August 2024

CURRICULUM VITAE

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EDUCATION

INSTITUTION	DATES	AREA OF STUDY	DEGREE
Virginia Tech (Blacksburg, VA)	1984-88	Animal Science	B.S.
University of Nebraska-Lincoln (Lincoln, NE)	1988-91	Reproductive Endo	M.S.
University of Nebraska-Lincoln (Lincoln, NE)	1991-94	Reproductive Endo	Ph.D.
University of California-San Francisco (CA)	1994-96	Molecular and Cell Biol	Postdoc
Washington State University (Pullman, WA)	1996-97	Molecular and Cell Biol	Postdoc

RESEARCH EXPERIENCE

Courtesy Appointment Department of OBGYN, University of Nebraska Medical Center, Sept 2020-present. ("mini-sabbatical") with John Davis, Professor UNMC OBGYN Sept 2020-April 2021.

Irvin T and Wanda R Omtvedt Professor of Animal Science- March 1, 2015-present (endowed professorship); Department of Animal Science, University of Nebraska-Lincoln, Lincoln, NE.

Professor, Reproductive Physiologist, July 2011- present; Associate Professor, Aug 2006-June 2011; Assistant Professor, Aug 2000-2006; Department of Animal Science, University of Nebraska-Lincoln, Lincoln, NE.

Research Assistant Professor/Assistant Professor (Adjunct) May 1998-August, 2000; Director of Transgenic and Knockout Mice Core- Center for Reproductive Biology, Jan 2000-August 2000; Center for Reproductive Biology, School of Molecular Biosciences, Washington State University, Pullman,WA.

USDA Postdoctoral Fellow, November 1996-December 1997; Center for Reproductive Biology, Department of Genetics and Cell Biology, Washington State University, Pullman, WA**;** Postdoctoral Mentor: Michael K. Skinner.

USDA Postdoctoral Fellow, September 1995-October 1996; Reproductive Endocrinology Center, Department of OB/GYN and Reproductive Sciences, University of California San Francisco, San Francisco, CA. Postdoctoral Mentor: Michael K. Skinner.

Postdoctoral Fellow, May 1994-September 1995; Department of OB/GYN and Reproductive Sciences, University of California San Francisco, San Francisco, CA; Postdoctoral Mentor: Michael K. Skinner.

Graduate Research Associate, 1990-1994; Center for Biotechnology/Animal Science Department, **Graduate Research Assistant, 1988-1989**; Animal Science Department, University of Nebraska-Lincoln, Lincoln, NE; Graduate Assistant Mentor: James E. Kinder.

Undergraduate Research Assistant, 1984-1988. Animal Science Department, VA Polytechnic Institute and State University, Blacksburg, VA; Undergraduate employer: VT Sheep Barns and Dr. David Notter.

RESEARCH INTERESTS

1) Female Infertility due to Androgen Excess

We have identified a population of females in the herd (15%) to have irregular reproductive cycles, anovulation, ***naturally occurring*** *excess androgen in follicular fluid of dominant follicles (High A4 cows), and a 17% reduction in calving rate compared to controls. Many aspects of their phenotype is similar to women with Polycystic Ovary Syndrome (PCOS).* In addition to reproductive problems, our High A4 cows also appear to have alterations in metabolites in blood plasma. While High A4 cows respond to FSH by developing similar numbers and diameter of follicles, they have 50% reduction in number of granulosa cells/follicle and granulosa cell gene expression indicates that excess androgen causes prematurely luteinization or loss of granulosa cell identity. Furthermore, ovarian cortex from these High A4 cows secretes excess A4 with increased production of other steroid hormones and metabolites. There is also increased oxidative stress and fibrosis in the ovarian cortex suggesting increased inflammation which can be resolved by in vivo FSH or in vitro treatment with angiogenic VEGFA165. (Collaborators- John Davis, DJ Murry UNMC, Jennifer Wood)

2) Heifer pubertal classifications may identify female reproductive longevity

Women diagnosed with PCOS often have reproductive problems identified around puberty and can display precocious or delayed puberty. Thus, we wanted to determine how females in our herd achieve puberty. We identified 4 different pubertal groups: Typical, Early, Start-Stop and Non-Cycling. Currently, we do not have a specific pubertal classification that appears to develop into High A4 cows, thus; genetics and environment may contribute to this naturally occurring androgen excess. Since earlier age at puberty indicates longer reproductive lifespan, we wanted to determine genetic and environmental factors that may affect puberty. We have genotyped the whole herd and conducted whole genome sequencing on 35 individuals. We have several Small Nucleotide Polymorphisms (SNP's) that may describe some genetic variation and pubertal classification that we are investigating. We determined that our 5 classes of puberty attainment are moderately heritable (0.38) and if we combine those that initiate reproductive cycles (cycling) and maintain cyclicity compared to those that do not, the heritability increases to 0.59 which is highly heritable. Ultimately, we would like to use our beef population to develop high-throughput methods to identify heifers that genetically may develop delayed or precocious puberty and select against them or determine ways to increase their reproductive efficiency to aid beef producers in profitability of their cow/calf operations. Further, we would like to be able to translate some of the basic endocrinology and cellular mechanisms to women with anovulation problems to be able to develop methods to enhance their ability to become pregnant. (Collaborators- Matt Spangler, Melanie Hess, Jessica Petersen and Jennifer Wood UNL and John Davis UNMC, Bob Cushman and Jennifer Thorson USMARC).

3) Vascular Endothelial Growth Factor (VEGFA) isoforms in Gonadal Morphogenesis and Function

Increasing numbers of couples have infertility problems. In the last 15-20 years, there has been an increase in the number of boys with ambiguous genitalia, and testicular cancer with 40% of the men in industrialized countries having subnormal sperm counts. In addition, infertility problems in women are on the rise with major problems associated with anovulation or ovulation at appropriate times during the reproductive cycle. Many scientists have associated adult reproductive infertility with abnormal differentiation of cells within the ovary and testis during development. Thus, one major focus of my laboratory is to determine the basic science behind what genes or cells may be alternatively regulated to result in male or female infertility. We are presently determining the role of Vascular Endothelial Growth Factor A (VEGFA) isoforms (pro-angiogenic and anti-angiogenic) and their receptors (KDR and FLT1) and co-receptor (NRP1) in the testis and ovarian development through the use of gonadal organ cultures, recombination experiments, overexpression assays, transgenic and conditional knockout mice (using cell-specific gene knockouts) or overexpressing mice lines. We have developed over 8 different lines of mice to knockout a member of the VEGFA family or overexpress it. These unique mouse models have allowed us to determine that the VEGFA family has novel roles in the maintenance of the spermatogonial stem cell niche in males. In females the VEGFA family also is critical in stimulating follicle progression, proliferation and survival of somatic cells which is necessary for fertility, reproductive lifespan, and bone density.

4) Differentiation of Granulosa and Theca Cells to form luteal cells and a Corpus Luteum (CL)

We have determined gene expression profiles for theca and granulosa cells during the process of differentiation to luteinization which also includes lipid production and immune function. We have been determining how these cells differentiate, how they interact with the immune system, and how lipids are produced and involved in this process. We also have evaluated how the CL regresses and what signal transduction pathways are involved. (Collaborators- John Davis, Jennifer Wood and Michele Plewes).

HONORS AND AWARDS

- 2024 Society for the Study of Reproduction (SSR) Distinguished Fellow
- 2024 Awarded Honorary Professor at the University of Jordan, Amman Jordan
- 2022-2023 Completion of UNL Office of Research (ORED) Research Leaders Program, April
- 2023 Ron Randel Lecture, Southern Section of the American Society of Animal Science, Raleigh, NC
- 2022 Keynote talk "; Animal Reproductive Innovations During Pubertal Attainment to Increase Animal Protein" at 4th International Conference of Agricultural Sciences AgInsight 2022, Belihuloya, Sri Lanka
- 2022-2026 Standing Member Cellular and Integrative Molecular Reproduction (CIMR) NIH Study Section
- 2022 Inducted into the Nebraska Hall of Agricultural Achievement
- 2020 Omtvedt Innovation Award- Research; UNL.
- 2017-2018 Animal and Poultry Sciences Department Distinguished Alumni Award for College of Agriculture and Life Sciences; Virginia Tech
- 2017 Nebraska Beef Industry Endowment Award; Nebraska Cattleman Education Foundation
- 2017-2021 Vice President Elect; Vice President, President and Past President; SSR
- 2017 American Society of Animal Science Physiology and Endocrinology Award
- 2017 Kiracofe Lecturer- Kansas State University, Animal Science Dept, April
- 2017 First Saacke Lecturer- Virginia Tech, Animal and Poultry Science Dept, February
- 2017 Represented Virginia Tech at Chancellor Green's University of Nebraska-Lincoln Installation April
- 2015 UNL Gamma Sigma Delta Excellence in Research Award Jan 31, 2016.
- 2015 Irvin T and Wanda R Omtvedt Professor of Animal Science- (endowed professorship)
- 2013-2016 Secretary of Society for the Study of Reproduction, Member of Board of Directors
- 2012-2014 Instructor at Frontiers in Reproduction (FIR) Course Woods Hole, Mass
- 2006 Society for the Study of Reproduction Young Investigator Award
- 2006 Outstanding Young Animal/Dairy Scientist Midwest Section of ASAS/ADSA
- 2004 UNL Agriculture Research Division Junior Faculty Excellence in Research Award- November.
- 1993 Arthaud Memorial Travel Fellowship, University of Nebraska Animal Science Dept
- 1992 Milton E. Moore Biotechnology Fellowship, University of Nebraska-Lincoln
- 1992 Women's Research Institute Reproductive Colliculum Travel Grant
- 1992 Society for the Study of Reproduction Trainee Travel Fellowship
- 1991 Sigma Xi Travel Fellowship, University of Nebraska-Lincoln
- 1990 Arthaud Memorial Travel Fellowship, University of Nebraska Animal Science Department
- 1987 Rocco Student Leader Scholarship, Animal Science Dept., Virginia Tech
- 1984 Daily News Record Leadership Award (awarded to three seniors in Rockingham Co., Virginia).

