

Distribution and Function of Bacterial Aggregates Within Tissues of the Coral *Acropora loripes*

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I acknowledge the Wulgurukaba and Bindal people as the Traditional Owners of the land and sea country this work was conducted

BACTERIAL AGGREGATES

- Bacteria from the genus *Endozoicomonas* are commonly found as aggregates in a wide range of coral species termed coral-associated microbial aggregates (CAMAs).
- These structures remain poorly understood in terms of spatial distribution and function despite extensive efforts studying the coral microbiome

WHY STUDY THEM?

- Due to the close association within the coral host, *Endozoicomonas* may be developed into a coral probiotic to mitigate coral bleaching
- Genomic data may guide the selection of probiotic candidates by identifying potential interactions within the coral holobiont.

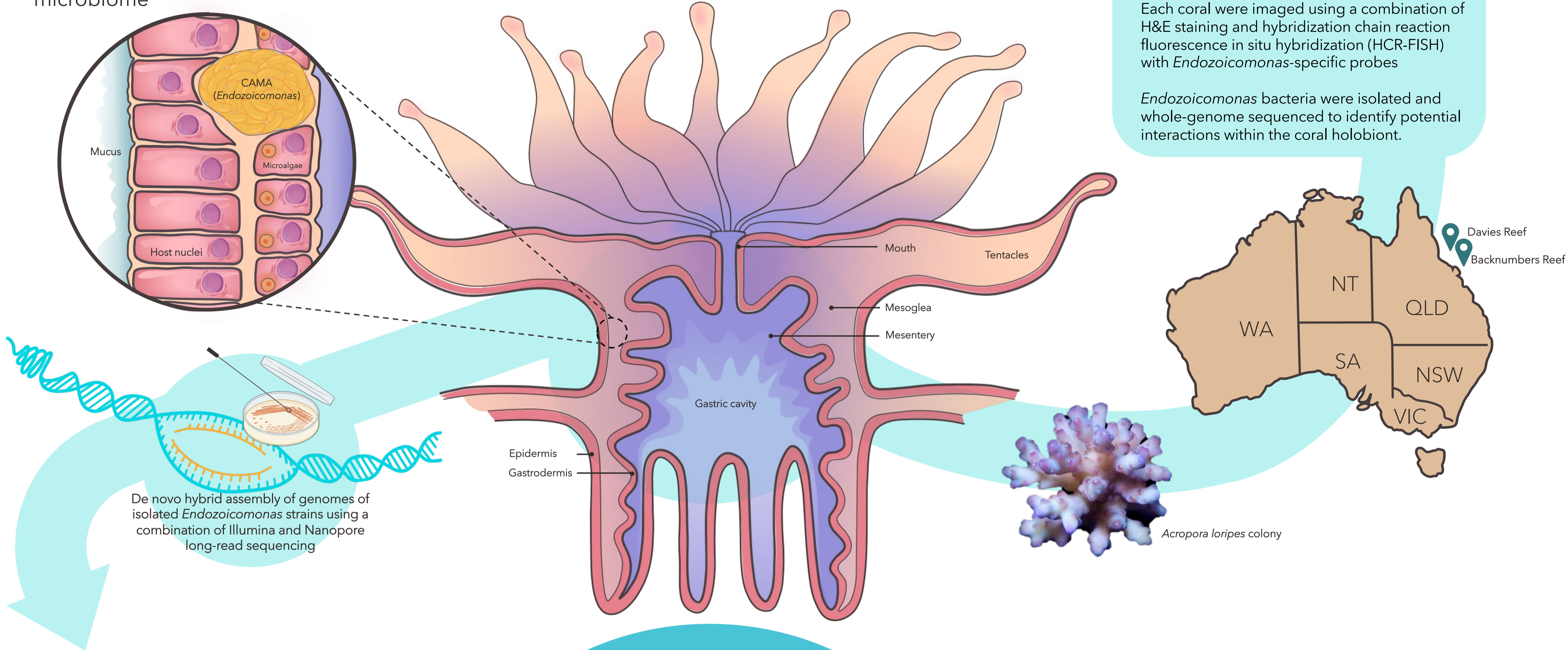
AIM: Characterization of CAMAs associated with the coral *Acropora loripes* to provide novel insights into their distribution and functional potential.

