WormBase ParaSite Exercises

Browsing the website

1. How many *Meloidogyne spp.* are present in WormBase ParaSite? Have any of these been sequenced by multiple genome projects?

2. Locate the gene GPLIN_000054100:
    a. How many predicted transcripts does this gene have?
    b. For each transcript, how many exons does this transcript have?
    c. What is the total length of the protein product?

BioMart

3. A list of *Globodera pallida* genes are saved on your computer with the filename globodera_genes.txt. Using this list:
    a. How many of these genes have a *C. elegans* orthologue?
    b. Create a table showing the gene stable ID, gene name, gene description, orthologous *C. elegans* gene ID and the %ID between the two homologues.

4. Get a list of *Globodera pallida* genes that are associated with calcium ion transport. Annotate the list with the accession, name and the description for any other gene ontology terms.

5. Retrieve a list of *Bursaphelenchus xylophilus* genes with a SignalP cleavage site. Annotate the list with the gene name and gene description, where possible.

6. The WormBase ParaSite BioMart can be queried in a "species neutral" way. Get a list of genes from Clade I nematodes with a Small GTPase superfamily protein domain.
(Hint: Small GTPase superfamily has an InterPro accession number)

7. BioMart can also return sequence, instead of gene-based results tables. Get the sequence 250bp upstream of each gene in the file globodera_genes.txt.

8. Create a FASTA file containing the gene stable ID, gene name, chromosomal coordinates and genomic sequence for every *Meloidogyne incognita* gene with a coiled coil.

BLAST

9. Locate the protein sequence of *Meloidogyne incognita* gene NPR-3. Does this protein have similarity to other proteins in *Meloidogyne spp.*?

10. Does the first exon of gene Minc00038 have similarity in other Clade I nematode species?

11. Find a gene of choice from a species of your choice. BLAST the sequence of the second exon against the database of all helminth transcriptomes.