Spallanzani's Experiments:

 Boiled infusion for almost an hour and sealed the vials by melting their slender news closed.

• His infusion remained clear unless he broke the seal and exposed the infusion to air, after which they became cloudy with microorganisms.

• He concluded 3 things:

- Needham either had failed to heat his vials sufficiently to kill all microbes or had not sealed the mightily enough.

- Microorganisms exist in the air and can contaminate experiments

- Spontaneous generation of microorganisms does not occur all living things arise from other living things.

Pasteur's Experiments:

Demonstrated spontaneous generation did not exist

e.co.uk stead of sealing the flasks, he Boiled infusion long enough to kill everythips 9 6 bend their necks into an S-shape which a lowed air to enter while preventing the introduction of dust and m hes into the broth.

mained free of microbes even 18 months swan-necked fia Reper his

Jor 🖻 new all the nutrients (including air) known to be required by b/c the flasks living things, he concluded:

"Never will spontaneous generation recover from the mortal blow of this simple experiment"

• He broke the necks off some flasks, exposing the liquid in them directly to the air, and he carefully tilted others so that the liquid touches the dust that had accumulated in their necks.

- The next day, all of these flasks were cloudy with microbes.
- concluded that the microbes in the liquid were the progeny of microbes that had been on the dust particles in the air.



1: The suspected causative agent must be found in every case of the disease and be absent from healthy hosts.

2: The agent must be isolated and grown outside of the host.

3: When the agent is introduced to a healthy, susceptible host, the host must get the disease.

4: The same agent must be found in the diseased experimental host

• use the term suspected causative agent b/c

It is merely "suspected" until the postulates have been fulfilled.

Gram's Stain

• Danish scientist Christian Gram's procedure involved the application of a series of dyes, leaving some microbes purple and other pink.

- We now label the first group of cells gram positive (purple cells) and gram negative (pink cells).



▲ **FIGURE 1.17 Results of Gram staining.** Gram-positive cells (in this case *Staphylococcus aureus*) are purple; Gram-negative cells (in this case *Escherichia coli*) are pink.

1.13 List at least 7 contributions made by Koch to the field of microbiology

1: Koch developed Koch's Postulates, which were used to ID a disease-causing agent.

2: Created simple staining techniques for bacteria that allowed scientists to view the colorless bacteria under a microscope.