

**Flesh-eating bacteria spread in Japan**

**It caused death in 48 hours, 977 cases found**

**The disease begins with soreness and swelling**

# UPSC CSE : Previous Year Question

**Question 1:** Which bacterial strain, developed from natural isolates by genetic manipulation, can be used for **(UPSC 2010)**

treating oil spills?

1. Agrobacterium
2. Clostridium
3. Nitrosomonas
4. Pseudomonas



# UPSC CSE : Previous Year Question

**Question 2:** Widespread resistance of malarial parasites to drugs like chloroquine has prompted attempts to develop a malarial vaccine to combat malaria. Why is it difficult to develop an effective malaria vaccine? **(UPSC 2010)**

1. Malaria is caused by several species of Plasmodium
2. Man does not develop immunity to malaria during natural infection
3. Vaccines can be developed only against bacteria
4. Man is only an intermediate host and not the definitive host

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**Question 3:** Consider the following kinds of organisms: **(UPSC 2012)**

1. Bacteria
2. Fungi
3. Flowering plants

Some species of which of the above kinds of organisms are employed as biopesticides?

1. 1 only
2. 2 and 3 only
3. 1 and 3 only
4. 1, 2 and 3



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**Question 4:** With reference to the food chains in ecosystems, which of the following kinds of organisms is/are known as decomposer organisms/organisms? **(UPSC 2013)**

1. Virus
2. Fungi
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Select the correct answer using the codes given below.

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**Question 5:** Improper handling and storage of cereal grains and oilseeds result in the production of toxins known as aflatoxins which are not generally destroyed by normal cooking process. Aflatoxins are produced by **(UPSC 2013)**

1. bacteria
2. Protozoa
3. moulds
4. Viruses



# UPSC CSE : Previous Year Question

**Question 6:** Lichens, which are capable of initiating ecological succession even on a bare rock, are actually a symbiotic association of **(UPSC 2014)**

1. algae and bacteria
2. algae and fungi
3. bacteria and fungi
4. fungi and mosses

# UPSC CSE : Previous Year Question

**Question 7:** Which of the following statements is/are correct? (UPSC 2016)

Viruses can infect

1. bacteria
2. fungi
3. plants

Select the correct answer using the code given below.

1. 1 and 2 only
2. 3 only
3. 1 and 3 only
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# Bacteria

- The word bacteria is derived from a Latin and a Greek word *Bakteria* meaning “*cane*”. (Rod)
- Bacteria is a micro organism with few micro meter in length and have wide range of shapes (round, oval, rod and spiral shapes).
- First discover by Antony Van Leeun Hook in 1676, initially called “*Animalcules*”
- Study about bacteria is know as “*Bacteriology*”, while study about the harmful effect of bacteria on human body is known as “*Medical bacteriology*”.





# What are bacteria?

There are **millions of bacteria** in a teaspoon of pond water or a pinch of soil. About **five million trillion trillion** bacteria are alive on Earth, which together weigh more than all the plants and animals combined. But **what are they really?**

