

## **IBERS Biology: Parasites and Drug Screening module: Writing up your mini research paper**

*You might like to have a go at writing up a mini research paper from your work in this module. You could show this to your tutor (if you are going to university) or to your science teacher at school to demonstrate how you have been continuing your learning from home and preparing for the next phase of your studies.*

*Here is a set of guidelines to help you to complete this task:*

1. Your paper should be no longer than two sides of A4 paper.
2. Your paper should be a write up of the work that we have covered during the workshops.
3. Layout:

You should set out your research paper in the following format:

**TITLE** - you may decide on your own title if you wish or use the following: ‘Comparison of the drug resistance status of two strains of *Panagrellus redivivus*’

**ABSTRACT** - this should be a short paragraph summing up the work we have carried out. Include a sentence introducing the work (what nematode we are using and why we are using it e.g. this is a model nematode and we can use this to look at resistance mechanisms in nematodes of veterinary importance). A brief sentence describing the methods (e.g. including the drug assay, DNA extraction, PCR, sequencing and bioinformatics). A sentence describing the results (e.g. from the assay strain 2 had a greater survival rate under drug pressure than strain 1). Finally, a sentence on a conclusion (e.g. we determined that strain 2 was resistant).

**INTRODUCTION** – Use the information from the introduction to the module to help you write a short paragraph of introduction. Here are a few other resources you may find useful for your introduction and discussion.

[http://www.wormbook.org/chapters/www\\_anthelminticdrugs/anthelminticdrugs.html](http://www.wormbook.org/chapters/www_anthelminticdrugs/anthelminticdrugs.html)

<http://www.moredun.org.uk/research/research-@-moredun/parasitic-worms/anthelmintic-resistance>

<http://www.britannica.com/EBchecked/topic/27270/anthelmintic>

Alternatively, you can search for key words such as drug resistance in nematodes/ anthelmintic resistance/ resistance mechanisms etc, to find extra information if you wish.

**METHODS** – You can write up the methods based on the work that we did in the workshops. You can also use the extra information provided from the video links.

**RESULTS** – The compilation of the class results table for you to use in your write up can be found in the **example paper**. Here you should include the table of results from the drug assay. You may also create a graph of the results if you would like to improve your paper.

**DISCUSSION** – Write a short paragraph discussing the results we have generated during the workshops. Include a discussion on how the results were generated, for example what would have improved the experiment. Could we have used more replication regarding number of worms, type of worms, type of drugs, concentration of drugs etc? Think about how we validated our results using the sequencing data, did this confirm the resistance status of our worms we determined from the initial drug resistance assay we conducted in workshop 1? Is there any way you can think of to extend the study further, what could we go on to look at next?

**REFERENCES** – Include a reference list at the end of your paper citing references that you have used in the text. If you have used websites put the link and the date you accessed the link. For paper references use the Harvard referencing system. For example, in the text you might write something like ‘resistance can be selected for in the laboratory (Wolstenholme, *et al.*, 2004)’. You need to describe the piece of information taken from the paper in your own words (not directly copied as this would be plagiarism) and then correctly cite the source using the surname of the first author on the paper followed by *et al.*, (in *italics*) followed by the date the paper was published. In the references section the paper should then be cited in full using the Harvard referencing system as follows:

1. The authors list first with the initials after the surname.
2. The date the paper was published
3. The title of the paper
4. The journal the paper was published in (this should be in italics)
5. The journal volume
6. The starting page and end page number of the paper

Wolstenholme A.J, Fairweather, I, Prichard, R, von Samson-Himmelstjerna, G. and Sangster, N.C. 2004. Drug resistance in veterinary helminths. *Trends in Parasitology*. 20. (10). 469 - 476.

It would be great for you to include at least 2 references if possible, these can be cited in your introduction and references should also be cited in your discussion.

All the information you need (except for any references that you find yourself) can be found in our IBERS Biology: Parasites and Drug Screening Module.