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The role of aerobic metabolism and intragel oxygen in hypoxia tolerance of three ctenophores: *Pleurobrachia bachei*, *Bolinopsis infundibulum* and *Mnemiopsis leidyi*

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Abstract:

Ctenophores are important members of planktonic communities that are often abundant in dysaerobic environments. Previous studies have shown that ctenophores are not adversely affected by extended periods of hypoxia. The three species used in this study, *Pleurobrachia bachei*, *Bolinopsis infundibulum*, and *Mnemiopsis leidyi*, were all able to oxyregulate to very low partial pressures of oxygen (PO_2 s). These species were found to have mean critical oxygen tensions of 7.7, 10.6, and 7.2 hPa respectively. In general, ctenophores are better oxyregulators than medusae and many species of shrimps, fish and squid. Intragel oxygen was measured using a fibre optic oxygen optode. All these ctenophores have intragel subsurface $[O_2]$ s of 5–10% below that of the surrounding seawater. Intragel oxygen measurements of *P. bachei* showed a gradient of decreasing PO_2 from surface tissues to the gut. Specimens of *P. bachei* over 14 mm in diameter had anaerobic guts. Survival times in anoxia ranged from 0 h for *M. leidyi* to up to 6 h for *P. bachei*. Ctenophores rely on aerobic metabolism to tolerate hypoxia.