaeffer DJ, Eroschenko VP and Keen JE. 1990. Computer tracking of testicular germ cell development and assessment of stage frequencies in the cycle of the seminiferous epithelium. *J. Androl.* 11 (Suppl 1):P-53.
20. Ilio KY and **Hess** RA. 1990. Electron microscopic localization of K<sup>+</sup>-dependent p-nitrophenyl phosphatase (NPPase) in the ductuli efferentes of the rat. *Biol. Reprod.* 42 (Suppl.):111.
21. Gist, DH, **Hess** RA and Dawes S. 1990. Cytoplasmic bodies of the post-testicular sperm of reptiles. Annual meeting of the Society for the Study of Amphibians and Reptiles.
22. Porcelli J, Meisami E, **Hess** RA and Cooke P. 1990. A method for experimentally increasing testicular size and spermatogenesis in the rat. The eleventh annual mini-symposium on reproductive biology, October 8th, Northwestern University, Evanston, Illinois.
23. Forrer JM, Bechtel PJ and **Hess** RA. 1990. Effects of estradiol and estradiol with growth hormone on young and aged rats. The eleventh annual mini-symposium on reproductive biology, October 8th, Northwestern University, Evanston, Illinois.
24. Ilio KY and **Hess** RA. 1990. Localization and modulation of Na<sup>+</sup>,K<sup>+</sup>-ATPase in the ductuli efferentes. The eleventh annual mini-symposium on reproductive biology, October 8th, Northwestern University, Evanston, Illinois.

25. Guttroff R, Barnett DM, **Hess** RA and Cooke P. 1990. Microdissection of the ductus efferentes of the rat: localization of occlusions caused by carbendazim. The eleventh annual mini-symposium on reproductive biology, October 8th, Northwestern University, Evanston, Illinois.
26. **Hess** RA and Ilio KY. 1991. The fungicide benomyl induces testicular atrophy by two mechanisms. *The Toxicologist* 11:245.
27. Cooke P, **Hess** R, Meisami E and Porcelli J. 1991. A method for experimentally increasing testicular size and spermatogenesis in the rat. *J. Androl.* 12 (Suppl. 1):P-28.
28. **Hess** RA, Guttroff R and Cooke P. 1991. Blind-ending tubules in the ductuli efferentes of the rat. *J. Androl.* 12 (Suppl. 1):P-41.
29. Schaeffer N, Ilio K, **Hess** R and Beehler, B. 1991. Ovarian histology and pathology of the African rhinoceros (*Diceros bicornis*, *Ceratotherium simum*). Proc. Ann. Meeting of the Zoological Society of San Diego., May 9-11, 1991. San Diego, CA.
30. Nitta H, Payne AH, **Hess** RA, Osawa Y, Mason JI, Bunick D, Bahr JM. 1991. Immunolocalization of steroidogenic enzymes in the adult mouse testis: evidence of germinal cells as steroidogenic cells. Sero Symposium, Molecular Basis of Reproductive Endocrinology, July 25-26, 1991, University of British Columbia, Vancouver, British Columbia.
31. Bahr JM, **Hess** RA, Payne AH, Osawa Y, Mason JI, Bunick D, Nitta H. 1991. Identification of steroidogenic cells in the rooster testis by immunocytochemistry. Sero Symposium, Molecular Basis of Reproductive Endocrinology, July 25-26, 1991, University of British Columbia, Vancouver, British Columbia.
32. **Hess** RA, Kirby J, Goldberg E. 1991. Developmental expression of testicular and somatic cytochromes c during spermatogenesis. Second Biennial Mammalian Developmental Genetics Workshop, Jackson Laboratory, Bar Harbor, ME, September 11-15.
33. **Hess** RA and Cooke PS. 1992. Total number of Sertoli cells is doubled in the neonatal hypothyroidism model for increased testis size. *J. Androl.* 13 (Suppl. 1):P-38.
34. Cooke PS and **Hess** RA. 1992. The pattern of Sertoli cell proliferation is altered in the neonatal hypothyroidism model for increased testis size. *J. Androl.* 13 (Suppl. 1):P-47.
35. Nakai M, Moore BJ, Guttroff RF, **Hess** RA. 1992. Carbendazim-induced occlusion of the rat efferent ductules causes irregular growth of epithelium during recanalization. *J. Androl.* 13 (Suppl. 1):P-32.
36. Kirby JD, Jetton AE, Cooke PS, **Hess** RA and Turek FW. 1992. Neonatal hypothyroidism model for increased testis size alters developmental profiles of serum FSH and LH in the rat. *J. Androl.* 13 (Suppl. 1):P-48.
37. Nitta H, Bunick D, **Hess** RA, Osawa Y and Bahr JM. 1992. Efferent ductules of the rooster as a site of estrogen production and a target for estrogen action. *Biol. Reprod.* 46 (Suppl. 1):92.
38. Janulis L, Nitta H, Bunick D, **Hess** RA, Newton SC, Millette CF, Osawa Y., Shizuta Y, Toda K and Bahr JM. 1992. Mouse germ cells in the testis and epididymis express active aromatase. Fifth Annual Cell and Molecular Biology and Molecular Biophysics Research Symposium, September 19, Beckman Institute, University of Illinois, Urbana.
39. Hofmann M-C, Narisawa S, **Hess** RA and Millán JL. 1992. Immortalization of germ cells and somatic testicular cells. 7th European Workshop on Molecular and Cellular Endocrinology of the Testis. Germany, 68.
40. **Hess** RA, Moore BJ, Ilio KY. 1993. Early time-response effects of benomyl on the testis and epididymis in the rat. *The Toxicologist* 13:95.
41. **Hess** RA, Ilio KY. 1993. The fungicide carbendazim causes an increase in the activity of Na<sup>+</sup>,K<sup>+</sup>-ATPase in the ductuli efferentes of the rat. *J. Androl.* 14 (Suppl.):P-32.
42. Nakai M, **Hess** RA. 1993. Sertoli cell effects of the fungicide carbendazim, a microtubule poison. XIIth North American Testis Workshop, April 13-16, Tampa, FL.

43. Bunick D, Kirby J, **Hess RA**, Cooke PS. 1993. Effects of neonatal hypothyroidism on the developmental expression of testis mRNAs in the rat. XIIth North American Testis Workshop, April 13-16, Tampa, FL.
44. Kirby JD, Cooke PS, Arambepola N, **Hess RA**, Bunick D, Turek FW. 1993. Neonatal hypothyroidism increases adult testis size and sperm production in the golden hamster (*Mesocricetus auratus*). XIIth North American Testis Workshop, April 13-16, Tampa, FL.
45. Cooke PS, Kirby JD, **Hess RA**. 1993. Developmental changes in rat testis induced by neonatal propylthiouracil (PTU) treatment. XIIth North American Testis Workshop, April 13-16, Tampa, FL.
46. Janulis L, Nitta H, **Hess RA**, Osawa Y, Bunick D. 1993. Mouse germ cells decrease in P<sub>450</sub> aromatase activity as they pass through the epididymis. *Biol. Reprod.* 47 (Suppl. 1):86.
47. Rosenfeld CS, **Hess RA**. 1994 Effects of the fungicide benomyl on stage-specific events of spermatogenesis. *The Toxicologist* 14:87.
48. Lee EW, Brady AN, **Hess RA** 1994 Effects of long-term inhalation of methanol (M) on the male reproductive system. *The Toxicologist* 14:75.
49. Shinomiya K, Bjerke DL, Moore RW, **Hess RA**, Cooke PS, Zucker RW, Peterson RE 1994 Effects of *in utero* and lactational exposure to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD) on spermatogenesis in rats. *The Toxicologist* 14:382.
50. Janssen S, Janulis L, Bahr JM, Bunick D, Osawa Y., **Hess RA** 1994 P450 aromatase in the rat testis and epididymis. *J. Androl.* 15 (Suppl. 1):P-21.
51. Smithwick EB, **Hess RA**, Young LG 1994 Cellular associations in the seminiferous epithelial cycle of the chimpanzee. *J. Androl.* 15 (Suppl. 1):P-38.
52. Hardy MP, Sharma RS, **Hess RA**, Cooke PS 1994 Increased proliferation of Leydig cells follows neonatal hypothyroidism in the rat. *J. Androl.* 15 (Suppl. 1):P-39.
53. Janulis L, Janssen S, Kwon S, Bahr JM, **Hess RA**, Bunick D. 1994 Rat testicular germ cells express active P450 aromatase. *Biol. Reprod.* 48 (Suppl. 1):80.
54. Ohsako S, Janulis L, Skalla D, Weihl C, **Hess RA**, Bahr J, Hayashi Y, Bunick D. 1994 Expression of the spermatogenic cell-specific calnexin variant (calnexin-T) in bacteria (*Eschericia coli*). *Biol. Reprod.* 50 (Suppl. 1):79.

