

A most interesting observation was made on the effect of salinity on the incorporation of amino acids. Embryos of late stage, incubated two days in distilled water and showing no morphological effects, were virtually incapable of incorporation of lysine into protein. The incorporation occurred and increased rapidly as the sea water content was raised, reaching a plateau at 12.5% which remained constant up to 50% sea water. Using full strength sea water, the incorporation of lysine into protein was double the plateau rate. This phenomenon deserves further study regarding both the morphological effects caused by early deprivation of sea water and the role of sea water components on the intracellular control of protein synthesis.

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EXCHANGEABLE OXYGEN STORES IN THE HARBOR SEAL (*Phoca vitulina*) DETERMINED USING O¹⁸ DILUTION

Carroll E. Cross, Bernard S. Packer, Michael Altman, J. Bernard L. Gee, H. Victor Murdaugh and Eugene D. Robin, Department of Medicine, University of Pittsburgh School of Medicine, Pittsburgh, Pa.

The magnitude of available O₂ stores is an important determinant of survival time following loss of external O₂ supply. Presumably the ability of the seal to survive 20 minutes of diving depends on the magnitude of its oxygen stores. Previously there has been no experimental method to determine whole body exchangeable oxygen stores.

This laboratory (J. Clin. Invest. 46:1048, 1967) developed a method for the determination of exchangeable oxygen stores in man using the dilution of O¹⁸ in a rebreathing circuit. Total body oxygen stores (TBO₂) were calculated using the expression:

$$TBO_2 = V_i \left(\frac{F_i^{18}O_2 / F_i^{16}O_2}{F_t^{18}O_2 / F_t^{16}O_2} \right) - 1$$

where V_i represents the initial volume of oxygen in the external system determined by direct measurement, and F_i¹⁸O₂/F_i¹⁶O₂ and F_t¹⁸O₂/F_t¹⁶O₂ refer to initial and final specific activities of ¹⁸O₂ determined by mass spectrometry.

TBO₂ equals the sum of oxygen in the lung (LO₂) and non-lung oxygen (NLO₂) stores. The dilution of neon was used to measure lung volume at the time of study thus allowing calculation of LO₂, and by difference, NLO₂.

A rebreathing circuit was designed to use with the seal, and 12 measurements of oxygen stores were made in three young harbor seals, and values expressed at BTPS. Results in the seal were TBO₂ = 48 ± 6 (S.D.) and NLO₂ = 28 ± 3 (S.D.) ml/Kg body weight. On a weight basis, the NLO₂ of the seal was more than twice the value found in man. Multiplying estimated O₂ consumption during diving by maximal diving time suggests that death occurs when O₂ stores become entirely exhausted. The increased O₂ stores found in this animal appears to be an important adaptation subserving the function of survival during prolonged diving.