

## EXERCISE-INDUCED CHANGES IN AIRWAY CELLS

[Variazioni delle cellule delle vie aeree indotte dall'esercizio fisico]

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**Key words:** airway inflammation, bronchial epithelial damage, remodelling, induced sputum, endurance training

**Parole chiave:** infiammazione delle vie aeree, danno dell'epitelio bronchiale, rimodellamento, espettorato indotto, allenamento di endurance.

**Abstract:** Background. Exercise-induced changes in airway cells are largely documented in athletes and animal models. Increased inflammatory cells have been reported in the airways of non-asthmatic endurance athletes independently of symptoms or spirometric alterations, but the functional significance of such findings is still uncertain.

**Aim.** The purpose of this review is to summarize the current state of knowledge about the physiological changes in airway cells induced by acute exercise and training.

**Results.** Runners and athletes of different endurance activities carried out under moderate environmental conditions showed increased airway neutrophils at rest, which tended to further increase after exercise. Skiers and swimmers also showed large increases in airway lymphocytes and eosinophils, possibly related to chronic exposure to cold and dry air or irritants, respectively. In endurance trained mice we found increased inflammatory cells and damaged bronchial epithelium in small airways. Nevertheless, the increase in airway inflammatory cells observed in athletes and mice was not associated with inflammatory activation, and the airway inflammation of athletes did not correlate with bronchial hyperreactivity or post exercise respiratory symptoms.

**Conclusions.** Training-induced airway changes may represent adaptive responses to exercise hyperventilation. However, further studies are necessary to understand the mechanisms responsible for control of inflammatory activation, and assess the relationship between amount/intensity of training and morphologic/functional changes in airways.

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**Riassunto:** Premessa. Variazioni delle cellule delle vie aeree indotte dall'esercizio sono ampiamente documentate negli atleti e nei modelli animali. Nelle vie aeree di atleti di endurance non asmatici è stato descritto un incremento delle cellule infiammatorie indipendente da sintomi o alterazioni spirometriche, ma il significato funzionale di queste osservazioni resta incerto.

**Scopo.** Lo scopo di questa review è di riassumere lo stato attuale delle conoscenze sulle variazioni fisiologiche delle cellule delle vie aeree indotte dall'esercizio acuto e dall'allenamento.

**Risultati.** Podisti ed atleti di altre attività d'endurance praticate in condizioni ambientali moderate mostravano, a riposo, un aumento dei neutrofili nelle vie aeree che tendevano ad aumentare dopo esercizio. Sciatori