Trained/Mentored: 22 graduate students (an additional 2 current) and 24 Undergraduate students on Research Projects (additional 1 current); 3 undergraduate research thesis projects and 21 UCARE projects

Mentored 4 Postdoctoral Fellows (1 additional current)

Mentored 5 Visiting Scientists

TEACHING EXPERIENCE

Lecturer- Woods Hole Frontiers in Reproduction (FIR) Workshop- *Testis Development May 8, 2012; May 7, 2013, and May 13, 2014.*

University of Nebraska-Lincoln, Animal Science Department

1) Grant Writing Course- 896; 2013-2016 every spring 2018, 2019, 2021, 2022, 2024-present even spring years. Grad students and postdocs write pre-doctoral or fellowship grant, SARE grants, state funded NDHHS grants, Federal USDA, NIH, NSF, during class and develop budgets, scientific method, hypothesis and experiments to test hypothesis.

2) Endocrinology, Fall 2001-present (442/842 Undergraduate/Graduate level course).

GRANTS AND FELLOWSHIPS *($12,166,547 Million total)*
Federal Grants ($8,354,680 Million federal) NIH, USDA
Current
***-USDA NIFA* 2023-08344**; *Androgen Excess Ovarian Microenvironment On Bovine Folliculogenesis; Lead PI, Co-PI Davis and Wood; 7/1/2024-2027, $650,000.*
***-NIH/USDA NIFA 2023-06292** Dual Purpose Dual Benefit -Metabolic and Mitochondrial Signals During Ovulation, Lead PI John Davis, Co-PI Cupp 9/1/2023-8/31/27. $1,750,000.*
***-RO3-DHHS/NIH/NICHD** Vascular remodeling in the ovary, Lead PI John Davis, Cupp Collaborator 07/01/2023 - 06/30/2025, $153,500.*
***- American Heart Association pre-doctoral Fellowship-"**Modeling angioregression of the corpus luteum". Corinne Monaco, Collaborating Mentor- Cupp 2023-2025. $120,000.*

University of Nebraska and State Grants ($4,211,867 million state and UNL)
Current
- University of Nebraska Collaboration Initiative Grant:"*Understanding the Protective Effect of VEGFA on Ovarian Vasculature Against Chemotherapy Toxicity*". $40,000; 7/1/2024 –6/30/2025.
ARD USDA Hatch Multi-State Enhanced Strengthening Grant: Epitranscriptomic Regulation of Bovine Developmental Milestones, Objective: Determine how RNA methylation affects the stability, translation, and degradation of mRNAs during oocyte maturation and cell differentiation during pre-implantation embryo development. $200,000; 10.2023-09.2027, Wood JR (PI), Cupp Co-I.
***-ARD Hatch Multistate Enhanced Program** - FSHR Haplotypes as a predictor of altered puberty in beef heifers; $250,000; Oct 1, 2021-Sept. 30, 2026; Lead PI Cupp.*

INVITED TALKS 60+ talks at University seminars, regional and national/international meetings, one Keynote

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS
-Society for the Study of Reproduction; 1989-present
-Endocrinology, 2000-present
-American Society of Andrology, 1994-2016
-American Society of Animal Science 1989-1994, 2001-present
-American Association for the Advancement of Science 1997-2009; 2013-present
-Nebraska Physiological Society 2000-2010
-Sigma Xi, 1994-2009; 2014-present
-Alpha Zeta, VPI&SU; 1986-1997.
-Gamma Sigma Delta, University of Nebraska; 1990-1994; 2004-present
-Center for Reproductive Biology, Washington State University (1998-2000)

PROFESSIONAL SERVICE
-Departmental Review Team
- Chair- University of Arizona Animal Science Department, March 19-20, 2012.
- University of Connecticut, Department of Animal Science, March 2021.

-Federal Grant Panel Reviewer
- NIH/NICHD CMIR (Cellular and Molecular and Integrative Reproduction) Study Section Member October 2022- 2026
-NIH/NICHD CMIR (Cellular and Molecular and Integrative Reproduction) Study Section Ad Hoc, June 202, March 2020, Feb 2018, June 2014, June 2010
-NIH/NICHD P50 Program Panel Reviewer for National Centers for Translational Research in Reproduction and Infertility, November 2018
-NIH/Special Emphasis Panel/Scientific Review Group Endocrinology Metabolism, Nutrition and Reproductive Sciences Panel Reviewer, March 2017, March and Nov 2016, Nov 2014
-NIH/ICER- Integrative and Clinical Endocrinology and Reproduction Study Section, February 2015

-NIH/NICHD Andrology & Gynecology Study Section, November, 2013
-NIH/NICHD PO1 Grant Review, November 2011
-NIH/ Special Conflict of Interest Grants panel/NICHD May 2011
-NSF/Virtual Reviewer Aquaculture, October 2010.
-USDA/AFRI- Animal Genomics Program, Grant Panel Reviewer- Sept. 2009
-USDA/NRI Animal Reproduction Program, Grant Panel Reviewer- May 2004.
-NIH/NIDDK/NICHD- Special Study Section- Murine Atlas of Genitourinary Develop. -July 2004.

-Grant (Adhoc) and Journal Reviewer/Editor

USDA Reproductive Efficiency Program; 1995-2003, Growth and Development Program; 1998
Journal Reviewer for Biology of Reproduction; 2000-present
Journal Reviewer for Reproduction; 2008-present
Journal of Animal Science Reviewer; 2000-present
Journal Reviewer for Systems Biology in Reproductive Medicine- 2008-present
Journal reviewer for Domestic Animal Endocrinology- 2009-present
Journal reviewer for Molecular Reproduction and Development- 2008-present
Animal Reproduction Science Journal; 2001-present
The International Journal of Developmental Biology; 2003-present
Journal of Experimental Zoology; 2004-present
Endocrinology 2013-present
Molecular and Cellular Endocrinology; 2013-present
Journal of Clinical Endocrinology and Metabolism; 2013-present
Placenta- 2012 to present
Physiological Genomics- 2006-present

FORMAL LEADERSHIP

1) **Leading COBRE Proposal to NIH for Center for Interdisciplinary Women's Health Research (CIWHR) May 2024-present**
2) **Completion of ORED (Office of Research and Economic Development) UNL Research Leaders Program- April 2023**
3) **Co-Founder and Co-Chair of Women Supporting Women in the Institute of Agriculture and Natural Resources (IANR) Initiative** - developed with colleague Dr. Angela Pannier (Biological System Engineering) to support women faculty through mentoring, professional development and networking within IANR; 2022-present.
4) **Vice President-Elect; Vice President, President and Past-President; Board of Directors for the Society for the Study of Reproduction-** national society for scientist studying reproductive biology; 2017-2021. Developed first virtual meeting in July 2020; Developed first Hybrid (virtual and in-person) meeting in December 2021; carried out strategic plan and increased submission of manuscripts from board members to Biology of Reproduction. Also worked through changes with SSR staff in meeting structure, postponed in-person meeting and moved venue contract to 2023 (saved SSR $600,000) due to COVID. Subsequently moved 2021 meeting from August to December 2021 while again saving the society losses associated with this move with venue contracts. Moved all monthly executive and board meetings to zoom. Met more frequently and increased efficiency of operations by weekly one-on-one meetings with Executive Director. Also developed status update meetings with Executive Director and next President to develop a smoother transition to leadership for the next year.
5) **Chair of Agriculture Research Division Faculty Advisory Committee (UNL IANR)**- 2015-2017; Developed white papers for: 1) methods to partner with industry to develop graduate student assistantships, and 2) Team Science Criteria to aid promotion and tenure committees within IANR in evaluation of team science on annual faculty evaluations.
6) **Chair of Promotion and Tenure Committee Department of Animal Science;** Chair 2014-2015; 2016-2017, 2018-2019; Initiated (2016-2017) and developed criteria for meeting and exceeding guidelines for Teaching, Research and Extension for Department of Animal Science (2018-2019).