### 1995

55. Chen YC, Bunick D, Finnigan-Bunick C, Klinefelter GR, Bahr JM, **Hess RA**. 1995 Expression Of Estrogen Receptor (ER) and Clusterin mRNAs in Cultured Epithelial Cells of Rat Ductuli Efferentes and Initial Segment Epididymis. *Biol. Reprod.* 52 (Suppl. 1):70.
56. Kwon S, **Hess RA**, Bunick D, Janulis L, Finnigan-Bunick C, Yao H-C, Volentine KK, Bahr JM. 1995 Estrogen Receptor (ER) mRNAs and Estrogen (E) Binding Sites in the Epididymal Region of the Rooster. *Biol. Reprod.* 52 (Suppl. 1):141.
57. Wenz J, **Hess RA**, Nakai M. 1995 Disruption of microtubules and intermediate filaments in the Sertoli cell induces sloughing of elongating spermatids. XIIIth North American Testis Workshop, March 30-April 1, Raleigh, NC.
58. Nakai M, **Hess RA**, Netsu J, Nasu T. 1995 Carbendazim-induced contraction of the rat Sertoli cell. XIIIth North American Testis Workshop, March 30-April 1, Raleigh, NC.
59. Janulis L, Bahr JM, Nitta H, **Hess RA**, Janssen S, Kwon S, Bunick D. 1995 Determination of P450 aromatase messenger ribonucleic acid in rat germ cells by reverse transcription-polymerase chain reaction amplification. *Biol. Reprod.* 52 (Suppl. 1):191.

### 1996

60. Gist DH, **Hess RA**, Bahr J, Bunick D. 1996 Immunocytochemical localization of estrogen receptor in efferent ductules and epididymis of the adult male rat. *J. Androl.* 16 (Suppl. 1):P-25.

61. **Hess RA**, Bunick D, Seo K, Lubahn DB. 1996 Adult estrogen receptor knock-out mice have abnormal seminiferous tubules, rete testes and efferent ductules. *J. Androl.* 16 (Suppl. 1):P-38
62. Joyce KL, **Hess RA**, Cooke PS. 1996 Neonatal estrogen treatment: effects on Sertoli cell proliferation and testis development in the rat. *J. Androl.* 16 (Suppl. 1):P-24
63. Lubahn DB, Taylor JA, Seo K, Bunick D, **Hess RA**. 1996 Estradiol receptor-minus mice have abnormal seminiferous tubules, rete testes and efferent ductules. 10th International Congress of Endocrinology, San Francisco, CA.
64. Chen YC, Finnigan-Bunick C, Bahr JM, **Hess RA**, Bunick D. 1996 Estrogen receptor-mediated gene expression in epithelial cell cultures from rat efferent ductules. *Biol. Reprod.* 54 (Suppl. 1):94.
65. Bunick D, Finnigan-Bunick C, Chen YC, Bahr JM, **Hess RA**. 1996 Isolation and culture of epithelial cells from the chicken ductuli efferentes. *Biol. Reprod.* 54 (Suppl. 1):111.
66. Nakai M, **Hess RA**. 1996 Abnormal spermiogenesis induced by a microtubule poison, carbendazim. *Biol. Reprod.* 54 (Suppl. 1): 63.

### 1997

67. **Hess RA**, Bunick D, Bahr J, Lubahn D. 1997 Ductuli efferentes in estrogen receptor knock out mice do not reabsorb luminal fluid. *J. Androl.* (Suppl.):P-40.
68. Rosenfeld CS, Miller MA, Gomez-Sanchez C, Gomez-Sanchez E, **Hess RA**, Bunick D, Ganjam VK, Lubahn DB. 1997 11 $\beta$ -HSD and Mineralocorticoid Receptor in the Male Reproductive Tract of Estrogen Receptor Knockout (ERKO) and Wild-Type Sibling Mice. 79th Annual Meeting of the Endocrine Society.
69. **Hess RA**, Bunick D, Lubahn DB, Bahr J. 1997 Estrogen and the male reproductive tract: Source, Target and Function. *Int. J. Androl.* 20 (Suppl. 1): 74.

### 1998

70. Clevenger JE, **Hess RA**, Parlow AF, Bahr JM, Simutis CA, Brown LJ, Carroll DA, Jassim EW, Jackson GL, Nakai M, Poulet FM, Vancutsem PM. 1998 Long-term consequences of neonatal tamoxifen administration on male reproduction in rats. 37th Annual Meeting of the Teratology Society, San Diego, CA.
71. Janssen SJ, Kirby JD, **Hess RA**, Rhoads M, Bunick D, Wang H, Bahr JM. 1998. Reduced fertility in roosters with calcium stones in the epididymis. 31st Annual Meeting of the Society for the Study of Reproduction.
72. Yellayi S, Teuscher C, Lubahn DB, **Hess RA**, Bunick D, Lee KH, Cooke PS. 1998. Role of estrogen receptor alpha (ER $\alpha$ ) in the development and function of the thymus in male and female mice. 31st Annual Meeting of the Society for the Study of Reproduction.
73. Franca LR, Silva Jr. VA, Chiarini-Garcia H, Garcia SK, **Hess RA**, Debeljuk L. 1998. Transient neonatal hypothyroidism induced by PTU decreases testis size, Sertoli cell population and DSP in boars. *J. Androl.* (Suppl.):47.
74. **Hess RA**. 1998. Estrogen, fungicides and male infertility. An oral presentation at the Environmental Horizons 98, University of Illinois-Urbana.

### 1999

75. Pereyra-Martinez AC, Hess RA, Resko JA. 1999. Cytochrome P450 aromatase mRNA in Rhesus monkey testes detected by *in situ* hybridization. Annual Meeting of The Endocrine Society.
76. Lee K-H, **Hess RA**, Lubahn D, Bahr B, Bunick D. 1999. Antiestrogen (ICI 182,780) treatment of normal male mice mimics morphological effects on the testis and efferent ductules seen in estrogen receptor alpha knockout mice (ERKO). Serono Symposia USA, XV North American Testis Workshop, Louisville, KY.

