

In contrast, the broth became contaminated if the top of the neck of the flask was broken off and the bacteria-laden particles within the air were allowed to enter the flask, thereby showing that microorganisms do not spontaneously generate but are able to enter areas by traveling through the air. At this point, the germ theory, which states that infectious diseases are caused by microorganisms, gained support and was further substantiated by the discovery of several disease-causing bacteria, such as those that cause anthrax, cholera, and tuberculosis. similarity of the flask's neck to that of a swan In the mid-1800s. Considered the father of bacteriology, he built upon discussions with other scientists and published four criteria, now known as Koch's Postulates, to scientifically demonstrate that a microbe is the causative agent of a disease: 1 2 The organism must be present in every case of the disease. 1. 11A) performed some simple yet elegant experiments to show that life does not arise through spontaneous generation, the belief at the time that living organisms could spontaneously arise from nonliving matter. In one experiment, Pasteur sterilized beef broth by boiling it in a swan-neck flask, The German physician and microbiologist Robert Koch (Fig. Even though Koch himself admitted that not all bacterial diseases could satisfy the four postulates, the adherence to these would prove to be an obstacle in the discovery of viruses. In 1879, the German chemist Adolf Mayer was asked to investigate a disease afflicting tobacco plants in the Netherlands. 7 8 The same organism must again be recovered from the experimentally infected host. the French chemist. (0 Louis Pasteur (Fig. 1. 12) was the first person to identify that the causative agent of anthrax was a bacterium. 5 6 The disease must be reproduced when a healthy susceptible host is inoculated with the pure culture. These postulates were regarded as the necessary proof that an infectious agent is responsible for a specific disease. 3 4 The organism must be isolated from the host with the disease and grown in pure culture. National Library of Medicine.