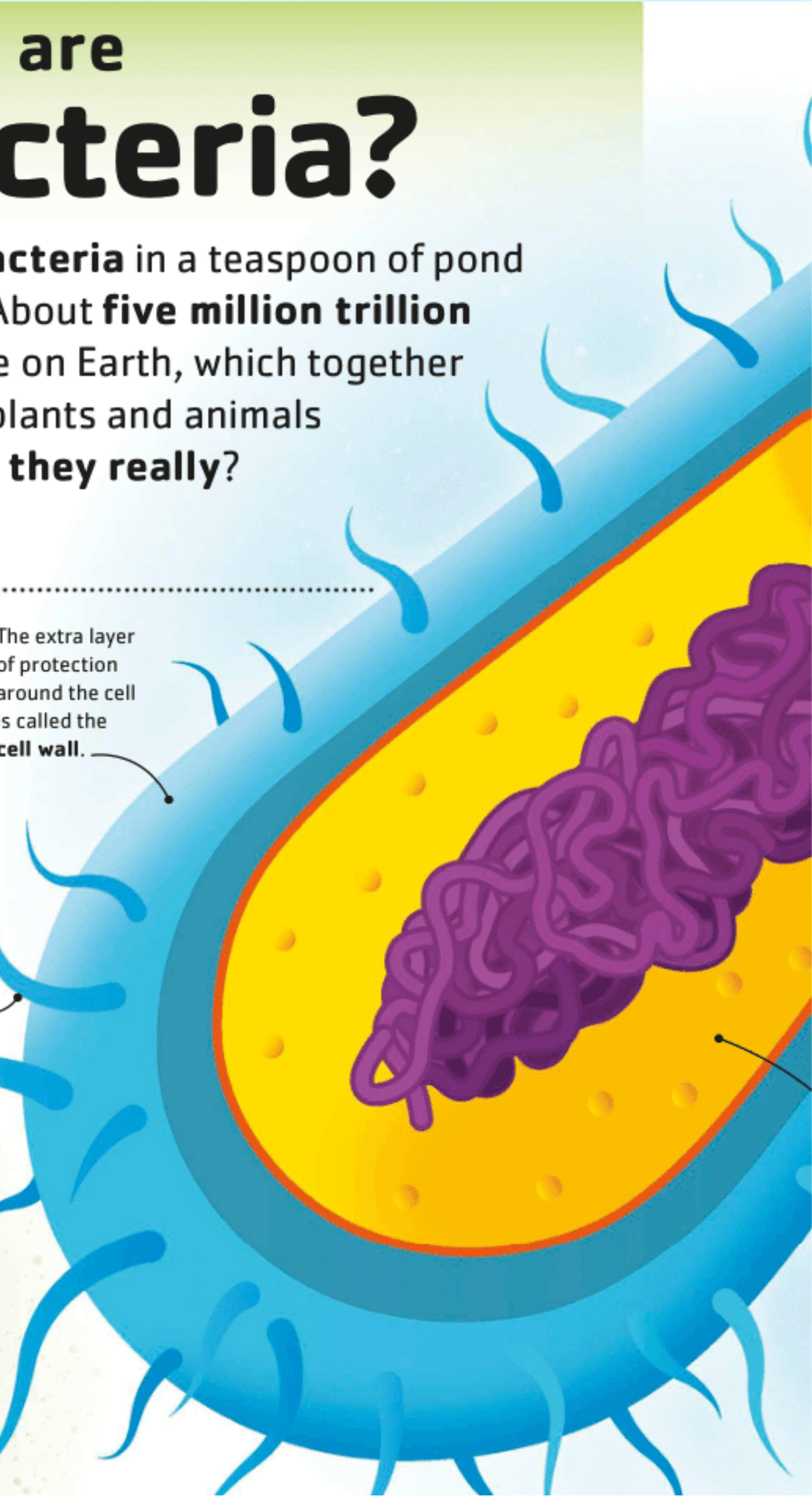
## Bacteria cell

Every bacteria is made of one cell. The inside of a bacteria cell is much simpler than the cells of other living things.

The extra layer of protection around the cell is called the **cell wall**.