77. Rosenfeld CS, Cooke PS, Welsh TH, Simmer GS, Hufford MG, **Hess RA**, Lubahn DB. 1999. The differential fate of the mesonephric tubules (efferent ductules) in estrogen receptor- $\alpha$  knockout (ER $\alpha$ KO) versus wild-type (wt) female mice. Annual Meeting of The Endocrine Society.
78. Silva Júnior VA, **Hess RA**, França LR. 1999. Effects of Neonatal Hyperthyroidism Induced by Administration of Triiodothyronine (T3) on Sertoli Cell and Leydig Cell Numbers in the Testis of Postpubertal Landrace Boars. Brazilian EM and Cell Biology Meeting, Sao Paulo.
79. **Hess RA**, 1999. Estrogen in the male reproductive tract. *Mol. Cell. Endocrinol.* 155:160.

### 2000-2003

80. Nakai M, Miller MG, **Hess RA**. 2000. Early response of the testis to an oral exposure to the fungicide carbendazim in the rat. Annual Meeting of the Society of Toxicology, 4/23/2000, Philadelphia, PA,
81. Nie R, Zhou Q, Jassim E, **Hess RA**. 2000. Localization of estrogen receptor- $\alpha$  in the reproductive tract of adult male dogs and cats: an immunohistochemical study. Annual Meeting of the American Society of Andrology, Boston.
82. Zhou Q, Nie R, **Hess RA**. 2000. Immunolocalization of several steroid hormone receptors in efferent ductules of adult rat. Annual Meeting of the American Society of Andrology, Boston.
83. Qing Zhou, David Bunick, Lane Clarke, Y. Howard Lien, Ki-Ho Lee, Carrol Bunick, Rong Nie, Dennis Lubahn, Li-Wen Lai, Rex A. **Hess**. 2000. Carbonic anhydrase II (CAII) and sodium/hydrogen exchanger (NHE3) in efferent ductules of the male estrogen receptor- $\alpha$ ; knockout mouse (alphaERKO) and comparison to CAII and NHE-3 deficient mice. Meeting Society for the Study of Reproduction. Madison, Wisconsin.
84. Kay Carnes, David Bunick, Dennis Lubahn, Rex **Hess**. 2000. Morphological differences in postnatal development of the testis, rete testis, and efferent ductules in the estrogen receptor- $\alpha$  knock out mouse ( $\alpha$ ERKO). Society for the Study of Reproduction. Madison, WI.
85. Ki-Ho Lee, David Bunick, Rex **Hess**, Dennis Lubahn, Janice Bahr. 2000. Antiestrogen (ICI 182,780) treatment of normal male mice produces similar morphological effects on the testis and efferent ductules as seen in the estrogen receptor knockout mouse. Society for the Study of Reproduction. Madison, WI.
86. Hyun Wook Cho, Noaman A.Q. Sharief, kay Carnes, David Bunick, Rex **Hess**. 2000. Effects of the anti-estrogen ICI 182,780 on testis and efferent ductules of the adult male mouse. Society for the Study of Reproduction, Madison, WI.
87. Cleida Oliveira, Kay Carnes, Luiz Franca, Rex **Hess**. 2000. Effects of the anti-estrogen ICI 182,780 on testis and efferent ductules of the adult male rat. Society for the Study of Reproduction. Madison, WI.
88. Qing Zhou, David Bunick, Lane Clarke, Y. Howard Lien, Ki-Ho Lee, Carrol Bunick, Rong Nie, Dennis Lubahn, Li-Wen Lai, Rex A. **Hess**. 2001. Estrogen Regulation of Fluid Transport Systems in the Male Reproductive Tract. *Experimental Biology* 2001, March 31-April 4, Orlando, Florida.
89. Hyun Wook Cho, Sung Tae Yee and Rex A. **Hess**. 2001. Localization of mercury compound in testis, efferent ductule and epididymis of the adult mouse. *International Conference of The Korean Society of Toxicology*. P-10, 118.
90. Q. Zhou, R. Nie, K. Carnes, L. Clarke, A. Verkman, D. Lubahn, H.W. Cho, J. Fisher, R.A. **Hess**. 2001. Estrogen receptor- $\alpha$  and regulation of sodium/hydrogen exchanger-3 and aquaporin-1 in efferent ductules of the male. *Endocrine Society*, Denver, CO.
91. Qing Zhou, Lane Clarke, Rong Nie, Kay Carnes, Li-Wen Lai, Yeong-Hau H. Lien, Alan Verkman, Dennis Lubahn, Jane S. Fisher, Benita S. Katzenellenbogen and Rex A. **Hess**. 2001. Estrogen action and male fertility: roles of the sodium/hydrogen exchanger-3 and fluid reabsorption in reproductive tract function. *e.hormone* 2001, October 18-20, 2001, New Orleans, LA.
92. Cleida A. Oliveira, Kay Carnes, Qing Zhou, Rong Nie, David E. Kuehl, Gary L. Jackson, Luiz R. França, Masaaki Nakai, Rex A. **Hess**. 2002. Short and long-term effects of the antiestrogen ICI

- 182,780 on the testis and efferent ductules, without changes in testosterone. Annual Meeting of the American Society of Andrology, Seattle.
93. F.M. Pereira, G.C. Bregunci, G.D. Cassali, R.A. Hess, L.R. França. 2002. Cyclins expression in somatic cells of the testis in neonatal wistar rats. Annual Meeting of the American Society of Andrology, Seattle.
  94. Zhou Q, Al-Awqati Q, Nie R, Carnes K, Lubahn D, Hess R. 2002. Potential estrogen regulation of *hensin*, an epithelial terminal differentiation gene in the male reproductive tract. Annual Meeting of the American Society of Andrology, Seattle.
  95. Miranda, J.R., Rocha D.C.M., Hess, R.A., Cassali, G.D., Franca, L.R. 2002. Sertoli cell proliferation in the transition between seminiferous tubules and the rete testis. European Testis Workshop.
  96. Qing Zhou, Rong Nie, Kay Carnes, Cleida Oliveira, and Rex A. Hess, 2002. Short and long-term effects of the antiestrogen ICI 182,780 on the testis and efferent ductules, without changes in testosterone. Annual Meeting of the Society for the Study of Reproduction, Baltimore.
  97. Qing Zhou, Qais Al-Awqati, Rong Nie, Kay Carnes, Dennis Lubahn, Rex A. Hess, 2003. Estrogen Regulation of Epithelial Differentiation in the Male Reproductive Tract During Development and in the Adult. Annual meeting of the Endocrine Society, San Francisco.
  98. C.S. Sloan, S.A. Anderson, C.E. Cook, R.A. Hess, H.A. Navarro, B.F. Thomas, 2003. Effects of RTI 4587-073(I) on spermatogenesis in the adult New Zealand White (NZW) rabbit: a potentially reversible nonsteroidal contraceptive. Annual Meeting of the American Society of Andrology, Phoenix.
  99. Oliveira CL, Carnes K, França LR, Hess RA. 2003. The antiestrogen ICI 182,780 decreases the expression of estrogen receptor- $\alpha$  but has no effect on ER $\beta$  and the androgen receptor in rat efferent ductules. Integration Congress on Biology of Reproduction 2003, Ribeirão Preto, São Paulo, Brazil, April 12-15.
  100. Oliveira CL, Mahecha GAB, Carnes K, França LR, Hess RA. 2003. Differential hormonal regulation of estrogen receptors ER $\alpha$  and ER $\beta$  and androgen receptor expression in the rat efferent ductules: effects of castration and hormone replacement. Integration Congress on Biology of Reproduction 2003, Ribeirão Preto, São Paulo, Brazil, April 12-15.
  101. Oliveira CL, Mahecha GAB, Carnes K, França LR, Hess RA. 2003. Aquaporins 1 and 9 are differentially regulated by estrogen in the rat efferent ductule epithelium and the initial segment of the epididymis. Integration Congress on Biology of Reproduction 2003, Ribeirão Preto, São Paulo, Brazil, April 12-15.
  102. Madeu AM, Leite FGG, Oliveira CA, Hess RA, Mahecha GAB. 2003. Induction of epididymal lithiasis in roosters and japanese quails by using culture of testis-epididymis macerate extracted from birds affected by the disease. Integration Congress on Biology of Reproduction 2003, Ribeirão Preto, São Paulo, Brazil, April 12-15.

