Title: Hyperbaric He but not N2 augments Ca2+-dependent dopamine release from rat striatum

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Abstract: Endogenous dopamine (DA) and 3,4-dihydroxyphenylacetic acid (DOPAC) were measured by high performance liquid chromatography with electrochemical detection in perfusate from continuously superfused rat brain striatal slices, and the effects of various pressures of He and N2 were determined. He at 24 and 100 atmospheres absolute (ATA) significantly (P less than 0.01 and less than 0.05) increased the release of DA evoked by a 6-min exposure to 35 mM K+, whereas He at 48 ATA did not. Experiments conducted in a Ca2+-free medium showed that only the extracellular Ca2+-dependent component of release was affected by pressure. Similar increases in DA release were observed when DA reuptake and metabolism were blocked with cocaine and pargyline, although statistical significance was not achieved. N2 did not significantly affect DA release at 12, 24, 48, or 100 ATA. The results indicate that He (= hydrostatic pressure) augments Ca2+-dependent DA release and that substitution of N2 negates this effect. The relevance of these observations to the phenomena of high pressure neurologic syndrome in divers and the anesthetic reversal of pressure effects is discussed.

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