

# Local acclimatisation-driven differential gene and protein expression patterns of Hsp70 in *Acropora muricata*: implications for coral tolerance to bleaching

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## Abstract

Corals show spatial acclimatisation to local environment conditions. However, the various cellular mechanisms involved in local acclimatisation and variable bleaching patterns in corals remain to be thoroughly understood. In this study, the modulation of a protein implicated in cellular heat stress tolerance, the Heat shock protein 70, was compared at both gene (hsp70) and protein (Hsp70) expression level in bleaching tolerant near-coast *Acropora muricata* colonies and bleaching susceptible reef colonies, in the lagoon of Belle Mare (Mauritius). The relative Hsp70 levels varied significantly between colonies from the two different locations, colonies having different health conditions and the year of collection. Before the bleaching event of 2016, near-coast colonies had higher basal levels of both Hsp70 gene and protein compared to reef colonies. During the bleaching event, the near-coast colonies did not bleach and had significantly higher relative levels of both Hsp70 gene and protein compared to bleached reef colonies. No significant genetic differentiation between the two studied coral populations was observed and all the colonies analysed were associated with Symbiodiniaceae of the genus *Symbiodinium* (Clade A) irrespective of location and sampling period. These findings provide further evidence of the involvement of Hsp70 in conferring bleaching tolerance to corals. Moreover, the consistent expression differences of Hsp70 gene and protein between the near-coast and reef coral populations in a natural setting indicate that the modulation of this Hsp is involved in local acclimatisation of corals to their environments.

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