### **2004-2005**

103. Ford JA, Jr., Carnes K, Hess RA. 2004. Morphological evaluation of efferent ductules in adult male hamsters. Annual Meeting of the American Society of Andrology, Baltimore.
104. P. S. Cooke, D. R. Holsberger, R. A. Hess, L. R. Franca, H. Kiyokawa. 2004. Thyroid hormone regulation of Sertoli cell proliferation may be mediated through the cell cycle inhibitors p27<sup>Kip1</sup> AND p21<sup>Cip1</sup>. The XXII Symposium on Reproductive Biology and Comparative Endocrinology, Madras, India
105. DS Holsberger, G Buchhold, DA O'Brien, RA Hess, LR Franca, H Kiyokawa and PS Cooke. 2004. Cell cycle inhibitors p27<sup>KIP1</sup> and p21<sup>CIP1</sup> regulate Sertoli cell proliferation. Annual meeting of the American Society of Andrology, Baltimore, MD.

106. Lohrke SM, Stutler SA, Johnson EW, Miller JE, Hess RA, Carnes K, Schaeffer DJ, Arfsten DP. 2004. Impact of method of euthanasia on sperm motility of older adult Sprague-Dawley rats. Annual meeting of the Society of Toxicology, Baltimore, MD.
107. James A. Ford Jr., Avenel D. Joseph, Kay I. Carnes, Rex A. Hess. 2004. Immunohistochemical evaluation of steroid hormone receptors in epithelium of the efferent ductules and epididymis of adult male golden syrian hamsters. Meeting Society for the Study of Reproduction. Vancouver, British Columbia, Canada.
108. Kay I. Carnes, James A. Ford and Rex A. Hess. 2004. Effects of the antiestrogen ICI 182,780 on the reproductive tract of the adult male hamster. Meeting Society for the Study of Reproduction. Vancouver, British Columbia, Canada.
109. Rex A Hess, Ricardo Ruz, Mary Gregory, Charles E Smith, Daniel G Cyr, Dennis B Lubahn and Louis Hermo. 2004. Role of the estrogen receptor  $\alpha$  in sperm production and motility in mice. Meeting Society for the Study of Reproduction. Vancouver, British Columbia, Canada.
110. P. S. Cooke, D. R. Holsberger, R. A. Hess, L. R. Franca, H. Kiyokawa. 2004. Thyroid hormone regulation of Sertoli cell proliferation may be mediated through the cell cycle inhibitors p27<sup>kip1</sup> and p21<sup>cip1</sup>. SRBCE meeting.
111. R. Hess, L. Franca, S. Clark, K. Carnes 2004. Immuno-expression of potential cell cycle regulatory factors in the neonatal pig testis. International Congress on Animal Reproduction, Porto Seguro, Brazil.
112. T.J.Evans, E.M.Walters, Y.Agca1, T.J.Fangman, F.WilliamsIII, J.K.Critser, R.A. Hess. 2005. The effects of subacute oral exposure to vinclozolin on reproductive parameters in peripubertal and post-pubertal boars. Society of Toxicology, New Orleans.
113. Chen Chen, Rex A. Hess, Wenjun Ouyang, Vadim Grigura, Kenneth M. Murphy. 2005. The transcription factor ERM (ETV5) is Sertoli cell specific in the testis for spermatogonial stem cell self-renewal. North American Testis Workshop, Seattle.
114. Kay Carnes, Carla Morrow, Paul Klopfenstein, Sheila McCullough, Debra Sauberli, and Rex A. Hess. 2005. Effects of the antiestrogen ICI 182,780 on male reproductive tracts in the mature dog and marmoset monkey. American Society of Andrology Annual Meeting, Seattle, WA.
115. Carla Morrow, Kay Carnes, Cleida Oliveira, Rex Hess. 2005. Nuclear receptor cofactor expression in the efferent ductules of the mouse, rat, hamster, and marmoset monkey. American Society of Andrology Annual Meeting, Seattle, WA.
116. Avenel Joseph, J. Aardema, R Hess, H Yao. 2005. Temporal and spatial expression patterns of androgen and Hedgehog signaling components in mouse Wolffian duct differentiation. Annual Meeting Society for the Study of Reproduction. Quebec City, Canada.

### 2006-2007

117. James A. Ford, Jr., Rita X. Ciurlionis, Eric A. Blomme, William M. Bracken, Kay I. Carnes, Rex A. Hess, 2006. Boric acid and dibromoacetic acid cause delayed spermiation in stage VIII seminiferous tubules cultured for up to 48 hours. American Society of Andrology Annual Meeting, Chicago, IL.
118. Benita S. Katzenellenbogen, Edmund Chang, Fabio Stossi, Seongeun Park, Paola Mussi, Daniel Barnett, Zeynep Madak-Erdogan, Carla Morrow, Rex Hess and John A. Katzenellenbogen. 2006. Novel Modulators of Estrogen Receptor Function, Keystone Conference.
119. Morrow, C, Park, SE, Mukai, M, [Katzenellenbogen BS](#), [Hess RA](#). 2006. Reproductive abnormalities in repressor of estrogen receptor activity (REA) heterozygous knockout mice. J Androl: 39-39 11 Suppl.
120. Surace, EI, Strickland, A, Hess, RA, [Gutmann DH](#), [Naughton CK](#). 2006. TSLC1 (nectin-like molecule-2) is essential for spermatozoa motility and male fertility. J Androl: 69-69 77 Suppl.
121. Hild, SA, Marshall, GR, Attardi, BJ, [Hess RA](#), [Schlatt S](#), [Simorangkir DR](#), [Ramaswamy S](#), [Koduri S](#), [Reel JR](#), [Plant TM](#). 2006. Development of I-CDB-4022 as a male nonhormonal contraceptive: Induction of azoospermia and recovery in adult male cynomolgus monkeys J Androl: 85-85 116 Suppl.

