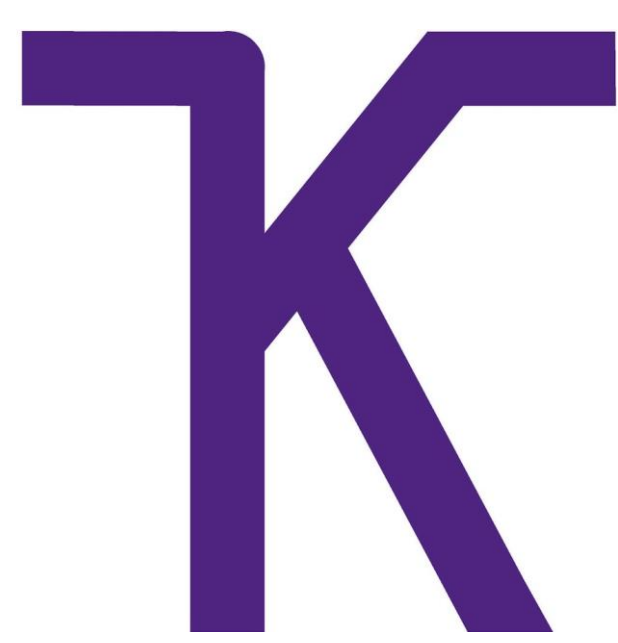




THE EFFECT OF INJECTING DIFFERENT CONCENTRATIONS OF NICOTINAMIDE RIBOSIDE ON AVIAN MYOGENESIS

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Introduction

- The poultry industry is continually striving to produce enough meat to satisfy demand.
- Nicotinamide Riboside (NR) leads to a 33% increase in muscle mass (Davis et al., 2018). This result can be influenced by either cell hypertrophy or cell hyperplasia.
- In other species NR, a form of vitamin B3 and a NAD⁺ precursor increased mitochondria quantity (Agerholm et al., 2017).
- Cell cycle function is directly related to the cyclin D complex quantity and can increase cell hyperplasia.

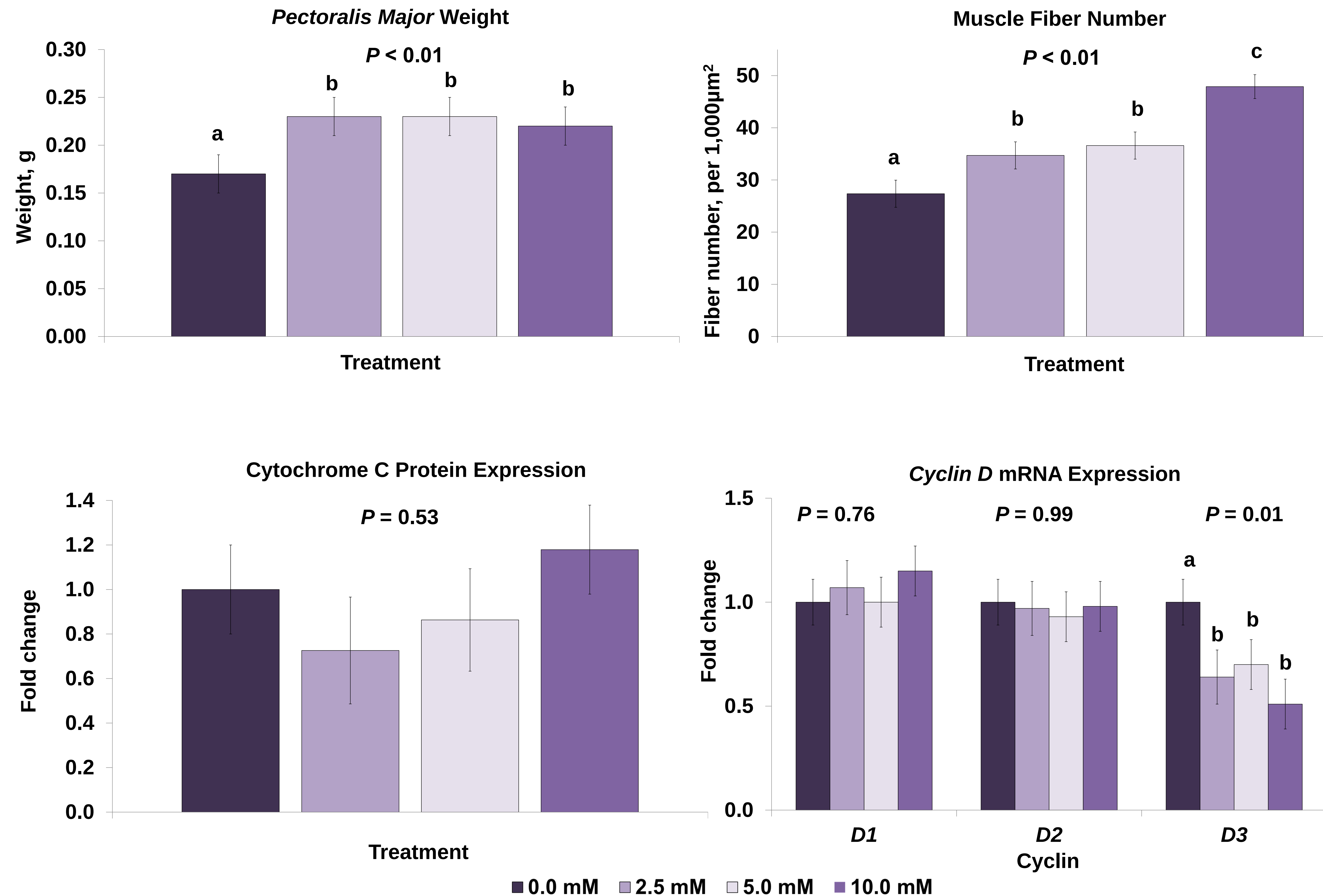
Objective

- To evaluate the effect of different concentrations of *In Ovo* injected NR on *Pectoralis Major*, muscle fiber number, mitochondria, and cyclin D quantity.

Experimental Procedures

- Broiler eggs ($N=120$; Cobb 500) randomly assigned to four injection treatments (0.0, 2.5, 5.0, 10.0 mM in 0.9% sterile saline).
- Eggs were injected with 100 μ l into the yolk on day 10 of incubation.
- Chicks were euthanized at hatch under prolonged exposure to carbon dioxide and decapitation after hatch.
- Weight of the *Pectoralis Major* was taken and the left leg quadricep muscles were removed for further analyses.
- Histology and immunohistochemistry were performed to examine muscle fiber number.
- Cytochrome c protein expression was determined via western blot protocol from extracted mitochondria.
- *Cyclin D1*, *D2*, and *D3* were quantified via semi-quantitative real-Time PCR.

Results



Conclusions

- NR inject into the yolk of broiler eggs on day 10 of incubation increased *Pectoralis Major* weight which was due to an increase in muscle fiber number.
- Increases in muscle development were not due to mitochondria biogenesis.
- Reduced *cyclin D3* mRNA expression may indicate this gene was upregulated earlier in embryo development.