

## Publications

### Research Papers

#### Peer reviewed

1. Bollatti, J., Zenobi M., Artusso N., Lopez A., **Nelson C.D.**, Barton, B., Staples C., and J.E.P. Santos. 2020. Effects of rumen-protected choline on the inflammatory and metabolic status and health of dairy cows during the transition period. *J. Dairy Sci.* 103:4192-4205. doi.org/10.3168/jds.2019-17294.
2. Bollatti JM, Zenobi MG, Artusso NA, Alfaro GF, Lopez AM, Barton BA, **Nelson CD**, Staples CR, Santos JEP. 2020. Timing of initiation and duration of feeding rumen-protected choline affects performance of lactating Holstein cows. *J. Dairy Sci.* 103:4174-4191.
3. Fan P., Bian B., Teng L., **Nelson C.**, Driver D., Elzo M., and KC Jeong. 2020. Host genetic effects upon the early gut microbiota in a bovine model with graduated spectrum of genetic variation. *ISME J.* 14:302-317. doi:10.1038/s41396-019-0529-2.
4. Poindexter M.B., Kweh M.F., Zimpel R., Zuniga J., Lopera C., Zenobi M., Jiang Y., Engstrom M., Celi P., Santos J.E.P., and **C.D. Nelson**. 2020. Feeding supplemental 25-hydroxyvitamin D<sub>3</sub> increases serum mineral concentrations and alters mammary immunity of lactating dairy cows. *J. Dairy Sci.* 103: 805-822. doi.org/10.3168/jds.2019-16999.
5. Spanier JA, Nashold F.E., **Nelson C.D.**, Praska C.E., and C.E. Hayes. 2020. Vitamin D<sub>3</sub>-mediated resistance to a multiple sclerosis model disease depends on myeloid cell 1,25-dihydroxyvitamin D<sub>3</sub> synthesis and correlates with increased CD4<sup>+</sup> T cell CTLA-4 expression. *J. Neuroimmunol.* 338:577105. doi: 10.1016/j.jneuroim.2019.577105.
6. Wilkens M., **Nelson C.D.**, Hernandez L., and J. McArt. 2020. Symposium Review: Joint Animal Health/Reproductive Physiology Symposium: Transition Cow Calcium Homeostasis – Health Effects of Hypocalcemia and Strategies for Prevention. *J. Dairy Sci.* 103:2909-2927.
7. Zenobi M., Gardinal R., Zuniga J., Mamedova L., Barton B., Santos J.E.P., Staples C., and **C.D. Nelson**. 2020. Effect of prepartum energy intake and supplementation with ruminally-protected choline on innate and adaptive immunity of multiparous Holstein cows. *J. Dairy Sci.* 2200-2216.
8. Blakely L.P., Poindexter M.B., Stuart R.L., and **C.D. Nelson**. 2019. Effects of supplementing pasteurized waste-milk with vitamins A, D and E on vitamin status, growth and health of dairy calves. *Bovine Practitioner.* 53:134-141.
9. Cangiano L.R., Zenobi M.G., **Nelson C.D.**, Ipharraguerre I.R., and N .DiLorenzo. 2019. A bioactive extract from *Olea europaea* protects newly weaned beef heifers against experimentally-induced chronic inflammation. *J. Animal Sci.* 97:4349-4361.
10. Fan P., **Nelson C.D.**, Driver J., Elzo M.A., and K.C. Jeong. 2019. Animal breed composition influences the gut microbiota structure and antibiotic resistome in an Angus-Brahman crossbred herd. *Frontiers in Microbiology.* 10:1846. doi: 10.3389/fmicb.2019.01846.
11. Kweh M.F., Merriman K.E., and **C.D. Nelson**. 2019. Inhibition of DNA methyltransferase and histone deacetylase activity modifies  $\beta$ -defensin responses of bovine mammary epithelial cells. *J. Dairy Science.* 102: 5706-5712.
12. Merriman K., Martinez Patino N., Rodney R., Block E., Santos J.E.P., and **C.D. Nelson**. 2019. Neutrophil  $\beta$ -defensin gene expression of postpartum dairy cows is altered by prepartum dietary cation-anion difference. *J. Dairy Sci.* 102:11636-11651.
13. Tao J., McCourt C., Sultana H., **Nelson C.**, Driver J., and T Hackmann. 2019. What the Uncultured Eat: Identifying Which Uncultured Rumen Bacteria Consume Glucose by Using a Fluorescent Glucose Analog (2-NBDG). *Appl. Env. Microbiol.* 85(7):e03018-18.
14. Belli A.L., Reis R.B., Veronese A., Moreira R., Flanagan K., Driver J., **Nelson C.D.**, Clapper J.A., Ballou M.A., Jeong K.C., Chebel R.C. 2018. *J. Dairy Sci.* 101(7):6602-6615.
15. Lopera C., Zimpel R., Vieira-Neto A., Lopes F.R., Ortiz W., Poindexter M., Faria B.N., Gambarini M.L., Block E., **Nelson C.D.**, and J.E.P. Santos. 2018. Effects of level of dietary