122. Avelar, GF, Hess RA, Franca LR. 2006. Sertoli cell proliferation in the transition region of seminiferous tubules in pigs is extended beyond puberty. International Symposium on Animal Reproduction. Belo Horizonte, MG, Brazil. Nov. 15-18.
123. Clark SG, Ford JA, Baldrighi J, Mello M, Franca L, Carnes KI, and Hess RA. 2006. Effects of FSH and PTU on Sertoli cell proliferation in porcine testicular tissue. *Theriogenology* 66:677.
124. Paul Cooke, Heather Schlessner, Gaurav Tyagi, Liz Simon, Kay Carnes, Marie-Claude Hofmann, Kenneth Murphy and Rex Hess. 2007. Ets-related molecule (ERM) and spermatogonial stem cell self-renewal. Keystone Meeting Stem Cells.
125. Morrow, C. Hostetler, M. Griswold, K. Murphy, P.S. Cooke, and R.A. Hess, 2007. The transcription factor ERM (Ets-related molecule) is necessary in both spermatogonial stem cells and Sertoli cells for spermatogenesis. Testis Workshop, Tampa, FL.
126. Heather N. Schlessner, Marie-Claude Hofmann, Kay Carnes, Kenneth M. Murphy, Rex A. Hess and Paul S. Cooke, 2007. Time course of spermatogonial stem cell loss in ERM knockout mice: critical neonatal effects of ERM. Testis Workshop, Tampa, FL.
127. G.F. Avelar, R.A. Hess, and L.R. Franca, 2007. Investigation of Sertoli cell proliferation in postpubertal pigs. Testis Workshop, Tampa, FL.
127. Liz Simon, Gail C. Ekman, Rex A. Hess, Kenneth M. Murphy and Paul S. Cooke. 2007. Common and distinct factors regulate expression of ERM and GDNF, Sertoli cell proteins essential for spermatogonial stem cell maintenance. Testis Workshop, Tampa, FL.
128. Baldrighi JM, Averhart W, Phillips T, Carnes K, Franca LR, Hess R, and **Clark S.** 2007. Immunoprecipitation of cyclins in post natal pig testis. *Acta Scientiae Veterinariae*; 35; Suppl. 3:963.
129. Gaurav Tyagi, Kay Carnes, Liz Simon, Kenneth M. Murphy, Marie-Claude Hofmann, Rex A. Hess and Paul S. Cooke, 2007. Neonatal role of Ets-related molecule (ERM) in spermatogonial stem cell (SSC) maintenance may involve SSC receptors for GDNF. Testis Workshop, Tampa, FL.
130. T.J. Evans, E.M. Walters, P. Sutovsky, C. Kinnison, F. Williams III, T.J. Fangman, V.K. Ganjam, R.A. Hess, D. Keisler and J.K. Critser. 2007. The Effects of Subacute Oral Exposure to Vinclozolin on Reproductive Parameters in Post-pubertal Boars. International Congress of Toxicology, Montreal, July 15-19.
131. Cooke et al. 2007. Ets-related molecule (ERM) is essential for spermatogonial stem cell maintenance and self-renewal. Annual meeting of the Endocrine Society

## 2008-2009

132. Liz Simon, Kenneth M. Murphy, Theresa L. Murphy, Rex A. Hess, Paul S. Cooke and Marie-Claude Hofmann. 2008. The transcription factor ETV5 regulates Sertoli cell chemokines that maintain spermatogonial stem cells in the stem cell niche.
133. Chad K. Stroud, Emily C. Radlowski, Manuel Roqueta-Rivera, Wanda M. Haschek, Mariangela Segre, Rex A. Hess, Manabu T. Nakamura. 2008. Male mice lacking delta-6 desaturase develop ulcerative dermatitis, infertility and altered immune function.
134. Baldrighi JM, Mello M, Carnes K, Franca LR, Hess R, and **Clark S.** 2008. Effects of FSH and PTU on boar spermatogenesis, Reproduction, Fertility and Development, 189-190.

## 2.9 Book Reviews (in print or accepted)

← Hess RA, 1993. Review of Hafez, Reproduction in Farm Animals. Published in: Doody's Health Sciences Book Review.

## 2.10 Other

1. STAGES™ computer software for Windows and MacOS, 1994. Sold by Vanguard Productions, Inc. Designed and produced by Rex A. Hess; Computer programmers: David Scott and Daniel Pape. This

product was produced with the cooperation of the University of Illinois-Champaign, Urbana. This program is used by pathologists and students throughout the world for tracking germ cells during spermatogenesis. Photographs are included for 5 species.

2.Hess RA (2005) Is time on your side? J Androl 26, 308-309.

### 3.0 RESIDENT INSTRUCTION

#### 3.1 Summary of Instruction

##### 3.1.1 Course Descriptive Data

Title	Year	Course #	Semester	# of Students	Credit Hrs
-------	------	----------	----------	---------------	------------

<b>Veterinary Histology</b>	1986-1995; 2000-2008	VB 301	Fall	90-110	5h
-----------------------------	----------------------	--------	------	--------	----

I was course coordinator for this course 1986-1995; 2000-2001 and 2007-2008. For many of these years, I presented lectures on cell biology; the organization of tissues; and several systems, including immune, integument, heart, respiratory, and urinary (approximately 50-60% of the lectures). Each lecture is followed by a 3-hour laboratory. As coordinator, I maintained records of grades and served as an intermediary for student complaints. I also maintained and develop the internet web site that is used throughout the course. During the Fall 1995, 2007 and 2008 I taught the entire course.

<b>Medical Histology</b>	2006; 2007-2009		Spring	150	
--------------------------	-----------------	--	--------	-----	--

I was course instructor for this course.

<b>Discovery in Environmental Toxicology</b>	2002-	VB 199	Fall	limited to 20	
--	-------	--------	------	---------------	--

I designed this course for the entering freshmen class. As coordinator, I present approximately 40% of the lectures and then provide field study, debates and outside lecturers.

<b>Developmental Anatomy</b>	1986-1991	VB 303	Fall/Spring	~90	2h
------------------------------	-----------	--------	-------------	-----	----

From 1986-1991 this course was taught as part of the Histology course, which was spread over two semesters. Embryology was taught with each organ system.

	1997-1999	VB305	Spring	~95	2h
--	-----------	-------	--------	-----	----

Dr. Cooke was coordinator of this course. I present 4 lectures and 4 labs. I also develop and maintain the Internet Homepage for the course: <http://www.cvm.uiuc.edu/vbweb/VB305/syllabus>

<b>Basic Toxicology</b>	1993-	ENVST 349	Spring or Fall	50	3h
-------------------------	-------	-----------	----------------	----	----

I present 4-5 lectures on reproductive toxicology and teratology (12% of the lectures). The reproductive toxicology section was prepared for the internet during Fall 1998.

<b>Morphology of Reproduction</b>	Every other year	VB 405	Spring	~5	2h
-----------------------------------	------------------	--------	--------	----	----

I present approximately 10 lectures on male reproduction.

<b>Interdisciplinary Toxicology Seminar.</b>	1992, 1994, 2001	VB 490	Spring	~50	1h
--	------------------	--------	--------	-----	----

Faculty rotate responsibility for this seminar series. My responsibility has been for the topic "Reproductive Toxicology".

<b>Integrated Electron Microscopy</b>	1992-1995	VB 350	Fall	~35	3h
---------------------------------------	-----------	--------	------	-----	----

I presented 1-2 lectures per year in this course. I worked with the past course coordinator, Dr. Richard Crang, in developing a new course outline and new laboratories. Dr. Birute Jakstys is the current coordinator.

**Toxicologic Pathology** Intermittent VP 448 Spring ~10 3/4 Unit  
I present 1 lecture on male reproductive pathology.

**Principles of Drug and Toxicant Evaluation Intermittent** VB 467 Spring ~10 3h  
I provided one lecture on "Reproductive Toxicity".

**Special Problems** Intermittent VB 492 All year long  
Students use this course to perform special research projects in my laboratory each semester. Credit and enrollment will vary.

**Advanced Endocrinology** Every 4 years (1996, 2000) PHYSL 412. 1/2 Unit  
This course is taught by faculty members of the Reproductive Biology Training Grant. Course supervision is rotated among the faculty and they choose the topic for that semester.