7) **Secretary and Executive Committee, Society for the Study of Reproduction Board of Directors 2013-2016;** SSR executive team made the decision to move to a different publisher and also interviewed management groups and moved SSR to new management team. With new management team we developed the first strategic plan with SSR and new Executive director/CEO.
8) **Nebraska Physiological Society-** Past-President 2005-2006; President 2004-2005; President-elect 2003-4; Councilor- 2001-2003.
9) **American Society of Animal Science Board Member**, Director-At-Large 2005-08; Was involved in developing and implementing a Strategic Plan. As part of the plan developed the Cell Biology Symposia to encourage more physiologists and molecular biologist to attend ASAS meetings and this is still part of the meeting today.

INFORMAL LEADERSHIP and DEVELOPMENT OF TEAMS

1) Developed two initiatives to bring faculty together to develop integrative teams to increase federal funding. Both were calls from VP for research office with some partnership with Agriculture Research Division within IANR. A) 2009 Reproductive Genetics and Epigenetic Initiative- external speakers were brought in that were experts in the Reproductive Genetics and Epigenetics area for seminars and to interact with a group of faculty from UNL, USMARC and UNMC that were interested in this topic. During lunches after seminars faculty interacted and collaborative groups development organically which at least 3 groups have been successful in garnering multi-PI grants (USDA and NIH). B) Beef Excellence Initiative was a planning grant also from the VP for research within UNL (2010). The objective of the Beef Excellence Initiative was to: **Bring scientific disciplines, and industries together to serve Nebraska and the national beef industry by providing science-based knowledge for producing beef cattle, processing beef products, and realizing the value of beef the human diet.** Six groups developed white papers (Prenatal Programming, Beef Systems, Combining Genetic markers and Phenotypic data for Genetic progress, Cattle Fertility, Economic Aspects of Cattle and Beef Systems, Comprehensive Beef Education) and a panel of experts came to UNL and reviewed the white paper and made recommendations. From these recommendations several faculty positions were obtained in Animal Genetics, a stress physiologist (fetal programming) and the comprehensive Beef Education group obtained a USDA Challenge grant and the Cattle Fertility group obtained several USDA and NIH grants.

2) My research has been enriched by collaborative teams consisting of scientists from USMARC (Bob Cushman), UNMC (John Davis, So-Youn Kim, Lynda Harris and DJ Murry) and UNL (Jennifer Wood, Jessica Petersen, Melanie Hess, Ligia Prezotto). Our efforts are to understand genomic and phenotypic markers of heifer puberty and how this may affect lifetime reproductive longevity. We also have been unraveling mechanisms which cause excess androgen and reduced calving (17%), follicular arrest and effects on somatic cell differentiation and corpus luteum function in androgen excess cows. We have also utilized conditional knockout mice and transgenic mice to determine how genes in the Vascular Endothelial Growth Factor A family may affect both male and female fertility and vascularization in the gonads. A focus has been to aid students and postdoctoral fellows to obtain funding which will allow them to be competitive for job and allow them to succeed. We have collectively received funding from USDA and NIH grants (including pre and postdoctoral USDA and NIH grants) as well as competitive hatch and NE health and human services state grants to support this funding. This group is now able to develop under the Center for Women's Health Research that has recently been developed at UNMC with John Davis as it's director. This group along with others would be an excellent group to develop a COBRE and T32 training grant with UNMC as our partners and drawing faculty from IANR (Animal Science, Biological Systems Engineering, Food Science, Biology, Biochemistry) and at UNMC Biochemistry, OBGYN, Genetics and Pediatrics.

COMMUNITY ACTIVITIES (LAST THREE YEARS)

-Antelope Park Church of the Brethren

Christian Ed Chair Jan 2024-2026
Leadership Team Chair Jan 2022- Dec 2023

-4H Assistant Leader of Western Feeders 4-H club- 2016-present- Cass County.

PEER REVIEWED PUBLICATIONS:

1.Roberson MS, MW Wolfe, TT Stumpf, LA Werth, **AS Cupp**, N Kojima, PL Wolfe, RJ Kittok and JE Kinder. 1991 Influence of growth rate and exposure to bulls on age at puberty in beef heifers. J. Animal Sci. 69:2092.

2. Roberson MS, MW Wolfe, TT Stumpf, DL Hamernik, **AS Cupp**, LA Werth, N Kojima, RJ Kittok, HE Grotjan and JE Kinder. 1992 Influence of 17beta-estradiol on steady-state levels of alpha- and LH beta- subunit messenger ribonucleic acids in the anterior pituitary during sexual maturation in the heifer. Biol. Repro. 46:435.

3. Stumpf TT, MW Wolfe, MS Roberson, DD Zalesky, **AS Cupp**, N Kojima, LA Werth, RJ Kittok, HE Grotjan and JE Kinder. 1992 A similar distribution of gonadotropin isohormones is maintained in the pituitary throughout sexual maturation in the heifer. Biol. Repro. 46:442.

4. Roberson MS, TT Stumpf, MW Wolfe, **AS Cupp**, N Kojima, LA Werth, RJ Kittok and JE Kinder. 1992 Circulating gonadotrophins during a period of restricted energy intake in relation to body condition in heifers. J. Reprod. Fert. 96:461.

5. Kojima N, TT Stumpf, **AS Cupp**, LA Werth, MS Roberson, MW Wolfe, RJ Kittok and JE Kinder. 1992 Progestins and exogenous progesterone do not mimic the corpus luteum in regulation of LH and 17 beta-estradiol in circulating cows. Biol. Reprod. 47: 1009.

6. Wehrman ME, MS Roberson, **AS Cupp**, N Kojima, TT Stumpf, LA Werth, MW Wolfe, RJ Kittok and JE Kinder. 1993 Increasing exogenous progesterone during estrous synchronization decreases estrogen and increases conception in cows. Biol. Repro. 49:214.

7. Cupp AS, MS Roberson, TT Stumpf, MW Wolfe, LA Werth, N Kojima, RJ Kittok and JE Kinder. 1993 Pasturing of yearling or mature bulls with beef cows following parturition shorten the duration of postpartum anestrus. J. Anim. Sci. 71:306.

8. Sanchez T, ME Wehrman, EG Bergfeld, KE Peters, FN Kojima, **AS Cupp**, V Mariscal, RJ Kittok, RJ Rasby and JE Kinder. 1993 Pregnancy rate is greater when the corpus luteum is present during the period of progestin treatment of synchronize time of estrus in cows and heifers. Biol. Repro. 51:1102.

9. Sanchez T, ME Wehrman, GE Moss, FN Kojima, **AS Cupp**, EG Bergfeld, KE Peters, V Mariscal, HE Grotjan Jr., JE Kinder and DL Hamernik. 1994 Differential regulation of gonadotropin synthesis and release in ovariectomized ewes after treatment with a luteinizing hormone-release hormone antagonist. Biol. Repro. 51:755.

10. Bergfeld EGM, FN Kojima, **AS Cupp**, ME Wehrman, KE Peters, M Garcia-Winder, and JE Kinder. 1994. Ovarian Follicular Development in prepubertal heifers is influenced by level of dietary intake. Biol. Repro. 51:1051.

11. Peters KE, Bergfeld EG, **AS Cupp**, FN Kojima, V Mariscal, T Sanchez, ME Wehrman, HE Grotjan, DL Hamernik, RJ Kittok and JE Kinder. 1994. Luteinizing hormone has a role in development of fully functional corpora lutea (CL) but is not required to maintain CL function in heifers. Biol. Repro. 51:1248.

12. Cupp AS, TT Stumpf, N Kojima, LA Werth, MW Wolfe, MS Roberson, RJ Kittok and JE Kinder. 1995. Secretion of gonadotrophins change during the luteal phase of the bovine estrous cycle in the absence of corresponding changes in progesterone or 17beta-estradiol. Animal Reproduction Science 37:109.

13. Cupp AS, N Kojima, MS Roberson, TT Stumpf, MW Wolfe, LA Werth, RJ Kittok, HE Grotjan and JE Kinder. 1995. Increasing concentrations of 17 beta-estradiol has differential effects on secretion of LH and FSH and amounts of mRNA for gonadotropin subunits during the follicular phase of the bovine estrous cycle. Biol. Repro. 52:288.

14. Kojima FN, **AS Cupp**, TT Stumpf, DD Zalesky, MS Roberson, LA Werth, MW Wolfe, RJ Kittok, HE Grotjan and JE Kinder. 1995. Influence of 17beta-estradiol on distribution of luteinizing hormone and follicle-stimulating hormone isoforms during the follicular phase of the bovine estrous cycle. Biol. Repro. 52:297.