- cation-anion difference and duration of prepartum feeding on performance and metabolism of dairy cows. *J. Dairy Sci.* 101(9):7907-7929.
16. Martinez, N., R. M. Rodney, E. Block, L. L. Hernandez, **C. D. Nelson**, I. J. Lean, and J. E. P. Santos. 2018. Effects of prepartum dietary cation-anion difference and source of vitamin D in dairy cows: Health and reproductive responses. *J Dairy Sci.* 101(3): 2563-2578.
  17. Martinez, N., R. M. Rodney, E. Block, L. L. Hernandez, **C. D. Nelson**, I. J. Lean, and J. E. P. Santos. 2018. Effects of prepartum dietary cation-anion difference and source of vitamin D in dairy cows: Lactation performance and energy metabolism. *J Dairy Science.* 101(3): 2544-2562.
  18. Merriman, K.E. Powell, J.L., Santos, J.E.P., and **C.D. Nelson**. 2018. Intramammary 25-hydroxyvitamin D<sub>3</sub> treatment modulates innate immune responses to endotoxin-induced mastitis. *J. Dairy Sci.* 101(8): 7593-7607.
  19. Moore J.R., Hubler S.L., **Nelson C.D.**, Nashold F.E., Spanier J.A., and C.E. Hayes. 2018. 1,25-Dihydroxyvitamin D<sub>3</sub> increases the methionine cycle, CD4<sup>+</sup> T cell DNA methylation and Helios<sup>+</sup>Foxp3<sup>+</sup> T regulatory cells to reverse autoimmune neurodegenerative disease. *J Neuroimmunol.* 324:100-114.
  20. **Nelson C.D.**, M. F. Kweh, M.B. Poindexter, K. E. Merriman, and L. P. Blakely. 2018. Targeting antimicrobial defenses of the udder through intrinsic cellular pathways. *J. Dairy Sci.* 101(3): 2753-2761.
  21. Rodney, R. M., N. Martinez, E. Block, L. L. Hernandez, P. Celi, **C. D. Nelson**, J. E. P. Santos, and I. J. Lean.. 2018. Effects of prepartum dietary cation-anion difference and source of vitamin D in dairy cows: Vitamin D, mineral, and bone metabolism. *J Dairy Sci.* 101(3): 2519-2543.
  22. Zenobi, M. G., R. Gardinal, J. E. Zuniga, A. L. G. Dias, **C. D. Nelson**, J. P. Driver, B. A. Barton, J. E. P. Santos, and C. R. Staples.. 2018. Effects of supplementation with ruminally protected choline on performance of multiparous Holstein cows did not depend upon prepartum caloric intake. *J Dairy Sci.* 101(2): 1088-1110.
  23. Zimpel R., Poindexter M.B., Vieira-Neto A., Block E., **Nelson C.D.**, Staples C.R., Thatcher W.W., and J.E.P. Santos. 2018. Effect of dietary cation-anion difference on acid-base status and dry matter intake in dry pregnant cows. *J. Dairy Sci.* 101(9):8461-8475.
  24. Carrol J.A., Burdick Sanchez N.C., Arthington J.D., **Nelson C.D.**, Benjamin A.L., Korkmaz F.T., Kerr D.E., and P.A. Lancaster. 2017. In utero exposure to LPS alters the postnatal acute phase response in beef heifers. *Innate Immunity.* 23(1): 97-108.
  25. Silva P.R.B., **Nelson C.D.**, Driver J.P., Thatcher W.W., and R.C. Chebel. 2017. Effect of recombinant bovine somatotropin on leukocyte mRNA expression for genes related to cell energy metabolism, cytokine production, phagocytosis, oxidative burst, and adaptive immunity. *Journal of Dairy Science.* 100(10): 8471-8483.
  26. Merriman, K.E., Poindexter, M.B., Kweh, M.F., Santos, J.E.P., and **C.D. Nelson**. 2017. Intramammary 1,25-dihydroxyvitamin D<sub>3</sub> treatment increases expression of host-defense genes in mammary immune cells of lactating dairy cattle. *J. Steroid Biochem. Mol. Biol.* doi: 10.1016/j.jsbmb.2017.02.006.
  27. Vieira-Neto, A., Lima, I.R.P., Lopes, F., Lopera, C., Zimple, R., Sinedeo, L.D.P., Jeong, K.C., Galvao, K., Thatcher, W.W., **Nelson, C.D.**, and J.E.P. Santos. 2017. Use of calcitriol to maintain postpartum blood calcium and improve immune function in dairy cows. *J. Dairy Sci.* 100:1-19.
  28. **Nelson, C. D.**, Lippolis, J.D., Reinhardt, T.A., Sacco, R.E., Powell, J.L., Drewnoski, M.E. O'Neil, M., Beitz, D.C., and W.P. Weiss. 2016. Vitamin D status of dairy cattle: Outcomes of current practices in the dairy industry. *J. Dairy Sci.* 99:1-11.
  29. **Nelson, C.D.**, Powell, J.L., Price, D.M., Hersom, M.J., Yelich, J.V., Drewnoski, M.E., Bird, S.L., and G.A. Bridges. 2016. Assessment of serum 25-hydroxyvitamin D concentrations of beef cows and calves across seasons and geographical locations. *J. Anim. Sci.*, 94:3958-3965.
  30. Merriman, K.E., Kweh, M.F., Powell, J.L., Lippolis, J.D., and **C.D. Nelson**. 2015. Multiple  $\beta$ -defensin genes are upregulated by the vitamin D pathway in cattle. *Journal of Steroid*

