

# Carotid body type-I cells under chronic sustained hypoxia: Focus on metabolism and membrane excitability

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Chronic sustained hypoxia (CSH) evokes ventilatory acclimatization characterized by a progressive hyperventilation due to a potentiation of the carotid body (CB) chemosensory response to hypoxia. The transduction of the hypoxic stimulus in the CB begins with the inhibition of K<sup>+</sup> currents in the chemosensory (type-I) cells, which in turn leads to membrane depolarization, Ca<sup>2+</sup> entry and the subsequent release of one- or more-excitatory neurotransmitters. Several studies have shown that CSH modifies both the level of transmitters and chemoreceptor cell metabolism within the CB. Most of these studies have been focused on the role played by such putative transmitters and modulators of CB chemoreception, but less is known about the effect of CSH on metabolism and membrane excitability of type-I cells. In this mini-review, we will examine the effects of CSH on the ion channels activity and excitability of type-I cell, with a particular focus on the effects of CSH on the TASK-like background K<sup>+</sup> channel. We propose that changes on TASK-like channel activity induced by CSH may contribute to explain the potentiation of CB chemosensory activity. Copyright © 2018

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Carotid body

Chronic hypoxia

Ion channels

Membrane depolarization

TASK-like channel

adenosine triphosphate

calcium ion

chloride channel

cholinergic receptor

dopamine

endothelin 1

heme oxygenase 2

hypoxia inducible factor

hypoxia inducible factor 1beta

hypoxia inducible factor 2alpha

neurotransmitter

nitric oxide

potassium ion

sodium ion

voltage gated calcium channel

carotid body chemoreceptor

carotid body type I cell

cell activation

cell function

cell hypoxia

cell metabolism

cell proliferation

chemoreceptor cell

chronic sustained hypoxia

conductance

human

intracellular membrane

membrane depolarization

membrane potential

nerve cell excitability

neurotransmission

nonhuman

osmolarity

oxidative phosphorylation

protein expression

protein function

protein secretion

Review

sensitization