METHODS

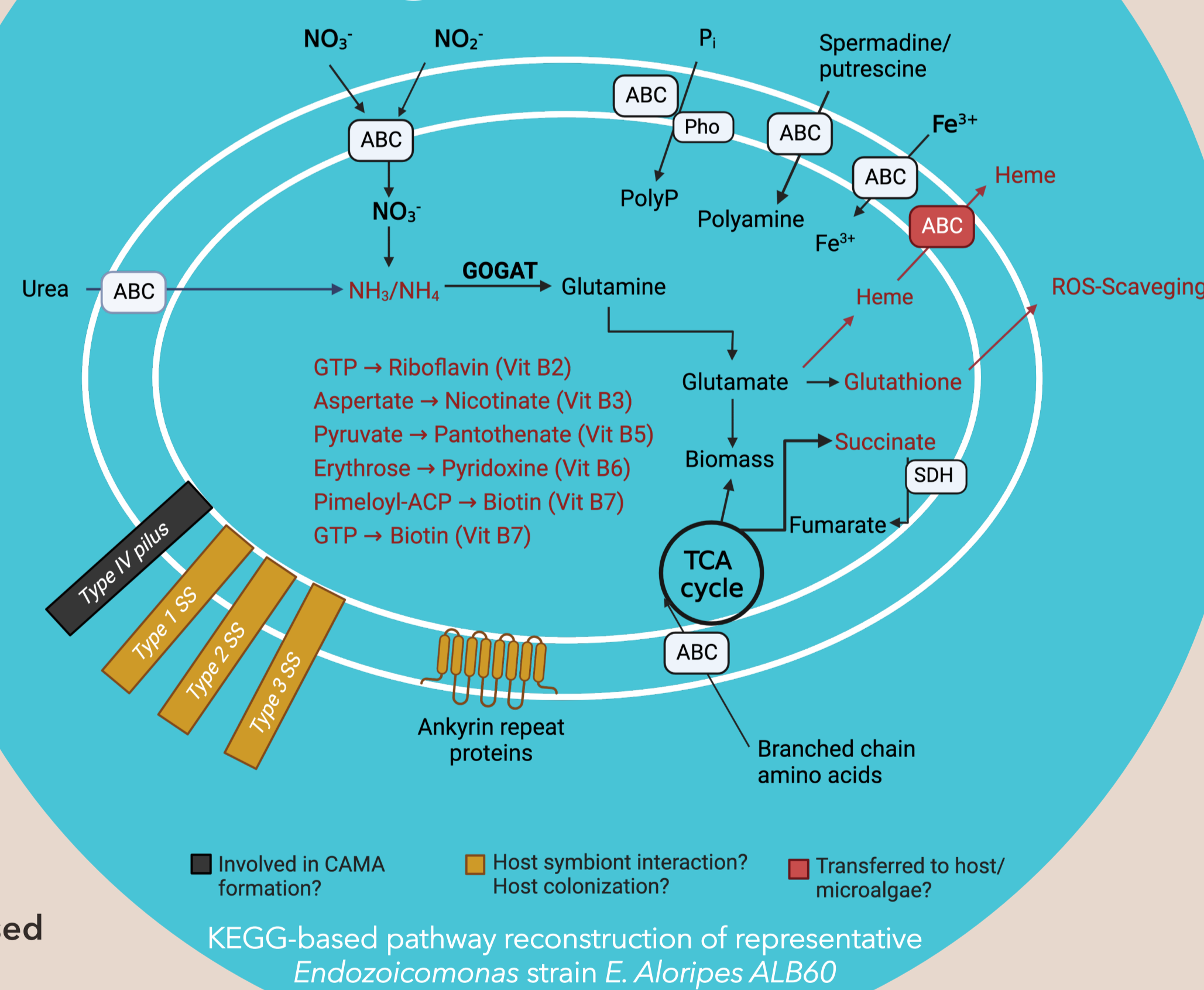
Twelve coral genotypes were collected from two separate reef sites in the central Great Barrier Reef.

