

In This Issue

- CERPI Highlight: John Gonzalez
- NAD in the News
- Recent CERP™ Publications
- Call for Manuscripts



Reminder

Do not forget to submit your progress report every six (6) months, or as stipulated in your MTA. An updated progress report is required when requesting additional material or submitting an MTA amendment. We will provide you with a progress report form to simplify the process.

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- Abstract, manuscript, poster, or presentation slides submissions

CERPI Spotlight: An Animal Scientist Studies How NR Influences Livestock



Dr. John Michael Gonzalez is currently an Associate Professor at the University of Georgia. His previous employment history includes XL Four Star Beef, Inc., followed by a brief stay at the University of Florida as postdoctoral associate, and before joining UGA, as a faculty member at Kansas State University. Originally from San Antonio, Texas, Dr. Gonzalez was introduced to agriculture during his high school years when he visited numerous ranches of classmates throughout the state. This led Dr. Gonzalez to pursue education in the field of Animal Science, eventually earning his PhD from the University of Florida in 2008. Over the course of his career, his research has centered around (i) the novel cellular influencers of muscle growth and their relation to meat quality, (ii) technologies that manipulate gestational, *in ovo*, or postnatal muscle growth and development, and (iii) cellular and biochemical mechanisms responsible for muscle fatigue during transportation of cattle and swine and the development of nutritional countermeasures. Dr. Gonzalez currently resides in Watkinsville, Georgia with his wife, Sara, his daughter, Penelope, son, Harrison, and Basset hounds Sugar Loaf and Hermione.

1. How did you learn about ChromaDex and CERP?

I learned about CERP by “accident”. A colleague of mine at Kansas State University sent me the Zhang et al. (2016) publication because we were working on pig fetal development projects at the time. He was interested in the muscle stem cell activity data, and I was interested in those data but also the fatigue data. We discussed a couple of research ideas, and I called the ChromaDex offices and asked about the possibility of forming a research partnership. A couple of months later, we signed an MTA, and our fruitful research partnership began.

2. How would you define your research interests and areas of expertise?

My doctoral major professor calls me a “hybrid” muscle biologist and meat scientist. Therefore, I study the biology of muscle growth and physiology and how it impacts postmortem muscle metabolism and meat quality. Currently, I have two main foci which partly revolve around my NR research. The first is manipulating the events of livestock embryonic and/or fetal myogenesis to optimize postnatal growth and meat quality. The second focuses on demonstrating the role transport trailer vibrations elicit on livestock stress and muscle fatigue, and countermeasure development (utilizing NR) to alleviate these conditions.

3. What have been your most significant discoveries as it relates to NAD+ and supplementing with nicotinamide riboside?

So far, my laboratory has had two major discoveries with our NR research. First, we demonstrated injecting (*in ovo* feeding) NR into the developing broiler chicken embryo yolk sac at incubation day 10 increased hatched chick pectoralis major weight though increased sirturin-1 and cyclin-D mRNA expression which increased muscle fiber density. Second, we found

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Dr. Gonzalez Interview, continued

supplementing low levels of NR to finishing pigs caused them to move around a performance track longer and farther. In the same trial, we demonstrated supplementation caused pork chops to be redder in appearance and have better color stability (chops remained redder longer). The fact that we have a patent around these projects is pretty fascinating to me. ChromaDex should be proud their product is being utilized to improve livestock welfare and protein production sustainability.

4. In your opinion, what are some important gaps in NAD+ and NR research?

Trying not to give away future research ideas, I think there are tons of applications for NR in beef, pork, and poultry research. Not only production questions, but also performance of our athlete species. Additionally, we are also beginning to explore opportunities how NR can benefit companion animals.