*Biochemistry and Molecular Biology*. 154: 120-129.

31. Spanier, J.A., Nashold, F.E., Mayne, C.G., **Nelson, C.D.**, and Hayes, C.E.. 2015. Vitamin D and estrogen synergy in Vdr-expressing CD4(+) T cells is essential to induce Helios(+)FoxP3(+) T cells and prevent autoimmune demyelinating disease. *Journal of Neuroimmunology*. 286: 48-58.
32. Nashold F.E., **Nelson C.D.**, Brown L.M., and C.E. Hayes. 2013. One calcitriol dose transiently increases Helios+FoxP3+ T cells and ameliorates autoimmune demyelinating disease. *Journal of Neuroimmunology*. 263: 64-74. doi:10.1016/j.jneuroim.2013.07.016.
33. **Nelson C.D.**, Nonnecke B.J., Reinhardt T.A., Waters W.R., Beitz D.C., and **J.D. Lippolis**. 2011. Regulation of Mycobacterium-specific mononuclear cell responses by 25-hydroxyvitamin D3. *PLoS ONE*. 6(6): e21674. doi:10.1371/journal.pone.0021674.
34. Lippolis J.D., Reinhardt T.A., Sacco R.A., Nonnecke B.J., and **C.D. Nelson**. 2011. Treatment of an intramammary bacterial infection with 25-hydroxyvitamin d(3). *PLoS One*. 6(10): e25479. doi:10.1371/journal.pone.0025479.
35. **Nelson C.D.**, Reinhardt T.A., Thacker T.C., Beitz D.C., and **J.D. Lippolis**. 2010. Modulation of the bovine innate immune response by production of 1alpha,25-dihydroxyvitamin D(3) in bovine monocytes. *Journal of Dairy Science*. 93: 1041-1049.
36. **Nelson C.D.**, Reinhardt T.A., Beitz D.C., and **J.D. Lippolis**. 2010. In vivo activation of the intracrine vitamin D pathway in innate immune cells and mammary tissue during a bacterial infection. *PLoS ONE*. 5(11): e15469. doi:10.1371/journal.pone.0015469.

