Observing

Sprinkle glitter on your right hand in such a way that it isn't visible to students, and then shake hands with them.

Bacteria are a group of microscopic single-celled organisms with a very simple structure. They have many different forms, but spherical and rod shapes are the most common. Their characteristic feature is the absence of a nucleus bound by a nuclear envelope. A consequence of this is, amongst other things, a very fast metabolism, and, as a result, a very fast pace of multiplication (reproduction). This ability, in conjunction with their amazing resistance to such factors as very high or very low temperatures, significant salinity, extreme pH, lack of food or various types of radiation, means that bacteria can be found in almost any environment.

Video/ Slide show

Watch a film in which Manu Prakash, a researcher, inventor and Assistant Professor of Bioengineering at Stanford University, talks about the fascinating world of bacteria.

Good bacteria

Not all bacteria cause diseases. Few people know that the ratio of microbes to human cells in our body may be as high as 10:1! The entirety of the bacterial flora of an adult person can weigh as much as 4, 4 lb (2 kg). In seven-year-olds, this value is about 1, 54 lb (700 grams). Bacteria help us to carry out some metabolic processes, and produce some vitamins and useful chemical compounds. Above all, however, they protect us against undesirable microorganisms, which, in order to cause a disease usually first have to attach themselves – e.g., by sticking to human cells. What happens in the intestinal epithelium is an example of the activity of good bacteria – they attach themselves to the epithelial cells and in this way make it impossible for unfriendly bacteria to become attached.

Conclusions

Draw conclusions from the exercise. Can we say that bacteria are ubiquitous?

You can read about 6 most extreme places on Earth, where only bacteria can live: http://mic.com/articles/52753/6-most-extreme-places-on-earth-where-only-bacteria-can-live#.7GQf0othT

Manual exercise

Students build model bacteria from plasticine and, through the exercise, observe and understand the principle of multiplication of bacteria.

Bacteria reproduce by dividing. When a bacterium reaches the right size, a groove appears on the surface of its cell, which becomes deeper and deeper until finally it results in division into two daughter cells. These new bacteria grow and again divide, resulting in four cells, etc. The unusually fast pace of metabolism of these microorganisms means that some species (e.g., Escherichia coli) can divide as rapidly as once every 20 minutes. This means that in a period of 16 hours, in favorable conditions, over 65,000 bacteria may be formed from a single cell.