Adaptive Capacity of Marine Turtles to a Warming Climate: a Full Transcriptomic Analysis

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Marine turtles are highly susceptible to the effects of global warming, especially during their embryonic phase, due to their temperature dependent sex determination, narrow thermal tolerance limits and long generation times (30-50 years). Anthropogenic climate change is predicted to significantly increase global ambient temperatures of up to 3.4°C in Australia by the year 2070 under a high emissions scenario. Understanding how embryonic marine turtles may respond to high temperatures during incubation is imperative in facilitating conservation efforts. This study compared loggerhead (*Caretta caretta*) turtles from Dirk Hartog Island in Shark Bay, Western Australia, exposed to a period of thermal stress (36°C for three hours) late in development (>80%) with a control treatment with a consistent temperature close to the pivotal temperature (29°C). Here, we use the Trinity platform for *de novo* transcriptome assembly with Trinotate utilised for downstream full transcriptomic analyses. Our preliminary results suggest thermal stress effects gene expression. Based on expression, a hierarchical cluster analysis produced two distinct groups. One contained all individuals exposed to the heat shock treatment and the other contained the control treatment individuals. By comparing the expression of these transcripts between populations, management strategies will be able to determine those populations that are at the highest risk of vulnerability to global warming. This study provides a foundation on which to build future studies to compare populations from thermally different nesting beaches and other species of marine turtle to determine if the observed expression changes are universal in marine turtles.

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