

CURRICULUM VITAE

REX A. HESS

Date of Preparation: November 2003

I. PERSONAL HISTORY AND PROFESSIONAL EXPERIENCE

A. Mailing Address:

Department of Veterinary Biosciences
University of Illinois
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B. Biographical Background:

US Citizen

C. Educational History:

1983 PhD Animal Physiology, Clemson University
1975 MS Physiology Area, University of Missouri-Columbia
1971 BS Education/Zoology, University of Missouri-Columbia

D. List of Academic Positions since Final Degree

1983-1986 Postdoc; U.S. Environmental Protection Agency, RTP, N.C.
1986-1992 Assistant Professor, University of Illinois-Urbana
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
1990-1998 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-Urbana
1998- Professor; Department of Veterinary Biosciences, University of Illinois-Urbana
1999-2002 Chair of Morphology Division, Department of Veterinary Biosciences, University of Illinois-Urbana
2000-2002 Director, NIEHS Training Grant in Environmental Toxicology
2002- Associate Director, NIEHS Training Grant in Environmental Toxicology

E. 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, New York, NY
1980-1983 Graduate Teaching Assistant; Clemson University

F. 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-
- Editorial Board, Reproductive Biology & Endocrinology, 2002
- 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
- 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.

G. 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 28th 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," 1st European Congress of Toxicological Pathology, Hamburg, Germany, September 24-27, 2003.

Invited Symposium Keynote Speaker, "Estrogen and male fertility," 1st 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.

Total number of Invited Lectures since 1990 (as of Oct. 31, 2003): 73

Total number of lectures in foreign countries since 1990: 41

Foreign Countries: Germany, France, Austria, Australia, Brazil, Canada, Mexico, Italy, Sweden, Spain, Japan, The Netherlands

H. Activities in Professional Societies

1. Memberships

Society for the Study of Reproduction
American Society of Andrology
The Endocrine Society
Society of Toxicology
Microscopy Society of America

2. Offices Held

1979-1980 Treasurer, Central-States Electron Microscopy Society
1995-1998 Secretary, American Society of Andrology

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* (BioMed Central)

I. Editorships of Journals or other Learned Publications

None

J. 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 - 6/30/05.
- 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 \$350,918; PI: Rex Hess; Co-I: Sheila McCullough. 02/2002 to 02/2004.

Total funding since arriving at the University of Illinois (1986 to 3/25/01), including co-investigator status: \$47,671,682

Total number of grant proposals submitted as PI since 1992 (as of April 2003): 26

Total number of NIH, NSF or USDA grant proposals submitted as PI since 1992 (as of April 2003): 15

K. Grants Pending (total costs)

NIH. "Estrogen Receptor: A Target for Male Contraception." RFA: Novel Approaches to Male Fertility Regulation. \$1,527,880. 9/03 to 8/08. PI: Rex Hess (20%).

NIH. "Developmental estrogen-induced male reproductive disease." \$450,522. 4/03 to 03/06. PI: Rex Hess (10%).

L. 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)

II. PUBLICATIONS AND CREATIVE WORKS

* 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.

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

Citations Index

1990-2001: as of June 2003, there have been 2001 citations of papers authored or co-authored by Rex A. Hess.

A. Doctoral thesis title

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

B. Books Authored or Co-Authored (in print or accepted)

none

C. Books Edited or Co-Edited (in print or accepted)

None

D. Chapters in Books (in print or accepted)

1. ~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.
2. ~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.
3. ~Hess RA, Bunick D, Bahr JM. 1995. Sperm, a source of estrogen. *Environ Health Perspect.* 103: Suppl 7, 59-62.
4. 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.
5. 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.
6. Hess RA 1998 Spermatogenesis, Overview. In: *Encyclopedia of Reproduction.* vol. 4 (eds. E. Knobil and J. D. Neill), Academic Press, San Diego, 539-545.
7. ~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.
8. 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
9. 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.

10. **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.

E. Invited Reviews and Monographs (in print or accepted)

1. 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.
2. **Hess, R.A.** 2003. Estrogen in the adult male reproductive tract: A review. *Reprod Biol Endocrinol.* 1, 52.

F. Articles in Journals (in print or accepted)

1975

01. Adshead 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.
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G. Creative Works (Exhibitions, Commissions, Competitions, Performances, Art, etc)

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. Publications Selected For Journal Covers

- **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.
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3. Patent Application/Awards

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

H. Bulletins, Reports, or Conference Proceedings (in print or accepted)

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I. Abstracts (in print or accepted)**1972**

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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⁺,K⁺-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 P₄₅₀ 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 β -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 α) 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- α knockout (ER α 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

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- α 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- α knock out mouse (α 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.

2001

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.

2002-2003

92. Cleida A. Oliveira, Kay Carnes, Qing Zhou, Rong Nie, David E. Kuehl, Gary L. Jackson, Luiz R. Franca, 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. Franca. 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- α but has no effect on ER β 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 α and ER β 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.
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.

