

Cell Theory

The discovery of the [cell](#) was made possible by the invention of the [microscope](#), which was made possible by improved lens-grinding techniques. **Antoni van Leeuwenhoek** (1632-1723), a Dutch tradesman, learned to grind lenses and assemble them into simple microscopes. His contemporary **Robert Hooke** (1635-1703) used such an instrument to observe cork cells, sketches of which appeared in his 1665 publication "Micrographia." Inspired by Hooke's work, Leeuwenhoek began making microscopic examinations of his own. In 1678, he reported to the Royal Society that he had discovered "little animals" -- bacteria and protozoa -- in various samples. The society asked Hooke to confirm Leeuwenhoek's findings, and he did.



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In 1678, Antoni van Leeuwenhoek reported that he had observed "little animals" -- protozoa -- through a microscope.

This paved the way for wide acceptance that a hidden world existed just beyond the limits of human [vision](#) and encouraged many scientists to take up the microscope in their investigations. One such scientist was German botanist **Matthias Jakob Schleiden** (1804-1881), who looked at numerous plant samples. Schleiden was the first to recognize that all plants, and all the different parts of plants, are composed of cells. While having dinner with zoologist **Theodor Schwann** (1810-1882), Schleiden mentioned his idea. Schwann, who came to similar conclusions while studying animal tissues, quickly saw the implications of their work. In 1839, he published "Microscopic Investigations on the Accordance in the Structure and Growth of Plants and Animals," which included the first statement of the cell theory: All living things are made up of cells.

Then, in 1858, **Rudolf Virchow** (1821-1902) extended the work of Schleiden and Schwann by proposing that all living cells must rise from pre-existing cells. This was a radical idea at the time because most people, scientists included, believed that nonliving matter could spontaneously generate living tissue. The inexplicable appearance of maggots on a piece of meat was often given as evidence to support the concept of spontaneous generation. But a famous scientist by the name of **Louis Pasteur** (1822-1895) set out to disprove spontaneous generation with a now-classic experiment that both firmly established the cell theory beyond doubt and solidified the basic steps of the modern scientific method.

Thanks to the contributions of these scientists, a unified cell theory was created. The cell theory states:

1. All living things are composed of cells
2. Cells are the basic unit of structure and function in living things
3. New cells are produced from existing cells

Cell Theory: Guided Notes

1. Provide each scientist's contribution to the cell theory in the table below:

| Scientist | Contribution |
|--------------------------|---------------------|
| Antoni van Leeuwenhoek | |
| Robert Hooke | |
| Matthias Jakob Schleiden | |
| Theodor Schwann | |
| Rudolf Virchow | |
| Louis Pasteur | |

2. What tool did the cell theory scientists use to view cells?

3. Which scientist published the first statement of the cell theory, and what was it?

4. Which scientist published the third statement of the cell theory, and what was this statement?

5. Explain the theory of spontaneous generation. Explain how Louis Pasteur disproved this theory.