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Title: Changes in rat respiratory behavior under varying PCO₂ levels and argon content in hyperbaric Ar-O₂-CO₂ atmospheres

Authors: Friess, SL
Hudak, WV
Boyer, RD

Keywords: respiratory
carbon dioxide
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animal
rat

Issue Date: 1976

Citation: Undersea Biomed Res. 1976 Jun;3(2):85-94.

Abstract: An anesthetized rat preparation has been used for breathing studies in hyperbaric Ar-O₂-CO₂ atmospheres in which total saturation pressure was varied in the range 1-19.1 ATA and PCO₂ was set at levels of 0.0, 0.05 or 0.10 ATA. The variables monitored were respiration rate and an isotonic measure of diaphragm-twitch amplitude during contracture/relaxation (twitch index). The results indicate that: (1) hyperbaric Ar-O₂ atmospheres are able to maintain the animal in stable condition for several hours; (2) elevation in PCO₂ level produces enhancements in respiration rate and twitch index that are markedly dependent on the PAr level; (3) successive increases in PAr are able to lower progressively the effects on both breathing parameters produced by either 0.05 or 0.10 ATA of CO₂, with full abolition of both effects of inhaled CO₂ in the PAr range 14-19 ATA; and (4) the intrinsic ability of hyperbaric argon to abolish respiratory enhancement by CO₂ is greater than that of hyperbaric helium. These results have been discussed in terms of possible CNS loci at which hyperbaric argon (or helium) is able to antagonize centrally induced effects from dissolved molecular species derived from inspired CO₂, and in relation to the broader task of control of excitatory/inhibitory centers of the CNS during diving by manipulation of the partial pressures of diluent components of

breathing-gas mixtures. Animals Argon/*toxicity
Atmosphere Exposure Chambers Carbon
Dioxide/*toxicity Diaphragm/drug effects
Environment, Controlled Helium/toxicity Rats
Respiration/*drug effects

Description: Undersea and Hyperbaric Medical Society, Inc.
(<http://www.uhms.org>)

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