2004-2005

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^{Kip1} AND p21^{Cip1}. The XXII Symposium on Reproductive Biology and Comparative Endocrinology, Madras, India

J. Book Reviews (in print or accepted)

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

K. Other

1994. **STAGES™ computer software** for Windows and MacOS; 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.

III. RESIDENT INSTRUCTION

A. Summary of Instruction

1. Course Descriptive Data

<u>Title</u>	<u>Year</u>	<u>Course #</u>	<u>Semester</u>	<u># of Students</u>	<u>Credit Hrs</u>
Veterinary Histology	1986-1995; 2000-	VB 301	Fall	90-110	5
<p>I was course coordinator for this course 1986-1995 and 2000-2001. 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, I taught the entire course. During Fall 2002, I lectured on the reproductive system.</p>					
Developmental Anatomy	1986-1991	VB 303	Fall/Spring	~90	2
<p>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.</p>					
	1997-1999	VB305	Spring	~95	2
<p>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</p>					
Basic Toxicology	1993-	ENVST 349	Spring or Fall	50	3
<p>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.</p>					
Morphology of Reproduction	Every other year	VB 405	Spring	~5	2
<p>I present approximately 10 lectures on male reproduction.</p>					
Interdisciplinary Toxicology Seminar.	1992, 1994, 2001	VB 490	Spring	~50	1
<p>Faculty rotate responsibility for this seminar series. My responsibility has been for the topic "Reproductive Toxicology".</p>					
Integrated Electron Microscopy	1992-1995	VB 350	Fall	~35	3
<p>I present 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.</p>					
Toxicologic Pathology	Intermittent	VP 448	Spring	~10	3/4 Unit
<p>I present 1 lecture on male reproductive pathology.</p>					
Principles of Drug and Toxicant Evaluation	Intermittent	VB 467	Spring	~10	3
<p>I provide one lecture on "Reproductive Toxicity".</p>					
Special Problems	Intermittent	VB 492	All year long		
<p>Students use this course to perform special research projects in my laboratory each semester. Credit and enrollment will vary.</p>					
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.

2. Supervision of Graduate Student Research

Names and Positions of Graduate Students and Postdoctoral Associates

a. Major Advisor, Research Advisor or shared advisorship

M.S. / Ph.D. Students

N. Bassily, M.D.	Ph.D. 1989	Medical Resident, Brown University Medical School
K. Ilio, D.V.M.	Ph.D. 1992	Research Associate, Univ. of Illinois-Chicago, Medical School; Director, Andrology Laboratory
Seok Kwon	Ph.D. 1995	Postdoc, CIIT, Research Triangle Park, NC
Lynn Janulis	Ph.D. 1995	Postdoc, University of Illinois-Chicago, Medical School
Yu-Chyu Chen	Ph.D. 1997	Department of Urology, Mayo Clinic, Rochester MN 55905
Sarah Janssen	M.D., Ph.D. 2001	Dept. Urology, University of California-SF
Rong Nie	M.S. 2001	Center for Microscopic Imaging, University of Illinois
Qing Zhou	Ph.D. 2002	“Estrogen receptors and estrogen-regulated genes in the male reproductive tract.” Postdoc, Dr. Michael Griswold, University of WA, Pullman
Cleida Oliveira	Ph.D. 2002	“Effects of antiestrogen ICI 182,780 on the regulation of hormones and the expression of the estrogen receptors in efferent ductules of the rat.” Assistant Professor, Departamento de Morfologia, Federal University de Minas Gerais, Belo Horizonte, Brazil
Tameka Phillips	Current 2002-	
Dongsheng Zhang	Current 2002-	
Carla Morrow	Current 2003-	
Avenel Joseph	Current 2003-	

Post Doctoral Associates

A. Abuel-Atta, Ph.D.	1988	Professor, Veterinary Medicine, Zagazig University, Egypt
M. Nakai, D.V.M., Ph.D.	1992, 1999-2000	Assistant Professor, Miyazaki, University, Miyazaki, Japan
Hyun Wook Cho, Ph.D.	1999	Professor, Dept. of Biology, College of Natural Sciences, Suncheon National University, South Korea
James Ford, Jr., Ph.D.	Current 2003-	

b. Member of Student’s Advisory Committee

Niromi Arambepola	Ph.D., Vet Biosci. 1997
Laura Burger	Ph.D. Physiology 1997
Sajini Guntur	M.S. / Physiology 1997
S. Khan	Ph.D. Vet Biosciences 1996

