

Cells within cells: An extraordinary claim

The idea that mitochondria once existed as free living bacteria and that a cell (or cells) engulfed another prokaryote cell which was not digested but became an organelle inside a eukaryote cell millions of years ago is a difficult idea to 'prove'. (The scientific method doesn't prove theories with certainty like mathematics, it uses evidence to support an idea until it is falsified by new evidence.)

This story of a biologist's research over sixteen years illustrates some important ideas about the nature of science.

Key ideas about the nature of science

- Science can test hypotheses about events that happened long ago.
- Scientific ideas are tested with multiple lines of evidence.
- Science is a community endeavour - new discoveries depend on the scientific community.
- Scientific ideas evolve with new evidence.
- The scientific method can overcome individual biases.

Lynn Margulis spent sixteen years researching the theory of endosymbiosis?

Read the first pages about endosymbiosis in the article 'A world under the microscope'

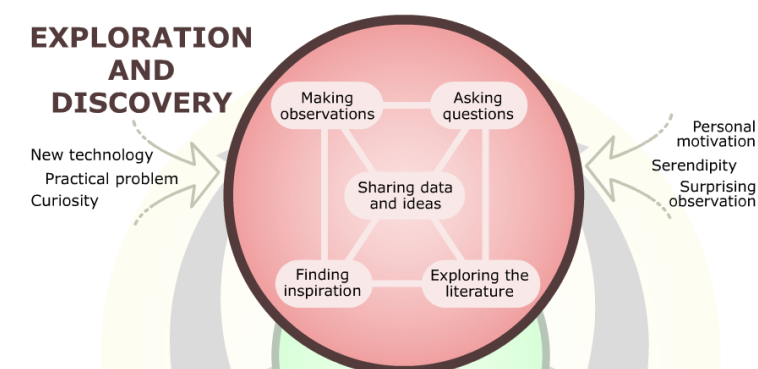


http://undsci.berkeley.edu/article/0_0_0/endosymbiosis_01

published by The University of California Museum of Paleontology, Berkeley, and the Regents of the University of California

www.understandingscience.org

Then look at this diagram of 'Exploration and discovery' in science.



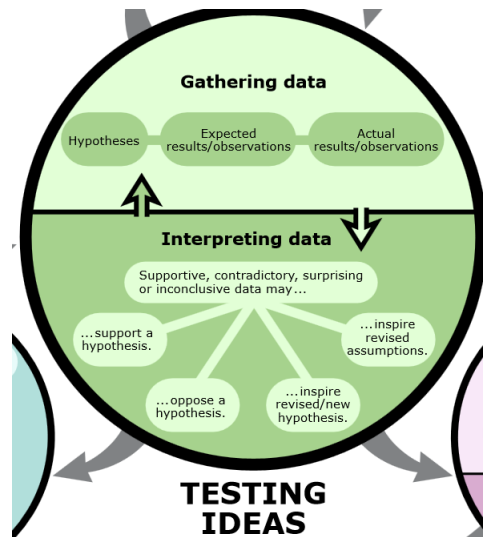
Screenshot from: <http://undsci.berkeley.edu/article/scienceflowchart>

Answer the following questions about the article.

1. Which aspects of 'exploration and discovery' lead Lynn Margulis to begin her research into the theory of endosymbiosis?

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Look at the next part of the diagram of how science works: Testing ideas.



from: <http://undsci.berkeley.edu/article/scienceflowchart>

2. Outline the hypothesis which Lynn Margulis stated at the start of her research into endosymbiosis.

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3. In what ways was the scientific community an obstacle to the acceptance of the research?

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4. Which parts of the data she collected were supportive of the hypothesis?

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5. Which parts of the data were contradictory or inconclusive?

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6. How did she use evidence which opposed a hypothesis to support her own hypothesis?

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