Each coral were imaged using a combination of H&E staining and hybridization chain reaction fluorescence in situ hybridization (HCR-FISH) with *Endozoicomonas*-specific probes

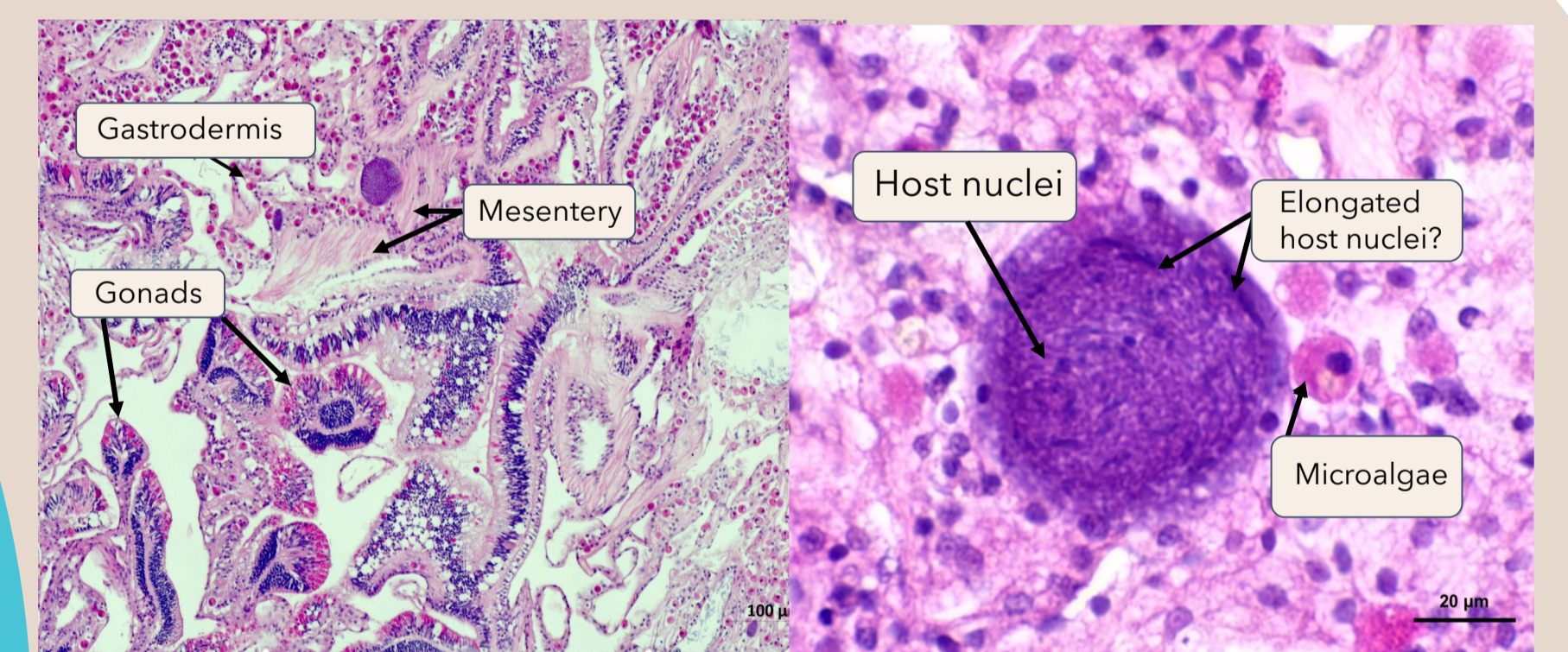
Endozoicomonas bacteria were isolated and whole-genome sequenced to identify potential interactions within the coral holobiont.



