IRON IN THE CAROTID BODY

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Iron is reported to be essential for the hypoxia-sensing mechanisms in the carotid body (CB). Chelation of iron in *in vitro* glomus cells results in hypoxia-like effects, such as increases in chemosensory discharge, intracellular calcium level, and HIV-1α expression. How such changes translate into the hypoxic ventilatory response to acute hypoxia (HVR) *in vivo* is unclear. In this study we seek to determine the effects of chronic iron chelation on the HVR and on CB ultrastructure. This is a longitudinal study in which the responses to 14% and 9% hypoxia were taken, using a whole body poikilocapnic plethysmography, before and then at 7 and 14 days of iron chelation by ciclopirox olamine (CPX; 20 mg/kg, ip, daily) in 9 conscious adult Wistar rats. The HVRs were compared in each animal at 30 s intervals and the group data were calculated. After taking the last HVR, the animals were anesthetized, CB were dissected and processed for electron microscopy. We found that CPX decreased the HVR by 10-30%. The decrease was similar at both hypoxic levels, was noted after 7 days' iron chelation, and did not further advance after 14 days' chelation. The peak hypoxic ventilatory stimulation decreased significantly by 476 ±140 and 320 ±181 ml/min/1000g in 14% and 9% hypoxia, respectively. However, these decreases were not statistically different from each other, so that iron chelation did not alter the HVR gain. At the ultrastructural level, 7 days' iron chelation resulted in disruptive changes in the endothelial layer of CB microvasculature and in a spectrum of bright-to-dark variants of glomus cells necrosis. The results show a substantial discrepancy between severe morphological and rather modest functional CB changes after iron chelation. We conclude that HVR is reasonably well upheld in conscious rats in the face of iron chelation.