Mark Wickstrom	PhD Toxicology 1995
W. Tehseen	PhD Toxicology 1992
M. Biduaka	M.S. / Vet Biosciences 1989
Yao Hung-Chang	Ph.D. / Animal Sciences 1999
Magdy Hassan	M.S. / Veterinary Clinical Medicine 1999
Peiyong Zhai	Ph.D. / Veterinary Biosciences 2000
Srikanth Yellayi	M.S. / Veterinary Biosciences 2000
Xudong Shi	Ph.D. / Molecular and Integrative Physiology 2001
Srikanth Yellayi	Ph.D. / Veterinary Biosciences 2002
Hyung Lee	Ph.D. / Molecular and Integrative Physiology 2003
Heather Burkin	Ph.D. / Animal Sciences 2003
Kelly Schubert	Ph.D. / Animal Sciences 2003
Chris Kuster	Ph.D. / Veterinary Clinical Medicine 2003
Longmei Zhao	Ph.D. candidate under Dr. David Miller

3. 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

IV. SERVICE (Public, Professional / Disciplinary, and University)

A. Summary of Service

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-
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
Tissue and Cell	1996-
Reproductive Biology & Endocrinology	2003-

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)
CONRAD Program for Contraceptive Research (2001)

d. Scientific Society Committees:

American Society of Andrology: Publications Committee; Minority Affairs; Trainee Affairs (Chair, 2003)

Society for the Study of Reproduction: Publications Committee

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.

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. The website for Vanguard is: <http://www.vpicd.com/>

Abbott Laboratories

Boehringer-Ingelheim

Bristol-Myers Squibb Company

Ciba-Geigy, Ltd.

CIIT Centers for Health Research

Dow Chemical Company

E.I. du Pont de Nemours & Co.

Eli Lilly & Company

GeoCenters Research

Hoffmann-La Roche, Inc.

Johnson & Johnson Corporation

Merck & Co., Inc.

Monsanto Company

Myogen, Inc.

Pharmacia Corporation

Pfizer, Inc.

Research Triangle Institute

RW Johnson Pharmaceutical Res. Institute

Sandoz Pharmaceuticals Corp.

Schering-Plough Corporation

Searle, Inc.

SmithKline Beecham Pharmaceuticals

Upjohn Company

Warner-Lambert Company (Parke-Davis)

Yamanouchi Pharmaceuticals

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. 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/>

2000-present: I serve on the Publications Committee and the Archives Committee.

Society for the Study of Reproduction:

1999-2001: Publications Committee for SSR

2003-2006: Awards Committee for SSR

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.

4. Harlan E. Moore Heart Research Foundation

Research Vice-President (2002- present). 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.

B. 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 LAB₆ 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.

C. COMMITTEES

COLLEGE OF VETERINARY MEDICINE

Information Management Committee (1999- 2000)

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): 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.

DEPARTMENTAL COMMITTEES

Courses and Curriculum (1994-1997); Chair (1996)

Graduate Studies (1989-1993; 1999-2002); Chair (1991-1992) 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);

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.

CAMPUS-WIDE COMMITTEES

Environmental Council University of Illinois (2003-). 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; 1993-2202 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.

V. Research Summary

Studies in the Hess laboratory are focused on male reproductive pathology, endocrinology and toxicology. Specific interests include spermatogenesis, testicular growth and development, and efferent duct physiology. Recent studies have examined the localization of estrogen receptors in the male reproductive tract and the function of estrogen in the male. Efferent ductules of the male were found to express estrogen receptors 3.5 fold greater than female tissue. Using transgenic mice and antiestrogen chemical treatments, the Hess laboratory has discovered the first known function for estrogen in the male reproductive tract. Estrogen was found to regulate fluid reabsorption by the efferent ductules of the testis, a function that is apparently essential for fertility. Using this new discovery, current research is attempting to develop the antiestrogen chemicals as contraceptives in males, both for humans and for feral and domesticated animals. Studies in toxicology by this lab have focused on cellular mechanisms of toxicant-induced injury of the seminiferous epithelium and the role of Sertoli cell cytoskeleton and efferent ductal occlusions. These studies have examined pathophysiological effects of fungicides on cell structure, as related to germ cell sloughing and abnormal development.

VI. References

<input type="checkbox"/>	Name	Title	Phone
1	Dr. David Gross	Professor and Department Head Veterinary Biosciences, University of Illinois, 2001 S. Lincoln, Urbana, IL 61802	(217) 333-2506 gross1@uiuc.edu
2	Dr. Val Beasley	Professor and Director EnviroVet Veterinary Biosciences, University of Illinois, 2001 S. Lincoln, Urbana, IL 61802	(217) 333-9360 val@uiuc.edu
3	Dr. Victor Valli	Professor and former Dean College of Veterinary Medicine, University of Illinois, 2001 S. Lincoln, Urbana, IL 61802	(217) 265-5415 tvalli@cvm.uiuc.edu
4	Dr. Paul Cooke	Professor Veterinary Biosciences, University of Illinois, 2001 S. Lincoln, Urbana, IL 61802	(217) 333-6825 p-cooke@uiuc.edu
5	Dr. William Kelce	William R. Kelce, Ph.D, Fellow ATS Assistant Director and Head Reproductive Toxicology Drug Development Toxicology Pfizer Corporation	(269) 833-1742 william.r.kelce@pharmacia .com

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