### **Non-peer reviewed**

Nelson, C.D., Reinhardt, T.A., Beitz, D.C., and J.D. Lippolis. 2010. 1,25-Dihydroxyvitamin D3 Enhances Bovine Mammary Epithelial Innate Immune Responses. Iowa State University, Department of Animal Science Animal Industry Report, R2488.  
<http://www.ans.iastate.edu/report/air/?pg=tablecontent10>

Nelson, C.D., Reinhardt, T.A., Beitz, D.C., and J.D. Lippolis. 2009. Activation of vitamin D3 in bovine mastitis caused by *Streptococcus uberis*. Iowa State University, Department of Animal Science Animal Industry Report, R2432.  
<http://www.ans.iastate.edu/report/air/?pg=tablecontent09>

Nelson, C.D., Reinhardt, T.A., Beitz, D.C., and J.D. Lippolis. 2008. Toll-like receptor signaling in bovine macrophages increases 1,25-dihydroxyvitamin D3 production. Iowa State University, Department of Animal Science Animal Industry Report, R2276.  
<http://www.ans.iastate.edu/report/air/?pg=tablecontent08>

### **Reviews**

Nelson, C.D., Reinhardt, T.A., Lippolis, J.D., Sacco, R.A., and B.J. Nonnecke. 2012. Vitamin D signaling in the bovine immune system: A model for understanding human vitamin D requirements. *Nutrients*. 4(3), 181-196.

### **Book Chapters**

Hayes, C.E., Nelson, C.D., and J.A. Spanier. In press. "Vitamin D and Autoimmune Disease", *Vitamin D: Oxidative Stress, Immunity, and Aging*, A. Gombart, Editor. CRC Press, Boca Raton, FL.

Hayes, C.E., Nashold, F.E., Mayne, C.G., Spanier, J.A., and C.D. Nelson. 2011. "Vitamin D and Multiple Sclerosis", *Vitamin D*, Third Edition, D. Feldman, J. Pike and J. Adams, Editors. Elsevier, San Diego, CA.

## **Abstracts**

### **Oral Presentations**

Nelson, C.D., Nonnecke, B.J., Reinhardt, T.A., Waters, W.R., Beitz, D.C., and J.D. Lippolis. 2010. Regulation of antigen-specific T-cell responses by a paracrine mechanism of vitamin D signaling. Conference of Research Workers in Animal Diseases. Chicago, IL.

Nelson, C.D., Reinhardt, T.A., Beitz, D.C., and J.D. Lippolis. 2010. Vitamin D signaling in the bovine immune system. Iowa Feed and Nutrition Seminar. Ames, IA.

Nelson, C.D., Reinhardt, T.A., Beitz, D.C., and J.D. Lippolis. 2010. 1,25-Dihydroxyvitamin D<sub>3</sub> Enhances Innate Immune Responses of Bovine Mammary Epithelial Cells that are Triggered by Toll-like Receptor Signaling. American Dairy Science Association - American Society of Animal Science, Midwest Section, Annual Meeting. Des Moines, IA.

Nelson, C.D., Reinhardt, T.A., and J.D. Lippolis. 2010. Vitamin D signaling in the bovine mammary gland is part of the innate immune response to bacterial pathogens. National Mastitis Council Annual Meeting. Albuquerque, NM.

Nelson, C.D., Reinhardt, T.A., Beitz, D.C., and J.D. Lippolis. 2009. Improvement of the innate immune response of bovine monocytes via an intracrine vitamin D signaling pathway. Conference of Research Workers in Animal Diseases. Chicago, IL.

Nelson, C.D., Beitz, D.C., Reinhardt, T.A., and J.D. Lippolis. 2009. Expression of inducible nitric oxide synthase is up-regulated by production of 1,25-dihydroxyvitamin D<sub>3</sub> in bovine monocytes in response to toll-like receptor signaling. American Dairy Science Association - American Society of Animal Science - Canadian Society of Animal Scientists Joint Annual Meeting. Montreal, Canada.

### **Poster Presentations**

Nelson, C.D., Beitz, D.C., Reinhardt, T.A., Lippolis, J.D. 2008. Toll-like receptor signaling increases production of 1,25-dihydroxyvitamin D<sub>3</sub> in bovine macrophages. Experimental Biology Meeting. San Diego, CA.

Nelson, C.D., Reinhardt, T.A., Beitz, D.C., and J.D. Lippolis. 2008. Autocrine signaling mechanism of vitamin D in the bovine innate immune response. American Dairy Science Association - American Society of Animal Science, Midwestern Section, Annual Meeting. Des Moines, IA.