15. Bergfeld EG, FN Kojima, ME Wehrman, **AS Cupp**, KE Peters, V Mariscal, T Sanchez, RJ Kittok M Garcia-Winder and JE Kinder. 1995 Frequency of luteinizing hormone pulses and circulating 17□-oestradiol concentration in cows is related to concentration of progesterone in circulation when the

progesterone comes from either an endogenous or exogenous source. Anim. Repro Sci. 37:257-265.

16. Kojima FN, JR Chenault, ME Wehrman, EG Bergfeld, **AS Cupp**, LA Werth, V Mariscal, T Sanchez, RJ Kittok and JE Kinder. 1995 Melengestrol Acetate at greater doses than typically used for estrous synchrony in bovine females does not mimic endogenous progesterone in regulation of secretion of luteinizing hormone and 17 beta-estradiol. Biol. Repro. 52:455-463.
17. Sanchez, T, ME Wehrman, FN Kojima, **AS Cupp**, EG Bergfeld, KE Peters, V Mariscal, RJ Kittok and JE Kinder. 1995. Dosage of the synthetic progestin, norgestomet, influences luteinizing hormone pulse frequency and endogenous secretion of 17 beta-estradiol in heifers. Biol. Repro. 52:464-469.
18. Whaley PD, J Chaudhary, **A Cupp**, MK Skinner. 1995 Role of specific response elements of the cfos promoter and involvement of intermediate transcription factor(s) in the induction of Sertoli cell differentiation (Transferrin promoter activation) by the testicular paracrine factor PModS. Endocrinology 136:3046.
19. Chaudhary J, PD Whaley, **A Cupp**, MK Skinner. 1995 Transcriptional regulation of Sertoli cell differentiation by follicle stimulating hormone at the level of the cfos and transferrin promoters. Biol. Repro. 54:692.
20. Bergfeld E, N Kojima, **A Cupp**, M Wehrman, K Peters, V Mariscal, T Sanchez, and J Kinder. 1996 Changing doses of progesterone results in sudden changes in frequency of luteinizing hormone pulses and secretion of 17beta-estradiol in bovine females. Biol. Repro. 54: 546.
21. Wehrman ME, Fike KE, Kojima FN, Bergfeld EG, **Cupp AS**, Mariscal V, Sanchez T, Kinder JE. Development of a persistent ovarian follicle influences response to superovulation in heifers. .Theriogenology. 1996 Feb;45(3):593-610.
22. Mariscal DV, PL Wolfe, EG Bergfeld, **AS Cupp**, FN Kojima, KE Fike, T Sanchez, ME Wehrman, RK Johnson, RJ Kittok, JJ Ford and JE Kinder. 1996 Comparison of circulating concentrations of reproductive hormones in boars of lines selected for size of testes or number or ovulations and embryonic survival to concentrations in respective control lines. J Anim. Sci. 74:1905-1914.
23. Fike KE, EG Bergfeld, **AS Cupp**, FN Kojima, V Mariscal, T Sanchez, ME Wehrman, JE Kinder. 1996. Influence of fenceline bull exposure on duration of postpartum anoestrus and pregnancy rate in beef cows. Animal Reproduction Science 41:161-167.
24. Fike KE, Bergfeld EG, **Cupp AS**, Kojima FN, Mariscal V, Sanchez T, Wehrman ME, Grotjan WH, Hamernik DL, Kittok RJ, Kinder JE. Gonadotropin secretion and development of ovarian follicles during oestrous cycles in heifers treated with luteinizing hormone releasing hormone antagonist. Anim Reprod Sci. 1997 Dec 5;49(2-3):83-100.
25. Chaudhary J, **AS Cupp**, MK Skinner. 1997. Role of basic-helix-loop helix proteins in Sertoli cell differentiation: Identification of a critical E-box response element in the transferrin promoter. Endocrinology 138:667-675.
26. Itoh N, U Patel, **AS Cupp**, MK Skinner. 1998. Developmental and hormonal regulation of Transforming Growth Factor Beta Gene Expression in Isolated prostatic epithelial and stromal cells: EGF and TGF-beta interactions. Endocrinology 139:1378-88.
27. Mariscal DV, EGM Bergfeld, **AS Cupp**, FN Kojima, KE Fike T Sanchez, ME Wehrman, RK Johnson, RJ Kittok, JJ Ford, JE Kinder. 1998. Concentrations of gonadotropins, estradiol and progesterone in sows selected on an index of ovulation rate and embryo survival. Animal Reproduction Science 54:31-43.
28. Cupp AS, G. Kim, MK Skinner. 1999. Role of Transforming Growth Factor-beta on embryonic testis development. Biol Repro 60:1304-1313.
29. Cupp AS, J Dufour, G. Kim, KH Kim, MK Skinner. 1999. Role of Retinoids in Embryonic Testis Development . Endocrinology 140:2343-52.
30. Levine E, **AS Cupp**, L Miyashiro, MK Skinner. Role of Transforming growth factor-alpha and the epidermal growth factor receptor in embryonic rat testis development. Biol Repro 2000;62:477-490.
31* Levine E, ***AS Cupp**, MK Skinner. Role of Neurotropins in Embryonic Testis Morphogenesis (Cord Formation). Biol Repro 2000;62:132-142. ***** **Co- First Authors**
32. Cupp AS, G Kim, MK Skinner. Expression and Action of Neurotropin-3 (NT3) and Nerve Growth Factor (NGF) in embryonic and early testis development. Biol Repro 2000; 63:1617-1628.

33. Cupp AS and Skinner MK. Actions of the endocrine disruptor methoxychlor and its estrogenic metabolite on embryonic seminiferous cord formation and perinatal testis growth. Repro Toxicol 2001; 15:317-326.
34. Cupp AS G Kim, and MK Skinner. Expression and action of Transforming Growth Factor-alpha on embryonic testis growth and development. J. Andrology 2001; 22:1019-1029.
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Manuscripts Submitted/Under Revision/In preparation:

Przygrodzka E, Binderwala F, Powers R, Wood J, **Cupp A**, Davis JS (2024) Acute Metabolic Changes Induced by Luteinizing Hormone in Bovine Luteal Cells: Crucial Role For Glycolysis and Fatty Acids for Steroidogenesis. In review

Spuri Gomes, R, MA. Abedal-Majed, CM Sutton SE Kurz, SC Tenley, J Bergman, S Hileman, MN Bedenbaugh, RM. McFee, AF Summers, JR Wood, **AS Cupp**. Androgen Excess Cows Have Altered Circulating Endocrine Hormones and Irregular Reproductive Cycles Similar to Women with Polycystic Ovary Syndrome (submitted to BOR in revision).

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PEER REVIEWED SYMPOSIUM OR PROCEEDINGS

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JOURNAL ABSTRACT

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9) M Magamage, M Hart, LD Prezotto, MA Abedal-Majed, R Spuri Gomes, CO Lemley, C Casey, SG Kurz, JS Davis, JR Wood, **AS Cupp**. Increased concentration of progesterone during the estrous cycle and altered follicular fluid IL-13, but not liver metabolism, may determine if High A4 cows ovulate or develop persistent follicles. Greenwald Reproductive Symposia, KC, Kansas 2023.
10) M Stohlmann, M Hess, S Ference, SR Nafziger, JA Keane, SG Kurz, ML Spangler, JL Petersen, and **AS Cupp**. Puberty classifications in beef heifers are moderately to highly heritable and associated with single nucleotide polymorphisms from candidate genes related to cyclicity and timing of puberty. Greenwald Reproductive Symposia, KC Kansas 2023.
11) CF Monaco, MR Plewes, E Przygrodzka, JR Wood, AS Cupp, JS Davis. Basic fibroblast growth factor induces matrix production and proliferation of bovine luteal fibroblasts. SSR 2022, Spokane, WA.
12) Abedal-Majed, MA, M Abuajamieh, M Al-Qaisi, M A. Alnimer, K. Sargent, HH Titi, A Abdelqader, Al Shamoun, A. Cupp. Ewes with androgen excess in follicular fluid have increased steroidogenic and inflammatory markers and follicular arrest, SSR 2022, Spokane, WA.
13) Bell, BE, K Hoffman, M Hart, K Sargent, A Castillo, J Ganser, M Abedal-Majed, K. Kirshner, AS Cupp. Elimination of Vascular Endothelial Growth Factor A (VEGFA) in Pre-Granulosa cells results in Reduced AMH and Subfertility in Mice. Accepted SSR 2022, Spokane, WA.
14) Mohamed A. Abedal-Majed, Shelby A. Springman, Hanan Jafar, Brooke Bell, Scott G. Kurz, Kyle Wilson, and Andrea S. Cupp. High A4 Females Are Present in Other Herds and have Naturally Occurring Androgen Excess Similar to Women Diagnosed with Polycystic Ovary Syndrome SSR 2021, St Louis December 15-18.
15) Jessica A. Keane, Alexandria P. Snider, Miguel A. Fudolig, Kerri A. Bochantin, Courtney M. Sutton, Jeff W. Bergman, Scott G. Kurz, Jennifer R. Wood, Kathryn J. Hanford, and Andrea S. Cupp. Reductions in

Hematocrit and Hemoglobin Concentrations in Non-Cycling Heifers May Contribute to Delayed Pubertal Attainment. SSR 2021, St Louis December 15-18.

