The effects of short-term salinity changes on the metabolic rate and burrowing behavior of the sand dollar (*Echinarachnius parma*)

Extreme ecosystems include deep-sea trenches, brine pools, polar regions, and intertidal zones. Organisms found intertidally experience drastic changes in their physical environment including fluctuations in salinity and temperature. Invertebrates in the phyla Echinodermata serve ecological roles as grazers and bioturbators within intertidal ecosystems. A common, yet understudied echinoderm in the lower intertidal zone of the Gulf of Maine is the sand dollar, *Echinarachnius parma*. This laboratory study examined the effects of short-term exposure to hypotonic, ambient, and hypertonic salinities on the metabolism and burrowing capacity of *E. parma.* In the lowest salinity treatment (22 psu) the metabolic rate of *E. parma* was significantly higher compared to the ambient (32 psu) treatment suggesting that *E. parma* employs cell volume regulation in response to osmotic stress. There was no difference in burrowing time of *E. parma* across any of the salinity treatments. With climate change driving lower salinities of surface waters due to melting and increased run off, sand dollars may have to portion a greater amount of energy towards retaining solute balances. These results contribute valuable information regarding how adult *E. parma* respond physiologically and behaviorally to changes in salinity.

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