Practice written final

These topics are potential questions for the written final

"The Listeria monocytogenes p60 Protein is not Essential for Viability in vitro, but Promotes Virulence in vivo"

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Intracellular pathogens (agents which infect host cells), such as Mycobacterium tuberculosis and Listeria monocytogenes, cause very high mortality rates in the United States. Therefore, deciphering the mechanisms through which the pathogens cause disease is of great interest. Listeria infection of mice is a well-developed model system for studying the fundamentals of host-pathogen interactions. In vitro assays (analysis of a sample) in animal cell cultures have helped show that Listeria causes illness by secreting molecules, called virulence factors, to the outside of the bacterial cell in order to affect the host organism. My work involves one such secreted protein, called p60. P60 is an antigen (an agent seen by the host immune system) implicated in regulated bacterial cell wall breakdown. The objective of this study was to examine two questions: first, is p60 essential to the viability of Listeria, as previously published? Second, is p60 a virulence factor in Listeria? To examine these questions, I constructed a Listeria strain lacking p60 (p60-). This new strain displayed no defect in viability. In fact, most standard in vitro pathogenicity assays were normal for p60-. However, when p60- was tested in a mouse (in vivo), a 1000-fold reduction in virulence was observed. This discovery suggests that p60 is indeed a key factor in the disease-causing ability of Listeria, but not essential for viability. Future studies will focus on the precise role of p60 in Listeria pathogenesis. This work increases our understanding of such diseases as tuberculoses, various food poisonings, and meningitis.

Use the abstract above to answer the questions below.

1. Write the research question(s) to the experiment. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. What is the independent variable? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What is the dependent variable? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Write down a possible hypothesis that could be tested?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. What are three variables that would have to remain constant to ensure the validity of the experiment?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. What is the relationship between the variables tested?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. What is the conclusion from this one experiment? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Fresh water organisms have evolved to live in an environment with a specific tonicity. Explain using a diagram, what would happen to sample of fresh water paramecium if they were accidentally placed in a salt water environment. In your explanation include the following concepts t.
   1. Net movement
   2. Selective permeability
   3. Types of solutions
   4. Types of transport
2. Macromolecules play an important role in cells function.
   1. Fill out the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| Type of macromolecule | Function in the cell | Monomer of macromolecule if appropriate | Chemical structure |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

* 1. Compare and contrast the macromolecules in the table above.

1. List the reasons why cells divide.
2. Compare and contrast respiration and photosynthesis in terms of function, location in the cell, processes, reactants, products and type of organism that uses each process. Use a graphic organizer for your answer.

1. Explain the relationship between the two processes above.