**Supplementary Information for**

Symbiosis modulates response to starvation in a model cnidarian

Maria Valadez-Ingersoll1, Pablo J. Aguirre Carrión1, Niharika A. Desai1, Caoimhe Bodnar1, Sarah W. Davies1\*, Thomas D. Gilmore1\*

1Department of Biology, Boston University, Boston MA

​​\*Corresponding authors: Thomas D. Gilmore, Biology Department, Boston University, 5 Cummington Mall, Boston, MA 02215, USA; 617-353-5444 (phone); 617-353-6340 (fax); E-mail: gilmore@bu.edu

Sarah W. Davies, Department of Biology, Boston University, 5 Cummington Mall, Boston, MA 02215, USA; 617-353-8980 (phone); 617-353-6340 (fax); E-mail: daviessw@bu.edu

**This file includes:**

Supplementary Figures 1 and 2

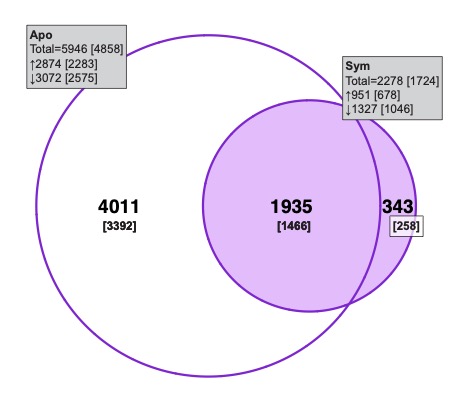
Supplementary Table 1

High resolution versions of all supplementary materials, and high-resolution GO term dendrograms, as well as scripts, *Exaiptasia pallida* reference files, and all data files and figures generated for this manuscript are publicly available at: <https://github.com/mariaingersoll/Aiptasia_Fed_Starved.git>

**Other materials for this manuscript include the following:**

Dataset 1

Dataset 2



**Supplementary Figure 1.** Venn Diagram of all differentially expressed genes as identified via DESeq2 with an FDR adjusted p-value of <0.1 and, in brackets, with an FDR adjusted p-value of <0.05 for aposymbiotic (Apo) and symbiotic (Sym) Aiptasia after two weeks of starvation compared to two weeks of regular feeding. At an adjusted p-value of <0.1, 1,935 differentially expressed genes were shared between Apo and Sym Aiptasia under starvation. At an adjusted p-value of <0.05, 1,466 differentially expressed genes were shared between Apo and Sym Aiptasia under starvation.



**Supplementary Figure 2.** Delta rank values (represented by point sizes) of all GO terms significantly enriched in fed (grey, negative delta rank values) or in starved (purple, positive delta rank values) treatments of at least two conditions (*Nematostella vectensis* (Carrión et al., 2022), aposymbiotic Aiptasia, symbiotic Aiptasia, or symbiotic *Oculina arbuscula* (Rivera et al., 2023)) were visualized. GO terms enriched in aposymbiotic and symbiotic Aiptasia, but not in either of the other species, were not included.

**Supplementary Table 1:** Heat and starvation responsive putative NF-κB target genes from Figure 4B. (**A)** Gene names, symbols, and annotation from the *Exaiptasia pallida* (Aiptasia)reference (Baumgarten et al., 2015), as well as the number of putative NF-κB binding sites in the gene promoter region (500 bp upstream of the transcription start site) from Cleves et al., 2020. Genes with no annotation are marked with n.a. **(B)** Log2 fold change (LFC) and FDR p-value (padj) of each gene following starvation in aposymbiotic (ApoFS) and symbiotic (SymFS) Aiptasia, as well as LFC and padj of each gene following three hours of heat shock in aposymbiotic (ApoHeat) and symbiotic (SymHeat) Aiptasia (from Cleves et al., 2020). All numerical values have been rounded to two decimal places. Genes that were not significantly expressed following starvation in symbiotic Aiptasia are noted with n.s. in SymFS LFC and SymFS padj columns.

|  |  |  |  |
| --- | --- | --- | --- |
| **(A)** | | | |
| **Gene** | **Gene Symbol** | **Annotation** | **NF-κB Sites** |
| AIPGENE  18569 | IFIH1.2 | Interferon-induced helicase C domain-containing protein 1 | 3 |
| AIPGENE  18872 | BCL3 | B-cell lymphoma 3 protein | 6 |
| AIPGENE  18937 | MAFG | Transcription factor MafG | 6 |
| AIPGENE  23318 | GBP5.1 | Guanylate-binding protein 5 | 5 |
| AIPGENE  26161 | MAF | Transcription factor Maf | 3 |
| AIPGENE  10002 | ELF3 | ETS-related transcription factor Elf-3 | 3 |
| AIPGENE  10155 | IFIH1 | Interferon-induced helicase C domain-containing protein 1 | 4 |
| AIPGENE  12036 | X.1657 | n.a. | 6 |
| AIPGENE  12505 | X.1741 | n.a. | 3 |
| AIPGENE  17157 | ACD\_16C00100G0095 | Tetratricopeptide repeat protein | 3 |
| AIPGENE  27025 | X.3853 | n.a. | 5 |
| AIPGENE  27057 | RCHY1.1 | RING finger and CHY zinc finger domain-containing protein 1 | 7 |
| AIPGENE  8848 | NFKB1 | Nuclear factor NF-kappa-B p105 subunit | 3 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **(B)** | | | | | | | | |
| **Gene** | **ApoFS**  **LFC** | **ApoFS**  **padj** | **SymFS**  **LFC** | **SymFS**  **padj** | **ApoHeat**  **LFC** | **ApoHeat**  **padj** | **SymHeat**  **LFC** | **SymHeat padj** |
| AIPGENE  18569 | 0.91 | 7.88E-05 | 0.61 | 1.31E-02 | 4.39 | 0 | 3.85 | 0 |
| AIPGENE  18872 | 1.17 | 5.89E-22 | 0.40 | 3.69E-03 | 2.50 | 0 | 2.02 | 0 |
| AIPGENE  18937 | 1.25 | 1.92E-12 | 0.69 | 3.91E-04 | 3.09 | 0 | 2.50 | 0 |
| AIPGENE  23318 | 1.78 | 1.07E-04 | 1.40 | 4.45E-03 | 3.76 | 0 | 3.04 | 0 |
| AIPGENE  26161 | 0.58 | 1.12E-02 | 0.63 | 6.83E-03 | 4.64 | 0 | 3.89 | 0 |
| AIPGENE  10002 | 0.38 | 2.13E-02 | n.s. | n.s. | 3.08 | 0 | 2.22 | 0 |
| AIPGENE  10155 | 1.31 | 2.30E-02 | n.s. | n.s. | 1.87 | 0 | 2.56 | 0 |
| AIPGENE  12036 | 0.61 | 2.14E-02 | n.s. | n.s. | 2.60 | 0 | 2.61 | 0 |
| AIPGENE  12505 | 0.61 | 2.60E-04 | n.s. | n.s. | 2.85 | 0 | 2.13 | 0 |
| AIPGENE  17157 | 1.10 | 2.58E-03 | n.s. | n.s. | 3.15 | 0 | 2.81 | 0 |
| AIPGENE  27025 | 0.55 | 7.76E-03 | n.s. | n.s. | 3.24 | 0 | 3.08 | 0 |
| AIPGENE  27057 | 0.71 | 1.05E-02 | n.s. | n.s. | 3.93 | 0 | 3.22 | 0 |
| AIPGENE  8848 | 1.21 | 3.96E-03 | n.s. | n.s. | 4.20 | 0 | 2.46 | 0 |