

Choline supplementation lowered body weight, body fat mass, and daily food intake compared to a control in post-gonadectomized kittens



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Introduction

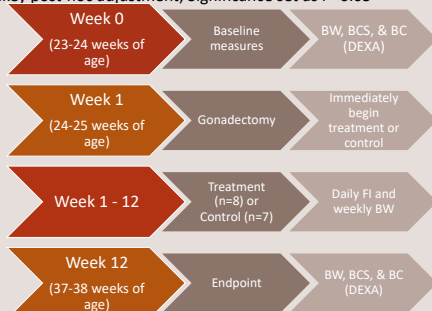
- Obesity is a nutritional disease that is a major concern for domestic cats¹
- Treatment for obesity may result in Hepatic lipidosis² and weight regain
- Gonadectomy has been shown to be a major risk factor for obesity³
- Choline is known to mobilize lipoproteins, reduce lipid accumulation, alter lipid metabolism, improve membrane integrity⁴
- In growing livestock species choline has documented effects^{5,6}:
 - Increased lean mass gain
 - Reduced fat mass

Objectives & Hypotheses

- To investigate whether choline supplementation (300 mg/kg BW^{0.75}) has effects on food intake (FI), body weight (BW), and body composition (BC) by dual energy x-ray absorptiometry (DEXA) in post-gonadectomy kittens
- Kittens supplemented with choline will:
 - ↓ food intake (FI)
 - ↓ body weight (BW)
 - ↓ fat mass (FM) gain
 - ↑ lean mass (LM)
 - No effect on bone mineral content (BMC)

Materials & Methods

- Approved by the University of Guelph Animal Care Committee-AUP#4118
- n=15 domestic short hair male kittens
 - Initial BW: 3.85 ± 0.067 kg (mean ± SEM)
- **Diet**
 - Commercial extruded dry food formulated for growth (AAFCO)
 - 3,310 mg choline/kg DM
- **11 week acclimation period⁷**
 - Fed to growth requirements (NRC 2006)
 - No supplemental choline (n=15)
- **12 week experimental period – post-gonadectomy**
 - Parallel treatment comparison with two treatments:
 - No supplementation (n=7)
 - 300 mg choline/kg BW^{0.75} supplemented choline (n=8)
 - Pet Shure 97 % Choline Chloride
 - All cats fed to mimic ad lib feeding
- **Statistical analysis:**
 - For FI and BW: Proc Mixed analysis with time and treatment as fixed effects and cat as subject (SAS University; SAS Studio 3.8)
 - For FM, LM, and BMC: Proc Mixed analysis with treatment as fixed effects and cat as subject (SAS University; SAS Studio 3.8)
 - Tukey post-hoc adjustment; Significance set as P<0.05



Results

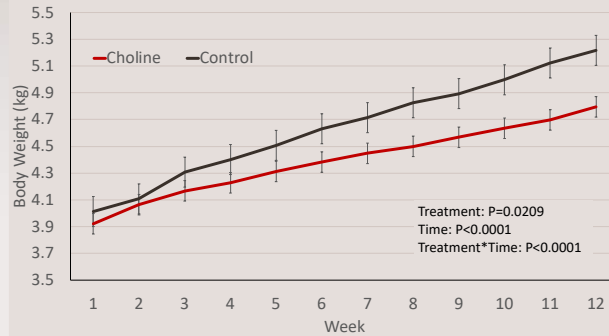


Figure 1. Mean ± SEM weekly BW in kittens on choline supplementation (300 mg/kg BW^{0.75}) (n=8) compared to control (n=7) for 12 weeks post-gonadectomy.

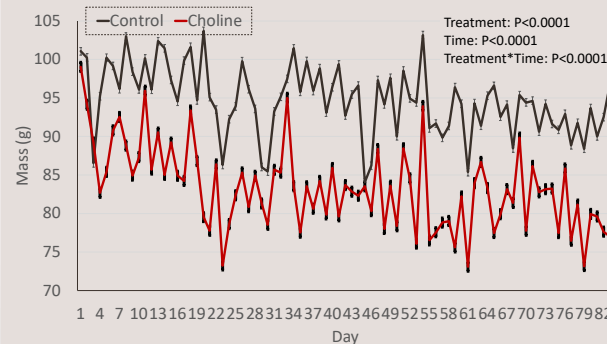


Figure 2. Mean ± SEM daily FI in kittens on choline supplementation (300 mg/kg BW^{0.75}) (n=8) compared to control (n=7) for 12 weeks post-gonadectomy.

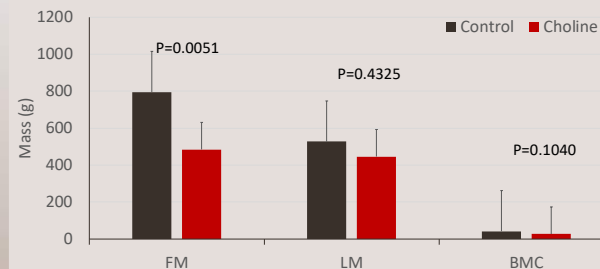


Figure 3. Mean ± SEM change [mass (g) from week 12 – mass (g) week 0] in body fat mass (FM), lean mass (LM), and bone mineral content (BMC) in kittens on choline supplementation (300 mg/kg BW^{0.75}) (n=8) or control (n=7) for 12 weeks post-gonadectomy.

Results

- Food intake was lower with choline compared to control (P<0.0001)
- Choline group had lower increase in BW (P=0.0209)
- Body FM increased in both groups, but the change in body FM was smaller in the choline group (P=0.0051)
- Change in LM (P= 0.4325) or BMC (P= 0.1040) did not differ between choline and control

Discussion

Hypotheses Check

- ✓ ↓ FI
- ✓ ↓ BW
- ✓ ↓ FM gain
- ✗ ↑ LM gain
- ✓ No effect on BMC

- Gonadectomy in cats increases FI, BW, and FM³
- Choline supplementation appears to result in decreases in FI, lower BW, and lower gain in FM during growth post-gonadectomy
- These results are similar to previous results in live stock species^{5,6}
 - Contrary to these studies, LM was not effected
- These results suggest potential benefits of additional choline in cats for obesity prevention
- Future studies should assess why these benefits occur such as effects on:
 - Lipid metabolism
 - Satiety hormone regulation
- A choline dose response study in cats should be assessed due to a lack of research in additional dietary choline

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