

Cardiorespiratory functions in the fetal llama

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Factors which allow the adaptation of adult llamas to oxygen limitation include principally: low P50, small elliptical red cells with high hemoglobin concentration, high muscle myoglobin concentration, high capillary density and a more efficient O₂ extraction at tissue levels. The fetal llama is known to have blood with a low P50 but it is not known whether it has further cardiorespiratory adaptations which could allow it to cope with a low oxygen milieu. To investigate this, we have measured fetal blood flow and blood oxygen content in 8 fetal llamas and compared the findings to similar measurements in 10 low altitude bred fetal sheep, during the last third of gestation. The llamas were born and raised at 4500 m. They were brought to Santiago (586 m) and were studied one week later. The results show that there was higher hemoglobin concentration and higher oxygen capacity in blood from the fetal llama compared to the fetal sheep. Fetal llama combined ventricular output and umbilical b