16) Emilia Przygrodzka, Jitu W. George, Scott Benson, Michele R. Plewes, Corrine F. Monaco, Jessica Keane, Renee McFee, Jennifer S. Wood, Andrea Cupp, John S. Davis Acute Metabolomic and Transcriptomic Changes During Luteolysis: Identification of New Players in Luteal Maintenance. SSR 2021, St Louis December 15-18.
17) Brooke Bell, Scott G. Kurz, Mohamed A. Abedal-Majed, Shelby A. Springman, Mariah Hart, Alexandria P. Snider, Jennifer R Wood, John S Davis and Andrea S. Cupp. Intra-Ovarian Factors contribute to inflammation and follicle arrest in the High A4 cow Ovarian Microenvironment. SSR 2021, St Louis December 15-18.
18) Hoffman K, SG Kurz, K Sargent, M Hart, CM Sutton, **AS Cupp**. Effect of Elimination of Vascular Endothelial Growth Factor A (VEGFA) in Granulosa cells on concentrations of Anti-Mullerian Hormone and follicle stages in mice. Undergraduate research Fair (UNL) and Undergraduate Honors Thesis. 2021.
19) McGibbon, E, AP Snider, R Spuri Gomes, MA Abedal-Majed, JR Wood, JS Davis, **AS Cupp**. Markers of Inflammation in Androgen Excess Cows. Undergraduate Research Fair (UNL)- 2021.
20) **Competition for Postdoctoral Poster Presentation SSR**: Snider, AP, RS Gomes, AF Summers, MA Abedal-Majed, SC Tenley, RM. McFee, JR Wood, JS Davis and **AS Cupp**. Lipids involved in pro and anti- inflammatory responses are altered in follicular fluid and plasma of cows administered a low-dose-FSH protocol and may be used as markers of ovulation in beef cows. SSR Virtual Poster. July 2020.
21) Sutton, C.M., S.A. Springman, J.A. Keane S.R. Nafziger, A.P. Snider, J.W. Bergman, S.G. Kurz, J.S. Davis and **A.S. Cupp**. Altered Anti-Mullerian hormone concentrations during pubertal attainment may contribute to altered or delayed puberty and predict reproductive performance in heifers during first breeding season.
22) Keane, JA, SR Nafziger, JW Bergman, SG Kurz, AP Snider, KA Bochantin, JR Wood, RA Cushman, AF Summers, and **AS Cupp**. Environmental Parameters May Increase Likelihood of Beef Heifers Classified with Earlier or Later Pubertal Attainment. SSR Virtual Poster 2020.
23) Bochantin, KA, JA Keane, AP Snider, SG Kurz, JW Bergman, RM McFee, **AS Cupp**, JR Wood. Systemic inflammation in beef cows is associated with delayed puberty attainment and decreased androgen production in small follicles. SSR Virtual 2020, poster. July 2020.
24) S.A. Springman, S. Nafziger, M. A. Abedal-Majed, A. Snider, K. Bochantin, J. Bergman, R. M. McFee, J.S. Davis, J. R. Wood, and **AS Cupp**. Follicle Stimulating Hormone Stimulation Restores Ovarian Microenvironment of Beef Heifers with Androgen Excess to Reduce Inflammation Society for the Study of Reproduction meeting oral abstract C13, San Jose, CA, 2019, Rocky Mountain Reproductive Symposia, Colorado, April 2019.
25) Bochantin, KA, AP Snider, SA Springman, SG Kurz, JA Keane, S Nafziger, JW Bergman, RM McFee, **AS Cupp**, JR Wood. Lipopolysaccharide Differentially Affects Pro-Inflammatory Responses in Theca Cells from Androgen Excess compared to Control Beef Cows. Society for the Study of Reproduction, San Jose, CA,,2019, Poster P113, Rocky Mountain Reproductive Symposia, Colorado, 2019.
26) Snider AP, S Nafziger, J Bergman, SG Kurz, JS Davis, JR Wood, JL Petersen, **AS Cupp**. Genetic variants of an excess androgen ovarian microenvironment can be potential markers for a High A4 phenotype. Rocky Mountain Repro Symposia, Colorado, April 2019; Society for the Study of Reproduction, San Jose, CA, 2019, Poster P92; Gil Greenwald Reproduction and Regenerative Medicine Symposia, Nov 2019.
27) Keane, J, S Nafziger, MA Abedal-Majed, S Tenley, M Hart, JW Bergman, SG Kurz, JR Wood, AF Summers and **AS Cupp**. Early Reduced Growth Rates Predict Delayed or Altered Puberty and May Adversely Affect Reproductive Longevity in Beef Heifers. Society for the Study of Reproduction, San Jose, CA, 2019 Poster 100; Gil Greenwald Reproductive and Regenerative Medicine Symposia, Kansas City KS, Nov 2019.
28) Sachse, C, K Roth, A Otto, SA Springman, M Shipka, B Alexander, R Zigler, J Blake, J Rowell and AS Cupp. Effect of Medroxyprogesterone Acetate (a Progestin) on Spermatogenesis in Farmed Male Reindeer. UNL Undergraduate Research Fair April 2019.
29) INVITED TALK: **Cupp, AS**, S Nafziger, MA Abedal-Majed, S Tenley, M Hart, AP Snider, JW Bergman, SG Kurz JS Davis, JR Wood, AF Summers. Attainment and Maintenance of Pubertal Cyclicity May Predict High A4 cows with Reduced Fertility. Midwest ASAS Meetings, Omaha, NE, 2019.

30) **Invited Talk:** Davis, JS, H Talbott, X Hou, JR Wood, **AS Cupp**. Cytokine Expression and Action in the Corpus Luteum. Endocrinology, 2019.
31) Nafziger, S, MA Abedal-Majed, S Tenley, AF Summers, M Hart, J Bergman, SG Kurz, JS Davis, JR Wood, RA Cushman, **AS Cupp**. Attainment and Maintenance of Pubertal Cyclicity May Predict High A4 cows with Reduced Fertility. Gil Greenwald Reproductive and Regenerative Medicine Symposia, University of Kansas Medical Center, October 2018.
32) Springman, SA, MA Abedal-Majed, ML Hart, V Largen, MPS Magamage, SG Kurz, KM Sargent, J Bergman, RM McFee, RA Cushman, JS Davis, JR Wood and **AS Cupp.** Ovarian Cortex from High A4 Cows Secrete Excess Steroid Hormones Contributing to Arrested Follicle Development, Increased Oxidative Stress and Fibrosis Which can be Rescued by Angiogenic VEGFA165. Gil Greenwald Reproductive and Regenerative Medicine Symposia, University of Kansas Medical Center, October 2018.
33) Snider A, RS Gomes, SM Romereim, AF Summers, MA Abedal-Majed, SC Tenley, SG Kurz, J Bergman, RA Cushman, JS Davis, JR Wood, and **AS Cupp**. Altered Blood Plasma and Follicular Fluid Lipid Profiles Predict Alterations in Cell Signaling, Metabolism, and Immune Function in Cows with Androgen Excess. Gil Greenwald Reproductive and Regenerative Medicine Symposia, University of Kansas Medical Center, October 2018.
34) Hart, ML, MA Abedal-Majed, RS Gomes, AP Snider, AF Summers, SG Kurz, JW Bergman, RM McFee, CA Casey, C Lemley, RA Cushman, JS Davis, JR Wood, **AS Cupp**. Cyclicity Phenotype and Ovarian Cortex Androgen Secretion in Androgen Excess Cows are Predictive of Plasma Steroid and Lipids, Liver Enzymes and Follicular Fluid Cytokines. SSR New Orleans, LA 2018.
35) MA Neilson, RS Gomes, SM Romereim, AF Summers, M A Abedal-Majed, SC Tenley, S SG Kurz, JW Bergman, RA Cushman, JS Davis, JR Wood, and **AS Cupp**. Altered Blood Plasma and Follicular Fluid Lipid Profiles Predict Alterations in Cell Signaling, Metabolism, and Immune Function in Cows with Androgen Excess. SSR New Orleans, LA 2018.
36) KA Bochantin, W. Pohlmeier, KM Sargent, S G Kurz, SM Romereim, O Daudu, RM McFee, **AS Cupp**, JR Wood. Microarray Analysis Predicts that Differentially Expressed Genes in Theca Cells from Cows with High Intrafollicular Androstenedione is Regulated by ESR1 and VEGFA Signaling and Increased mRNA Stability. SSR New Orleans, LA 2018**.**
37) S Nafziger, MA Abedal-Majed, S Tenley, AF Summers, ML Hart, MA Neilson, JW Bergman, SG Kurz, JR Wood, RA Cushman, **AS Cupp**. Progesterone Profiles at Puberty May Indicate Future Reproductive Longevity in Beef Heifers. SSR New Orleans. LA 2018.
38) SA Springman, MA, Abedal-Majed, ML Hart, V Largen, MPS Magamage, SG Kurz, KM. Sargent, J Bergman, RM McFee, RA Cushman, JS Davis, JR Wood and **AS Cupp**. Ovarian Cortex from High A4 Cows Secrete Excess Steroid Hormones Contributing to Arrested Follicle Development, Increased Oxidative Stress and Fibrosis Which can be Rescued by Angiogenic VEGFA165**.** SSR New Orleans. LA 2018**.**
39) AP Snider, SM Romereim, AF Summers, BE Pohlmeier, RM. McFee, SG. Kurz, JS. Davis, JR Wood, **AS Cupp**. Exposure to excess androgen in the ovarian microenvironment results in altered granulosa cell function with altered steroidogenesis, signal transduction, cyclicity and response to male exposure. SSR New Orleans. LA 2018**.**
40) INVITED TALK: **Cupp AS**. Effects of Ovarian Microenvironment on Folliculogenesis. PCOS Focus Session, SSR New Orleans, LA 2018.
41) Barnes TB, Beede KA, Merrick EM, Cadaret CN, **Cupp AS**, Yates DT*. 2018. Impaired muscle stem cell function in cows with high concentrations of androstenedione in their follicular fluid. Proc. West. Sect. Am. Soc. Anim.Sci. 69.
42) Nafziger S., MA Abedal-Majed, S. Tenley, A Summers, M Hart, G. Harsh, J Bergman, S. Kurz, JR Wood, RA Cushman, **AS Cupp**. Endocrine profiles during attainment of puberty may predict reproductive longevity in heifers. October 2017 Gil Greenwald Reproductive Symposium UKMC, Poster and Flash talk.
43) Abedal-Majed, MA, ML Hart, V Largen, MPS Magamage, SG. Kurz, KM. Sargent, J Bergman, RM McFee, RA Cushman, JS Davis, JR Wood and **AS Cupp** Ovarian Cortex from High A4 cows secretes excess A4, and exhibits increased oxidative Stress, and arrested follicle development which can be partially rescued by Angiogenic VEGFA isoforms. October 2017 Gil Greenwald Reproductive Symposium UKMC, Poster and Flash talk. Received Best Poster for Graduate Student Award.

