Adjustments of the oxygen diffusing capacity to energetic demands during the development of the quail (Coturnix coturnix japonica)

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One of the hypotheses that attempt to explain physiological limitations of energy budgets is the symmorphosis hypothesis, which proposes that if matching structures to functional needs were combined with the strict economy of energy and materials, the result would be an optimal organ design for the specific function it serves. Evidence in favor of symmorphosis in adults is as abundant as evidence against it, but the plasticity of some morphological traits may be dependent on the ontogenetic stage at which acclimation acts. Thus, here we studied the adjustment of structure and function in lungs at different stages of development in the quail Coturnix coturnix japonica under two thermal regimes. Our main results show that i) resting metabolic rate, maximum thermogenic oxygen consumption and oxygen diffusion capacity did not exhibit developmental plasticity for two thermal environments; and ii) oxygen diffusion capacity fully adjusted to resting metabolic rate and maximum oxygen consumpti