

Coumestrol Given Orally Induces Histological Changes in Dog Testis: Preliminary Findings

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Purpose

Coumestrol (COU) is a naturally occurring phytoestrogen that acts in a dose dependent fashion as either an estrogen agonist or antagonist. In mammals, COU binds to the α and β estrogen receptors (ER). In males, ER α are present in Leydig cells, while ER β are present in Sertoli cells, germinal cells, epididymal duct and prostate epithelium. In cattle and sheep, COU consumption induces sterility. In this study we assessed the histological effects of COU given orally on male dog testis.

Methods

Sperm in ejaculates from three healthy one year male dogs were counted and morphologically evaluated. After establishing base line data, two dogs were fed with a chow pellet containing 1ng COU for 4 weeks; the other dog was fed in a similar way with vehicle in chow pellet. Blood samples were collected at the end of period to evaluate red cells and platelets. At the end of each week, all dog's ejaculates were evaluated. After 5 weeks, all dogs were surgically castrated, their testis fixed in Bouins for 6 h, processed, in a automatic histoquinette for paraffin inclusion and 5 μ m sections were obtained with a microtome. The tissue cuts were stained with Masson and toluidine blue and examined by light microscopy with a 40 X objective.

Results

The sperm count of COU-treated dogs were drastically decreased correlating with treatment (fig 1). An increase in abnormal ejaculated spermatozoa were observed in treated dogs (fig. 2) The testis did not have any typical histological structures and interstitial Sertoli and sperm cells were disorganized (fig 4). Red cells and platelet maintained their physiological values (fig 3).

Conclusions

Male dogs fed COU over four weeks undergo changes in the testis histological structures. These results indicate that COU may be useful in dog population control. Further studies are needed to evaluate the reproductive impact of COU on the biochemical and endocrine processes of dogs to assure there are no negative side effects for a phytoestrogen-based reproductive control strategy development.

Reference:

Perez-Rivero JJ, Martinez-Maya JJ, Perez-Martinez M, Aguilar-Setien A, Garcia-Suarez MD, Serrano H. Testis alterations in dogs induced by phytoestrogen treatment. Arch. Androl. (In press)

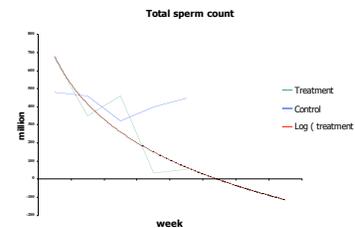


Figure 1. **Coumestrol induces astenozoospermia in dogs.** Coumestrol treated dogs were ejaculated before each pellet ingestion. Sperm count and concentration were obtained by haemocytometer count of formalin buffered samples.

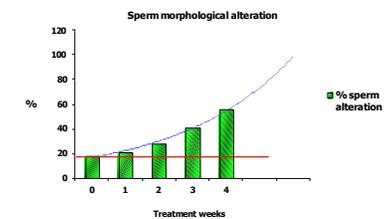


Figure 2. **Coumestrol induces an increase in altered spermatozoa.** Ejaculated spermatozoa from treated animals were evaluated under light microscopy. Solid bar at 20% indicate the maximal abnormal spermatozoa obtained in control dog. Logarithmic line indicate the actual tendency if treatment was maintained

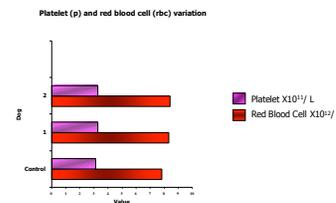


Figure 3. **Coumestrol does not alter hematopoietic parameters.** Control and experimental dogs were bled after treatment and total erythrocytes (rbc) and platelets were determined. No differences in both cell types was observed

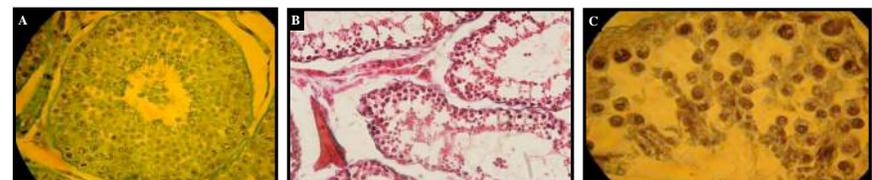


Figure 4. **Coumestrol treatment alters testis histoarchitecture.** Control dog tubuli show a germ cell's in different development phase at 40X (methyl green stained)(A). Disorganized germinal epithelium in tubuli, increased interstitial space and Sertoli cells are absent show in B (Masson stained) at 40X. (C) an oil view (100X) of germinal epithelium of treated dog show a decrease in intermediate germ cell's (toluidine blue stained).