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

*Takashi Toyofuku*

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