Reduced Innervation in the human pharynx in patients with obstructive sleep apnea

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Obstructive sleep apnea is a disease characterized by repetitive breathing during sleep that lead to reduced oxygen saturation and sleep disturbance among other symptoms. Obstructive sleep apnea is caused by blockade of the upper respiratory airway, although the pathogenic mechanism underlying this occlusion remains unknown. In these studies we explored the hypothesis that alterations in the innervation, especially mechanosensory innervation, of the pharynx may contribute to obstructive sleep apnea. We tested this hypothesis by analyzing the innervation of the human pharynx in normal individuals and in subjects clinically diagnosed with obstructive sleep apnea. Using immunohistochemistry for axon and Schwann cells, as well as for two putative mechanoproteins (ASIC2 and TRPV4), we observed a significant reduction in the density of nerve fibers in the submucosa of patients with obstructive sleep apnea as well as morphological abnormalities in mechanosensory corpuscles. Importantly, while ASIC2 and TRPV4 expression was regularly found in the axons of mechanosensory corpuscles distributed throughout the muscular layer in the control subjects, it was absent in patients with obstructive sleep apnea. These findings support that neurological alterations are important contributors to the pathogenesis of obstructive sleep apnea.

Mechanoproteins

Mechanosensory innervation

Nerve fibres

Upper airways

acid sensing ion channel

ASIC2 protein, human

enolase

protein S 100

TRPV4 protein, human

vanilloid receptor

adult

aged

axon

biological model

case control study

female

human

immunohistochemistry

innervation

male

mechanotransduction

metabolism

middle aged

pathology

pathophysiology

pharynx

physiology

Schwann cell

Sleep Apnea, Obstructive

Acid Sensing Ion Channels

Adult

Aged

Axons

Case-Control Studies

Female

Humans

Immunohistochemistry

Male

Mechanotransduction, Cellular

Middle Aged

Models, Neurological

Pharynx

Phosphopyruvate Hydratase

S100 Proteins

Schwann Cells

Sleep Apnea, Obstructive

TRPV Cation Channels