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Nutrient Acquisition By a Respiratory Epithelium in the Sea Cucumber, Thyonella Gemmata

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NUTRIENT ACQUISITION BY A RESPIRATORY EPITHELIUM IN THE SEA CUCUMBER, THYONELLA GEMMATA

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Many sea cucumbers (phylum Echinodermata) exhibit arborescent respiratory structures which emerge from the digestive system and ascend into the body coelom. These "respiratory trees" are accepted as the primary site of respiratory gas exchange for these animals. However, several studies have suggested the respiratory trees are also involved in feeding. We investigated the potential role of the respiratory trees of Thyonella gemmata to remove dissolved organic matter from seawater. Specimens were incubated in seawater containing labeled proteins (1mg/mL) for times up to 24 hours and then the trees were removed. To assess the presence of the absorbed label, tissue samples were examined using light and fluorescence microscopy. In both whole mounts and tissue cross sections (1μm), the label was detected within the cells of the respiratory trees. Although there was variability in the presence of label among experimental animals, no equivalent label was detected in unexposed animals. The respiratory trees of T. gemmata appear to be involved in nutrient acquisition and may account for a significant amount of the total nutrient uptake.