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Title: Spinal decompression sickness: hydrophobic protein and lamellar bodies in spinal tissue

Authors: Hills, BA

Keywords: decompression
animal
sheep

Issue Date: 1993

Abstract: Four basic studies have addressed the question of why the spinal cord is so vulnerable to decompression injury, with symptoms exceeding those related to the brain by a ratio often quoted as 3:1. Hydrophobic protein (HP) was discovered in sheep spinal tissue at roughly 3 times (3.3:1) the level in brain and several orders of magnitude greater than in skeletal muscle or plasma. Extravascular lamellar bodies (LBs) of largely phospholipid (PL) were also demonstrated in spinal tissue by electron microscopy using a special fixative, the population being 4.1 times that in brain tissue where some LBs were found adjacent to vascular endothelium. Extracts of spinal surfactant (HP+PL) were found to be particularly surface active on the Langmuir trough, with the HP greatly accelerating monolayer equilibration, especially the recruitment of PL to a rapidly expanding air-aqueous interface. The PL/HP surfactant complex was found to render surfaces hydrophobic when they were able to initiate "strings" of bubbles in supersaturated solutions of gases. These results are discussed as favoring the concept of autochthonous bubbles causing spinal decompression injury exacerbated by the large quantities of spinal surfactant present.

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