

# Role of the Carotid Body Chemoreflex in the Pathophysiology of Heart Failure: A Perspective from Animal Studies

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The treatment and management of chronic heart failure (CHF) remains an important focus for new and more effective clinical strategies. This important goal, however, is dependent upon advancing our understanding of the underlying pathophysiology. In CHF, sympathetic overactivity plays an important role in the development and progression of the cardiac and renal dysfunction and is often associated with breathing dysregulation, which in turn likely mediates or aggravates the autonomic imbalance. In this review we will summarize evidence that in CHF, the elevation in sympathetic activity and breathing instability that ultimately lead to cardiac and renal failure are driven, at least in part, by maladaptive activation of the carotid body (CB) chemoreflex. This maladaptive change derives from a tonic increase in CB afferent activity. We will focus our discussion on an understanding of mechanisms that alter CB afferent activity in CHF and its consequence on reflex control of autonomic, respiratory, renal, and cardiac function in animal models of CHF. We will also discuss the potential translational impact of targeting the CB in the treatment of CHF in humans, with relevance to other cardio-respiratory diseases. © Springer International Publishing Switzerland 2015.

Blood flow

Breathing

Carotid body

Heart failure

KLF2

Nitric oxide

Oxidative stress

Sympathetic nerve activity

angiotensin II

cystathionine gamma lyase

dipeptidyl carboxypeptidase inhibitor

kruppel like factor 2

nitric oxide

reduced nicotinamide adenine dinucleotide phosphate oxidase

simvastatin

adrenergic stimulation

apnea

Article

breathing disorder

carotid artery flow

carotid body chemoreceptor

chemoreceptor reflex

chemosensitivity

Cheyne Stokes breathing

exercise

heart failure

heart function

heart muscle blood flow

heart output

heart rate variability

human

kidney failure

kidney function

lung hemodynamics

nonhuman

oxidative stress

oxygen therapy

priority journal

protein function

respiratory sympathetic coupling

sensory nerve

sympathetic nerve

sympathetic tone

animal

autonomic nervous system

breathing

carotid body

heart failure

heart ventricle remodeling

hemodynamics

kidney

pathophysiology

physiology

reflex

Animalia

Animals

Autonomic Nervous System

Carotid Body

Heart Failure

Hemodynamics

Kidney

Reflex

Respiration

Ventricular Remodeling