Differentially expressed genes of octocoral, *Eleutherobia rubra* against heat stress and the local environment

Nayun Lee, Seungshic Yum, Seonock Woo
Korea Institute of Ocean Science and Technology, Busan, 49111 Republic of Korea

Abstract

Recently major impacts of climate change including, uprisng seawater temperature and ocean acidification, might have accelerated the process of destruction on coral ecosystem worldwide. Soft coral ecosystem in South Sea of Korea is one of the coral communities affected by global warming strongly because the fast warming Kuroshio Current arrives Korean peninsula from the origin of the northern Philippines. In this research, we studied the physiological aspect and transcriptional responses of the coral, *Eleutherobia rubra* using the heat exposure experiment. We collected corals and extracted RNA after heat stress experiments. For the heat stress experiment, we exposed corals to temperature (26 °C) for 24h and hybridized those RNAs with that of control group (18°C) on the Oligo chip. As the results, we identified several groups of genes which transcription changed compared with control group. Antioxidant genes, ubiquitin-related genes, calcium ion-responsive genes, genome-related genes, and telomerase-related genes were explored in heat exposed coral groups and we compared those gene expressions in spring and summer and also in different locality with various latitudes.

Materials & Methods

![Figure 1. Eleutherobia rubra](image1)

Figure 1. Eleutherobia rubra

![Figure 2. Sampling sites eru island in Korea](image2)

Figure 2. Sampling sites eru island in Korea

![Figure 3. Measuring relative gene expression by using DNA microarrays.](image3)

Figure 3. Measuring relative gene expression by using DNA microarrays.

Results

![Figure 4. The denaturing formaldehyde agarose gel analysis of total RNA after heat shock stress for 24 hr](image4)

Figure 4. The denaturing formaldehyde agarose gel analysis of total RNA after heat shock stress for 24 hr

![Figure 5. The denaturing formaldehyde agarose gel analysis of total RNA for Monthly](image5)

Figure 5. The denaturing formaldehyde agarose gel analysis of total RNA for Monthly

![Figure 6. DEG profiling of E. rubra exposed to heat stress](image6)

Figure 6. DEG profiling of *E. rubra* exposed to heat stress

![Figure 7. DEG profiling and clustering of control vs. heat exposed group](image7)

Figure 7. DEG profiling and clustering of control vs. heat exposed group

![Figure 8. Results of applying biomarkers May and August in eru island](image8)

Figure 8. Results of applying biomarkers (May & August in eru island)

![Figure 9. Results of applying biomarkers May and August in eru island](image9)

Figure 9. Results of applying biomarkers (May & August in eru island)

Acknowledgement

This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government(MSIT) (No. 2020R1A2B5B02001619).