Title: Hydrogen gas is not oxidized by mammalian tissues under hyperbaric conditions.

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Abstract: Mammalian tissues, including heart, lung, liver, kidney, spleen, and skeletal muscle of guinea pig, rat, or pig, were exposed to tritium (T2) and high pressures of H2. Incorporation of the tritium label was measured to test for a latent capacity by mammalian tissues to oxidize H2 under conditions such as those experienced by deep divers breathing H2. Tissues were removed aseptically, and either minced, homogenized, or prepared as live cell cultures. The tissues were placed in a chamber to which 8 mCi T2, 1 MPa He, and either 1 or 5 MPa H2 were added. After 1 h the chamber was decompressed. The tissues were spun briefly in a vortex mixer to facilitate elimination of T2 in the gas phase. Samples were analyzed by scintillation counting for tritium incorporation in the liquid phase or in the tissues. Saline and distilled water were used as negative controls. Palladium (Pd) beads immersed in water, and cultures of the H2-metabolizing bacterium Alcaligenes eutrophus were used as positive controls. The tissues incorporated on the order of 10 nCi T2.ml-1, which implied a H2 incorporation of 10-50 nmol H2.g-1.min-1. However this incorporation was not different from that found in the water controls and was attributed to radioisotope effects. The Pd and bacterial samples incorporated over 1,000-fold more T2 than the mammalian tissues. We concluded that the mammalian tissues did not oxidize H2 under hyperbaric conditions, with a limit of detection of 100 nmol H2.g-1.min-1.

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