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# THE IMPORTANCE OF THE CROCODILIAN HEPATIC PISTON PUMP TO VENTILATION DURING ALTERED RESPIRATORY DEMAND

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Crocodilians ventilate through a combination of the intercostal muscles, the abdominal muscles and the diaphragmaticus muscle. Previous studies report that the caudal-cranial movement of the liver during the ventilatory cycle by the diaphragmaticus muscle, termed the hepatic piston pump, is solely responsible for ventilation in floating caimans. However, the importance of the hepatic-piston pump to ventilation in crocodilians under altered conditions of ventilatory demand is unknown. The hepatic-piston pump made only a limited contribution to ventilation while crocodiles rested at 30<SUP>O</SUP>C, following a decrease in temperature (20<SUP>O</SUP>C, reduced ventilatory demand), and during hypercapnia (5% CO<SUB>2</SUB>, increased ventilatory drive). The

diaphragmatic muscle was important for facilitating ventilation during exercise (increased ventilatory demand) as loss of the hepatic piston pump, following inactivation of the diaphragmaticus muscle, compromised exercise induced increases in tidal volume and minute ventilation. A relative hyperventilation was induced by exercise (both with and without a functional hepatic piston pump) and, as a result, the alterations in ventilation following inactivation of the diaphragmaticus muscle did not significantly alter arterial oxygenation.