



Iodine secretion in airway fluid following a single bolus of sodium iodide

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Background

- Antimicrobial drug use in food animals is a concerning trend for U.S. consumers.
- Alternative methods of prevention and treatment of disease in livestock species are being considered to reduce antimicrobial drug use.
- Recent reports indicate that iodine can be secreted into airway fluid in humans and sheep and can be converted into a natural antimicrobial compound in the respiratory tract.

Objective and Hypothesis

- Objective:** The objective of our study was to measure iodine concentrations in cattle to determine if concentrations similar to those needed to inactivate viruses and bacteria *in vitro* could be achieved.
- Hypothesis:** We hypothesize that calves that receive an oral iodine bolus will have an increase in nasal secretion iodine concentrations.

Methods

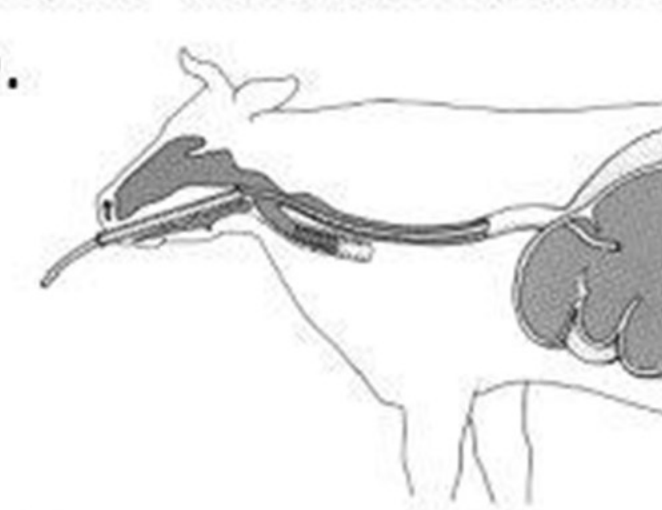
Sixteen crossbred cattle were divided into two random groups, an iodine group and control group.



Blood and nasal secretions were collected from each of the calves prior to administration of iodine.



Calves in the iodine group were administered 70 mg/kg of Sodium iodide and the control group was given sterile saline via orogastric tube.



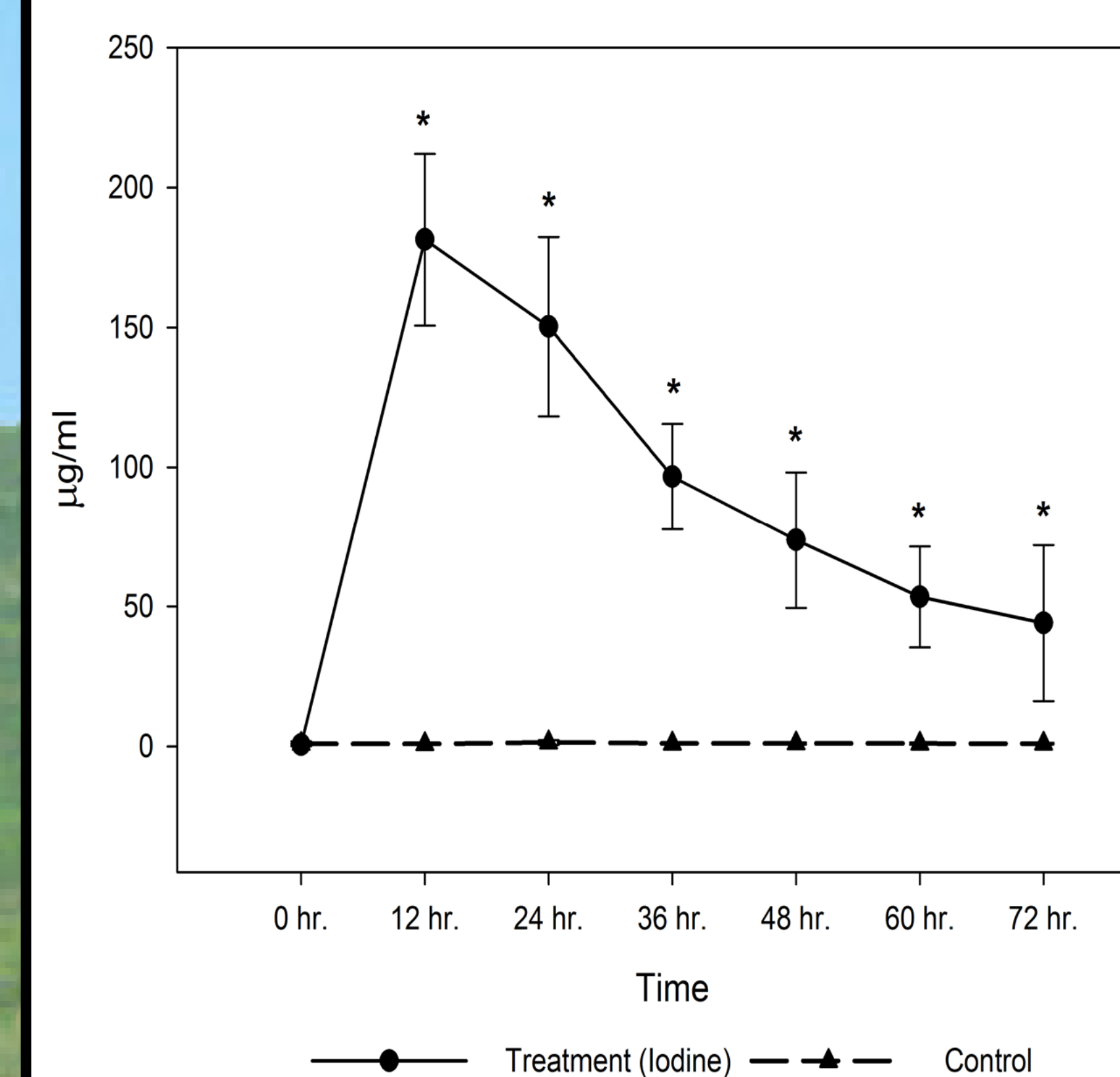
Samples of blood and nasal secretions were taken then again at 12-hour intervals for a total of 7 timepoints.



