**Wolbacchia Project**

You will **research** and learn about Wolbacchia. After your research is complete, you will work with a partner to **create** a PowerPoint and both of you will **present** your PowerPoint to the class.

***Wolbacchia Biology***

<http://www.atsu.edu/faculty/chamberlain/Website/Lects/RICKETT.HTM#ri>

Read only the section on Rickettsia

<http://en.wikipedia.org/wiki/Wolbachia>

<http://www.rochester.edu/college/bio/labs/WerrenLab/WerrenLab-WolbachiaBiology.html>

<http://cibt.bio.cornell.edu/labs_and_activities/images/Wolbachia-A_Tale_of_Sex_and_Survival.pdf>

<http://www.rochester.edu/college/bio/labs/WerrenLab/My%20Papers/1997_Wolbach_AnRevEnt.pdf>

Questions

1. Briefly describe the basic biology of Wolbachia.
2. What is meant by an obligate, intracellular symbiont?
3. What are the 4 basic reproductive strategies induced by Wolbachia?

***Reproductive Strategies***

<http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/A/AsexualReproduction.html>

<http://www.berkeley.edu/news/media/releases/2002/07/03_paras.html>

<http://www.scientificamerican.com/article.cfm?id=but-madam-butterfly-where>

<http://www.nature.com/news/1998/990429/full/news990429-8.html>

*Questions*

1. Define the 4 reproductive strategies of *Wolbachia*.
2. Why would *Wolbachia* induce asexual reproduction in its host?
3. How can we "cure" the host of asexual reproduction?

***Human Disease***

<http://www.a-wol.net/>

<http://www.irinnews.org/Report/30689/AFRICA-One-step-nearer-to-cure-for-river-blindness>

<http://www.eurekalert.org/pub_releases/2006-09/plos-twd091806.php>

[http://www.plospathogens.org/article/info%3Adoi%2F10.1371%2Fjournal.ppat.0020092](http://www.plospathogens.org/article/info%3Adoi/10.1371/journal.ppat.0020092)

<http://www.scidev.net/en/news/new-culprit-emerges-in-river-blindness.html>

*Questions*

1. List and describe two major human diseases associated with *Wolbachia*.
2. How did researchers confirm that *Wolbachia* was actually responsible for these diseases?
3. How are they being treated?

***Speciation in Insects***

<http://evolution.berkeley.edu/evosite/evo101/VC1gReproIsolation.shtml>

<http://www.unisci.com/stories/20011/0208011.htm>

<http://www.scientificamerican.com/article.cfm?id=bacteria-spurs-speciation>

<http://www.sciencenews.org/view/generic/id/1310/description/Infection_divides_two_wasp_species>

<http://www.rochester.edu/College/BIO/labs/WerrenLab/WerrenPapers-PDF/1998_Werren_WolbSpeciation.pdf>

<http://news.vanderbilt.edu/2011/05/bacterial-hitchhikers-new-host-species/>

*Questions*

1. What is meant by reproduction isolation? How can it lead to speciation?
2. How does *Wolbachia* influence speciation?
3. How did researchers confirm that *Wolbachia* may be responsible for speciation in insects?

***Vector Control***

<http://www.enotes.com/vector-borne-diseases-reference/vector-borne-diseases>

<http://lifescientist.com.au/content/health-medical/news/bacterial-parasite-shows-potential-in-disease-control-680565253>

<http://www.grandchallenges.org/ControlInsect/Challenges/GeneticStrategy/Pages/AgeStructure.aspx>

<http://news.bbc.co.uk/2/hi/health/5212950.stm>

<http://malaria.wellcome.ac.uk/doc_WTX035357.html>

*Questions*

1. What is meant by "vector-borne" disease?
2. Name at least two vector-borne diseases. How might vector-borne diseases be controlled using *Wolbachia*?
3. How might *Wolbachia* help to prevent the spread of malaria?

***Viruses/Phages***

<http://pathmicro.med.sc.edu/mayer/phage.htm>

<http://www.biologynews.net/archives/2006/05/19/viral_hitchhiker_inhibits_wolbachia_bacterias_ability_to_proliferate.html>

[http://www.plospathogens.org/article/info%3Adoi%2F10.1371%2Fjournal.ppat.0020043](http://www.plospathogens.org/article/info%3Adoi/10.1371/journal.ppat.0020043)

<http://www.the-scientist.com/?articles.view/articleNo/24008/title/Symbiotic-enemies-fight-over-insect/>

*Questions*

1. Describe the structure and infection process of bacteriophage.
2. What is the difference between the lytic and lysogenic lifestyles of bacteriophage?
3. What is the effect of bacteriophage WO-B within *Wolbachia*? The host insect? How did researchers confirm this relationship?

***Endosymbiosis***

<http://www.biology.iupui.edu/biocourses/N100/2k2endosymb.html>

<http://www.sumanasinc.com/webcontent/animations/content/organelles.html>

<http://evolution.berkeley.edu/evolibrary/article/0_0_0/endosymbiosis_01>

<http://en.citizendium.org/wiki/Horizontal_gene_transfer>

<http://discovermagazine.com/2008/jan/parasite-invades-its-host2019s-dna#.UOm5fnca51I>

<http://www.rochester.edu/news/show.php?id=2963>

[http://link.springer.com/article/10.1134%2FS0031030106020018](http://link.springer.com/article/10.1134/S0031030106020018)

*Questions*

1. Define endosymbiosis. What is the endosymbiotic theory of evolution?
2. Compare/contrast mitochondria & *Wolbachia*.
3. What is horizontal gene transfer? How does it relate to *Wolbachia*?

**PowerPoint- 65% of Project grade**

1. The PowerPoint must have a minimum of 10 (s) 12 (H)slides.
2. In the PowerPoint you must include:
3. Explanation of Rickettsia
4. The general biology of Wolbacchia
5. The 4 reproductive strategies of Wolbacchia
6. Two human diseases associated with Wolbacchia
7. How Wolbacchia may be responsible for speciation in insects.
8. Explanation of vector borne illness and how Wolbacchia is being used to control vector borne illness.
9. The relationship between WO-B bacteriophage and Wolbacchia, and the outcome.
10. Define endosymbiosis and compare a mitochondria to Wolbacchia
11. When preparing the PowerPoint, each slide should be a highlight (outline) of your presentation (Do not write long blocks of text on the PowerPoint).
12. Pictures which enhance your presentation are to be used. The PowerPoint must have a minimum of 10 pictures( H) or 8 pictures (S).
13. The PowerPoint must have a bibliography slide (At least one citation for each of the above content topics).

**Presentation - 35% OF Project grade**

1. The presentation must be 10 minutes in length.
2. You may use note cards to supplement your PowerPoint presentation.