**General Animal Physiology** 1981-1983 An 205 ~50 3  
Introductory undergraduate physiology course at Clemson University. I coordinated and taught the 3 laboratory sections per week. In 1981 I wrote the syllabus containing all experiments and lab exercises and questions.

### 3.1.2 Supervision of Graduate Student Research

Names and Positions of Graduate Students and Postdoctoral Associates

#### 3.1.2.1 Major Advisor, Research Advisor or shared advisorship

<b>M.S. / Ph.D. Students</b>	<b>Current Position</b>
1.N. Bassily, M.D. Ph.D. 1989	Medical Resident, Brown University Medical School
2.K. Ilio, D.V.M. Ph.D. 1992	Research Associate, Univ. of Illinois-Chicago, Medical School; Director, Andrology Laboratory
3.Seok Kwon Ph.D. 1995	Research Scientist, Proctor and Gamble, Kobe, Japan
4.Lynn Janulis Ph.D. 1995	Postdoc, University of Illinois-Chicago, Medical School
5.Yu-Chyu Chen Ph.D. 1997	Research Assistant Professor, Univ. South Carolina Medical School, Charleston, SC.
6.Sarah Janssen M.D., Ph.D. 2001	Dept. Urology, University of California-SF
7.Rong Nie M.S. 2001	Center for Microscopic Imaging, University of Illinois
8.Qing Zhou Ph.D. 2002	Postdoc, Dr. Michael Griswold, University of WA, Pullman
9.Cleida Oliveira Ph.D. 2002	Assistant Professor, Departamento de Morfologia, Federal University de Minas Gerais, Belo Horizonte, Brazil
10.Christopher Kuster Ph.D. 2004	Kuster Research and Consulting, Geneseo, IL
11.Carla Morrow, DVM. 2003-2008	Assistant Editor, Am. Vet. Medical Association
12.Avenel Joseph Current 2003-	

←

<b>Post Doctoral Associates</b>	<b>Current Position</b>
1.A Abuel-Atta, Ph.D. 1988	Professor, Veterinary Medicine, Zagazig University, Egypt
2.M. Nakai, DVM, Ph.D. 1992, 1999-2000	Assistant Professor, Miyazaki, University, Miyazaki, Japan
3.Hyun Wook Cho, Ph.D. 1999	Professor, Dept. of Biology, College of Natural Sciences, Sunchon National University, South Korea

4. James Ford, Jr., Ph.D. Current 2003-2006 Project Scientist, Covance Laboratories, Madison, WI

### 3.1.2.2 Member of Student's Advisory Committee

1. Niromi Arambepola	Ph.D., Vet Biosci. 1997
2. Laura Burger	Ph.D. Physiology 1997
3. Sajini Guntur	M.S. / Physiology 1997
4. S. Khan	Ph.D. Vet Biosciences 1996
5. Mark Wickstrom	PhD Toxicology 1995
6. W. Tehseen	PhD Toxicology 1992
7. M. Biduaka	M.S. / Vet Biosciences 1989
8. Yao Hung-Chang	Ph.D. / Animal Sciences 1999
9. Magdy Hassan	M.S. / Veterinary Clinical Medicine 1999
10. Peiyong Zhai	Ph.D. / Veterinary Biosciences 2000
11. Srikanth Yellayi	M.S. / Veterinary Biosciences 2000
12. Xudong Shi	Ph.D. / Molecular and Integrative Physiology 2001
13. Srikanth Yellayi	Ph.D. / Veterinary Biosciences 2002
14. Hyung Lee	Ph.D. / Molecular and Integrative Physiology 2003
15. Heather Burkin	Ph.D. / Animal Sciences 2003
16. Kelly Schubert	Ph.D. / Animal Sciences 2003
17. Chris Kuster	Ph.D. / Veterinary Clinical Medicine 2003
18. Longmei Zhao	Ph.D. candidate under Dr. David Miller 2006
19. Tanasa Osborne	Ph.D. candidate under Dr. Wanda Haschek
20. Gaurav Tyagi	Ph.D. candidate under Dr. Paul Cooke
21. Julia Baldrighi	Ph.D. candidate under Dr. Sherrie Clark
22. Santhi Annavajjala	Ph.D. candidate under Dr. Paul Cooke
23. Julia Balright	M.S. candidate under Sheri Clarke
24. Chad Stroud	Ph.D. candidate under Dr. Mani Nakamura
25. Manuel Roqueta Rivera	Ph.D. candidate under Dr. Mani Nakamura

### 3.2 Other Contributions to Instructional Programs

←1986-1988: Over this two-year period, Dr. J. Eurell and I were responsible for the complete reorganization of the visual aids and histology slide sets used in the Histology-Embryology courses (VB 301-305). This project involved coding and filing by topic nearly 8,000 kodachrome teaching slides and nearly 400 histology slides for microscopic demonstrations. This effort has improved the lecture presentations throughout the course and guarantees the future organization of visual material for this course. New materials are added to this collection each year.

←1987: Microscopic and video imaging system for Histology. The teaching proposal that I submitted for a microscopic imaging system was approved and funded by the College of Veterinary Medicine. This \$20,000 system is capable of projecting microscopic images onto an auditorium size screen. The system includes a microscope, high resolution color video camera, color monitor and projector, video tape recorder, and video pointer. The Histology-Embryology courses (VB 301-305) use this system for each laboratory period and depend upon its use for laboratory practical examination. Student response to this type of microscopic visualization has been outstanding.

←1994-1995: Computer-Assisted Interactive Review Program in Histology. The teaching grant was awarded by the University of Illinois Education Technologies Board in the amount of \$5,000. Rex Hess, PI. Paul Cooke, Co-I.

←1995: Interactive laserdisk workstations in Veterinary Medical Instruction. CVM Computer Assisted Instructional Grants for \$8,479 PI: George Foley, Co-PI: Rex Hess.

←1997-2001: Internet HomePage for the Developmental Anatomy, VB305 course. This internet site is continually updated to provide ready access for students to view the syllabus and numerous photos that explain various embryological features highlighted in lecture. The program is interactive. Based upon a student survey, this program has been extremely valuable.

←1997-2002: Director for the University of Illinois Center for Microscopic Imaging. I am responsible for the maintenance and development of technical courses in electron microscopy and associated methods. Our Center will be teaching the Biol. 350 course, Integrated Microscopy, and will be developing new short courses to replace the VB 352 and VB 353 courses. The first new short courses to develop will be the following: VB 352A Transmission electron microscope operation; VB 352B Biological Sample Preparation for microscopy

#### **4.0 SERVICE (Public, Professional / Disciplinary, and University)**

##### **4.1 Summary of Service**

###### **4.1.1 Public Service**

###### a. Review of Manuscripts:

Asian J. Andrology	2002-
Anatomical Record	1995-
Biology of Reproduction:	1989-
Endocrinology	1994-
Human Reproduction	2002-
International J. Andrology	1996-
J. Experimental Zoology	2002-
J. Am. Assoc. Vet. Med.:	1990-
J. Andrology	1991-
J. Endocrinology	1999-
Microsc. Research Techniques	1991-
Molecular and Human Reproduction	2002-
PNAS	2006-
Reproduction, Fertility & Development	2002-
Reproduction	2002-
Reproductive Biology & Endocrinology	2003-
Sigma Xi student Research award:	1987-
Scanning Electron Microscopy:	1987-
Toxicology & Applied Pharmacology	1990-
Toxicological Sciences	1998-
Theriogenology	1995-
Tissue & Cell	1993-
U.S. EPA extramural review:	1987-