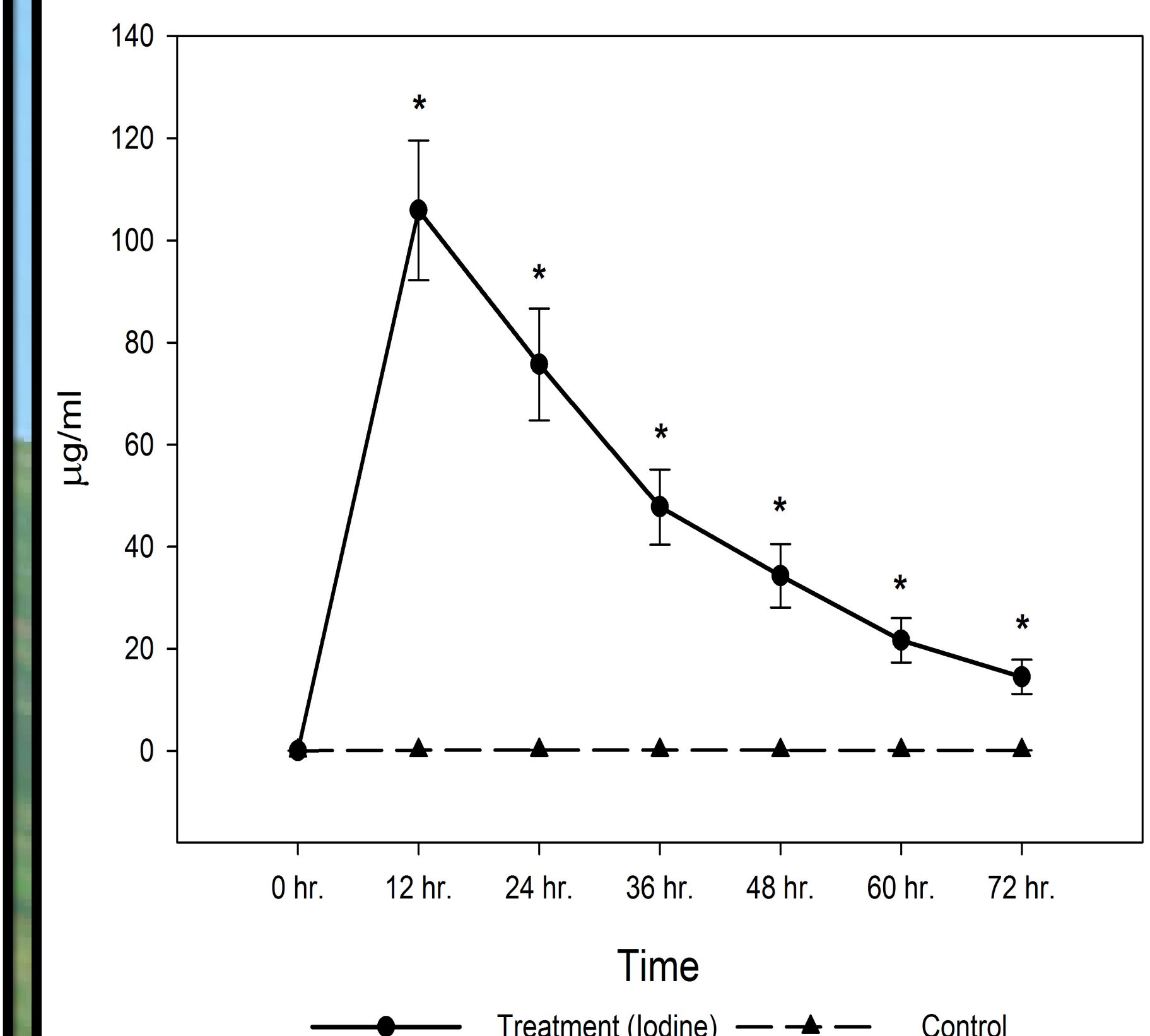
The samples were quantified for iodine by the Michigan State University Diagnostic Center for Population and Animal Health.