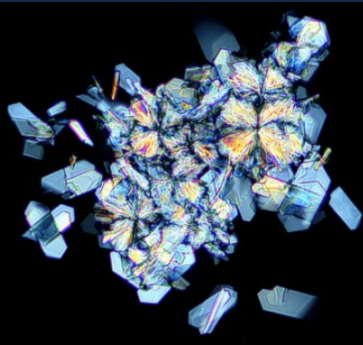
5. What are your future NR research plans? How are you funding this research?

We are currently in year three of a five-year USDA study optimizing NR supplementation dose and duration to maximize the delay of muscle fatigue in pigs while also improving pork chop color characteristics. We are also continuing to study *in ovo* feeding of NR to broiler chickens and its effect on post-hatch growth and meat quality. We are collaborating on this research with Dr. Casey Owens at the University of Arkansas and are currently looking for funding partners. Anyone reading this, we have a great opportunity for an amazing partnership! ■

NAD in the News

It is always exciting when NAD+ is making headlines in various media outlets. Here are a few that may be of interest to our CERPI community. Topics for these articles varied widely from changes in NAD levels by gender to patent decisions.

- Low levels of NAD in women was associated with [anemia](#) in a study from BYHEALTH.
- [Gender differences](#) were observed in a Chinese clinical observation study, showing a more significant loss of NAD in middle-aged men than women.
- A preprint of a NAD+ and [age-related hearing loss](#) study out of the National Institutes of Aging was highlighted in *Lifespan.io*. This study found that nicotinamide riboside supplementation attenuated the progression of age-related hearing loss in mice.
- An article in *Longevity.Technology* described the benefits of [exercise for maintaining NAD levels](#) with aging.
- In legal news, Thorne Research, Inc's. recent loss of nicotinamide riboside [patent challenge](#) through the U.S. Patent & Trademark Office's Patent Trial and Appeal Board, was outlined in Bloomberg.
- A study describing the unexpected results following mTOR inhibition in monocytes, including [attenuated intracellular production of NAD+](#) and increased inflammatory signaling was highlighted in Medical Xpress.
- ChromaDex's Greg Arabatzis, Vice President Practitioner Division, shared the benefits of supporting NAD+ with Niagen® (nicotinamide riboside chloride) in [Whole Foods Magazine](#).



ChromaDex, Empowered By:



Recent CERP Publications

- [Acklin et al.](#) (2022) Nicotinamide riboside alleviates cisplatin-induced peripheral neuropathy via SIRT2 activation. *Neuro-Oncology Advances*, vdac101-.
- [Ciarlo et al.](#) (2022) Nicotinamide Riboside and Dihydronicotinic Acid Riboside Synergistically Increase Intracellular NAD⁺ by Generating Dihydronicotinamide Riboside. *Nutrients*, 14, 2752.
- [Kolba et al.](#) (2022) Alterations in Intestinal Brush Border Membrane Functionality and Bacterial Populations Following Intra-Amniotic Administration (Gallus gallus) of Nicotinamide Riboside and Its Derivatives. *Nutrients*, 14, 3130.
- [Nagy et al.](#) (2022) Nicotinamide-ribose shifts the differentiation of human primary white adipocytes to beige adipocytes impacting substrate preference and uncoupling respiration through SIRT1 activation and mitochondria-derived reactive species production. *Frontiers in Cell and Developmental Biology*, 10, 979330.
- [Schaefer et al.](#) (2022) Nicotinamide Riboside alleviates exercise intolerance in ANT1-deficient mice. *Molecular Metabolism*, 101560.
- [Song et al.](#) (2022) Exercise training and NR supplementation to improve muscle mass and fitness in adolescent and young adult hematopoietic cell transplant survivors: a randomized controlled trial {1}. *BMC Cancer*, 22, 795.



Call For Manuscripts

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an Open Access Journal by MDPI

The Role of NAD⁺ Metabolism in Cellular Processes during Aging and Age-Associated Diseases

Guest Editors

Dr. Alessia Grozio

Deadline

30 November 2022

Special Issue

mdpi.com/si/109184

Invitation to submit

ChromaDex is not affiliated with Cells or this special issue

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