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Title: Sensitivity of cultured mammalian cells to oxidative stress: adaptation to repeated exposures of hyperbaric oxygen

Authors: Messier, AA
Fisher, HW

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Abstract: Four established cell lines (mouse neuroblastoma, N2A; Chinese hamster lung, V79; Chinese hamster ovary, CHO; and rabbit kidney, RK13) were made O₂-tolerant by repetitive exposure to hyperbaric oxygen (HBO). The cultures were exposed to 100% O₂ at pressures ranging from 6 to 10 ATA for time periods up to 3 h, and the surviving cells were regrown to monolayer confluency and reexposed; by the end of three cycles of treatment these cells were tolerant to exposures of 10 ATA O₂ for greater than 5 h. The development of O₂ tolerance was measured by enzyme and morphologic indices. Results showed that all of the cell lines tested could be made O₂ resistant. However, qualitative differences were found. RK13 cells were more resistant to HBO than the other cell types tested. The technique provides a powerful adjunct to current methods that study the effects of oxidative stress in mammalian cells. The ability to generate O₂-resistant cells in only 3-4 wk provides a considerable time savings over published efforts (12-20 mo.). In addition, rapid screening of various cell lines may lead to discovery of O₂-resistant cell types which will provide insight into the factors inherent in the development of oxygen tolerance.

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