44) S. Nafziger, MA Abedal-Majed, S. Tenley, A Summers, M Hart, G. Harsh, J Bergman, S. Kurz, JR Wood, RA Cushman, **AS Cupp**. Endocrine profiles during attainment of puberty may predict reproductive longevity in heifers. October 2017 Gil Greenwald Reproductive Symposium UKMC, Poster and Flash talk.
45) Abedal-Majed, MA, ML Hart, V Largen, MPS Magamage, SG. Kurz, KM. Sargent, J Bergman, RM McFee, RA Cushman, JS Davis, JR Wood and **AS Cupp** Ovarian Cortex from High A4 cows secretes excess A4, and exhibits increased oxidative Stress, and arrested follicle development which can be partially rescued by Angiogenic VEGFA isoforms. October 2017 Gil Greenwald Reproductive Symposium UKMC, Poster and Flash talk. Received Best Poster for Graduate Student Award.
46) Abedal-Majed, MA, ML Hart, V Largen, MPS Magamage, SG. Kurz, KM. Sargent, J Bergman, RM McFee, RA Cushman, JS Davis, JR Wood and **AS Cupp**. Ovarian Cortex from High A4 Cows Secretes Excess A4, and Exhibits Increased Oxidative Stress, Macrophage Markers and Arrested Follicle Development Which can be Partially Rescued by Angiogenic VEGFA Isoforms. (SSR 2017), Washington DC.
47) Hart ML, MA. Abedal-Majed, R Spuri Gomes, SG. Kurz, JW Bergmann, RM McFee, CO Lemley, CA Casey, JS Davis, JR. Wood, and **AS Cupp**. Reduced Sex Hormone Binding Globulin in Excess High Androstenedione Cows may be due to Alterations in Metabolism and Liver Function (SSR 2017), Washington DC.
48) SM Romereim, AF Summers, WE Pohlmeier, RM McFee, R Spuri Gomes, SG Kurz, JS Davis, JR Wood, **AS Cupp**. A High-Androgen Microenvironment Inhibits Granulosa Cell Proliferation and May Alter Cell Identity. (SSR 2017), Washington DC.
49) S Nafziger, MA Abedal-Majed, SC Tenley, AF Summers, ML Hart, G Harsh, JW Bergman, SG Kurz, JR Wood, RA Cushman, **AS. Cupp**. Endocrine Profiles during Attainment of Puberty may Predict Reproductive Longevity in Heifers (SSR 2017) Washington DC.
50) INVITED TALK ASAS 2017: **AS Cupp,** JR Essink, ML Cable, WE Pohlmeier, MM Laughlin and KM Sargent. Divergent Vascular Endothelial Growth Factor A (VEGFA) Signaling Determines Spermatogonial Stem Cell Fate. (ASAS 2017)
51) Romereim SM, SC Tenley, MA. Abedal-Majed, J Bergman, SG. Kurz, JS. Davis, J R. Wood, **AS Cupp**. Aromatase Inhibition during Bovine Dominant Follicle Development Delays Ovulation But Does Not Create a Persistent Follicle. Gil Greenwald Reproductive and Regenerative Medicine Symposia UKMC 2016.
52) KM Sargent, R Spuri Gomes, JR Essink, SG Kurz, WE Pohlmeier, N Ferrara, GJ. Bouma, DJ. McLean, and **AS Cupp**. Sertoli cell-specific elimination of *Vegfa* impairs spermatogonial stem cell (SSC) maintenance and reduces fertility in male mice. Gil Greenwald Reproductive and Regenerative Medicine Symposia UKMC 2016.
53) Hart ML, SG Kurz, KM Sargent, N Ferrara, GJ Bouma, and **AS. Cupp**. Elimination of VEGFA in granulosa and Sertoli cells via *Sry-Cre* decreases fertility in adult mice by increasing parturition intervals and decreasing pups per litter. Gil Greenwald Reproductive and Regenerative Medicine Symposia UKMC 2016.
54) Abedal-Majed MA, M Magamage, R Vinton, S Kurz, AK McNeel, HC. Freetly, RA Cushman, JR. Wood, **AS Cupp**. Effect of diet on ability of Vascular Endothelial Growth Factor A (VEGFA) isoforms to alter follicular progression in bovine ovarian cortical cultures Gil Greenwald Reproductive and Regenerative Medicine Symposia UKMC 2016.
55) Romereim, SM, JR Wood, X Hou, H Talbott, RA Cushman, JS Davis, **AS Cupp**. A Comparison of Ovarian Follicular and Luteal Cell Gene Expression Profiles Provides Insight into Cellular Identities and Functions. Society for the Study of Reproduction meetings, San Diego, CA 2016.
56) Sargent KM, JR Essink, ML Bremer, WE Pohlmeier, MM Laughlin, and **AS Cupp**. Loss of neuropilin-1 impairs VEGFA angiogenic signaling and alters the expression of spermatogonial stem cell maintenance markers. Society for the Study of Reproduction meetings, San Diego, CA 2016.
57) Hart ML, S G. Kurz, K M. Sargent, N Ferrara, G Bouma and **A S. Cupp**. Elimination of *Vegfa* in Granulosa and Sertoli cells via *Sry-Cre* decreases fertility in adult mice. Society for the Study of Reproduction meetings, San Diego, CA 2016.
58) Tenley SC, A Summers, R Spuri-Gomes, M A. Abedal-Majed, J Bergman, S Kurz, J Wood, R Cushman, and **AS Cupp**. A portion of heifers attaining “Early Puberty” do not display estrus, are anovulatory and have altered Sex Hormone Binding Globulin concentrations. Society for the Study of Reproduction meetings, San Diego, CA 2016.

