

LOWER DECOMPRESSION SICKNESS RISK IN PIGS SUPPLIED WITH H₂-METABOLIZING MICROBES DURING DIVES IN H₂. A. Fahlman, S.R. Kayar, W. Lin, and W.B. Whitman. Naval Med. Res. Center, Bethesda, MD 20889 and Dept. of Microbiology, Univ. of Georgia, Athens, GA 30602.

Pigs supplied with H₂-metabolizing microbes (n=14; 18.9±0.9 kg) had a 40% lower incidence of decompression sickness (DCS) compared to control animals (n=10; 19.6±1.6 kg), following exposure to elevated pressures of H₂. Animals received caecal injections of either *Methanobrevibacter smithii* (12-83 mL, activity 200-2200 µmol CH₄/min) or 60 mL of saline, 1-2 h prior to experiments. To simulate a H₂ dive, animals were placed in a dry hyperbaric chamber, compressed to 24 bar (21.6-22.9 bar H₂, 0.3-0.5 bar O₂) for 3 h, then decompressed to 11 bar at 0.9 bar/min, and observed for 1 h for severe symptoms of DCS. Chamber concentrations of O₂, N₂, He, H₂, and CH₄ were measured by gas chromatography throughout the dive. The CH₄ release rate in treated animals (9.7-23.4 µmol/min) was used to indicate the microbial activity of reducing the tissue burden of H₂. Treated animals had a significantly lower DCS incidence (P<0.05) than control animals (6/14 vs. 7/10), and a significantly higher mean CH₄ release rate (P<0.001) of 14.4±3.6 µmol/min vs. 6.7±2.5 µmol/min. Increasing the washout rate of the inert gas by metabolizing H₂ decreased the DCS risk in a pig model during H₂ dives. (Supported by NMRDC work unit #61153N MR04101.00D-1103; animal use guidelines of NIH Pub. # 92-3415, 1992).