

# The heme oxygenase-carbon monoxide system in the regulation of cardiorespiratory function at high altitude

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Pulmonary arterial hypertension is one of the most serious pathologies that can affect the 140 million people living at altitudes over 2500. m. The primary emphasis of this review is pulmonary artery hypertension in mammals (sheep and llamas) at high altitude, with specific focus on the heme oxygenase and carbon monoxide (HO-CO) system. We highlight the fact that the neonatal llama has neither pulmonary artery hypertension nor pulmonary vascular remodeling in the Andean altiplano. These neonates have an enhanced HO-CO system function, increasing the HO-1 protein expression and CO production by the pulmonary vessels, when compared to llamas raised at low altitude, or neonatal sheep raised at high altitude. The neonatal sheep has high altitude pulmonary artery hypertension in spite of enhancement of the NO system, with high eNOS protein expression and NO production by the lung. The gasotransmitters NO and CO are important in the regulation of the pulmonary vascular function at high altit