59) Abedal-Majed MA, M Magamage, R Vinton, S Kurz, AK McNeel, HC. Freetly, RA Cushman, JR. Wood, **AS Cupp**. Effect of Diet on Ability of Vascular Endothelial Growth Factor A (VEGFA) isoforms to alter Follicular Progression in Bovine Ovarian Cortical Cultures. Society for the Study of Reproduction meetings, San Diego, CA 2016.
60) Sargent, KM, JR Essink, ML Bremer, WE Pohlmeier, MM Laughlin, SG Kurz, and **AS Cupp**. Divergent VEGFA signaling determines spermatogonial stem cell fate. Midwest ASAS meeting March 2016; Young Scholar Awardee. Des Moines, IA.
61) Cushman RA, ÉM. Soares, MA Abedal-Majed, **AS Cupp**, GA. Perry, HC. Freetly. Fetal and postnatal nutritional programming of reproductive performance in ruminants. MWASAS meetings 2016 March. Invited talk at MWASAS 2016.
62) Cushman RA, SC. Tenley, ÉM. Soares, RS. Gomes, AK. McNeel, RG. Tait Jr., **AS. Cupp**, LA. Kuehn, GA. Perry, CC. Chase Jr. Use of an electronic activity detection system to characterize estrus activity in crossbred beef heifers differing in follicle number. MWASAS meetings March 2016
63) Romereim S, J. Wood, X. Hou, H Talbott, J Davis, **AS Cupp.** A Comparison of Ovarian Follicular and Luteal Cell Gene Expression Profiles Provides Insight into Cellular Identities and Functions. Gil Greenwald Reproductive and Regenerative Medicine Symposia. Best Post-doc Poster Presentation. UKMC Oct 2015.
64) Tenley SC, R Spuri-Gomes, MA Abedal-Majed, J Bergman, S Kurz, JR Wood, RA Cushman, **AS Cupp**. A Portion of Heifers Attaining "Early Puberty" do not display estrus, are anovulatory and have reduced Sex Hormone Binding Globulin concentrations. Gil Greenwald Reproductive and Regenerative Medicine Symposia, UKMC Oct 2015.
65) Sargent, KM, JR. Essink, ML. Bremer, WE. Pohlmeier, MM. Laughlin, and **AS. Cupp**. Divergent VEGFA signaling determines spermatogonial stem cell fate. Gil Greenwald Reproductive and Regenerative Medicine Symposia, UKMC Oct 2015.
66) Talbott, Heather, Pan Zhang, Xiaoying Hou, Autumn Keiser, Fang Yu, **Andrea S. Cupp**, John S. Davis. Identification of IL-17 as a Potential Mediator of Luteolysis: Inhibition of Progesterone Secretion. SSR 2015, Puerto Rico.
67) Romereim, Sarah M., Adam F. Summers, Bill E. Pohlmeier, Renee M. McFee, Renata Spuri-Gomes, Scott G. Kurz, Anthony K. McNeel, Robert A. Cushman, John S. Davis, Jennifer R. Wood and, **Andrea S. Cupp**. Granulosa Cell Cycle Regulation and Steroidogenesis in a High Androstenedione Follicular Microenvironment. SSR 2015, Puerto Rico.
68) Spuri-Gomes, Renata, Sarah C Tenley, Mohamed Ayoub, Scott G. Kurz, Jeff Bergman, Jennifer R. Wood, and **Andrea S. Cupp**. Cows with Intrafollicular Androgen Excess have Lower Sex Hormone Binding Globulin and appear to be Chronic or Sporadic Anovulatory. SSR 2015, Puerto Rico.
69) Sargent, Kevin, Renata Spuri Gomes, John R. Essink, Scott G. Kurz, William E. Pohlmeier, Napoleone Ferrara, Gerrit J. Bouma, Derek J. McLean, and **Andrea S. Cupp**. Sertoli cell-specific elimination of *Vegfa* impairs spermatogonial stem cell (SSC) maintenance and reduces fertility in male mice. SSR 2015, Puerto Rico.
70) Ayoub, Mohamed, Manjula Magamage, Rebecca Vinton, Robert A Cushman, Anthony K. McNeel, Harvey C. Freetly, Jennifer R. Wood, and **Andrea S. Cupp**. Vascular Endothelial Growth Factor A 165 (VEGFA165), Angiogenic Isoform, promotes while VEGFA165b antagonizes VEGFA165 stimulated follicular progression in bovine ovarian cortical pieces cultured from pre-pubertal heifers. SSR 2015 Puerto Rico.
71) Talbott, H, P Zhang, X Hou, **AS Cupp**, JS Davis. IL-17A in combination with TNF and PGF can inhibit LH-induced progesterone secretion of small luteal cells in vitro. MSBRF Feb 2015.
72) Cushman RA, AK McNeel, EC Wright, OL Amundson, SC Tenley, EL Larimore, BN Richardson, CC Chase Jr., GA Perry, **AS Cupp**. Relationship between pre-weaning gain, age at puberty, and reproductive tract development in Angus heifers. Midwest ASAS submitted Oct 2014.
73) Romereim, S, AF Summers, WE Pohlmeier, RM McFee, R Spuri-Gomes, SG Kurz, A McNeel, RA Cushman, JS Davis, JR Wood, **AS Cupp**. Differential Regulation of Cell Cycle and Immune Response Networks in Bovine Granulosa Cells with Excess Intrafollicular Androstenedione. Gil Greenwald Reproductive Symposia Nov 6, 2014.
74) Sargent KM, N. Lu, W. E. Pohlmeier, M.L. Bremer, A. F. Summers and **A. S. Cupp**. Transient treatment of Vascular Endothelial Growth Factor A (VEGFA) isoforms *in vivo* affects testis composition and mRNA abundance of genes that regulate the self-renewal of undifferentiated spermatogonia and

survival in the perinatal rat testes. Presented at UNL Molecular Mechanisms of Disease Symposia May 2014; SSR, oral talk July 2014.

75) Summers A.F., W. E. Pohlmeier, K. M. Sargent, S. G. Kurz, R. M. McFee, A. K. McNeel, R. A. Cushman, J. R. Wood, and **A. S. Cupp**. Granulosa Cell Gene Expression Profiling in Cows with Divergent Follicular Fluid Concentrations of Androgens presented orally at: UNL Molecular Mechanisms of Disease Symposia May 2014; SSR, July 2014.
76) Chase CC, EC Wright, AK McNeel, RA Cushman, GA Perry, AS Cupp, JL Vallet, DD Sypherd, JR Miles. 142 effect of high and low antral follicle count in pubertal beef heifers on ivf. Reprod Fertil Dev. 2013 Dec;26(1):184. doi: 10.1071/RDv26n1Ab142.
77) A. F. Summers, W. E. Pohlmeier, V. M. Brauer, K. M. Sargent, S. G. Kurz, R. M. McFee, R. A. Cushman, J. R. Wood, and **A. S. Cupp.** Altered Theca Gene Expression and Ovarian Follicular Development in Cows with Follicular Fluid Androgen Excess. Gil Greenwald Symposia UKMC. Oct 2013.
78) McFee R.M., Scott Kurz, Adam Summers, William Pohlmeier, Robert Cushman, Jennifer Wood, **Andrea Cupp**. Granulosa cells activate different signal transduction pathways dependent on follicle health status and ability to convert androstenedione to estrogen resulting in different steroidogenic profiles for beef cattle follicles. Biol. Repro 2013.
79) Sargent, K.M., N. Lu, D.T. Clopton, W.E. Pohlmeier, V.M. Brauer,R.M. McFee, N.Ferrara, D.W. Silversides, and **A.S. Cupp**. Loss of Vascular Endothelial Growth Factor A (VEGFA) isoforms in Granulosa cells using pDMRT-1 cre reduces female fertility by arresting follicular development and reducing number of follicles ovulated and affecting litter size. Biol. Repro 2013.
80) A. F. Summers, W. E. Pohlmeier, V. M. Brauer, K. M. Sargent, S. G. Kurz, R. M. McFee, R. A. Cushman, J. R. Wood, and **A. S. Cupp**. A Bovine Model for Polycystic Ovary Syndrome. Biol. Repro oral talk. Animal in Agriculture Award. 2013.
81) Kevin M. Sargent, Ningxia Lu, William E. Pohlmeier, Shantille G. Kruse, Meredith L. Bremer, and **Andrea Cupp.**2012**.** Altering the balance of vascular endothelial growth factor A (VEGFA) isoforms *in vivo* affects mRNA abundance of genes that regulate the self-renewal of undifferentiated spermatogonia and survival, testis morphogenesis, and germ cell numbers in perinatal rat testes. Greenwald Reproductive Symposia. 2013
82) Sargent KM, ML Bremer, WE Pohlmeier, VM Brauer, Andrea S Cupp. Neuropilin-1 (NRP-1) loss in Sertoli cells increases testis weight and alters expression of genes necessary for undifferentiated spermatogonia self-renewal, differentiation and cell survival. Biol. Repro platform August 2012.
83) Summers AF, WE Pohlmeier, RM McFee, VM Brauer, SG Kurz, RA Cushman, JR Wood and AS Cupp. VEGFA164_B mRNA abundance has a positive relationship to AMH, BCL2 and the ratio of E2:A4 in mural granulosa cells of estrogen active and inactive follicles prior to ovulation. Bio repro 2012.
84) Summers AF, R. A. Cushman, and A. S. Cupp. Heifers with low antral follicle counts have low birth weights and produce progeny with low birth weights. J Anim Sci. 2012.
85) He J, WE Pohlmeier, J Lee, AS Cupp. The effect of copper/zinc superoxide dismutase knockout (SOD1) on abundance of mRNA for Vascular Endothelial Growth Factor A (VEGFA) angiogenic and antiangiogenic isoforms in female ovaries. Rocky Mountain Reproductive Symposia 2012.
86) SG. Kurz, NX Lu, WE Pohlmeier, VM Brauer, D Silversides, N Ferrara and **AS Cupp**.Production of VEGFA Isoforms by Sertoli and Granulosa cells is critical for male and female fertility. Rocky Mountain Reproductive Symposia 2012.
87) Talbott H, Xiaoying Hou, Dulce Maroni, Jing Fan, Chittibabu Guda, Fang Yu, RA Cushman, **AS Cupp**, JS Davis. PGF2alpha Stimulates the Expression IL8 and other Chemokines: A Potential Role in Corpus Luteum Regression Through Recruitment of Neutrophils. American Society for Cell Biology, December 2011.
88) Sargent, Kevin M,Meredith L Bremer, William E Pohlmeier, Vanessa M Brauer, and **Andrea S Cupp.**Neuropilin-1 (NRP-1) loss in Sertoli cells reduces expression of genes necessary for spermatogonial stem cell (SSC) niche establishment. Reproductive Biology and Genetics Conference, Univ of Missouri May 16, 2011.
89) Davis, John S, Xiaoying Hou, Dulce Maroni, Heather Talbott, Jing Fan, Chittibabu Guda, Fang Yu, Robert A. Cushman, and **Andrea Cupp**. Rapid Induction of Gene Expression in the Corpus Luteum Following In Vivo Treatment with Prostaglandin F2 alpha. Biol Reprod June 2011 83(Supplement) 229.
90) Renee McFee, Robin Artac, William Pohlmeier, Jill Kerl, Vanessa Brauer, Robert Cushman, **Andrea Cupp**. Anti-angiogenic *VEGFA164B* isoform mRNA is more abundant in E2-inactive, atretic follicles