###### b. Serve on Editorial Boards of Journals:

Domestic Animal Endocrinology	1996-1999
Journal of Andrology	1997-2003; 2007-
Trainee Page Editor; J. of Andrology	2003-2005
Biology of Reproduction	2004-
Tissue and Cell	1996-
Reproductive Biology & Endocrinology	2003-

Animal Reproduction

2004-

c. Grant Review Panels:

NIH Special Study Section: Contraception (1990)  
 USDA, Animal Reproductive Efficiency Panel (1997)  
 USDA, Animal Reproductive Efficiency Panel (1998)  
 USDA, Animal Reproductive Efficiency, External Panel (2001, 2002)  
 NIH External Reviewer, Toxicology Study Section (1999)  
 NIH Special Study Section: Toxicology (1999)  
 NIEHS Study Section: Toxicology (1999, 2003, 2004)  
 CONRAD Program for Contraceptive Research (2001)

d. Scientific Society Committees:

*American Society of Andrology*: Publications Committee (2000-present); Education Policy Committee (1993-1994; Chair); Minority Affairs (1997); (Archives Committee (2000-present); Awards Committee (~1996-1998; 2005-); Nominations Committee (2002-2003); Trainee Affairs Committee (2003-2005; Chair); Executive Council (2005-2008).

*Society for the Study of Reproduction*: Publications Committee (1999-2001), Awards Committee (2003-2006)

*Testis Workshop*: Scientific Organizing Committee of the 2005 Testis Workshop

e. Member of the Champaign Chapter of the International Lion's Club.

This is a community service club that meets once per week and raises money for various community causes.

2nd Vice President (2007); Vice President (2008); President (2009)

f. Consultations/Business

Since 1995, I have either consulted for, taught or co-taught with Dr. Lonnie Russell a 2-day course on "Histopathological Evaluation of the Testis" to pathologists and toxicologists at the following companies. The University urge me to form a company to market a computer program developed in my laboratory. This program, titled STAGES, tracks spermatogenesis in time for 22 species and saves considerable time for pathologists in the study of toxic effects of chemicals on the testis. My company, Vanguard Productions, Inc. specializes in Electronic Publishing of Science and Educational materials and makes available free of charge the STAGES program to all UI students. The company also provides histopathological evaluation service and evaluates chemicals for potential male contraception.

Abbott Laboratories	Merck & Co., Inc.
Altana Pharmaceutical	Monsanto Company
AstraZeneca Pharmaceutical	Myogen, Inc.
Boehringer-Ingelheim	Pharmacia Corporation
Bristol-Myers Squibb Company	Pfizer, Inc.
Ciba-Geigy, Ltd.	Research Triangle Institute
CIIT Centers for Health Research	RW Johnson Pharmaceutical Res. Institute
Dow Chemical Company	Sandoz Pharmaceuticals Corp.
E.I. du Pont de Nemours & Co.	Schering-Plough Corporation
Eli Lilly & Company	Searle, Inc.
GeoCenters Research	SmithKlineBeecham Pharmaceuticals
Hoffmann-La Roche, Inc.	Upjohn Company
Johnson & Johnson Corporation	Warner-Lambert Company (Parke-Davis)

g. Public Service Lectures

7/27/05- Lion's Club of Champaign, IL. "Stem cells"

8/23/05- Stevic Senior's Center, Champaign, IL. "Stem cells"

1/07/06- Clarke-Lindsey Retirement Center, Urbana, IL. "Stem cells"

3/29/06- National Exchange Club. "Stem cells; are they really going to cure us?"

7/22/08- The Windsor of Savoy. "Stem cells and future medical treatments"

#### **4.1.2 Service to Professional Societies or Associations**

*American Society of Andrology:*

←1995: I am very active in the American Society of Andrology and was nominated and elected Secretary in 1995 to serve a three-year term (1995-1997). Additionally, I have served as chairperson of the Education Policy Committee and currently serve on an ad hoc committee to improve the outreach of our society through the development of computer Network systems.

←1994-2000: I served as the WebMaster for the American Society of Andrology until 2000 and designed all the webpages that were initially used before the Society hired a professional company to take over this activity. The current homepage is based on many of those original concepts and may be found at the following URL address: <http://www.andrologysociety.com/>

←2003-2005. Chair, Trainee Affairs Committee.

←2005-2008. Elected as member of the Executive Council for the American Society of Andrology. This Council is responsible for management of the Society.

←2005- . Committees: Membership, Awards, Trainee Affairs

#### **4.1.3 University / Campus Service**

←1999-2000 Campus Laboratory Animal Care Advisory Committee (LACAC), which has oversight responsibilities regarding the implementation of federal regulations involving animals in research and teaching. This position required considerable time and effort in reviewing protocols and meeting once per month for 3-4 hours to vote on acceptance of protocols and to set campus policy. Also, this committee was required to inspect campus facilities twice per year.

←1987-present. I have served as a faculty specialist in the evaluation of biopsies for the "immotile cilia syndrome." My specialized training in Pulmonary Medicine permitted me to develop the ability to recognize abnormal cilia when present in nasal and tracheal biopsy samples and in sperm. I typically evaluate 3-8 biopsies per year in consultation with a DVM pathologist. Although, in 2003 I stepped down as Director of the Center for Microscopic Imaging, my expertise in the immotile cilia syndrome has continued to be needed as an advisor. I receive several calls or emails each year to discuss this pathological condition and to help pathologists find a laboratory capable of making this diagnosis.

←2005-2008. UIUC Faculty Senate representative.

#### **4.1.4 Harlan E. Moore Heart Research Foundation**

← Research Vice-President (2002-2008). This is a Champaign County Non-Profit Foundation with a current focus on trans fatty acid effects on cardiovascular disease. The Board of Trustees is interested in expanding the foundation's research interests to "endocrine health" and has elected me as Vice-President to help guide the future research efforts. I work closely with Dr. Fred Kummerow, Past President and long

time University Professor, to perform novel studies of dietary effects on vascular grafts used in cardiac bypass.

#### **4.1.5 Pet HealthCare International and Addison Biologicals Laboratory**

2003-2004 I served on the Board of Directors of Pet HealthCare International, the company responsible for developing the new male dog contraceptive, Neutersol™. Their research and marketing contract is through Addison Biologicals and my laboratory served as a consultant on the various Neutersol cases that were returned for evaluation.

#### **4.2 ADMINISTRATIVE ACTIVITIES:**

•**1976-1980. Director of Electron Microscopy Laboratories**, Washington University School of Medicine, Department of Physiology, St. Louis, MO (2 years) and Mount Sinai Medical Center, Department of Pulmonary Medicine, New York, NY (2 years).

•**1987-1993; 1995-1996. Director of the Microscopic Imaging Laboratory**, College of Veterinary Medicine Duties included oversight of the staff supervisor, establishment of laboratory policy and charges, approval of purchase orders and leadership and advice in the new areas of technique. The person in this position also served as Chair of the Veterinary EM Committee and makes suggestions regarding new equipment and personnel hiring and training. This center provides service for the diagnostic clinic, as well as basic facilities and service for the research faculty of the College and the community. During my tenure, the Veterinary EM Facility has purchased 2 new ultramicrotomes (one through my NIH grant), a scanning electron microscope, a LAB<sub>6</sub> electron emitter (Research Board grant proposal) and a photographic enlarger. When I took over this position in 1987, the EM Facility showed a budget deficit and faculty often experienced delays in service. However, these problems have been corrected. During the 1991 fiscal year, the EM Facility contributed nearly \$30,000 to the operational budget and has contributed substantial amounts every year since that time.

