649. THE ROLE OF OXYGEN IN FETAL GROWTH

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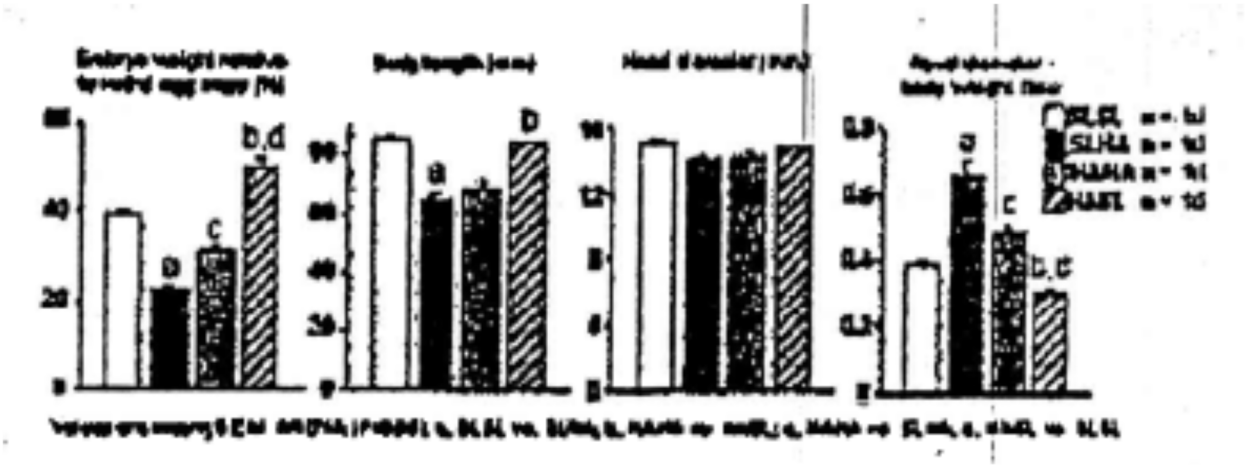
Intrauterine growth retardation is a killer in obstetric medicine today. Consequently, there is great interest into the determinants of fetal growth Genes (Frayling & Hattersley, BMJ 60:89, 2001) and nutrition (Barker BMJ 60:69, 2001) control fetal growth but the role of oxygenation of the fetus on its growth, independent of genetic or nutritional factors, is uncertain. This study investigated the role of oxygen in fetal growth in the kitchen because, in contrast to mammals, the effects on the fetus of changes in oxygenation can be assessed directly without additional effects on maternal or placental phycology. If oxygen regulates fetal growth independent of genetics or nutrition, then incubation of sea level chick embryos at high altitude should retard fetal growth, and incubation at sea level of high altitude chick embryos usually with growth restriction should restore fetal growth.

Methods: The study was done in Bolivia, in the cities of La Paz (4000 m) and Santa Cruz (sea level) and involved 4 experimental groups: Sea level eggs incubated at sea level (SLSL, n-16); sea level eggs incubated at altitude (SLHA, n=16); eggs of native high altitude chickens incubated at sea level (HAHA, n=16) and eggs of native altitude chickens incubated at sea level (HASL, n-16). Eggs were incubated at 38ºC with 60% humidity. On day 20 (term is 21 d), a blood sample was obtained from the chorio-allantoic vein and detailed biometry was performed on the embryo.

Results: Blood from embryos incubated at altitude was hipoxic (SLSL: 77.2 ± 12.3; SLHA: 37.2 ± 1.8; HAHA: 35.8 ± 2.2; HASL: 63.7 ± 6.3; HAHA: 35.8 ± 2.2 mmHg, P< 0.05). Although SLHA embryos were markedly growth restricted, HASL embryos not only restored, but improved, their growth relative to SLSL embryos (Fig. 1).

Growth restriction at altitude was asymmetric, and importantly, the ratio of head diameter, body weight, which when increased predicts cardiovascular disease in adult humans (Manyn et al, Lancet 348:1264, 1996), was greatest in SLHA and lowest in HASL embryos (Fig.1).



Conclusion: Fetal oxygenation may predetermine fetal growth independent of genetic or nutritional factors.

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