Results

Iodine Concentration in Nasal Secretions



Iodine Concentration in Serum

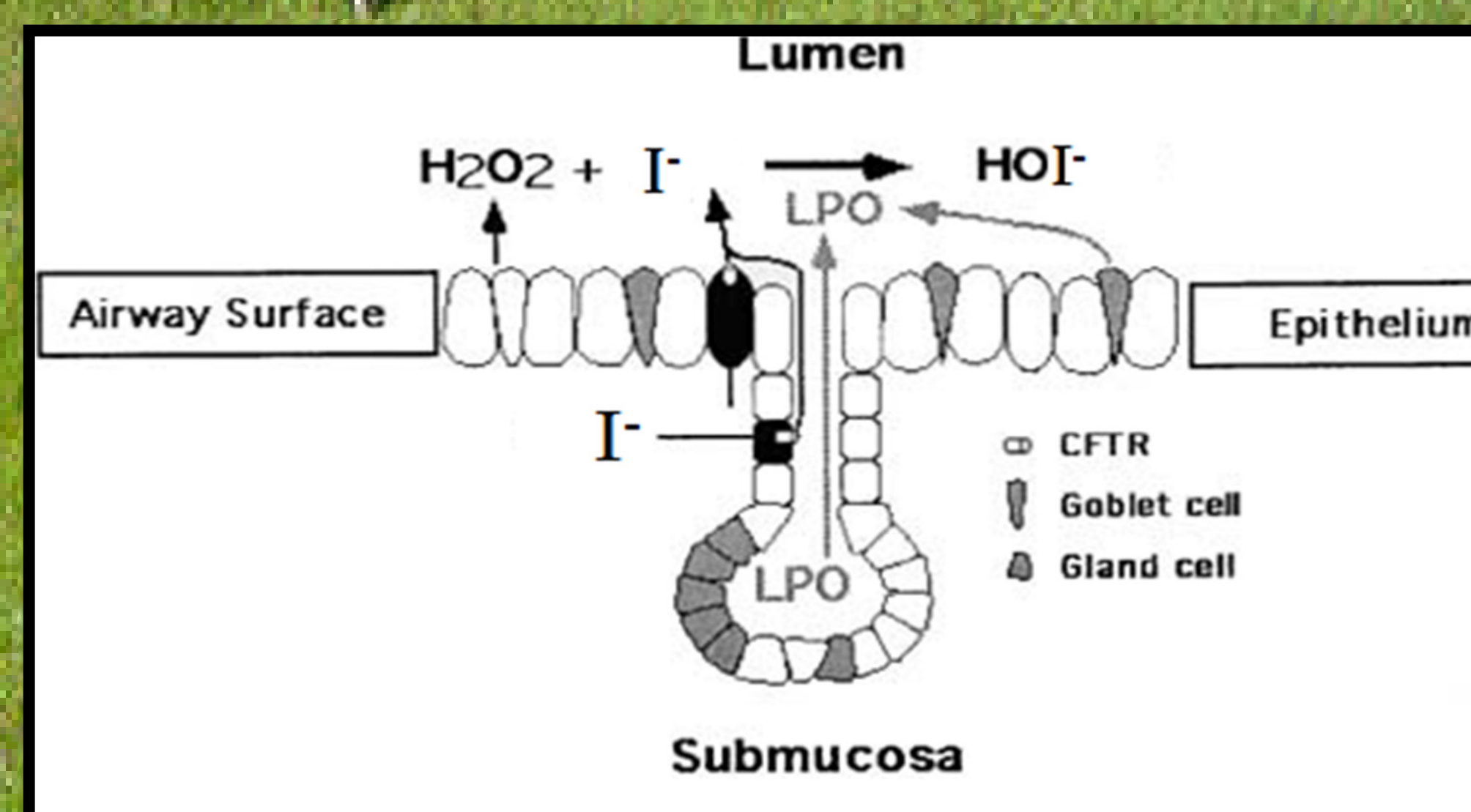


Error bars indicate 95% confidence interval

* Denotes statistical significance at $p < 0.05$

Discussion

Calves treated with oral sodium iodide had significantly more iodine in nasal secretions and serum compared to control calves. Further, the concentration of iodine in nasal secretions far exceeded those needed to neutralize several respiratory pathogens *in vitro* (data not shown). Further research will be necessary to characterize the clinical efficacy of oral iodine as an alternative respiratory disease therapy; however, our results indicate that iodine may prove to be a successful tool in respiratory disease control.



The figure to the left demonstrates the mechanism by which iodine is incorporated into airway fluid.

Adapted from:
Conner, G.E., Salathe, M., & Forteza, R. (2002). Lactoperoxidase and Hydrogen Peroxide Metabolism. *American Journal of Respiratory and Critical Care Medicine*, 166, S57-S61.

Derscheid, R. J. et al. (2013). Increased Concentration of Iodide in Airway Secretions Is Associated with Reduced Respiratory Syncytial Virus Disease Severity. *American Journal of Respiratory Cell and Molecular Biology*, 50, 389-397.

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