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Mild hyperoxia induces moderate pathological alteration in airway epithelium (ultrastructural study)

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<https://doi.org/10.17221/5785-VETMED>

Citation: Koonradova V., Uhlik J., Vajner L., Herget J., Adaskova J. (2003): Mild hyperoxia induces moderate pathological alteration in airway epithelium (ultrastructural study). Veterinarni Medicina, 48: 313-320.

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The ultrastructure of the tracheal epithelium in rabbits exposed for 96 hours to 35–37% O₂ was studied in our experiments. Due to the influence of mild normobaric hyperoxia, massive differentiation of new secretory elements was initiated and resulted in apparent changes in goblet cells distribution. 60 ± 4% of goblet cells took part in the formation of voluminous intraepithelial mucous glands. Ciliated cells were less damaged than the goblet ones. Tiny signs of pathological alteration of deeper portions of their cytoplasm and apical blebbing accompanied with destruction of some kinocilia were encountered. The ciliary border was slightly impaired. Mild, but significant decrease in the mean number of kinocilia/μm² went along with significant increase in percentage of altered cilia. Among the altered kinocilia, the slightly altered pathological cilia with local swellings of the ciliary membranes or with tiny vacuoles situated in their shafts were the most numerous. Hyperoxia did not influence the process of ciliogenesis in the ciliated cells. As morphological signs of impairment of the vital self-cleaning ability of the airway epithelium, layers of inspissated mucus were encountered in the area of the ciliary border. From morphological point of view, mild hyperoxia caused moderate damage to the airway epithelium.

Keywords:

trachea; oxygen; ultrastructure; rabbit

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Impact factor (WoS)

2016: **0.434**
5-Year Impact Factor: **0.71**
SJR (SCOPUS)
2017: **0.280 – Q2** (Veterina (miscellaneous))

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