

Peripheral Chemoreceptors Overview

Deep close to the carotid bifurcation,
Lay the carotid chemoreceptors.
Hypoxia, their major source of stimulation,
Results in the drive to breathe, and activity of the ventilators.

They receive much more blood flow,
Then many other organs above or down below,
From a small branch of the occipital artery,
But their mechanism of signaling seems to vary.

The receptors consist of Type I glomus cells,
Which are sensitive to pH, oxygen and carbon dioxide.
They are surrounded by Type II sustentacular cells,
And releases dopamine, acetylcholine, norepinephrine, and neuropeptide.

Many, many hypotheses were proposed,
To account for the signal transmission and responses from the host.
The first of which was the cholinergic hypothesis,
Which was later crushed by the hypoxic studies from the physiologists.

Channel based hypothesis remains probable,
Out of the rest which were proved miserable.
Although this idea is still controversial,
The following mechanism may seem functional.

Proton, carbon dioxide and oxygen bind a molecule, possibly,
Much like hemoglobin, but membrane bound.
Upon activation, it decreases potassium permeability
And result in glomus cell depolarization, hypothetical, it may sound.

Glomus cell depolarizes and releases transmitters,
Which bind to the receptors of the afferent fibers.
These fibers are part of the glossopharyngeal nerve,
And terminate in the NTS for integration, as it serves.

The aortic bodies may play minor roles,
Relative to the carotid bodies in respiratory controls.
These receptors are similar in histology and what they serve,
Except they sit at the arch of the aorta, and join the afferent vagus nerve.

Henry Leung