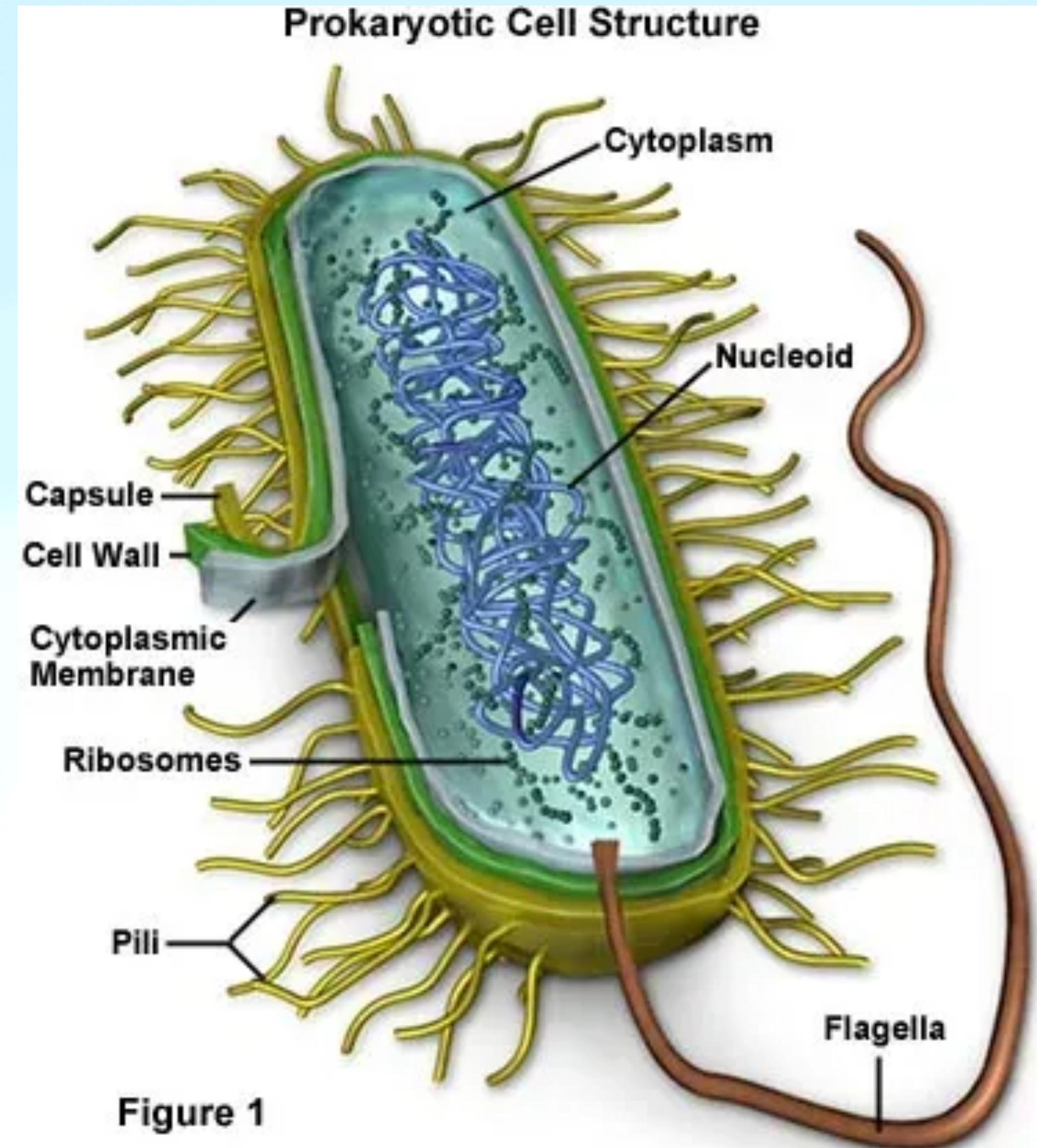
Some bacteria have little hairs called **pili**. They use their pili to attach to surfaces.

Bacteria with tails can swim **100 times** their own length in **one second**.





Being **prokaryotic** organisms, bacteria do not possess a true nucleus. They also do not have membrane-bound organelles like mitochondria. The following is the basic structure of a bacterium

