

Pasteur's Experiment

INTRODUCTION

In 1862, the great French scientist Louis Pasteur tested the validity of a widely held belief in spontaneous generation. For centuries, the general population and naturalists alike believed that a variety of organisms could arise spontaneously, without being generated from similar, parental organisms.

Pasteur based his experimental design on a number of observations. He knew that bacteria grow in open containers of meat broth. He also knew that if the broth is boiled for an hour in a sealed container that remains sealed, no bacteria will grow in it. Additionally, he observed that bacteria are found in dust particles that float in the air. Armed with this information, Pasteur set up a definitive experiment to test whether microbes arise from pre-existing microbes or are generated spontaneously.

1

Louis Pasteur designed a procedure to test whether sterile nutrient broth could spontaneously generate microbial life. To do this, he set up two experiments. In both, Pasteur added nutrient broth to flasks, bent the necks of the flasks into S shapes, and then boiled the broth to kill any existing microbes. If left undisturbed, will the broth in these flasks become cloudy with microbial growth? *Click on the correct answer.*

2

After the broth had been sterilized, Pasteur broke off the swan necks from some of the flasks, exposing the nutrient broth within them to air from above. The remaining flasks in were left intact. What do you predict will happen to the broth in the flask on the left? *Click on the correct answer.*

3

Over time, dust particles from the air fell into the broken flasks, but in the intact flasks, dust particles remained near the tip of the swan necks. They were unable to travel against gravity into the flasks.

4

The broth in the broken flasks quickly became cloudy—a sign that it teemed with microbial life. However, the broth in the unbroken flasks remained clear. Without the introduction of dust—on which microbes can travel—no life arose. Pasteur thus refuted the notion of spontaneous generation.

CONCLUSION

Pasteur's experiment showed that microbes cannot arise from nonliving materials under the conditions that existed on Earth during his lifetime. But his experiment did not prove that spontaneous generation never occurred. Eons ago, conditions on Earth and in the atmosphere above it were vastly different. Indeed, conditions similar to those found on primitive Earth may have existed, or may exist now, on other bodies in our solar system and elsewhere. This has led scientists to ask whether life has originated on other bodies in space, as it did on Earth.