

Pregnant lizards maintain lung diffusing capacity despite decreases in lung volume

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Tiliqua nigrolutea, the blotched blue tongue, is a large viviparous skink. Pregnancies in this species typically have high gestational loads, with clutch masses at birth representing 20-50% of maternal body mass. The large embryos have the potential to compromise the function of numerous organ systems, particularly those susceptible to compressive forces such as the respiratory system. Previous studies have shown that breathing patterns are altered and the energetic cost of breathing increased threefold during pregnancy in sleepy lizards (*Tiliqua rugosa*). In this study we measured the changes in lung diffusion capacity and total lung volume during pregnancy in *Tiliqua nigrolutea*. Lung diffusion capacity is a measure of the ability of gases to diffuse across the alveolar membranes and provides a measure the efficiency of the compressed lung during pregnancy. Small light weight breathing masks were attached to the lizards (pregnant n=6; non pregnant n=8) and lung volume and lung diffusing capacity were determined by giving the lizards low concentration of carbon monoxide (0.3%) and helium (13%) to breathe. Lung volume significantly decreased in pregnant lizards during the last 12 weeks of pregnancy. However, despite this reduction in lung volume pregnant lizards were able to maintain lung diffusion capacity and the rate of oxygen consumption. These results suggest that pulmonary perfusion maybe increased to non compressed areas of the lung during pregnancy. Exercise capacity was significantly reduced in gravid lizards due to limitations on exercise induced changes in tidal volume, rate of inspiration, breathing frequency and oxygen consumption.