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DNA barcoding of sea turtle leeches (Ozobranchus spp.) in Florida coastal waters

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Introduction

Fibropapillomas (FP) is a neoplastic disease originally identified only on green sea turtles (Caretta caretta). The disease has been observed on other sea turtle species (Caretta caretta, Chelonia mydas, Eretmochelys imbricata) and in non-marine turtles (Dipsochelys geoffroii) (Williams et al. 2011). The disease has a range of outcomes from benign tumors to death. The disease is caused by a novel beta papillomavirus (FPV) (Delap et al. 2009), and the pathogenesis of FPV is unknown (Williams et al. 2011). While the disease is mostly benign, the death of a sea turtle from FP can have a significant impact on the population (Williams et al. 2011). The disease is most commonly associated with the dermis of the eyes, mouth, and flippers (Williams et al. 2011). The disease can also be transmitted to non-turtle hosts (Williams et al. 2011).

Methods

Leech collection:

Leech collection was performed by dissecting the gills and branchiae (gills) of sea turtles. The leeches were collected from green sea turtles (C. caretta), black sea turtles (C. mydas), and loggerhead sea turtles (C. caretta). The leeches were collected from eight different sites in Florida: Vero Beach, St. John’s County, Delray Beach, Palm Beach, St. Petersburg, and Gainesville (Florida Keys). The leeches were identified and assigned a morphological identity based on the number of suckers. The leeches were then sequenced for multiple genes to determine the species of leech from which they originated.

DNA barcoding:

DNA barcoding of sea turtle leeches was performed using the mitochondrial 16S rRNA gene and the COI gene. The 16S rRNA gene was amplified using the primers HCO2198 and LCO1490. The COI gene was amplified using the primers LCO1490 and CO1526. The amplified DNA was sequenced and submitted to NCBI GenBank for selected fragments.

Results and Conclusions

The DNA barcoding results showed that the leeches collected from Florida coastal waters were Ozobranchus spp. Ozobranchus spp. has increased in recent years because of its connection to sea turtle conservation (MacCullouch et al. 2005). The disease is likely to be terminal if tumors are developed internally, but external tumors on the eyes, mouth, and flippers suggest the vector organism involvement behind FP (Williams et al. 2011). The COI genetic barcode of Florida leeches yielded a significant number of CAs unique to the Ozobranchidae family (vital to species differentiation), future research should include samples further south of the Florida peninsula (e.g. Lake Worth) and north of the Florida peninsula (e.g. Lake Huron). The invertebrate mitochondrial sequences were submitted to EMBL-EBI (Schulze et al. 2011). The disease is likely to be terminal if tumors are developed internally, but external tumors on the eyes, mouth, and flippers suggest the vector organism involvement behind FP (Williams et al. 2011).

References


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