

Description of Additional Supplementary Files

File name: Supplementary Data 1

Description: Metadata for the 97 sponge samples used in this study with full details on latitude, longitude, depth, biogeographic region, and date of collection per sample.

File name: Supplementary Data 2

Description: Summary table of the total number of reads obtained for each sponge species and their proportion of reads in the sequencing run.

File name: Supplementary Data 3.

Description: Summary table of abundance of OTUs, species and sequencing depth across the four sponge species (the number of samples per sponge species indicated in parentheses) assigned to each kingdom and then to each metazoan phyla.

File name: Supplementary Data 4

Description: Final OTUs table for the taxa found in the study (prokaryotes and the eukaryotes) including details for number of reads, proportion by sample, and all metadata associated as in Supplementary Data 1.

File name: Supplementary Data 5

Description: ANOVA tests for differences on alpha diversity of each biogeography, depth and site (A.1-A.3), and PERMANOVA results using Bray-Curtis distances for B.1 all sponge species by biogeographic region and depth. B.2. Only reads obtained from *Geodia barretti* tested by biogeographic region. Abbreviations refer to: NAB: North Atlantic Boreal; NEA: Northeastern Atlantic.

File name: Supplementary Data 6

Description: Indcspecies results for biogeographic region and depth range.