while expression of angiogenic *VEGFA* isoforms is greater in granulosa cells from developing bovine follicles prior to the LH surge. Biol Reprod June 2011 83(Supplement) 668.

91) Sargent, Kevin M., Ningxia Lu, William E. Pohlmeier, Vanessa Brauer, Renee McFee, Napoleon Ferrara, David Silversides, and **Andrea S. Cupp**. Sertoli and Germ cell Vascular Endothelial Growth Factor A (VEGFA) loss using pDMRT-1 Cre affects testis size and reduces spermatogenesis potentially through altering genes regulating the spermatogonial stem cell niche. Biol Reprod June 2011 83(Supplement) 567.
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UNDERGRADUATE HONORS THESIS

2021- Katie Hoffman; Biochemistry; Effect of Elimination of Vascular Endothelial Growth Factor A (VEGFA) in Granulosa cells on concentrations of Anti-Mullerian Hormone and follicle stages in mice.

2020- Katie Roth**-** School of Veterinary and Biomedical Science- Effect of Elimination of Vascular Endothelial Growth Factor A (VEGFA) in Granulosa cells on concentrations of Anti-Mullerian Hormone and follicle stages in mice.

2006- Natalie Hart. Biochemistry -ARD Funding $2,500- *Expression of mRNA for Hyaluronan Metabolic Enzyme sin Embryonic and Perinatal Rat Gonads; Defended Thesis. July 2006*

DISSERTATIONS AND THESIS

1) Bott, Rebecca. The role of vascular endothelial growth factor (VEGF) in embryonic testis morphogenesis. MS Thesis. University of Nebraska-Lincoln, Animal Science, 2005.
2) Harris, Heidi. Utilization of soybeans or corn milling co-products in beef heifer development diets. MS Thesis. University of Nebraska-Lincoln, Animal Science, 2005. Co-advised with Rick Funston.
3) Ten Broeck, Robin. The role of vascular endothelial growth factor (VEGF) isoforms during ovarian development and prior to ovulation. MS Thesis. University of Nebraska-Lincoln, Animal Science. 2006.
4) Martin, Jeremy. Effects of protein supplementation and source in cow/calf systems and heifer development. PhD Dissertation. University of Nebraska-Lincoln, Animal Science. 2007. Co-advised with Rick Funston.
5) Baltes-Breitwisch, Michelle. The role of vascular endothelial growth factor A (VEGFA) isoforms during testis morphogenesis. MS Thesis. University of Nebraska-Lincoln, Animal Science. 2007.
6) Larson, Daniel. Nutritional and Biochemical factors impacting reproduction in replacement heifers and puberty in bull calves. PhD Dissertation. University of Nebraska-Lincoln, Animal Science. 2009. Co-advised with Rick Funston.

7) Slattery, Racheal. The role of VEGF isoforms on ovarian follicle development and follicle status in the perinatal rat and adult bovine. MS Thesis. University of Nebraska-Lincoln, Animal Science 2009.
8) Lu, Ningxia. Alteration of Vascular Endothelial Growth Factor A (VEGFA) isoform expression results in Abnormal Gonadal function. MS Thesis. University of Nebraska-Lincoln, Animal Science December 2010.
9) McFee, Renee M. The role of Vascular Endothelial Growth Factor isoforms in early follicle development. MS Thesis. Kansas State University, February 2012- Co advisor with Tim Rozell.
10) Sargent, Kevin M. Treatment with or elimination of Vascular Endothelial Growth Factor A (VEGFA) results in altered mRNA abundance of undifferentiated spermatogonial niche renewal and differentiation factors. MS Thesis. University of Nebraska-Lincoln May 2012.
11) Summers, Adam F. Beef Cattle Production: Understanding the effect of Heifer development system, late gestation protein supplementation, and ovarian steriodogenic environment on productivity, reproduction, and longevity. PhD Dissertation. University of Nebraska-Lincoln, Animal Science, December 2012. Co-advised with Rick Funston.
12) Nielson, Hazy. Cattle Management systems for Estrus Synchronization and Heifer development. MS Thesis. University of Nebraska-Lincoln August 2015. Co-advised with Rick Funston.
13) McFee, Renee M. Role of VEGFA in bovine follicular development; Evaluation of the role of laboratories in Physiology classes. PhD Dissertation. University of Nebraska-Lincoln. December 2015. Co-advised with Jennifer Wood.
14) Spuri Gomes, Renata. Cows with Androgen Excess in Follicular Fluid have altered reproductive cycles, Sex Hormone Binding Globulin, metabolism and gonadotropin secretion. MS Thesis University of Nebraska-Lincoln, August 2016
15) Tenley, Sarah C. Endocrine hormone profiles and ovarian morphology as markers of pubertal status and fertility in heifers. MS Thesis University of Nebraska-Lincoln, August 2016. Co-advised with Bob Cushman.
16) Sargent, Kevin M. Divergent Vascular Endothelial Growth Factor A (VEGFA) Signaling Determines Spermatogonial Stem Cell Fate. PhD Dissertation University of Nebraska-Lincoln, December 2016
18) Springman, Shelby. Management Strategies for Beef Heifer Development. MS Thesis University of Nebraska-Lincoln, December 2017. Co-advised with Rick Funston.
17) Abedal-Majed,Mohamed Ayoub Sleman. Effect of postweaning diet, Excess Androstenedione, and Vascular Endothelial Growth Factor A (VEGFA) isoforms on follicular progression in bovine ovarian cortical cultures. PhD Dissertation University of Nebraska-Lincoln, December 2017.
18) Hart, Mariah. Alterations in Circulating Steroid Hormones, Lipids, Hepatic Steroid Inactivation Enzymes, and Ovarian Cortex and Follicular Fluid Cytokines in Cows with Androgen Excess. Thesis August 2018.
19) Nafziger, Sarah. Attainment and Maintenance of Pubertal Cyclicity May Predict High A4 Cows with Reduced Fertility. MS Thesis. University of Nebraska-Lincoln May 2019.
20) Keane, Jessica. Changes in whole blood parameters in beef heifers may contribute to delayed pubertal attainment. MS Thesis. University of Nebraska-Lincoln May 2021
21) Tadich, Landon. Effect of Supplementation prior to artificial insemination and during gestation in beef females. August 2023. MS. Thesis. University of Nebraska-Lincoln Co-advised with Rick Funston.
22) Christenson, Dempster. Artificial Insemination and Fetal Programming in Beef Production Systems. May/Aug 2024. MS Thesis. University of Nebraska-Lincoln. Co-advised with Rick Funston..

Genebank Sequences:

1) Pohlmann, RM, DT Clopton, and **AS Cupp.** Expression of VEGF 165b in the developing rat Gonad. Rattus norvegicus strain CD IGS vascular endothelial growth factor 165b mRNA, partial cds. Genbank Accession: EU040284; bases 1 to 220. *Status Date:* 07/2007
2) Longfellow RA, Clopton DT, **Cupp AS**. Rattus norvegicus strain DC IGS vascular endothelial growth factor 189b mRNA, partial cds. Genbank accession EU040285. *Status Date:* 07/2007
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