

Starvation's role in plankton metabolism

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Starvation at all scales of plankton from archaea to medusae is the prevailing condition in marine ecosystems. Such nutrient-limitation will shift the physiological state in these organisms with accompanying changes in their physiology and biochemistry. Here, we review our laboratory's progress in documenting these changes associated with starvation in a range of marine organisms. Specifically, we focused on respiration, ammonium excretion, RQ, proteinaceous biomass, respiratory ETS activity, glutamate dehydrogenase, and isocitrate dehydrogenase activity in the mysid, *Leptomysis lingvura*, a brine shrimp *Artemia sp*, a dinoflagellate, *Oxyrrhis marina* and two bacteria, *Vibrio natriegens*, and *Pseudomonas nautica*. In all cases, with starvation, the respiration and the ammonium excretion rates decreased, the RQ increased, the proteinaceous biomass, respiratory ETS activity, isocitrate dehydrogenase activity remained relatively constant, but the ratios of the enzyme activities to their associated physiological rates, increased. Incorporation of these new findings should improve the predictions of ecosystem models.

Keywords: Starvation, respiration, ammonium excretion, RQ, enzyme activity

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