FUNCTIONAL POTENTIAL

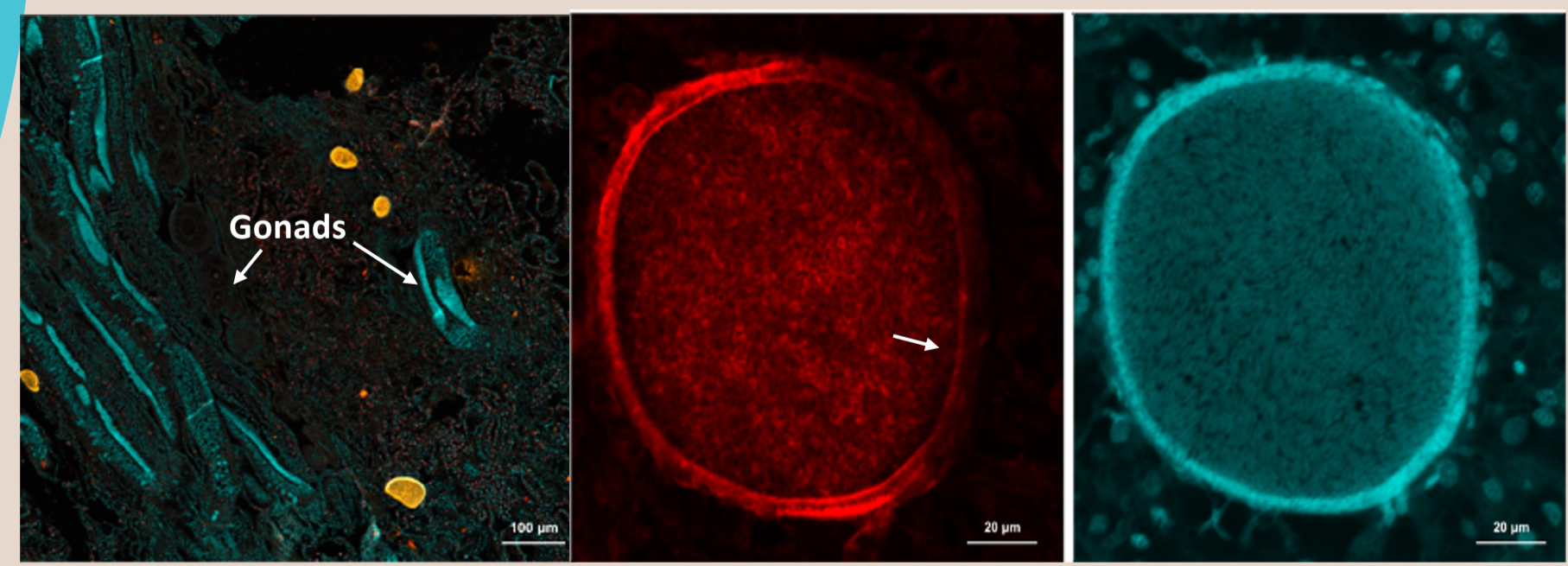


H&E Stain



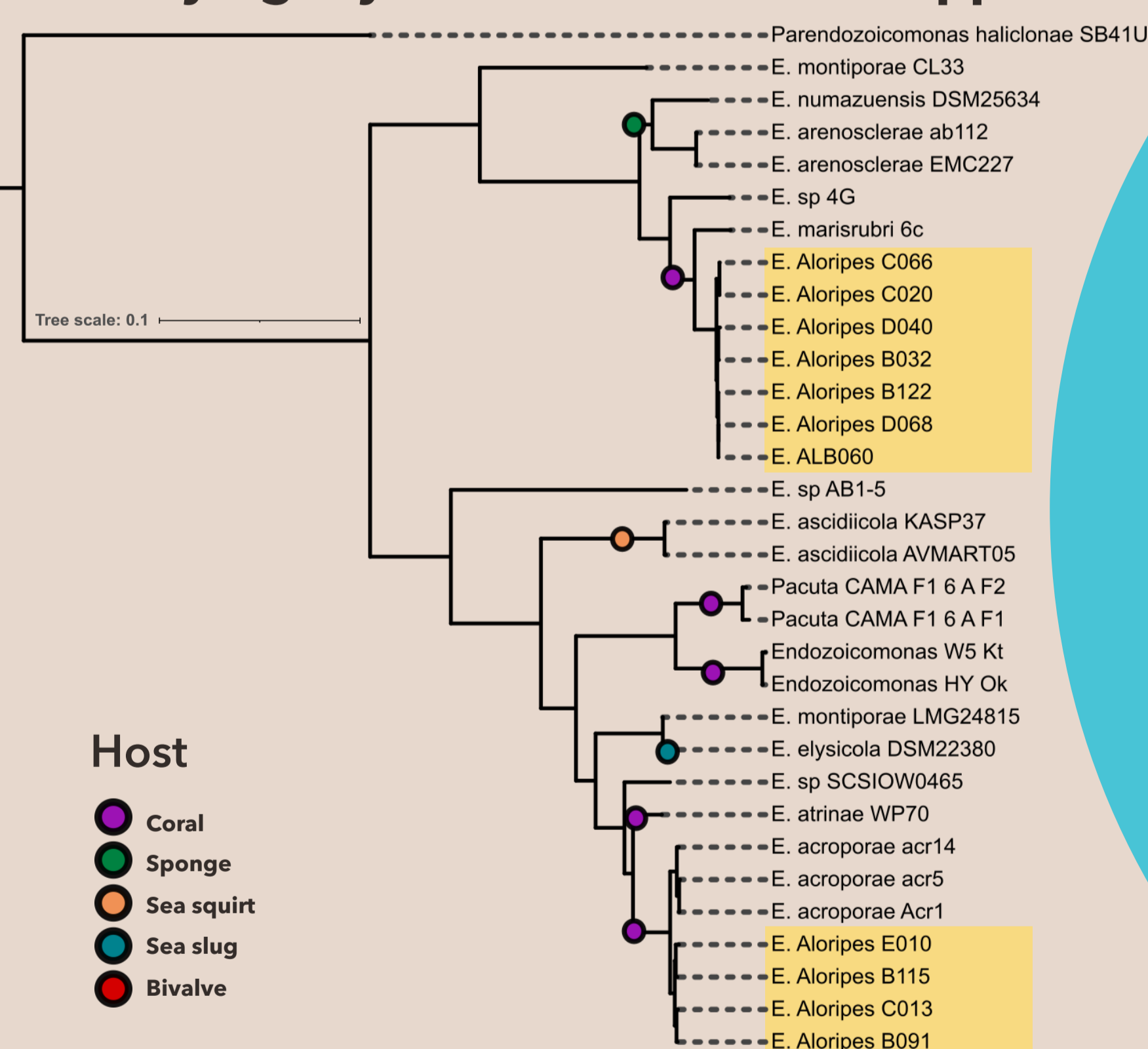
H&E images showing location and potential intracellular CAMA

HCR-FISH



HCR-FISH images showing location of CAMAs and potential membrane of unknown origin

Phylogeny of *Endozoicomonas* spp.



Phylogenetic tree of isolated *Endozoicomonas* strains based on 120 gene markers

RESULTS

- CAMAs located in tissues lining the gastric cavity
- Host nuclei found inside CAMAs
- Endozoicomonas* genomes show metabolic potential for mitigating oxidative stress and the production vitamins
- Genomic signatures including type VI secretion system and ankyrin repeats could allow host association.

CONCLUSIONS

- First evidence and characterization of CAMAs in the coral *Acropora loripes*.
- CAMAs likely intracellular and enclosed by a membrane.
- 11 isolated *Endozoicomonas* strains comprise two new species.
- Potential for beneficial interactions with host/microalgae