

Magical Proton Usage on Calcification of Ammonia "beccarii" -Acidify Environment to Realize Favorable pH at Calcification Site-

*Takashi Toyofuku¹

1. Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

The physiological processes responsible for calcification in foraminifera are poorly understood despite their contribution to oceanic CaCO₃ production. Here we show that calcification is driven by rapid transformation of bicarbonate to carbonate inside the cytoplasm, achieved by active outward proton pumping. We furthermore show that a V-type H⁺ ATPase is responsible for the proton flux and thereby, calcification. External transformation of bicarbonate into CO₂ due to the proton pumping implies that biomineralization does not rely on availability of carbonate ions, but total dissolved CO₂ in perforate foraminifera may not reduce calcification, thereby potentially maintaining the current global marine carbonate production.

Keywords: Biomineralization, Calcium carbonate, pH