•**1992-1993. Interim Director, Center for Electron Microscopy**, University of Illinois-Urbana The person in this position is appointed by the Vice-Chancellor for Research and is responsible for the campus-wide electron microscopy facilities. The laboratory is equipped with 3 transmission and 3 scanning electron microscopes and is responsible for the training of students and faculty in microscopic techniques. The facility maintains up-to-date equipment for research and also provides microscopic services upon request.

•**1996-2003. Director of the Center for Microscopic Imaging**, University of Illinois-Urbana. This is a campus-wide Center, formed by merger of the campus Center for Electron Microscopy and the Veterinary Medicine Microscopic Imaging Laboratory. The Center is a campus service laboratory, administered by the Department of Veterinary Biosciences. Its major function is to provide TEM service, training, and instrumentation for biologists. The facility also helps to integrate other types of microscopy, including high-resolution digital light microscopy, immunolight and electron microscopy and scanning EM. Duties include oversight of the staff (4 full-time and 1 part-time), providing leadership and advice for the campus on electron microscopy and imaging techniques, and suggestions regarding new equipment. The Center also offers several courses for graduate students in the area of microscopy. The 1999 budget, excluding salaries, was \$100,716. The Center has two transmission electron microscopes, four ultramicrotomes, cryoultramicrotomy, digital light microscopy, and miscellaneous laboratory equipment. The Center provides service to approximately 17 Departments in 4 Colleges and currently has 62 registered users.

The Center not only provides teaching and service for the University of Illinois, it also provides biopsy service for the local human hospitals and the veterinary clinics. This community outreach provides essential clinical assistance, particularly for kidney biopsies, which require electron microscopic analyses for complete diagnosis. This service provides a much-needed income supplement for the Center, which helps to cover maintenance contracts on the microscopes. On a yearly basis, the Center will process

approximately 250 projects, embed nearly 500 vials of tissue, ultrathin section approximately 500 blocks and print or process over 700 photomicrographs.

In January 2003, I felt it necessary to resign as Director because the State of Illinois budget was depleted and it was necessary to eliminate all but one service personnel position in the Center.

**•1999-2002. Chair, Morphology Division, Department of Veterinary Biosciences**, University of Illinois-Urbana. The person in this position is elected by faculty members of the Division and serves on the Departmental Advisory Committee. The Chair is responsible for making yearly evaluations of faculty and facilitating teaching responsibilities within the division.

**•2000-2002. Director, NIEHS Training Grant in Environmental Toxicology**, University of Illinois-Urbana.

**•2002-present. Associate Director, NIEHS Training Grant in Environmental Toxicology**, University of Illinois-Urbana.

### **4.3 COMMITTEES**

#### **4.3.1 COLLEGE OF VETERINARY MEDICINE**

- Information Management Committee (1999-2004)
- Committee on Committees (2001-2002)
- Scholastic Petitions Committee (1993-1996):
- Library Committee (1994-1997); Chair (1996-1997):
- Microscope Committee (1987-1996); Chair (1989-1996):
- Review policy and assist students in the selection of microscopes for purchase. Our committee recently was responsible for the purchase and organization of 100 microscope for the Histology and Pathology curriculum. After purchasing these microscopes, the committee was dissolve.

•Electron Microscopy Committee (1987-1996): As Faculty Director of the Microscopic Imaging Laboratory, I also serve as chairman of this committee, which is responsible for the establishment of guidelines under which the EM facility operates as a Veterinary College-wide center.

•Research Advisory Committee (1987-1990; 2008): Review of research proposals to be funded within the Veterinary College; Illinois Dept. Agric., Agric. Exp. Station, USDA Anim. Health Prog., Biomedical Res. Support Grants.

•Search Committee for Veterinarian Biomedical Communications Art Specialist (1987).

•College Facilities Committee (2002-2003): Review the physical plant of our college and make recommendations regarding improvements and potential building programs. I served a Chair of the subcommittee.

•Executive Committee (2005-2006): This committee advises the Dean and meets regularly to review College wide matters, including the 5-year review of the Dean.

#### **4.3.2 DEPARTMENTAL COMMITTEES**

- Courses and Curriculum (1994-1997; 2007-2010); Chair (1996)
- Graduate Studies (1989-1993; 1999-2002; 2004-present); Chair (1991-1992; 2006-2007) Review graduate student progress, review and make recommendations on graduate research policy and guidelines, and hear petitions for course work changes.

•Safety Committee (1990-1994); Chair (1993-1994) Review and establish guidelines in accordance with Campus-wide and Governmental regulations; hear complaints and make recommendations to the department head.

•Search Committees: Molecular Genetics Position (1987; 1989); Elections Committee (1986-1993); Physiologist position (1999); Morphology, 2 positions (2002); Theriogenology Professor (2003).

•Advisory Committee (1999-2002); Elected as part of the duties of the Chair of the Morphology Division. Responsible for providing advise to the Department Head.

### 4.3.3 CAMPUS-WIDE COMMITTEES

- Environmental Council University of Illinois (2003-2004). Members of the Environmental Council are responsible for catalyzing and coordinating environmental scholarship on the UIUC campus. The Council consists of 12 faculty members appointed by the Provost to strengthen environmental teaching, research and outreach at the UI, with emphasis on programs crossing college and departmental boundaries. It is currently supporting programs in the following areas: Ecology and Evolutionary Biology, Environmental and Resource Economics, Environmental Toxicology, and Human Dimensions of Environmental Systems.

- Committee for Electron Microscopy (1993-1995, Chair; 1993-2002 member) Responsible for oversight of the Campus Center for Electron Microscopy, located in the basement of Bevier Hall.

- Campus Laboratory Animal Care Advisory Committee (LACAC) (1999-2002). Responsible for implementing federal regulations involving animals in research and teaching.

- Faculty Senate (2005-2008). The Senate serves as the legislative body in matters of educational policy and other powers and duties specified in the *University Statutes on the Urbana-Champaign Campus*.

## 5.0 **Research Summary**

Studies in the Hess laboratory have a major focus on male reproductive pathology, endocrinology and toxicology. Specific interests include testicular growth and development, estrogen regulation of the male reproductive tract and spermatogonial stem cell regulation. Recent studies have focused on the presence and function of estrogen receptors in the male reproductive tract and Sertoli cell regulation of stem cell self-renewal. Efferent ductules of the male were found to express estrogen receptors 3.5 fold greater than female tissue. Using the ERalpha knockout mice and antiestrogen treatment, the Hess laboratory discovered the first known function for estrogen in the male reproductive tract. Estrogen was found to regulate fluid reabsorption by the efferent ductule epithelium, a function that is now considered to be essential for fertility. Using this new discovery, current research is attempting to develop a novel male contraceptive by targeting estrogen receptor in the male tract. Our stem cell research came about through a discovery at the Washington University School of Medicine. Scientists at Wash U found that knocking out a transcription factor, ERM (from the PEA-3 family), led to male infertility and through a collaboration we were able to demonstrate that this factor was specific for the Sertoli cell and that it was responsible for stem cell renewal. This study was recently published in *Nature* 436:1030. We are currently collaborating with Paul Cooke and Marie-Claude Hofmann to develop this animal model for the study of stem cell niche regulation. Through both basic and applied research, we seek a better understanding of structure and function of the male reproductive tract and improvements in reproductive and endocrine health.

## 6.0 **References**

Provided upon request