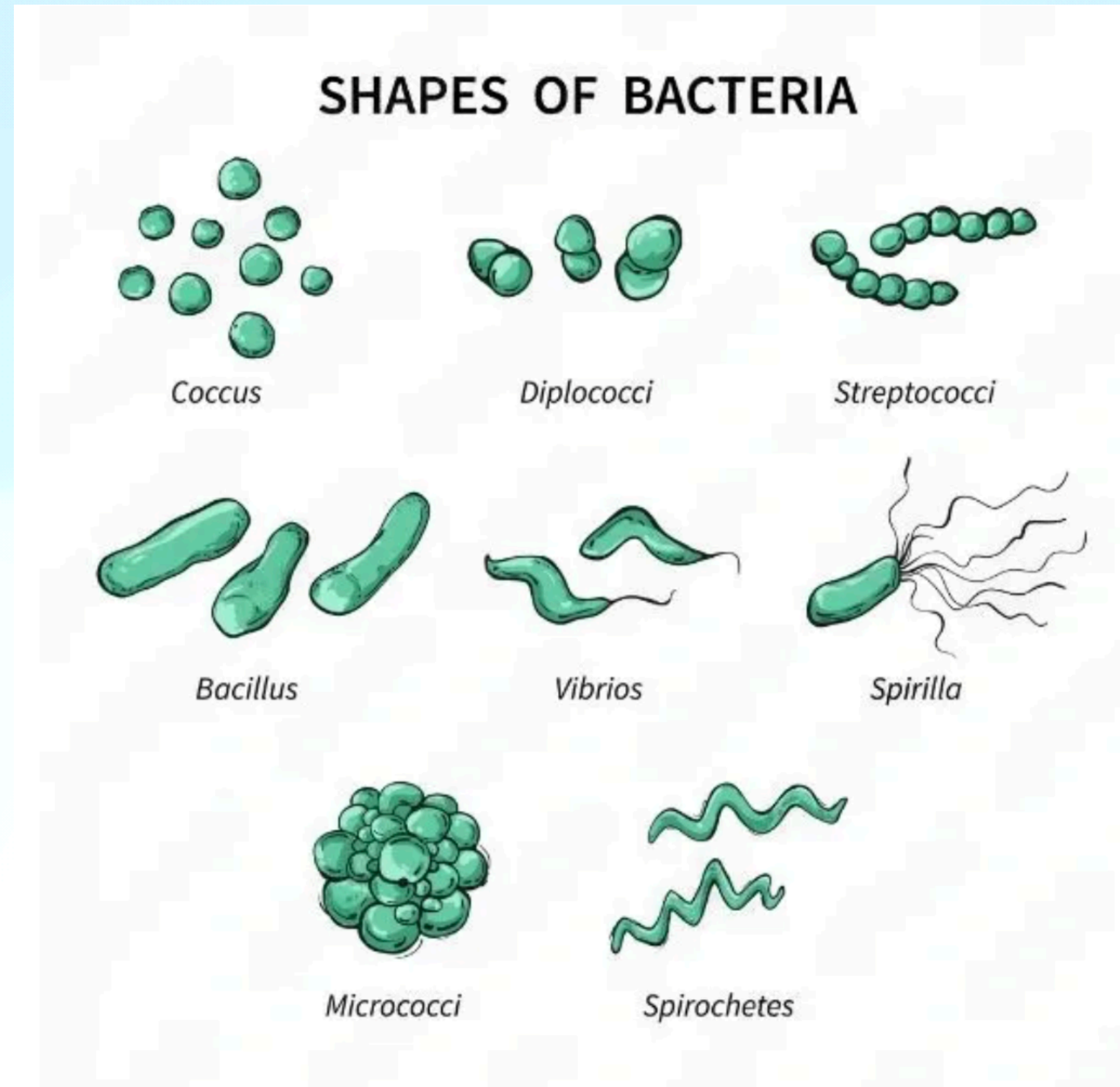




- Capsule: This thick protective gelatinous layer around some bacterial cells is related to the virulence of bacteria.
- Cell Wall: This rigid outer layer provides shape and protection to the cells.
- The Gram-positive bacteria have a thick layer of Peptidoglycan, while Gram-negative bacteria have a thinner layer along with an outer membrane.
- Cytoplasmic Membrane: This inner layer surrounds the cytoplasm and controls the flow of molecules in and out of the cell. It also houses various cellular processes.
- Cytoplasm: This semi-fluid substance contains various cellular structures.
  - Almost all the cellular processes of bacteria occur in the cytoplasm.
- Nucleoid: Instead of a nucleus, bacteria have a nucleoid.
  - It is an area where the genetic material (DNA) remains.
- Ribosomes: These are the tiny granules present in the cytoplasm and are the centres of protein synthesis.
- Vacuoles: These are fluid-containing cavities present within the cytoplasm.



# Classification of Bacteria



# On the basis of using oxygen

## Using oxygen

- **Aerobic** Bacteria: are bacteria that need oxygen to live and grow.
  - For example, *Lactobacillus*, *Nocardia*, *Mycobacterium tuberculosis*, etc
- **Anaerobic** Bacteria: are bacteria that can't live or grow when oxygen is around.
  - For example, *Clostridium*, *Bacteroides*, etc.
- **Facultative** Bacteria: Bacteria that can live and grow with or without oxygen.
  - For example, *Enterobacteriaceae*

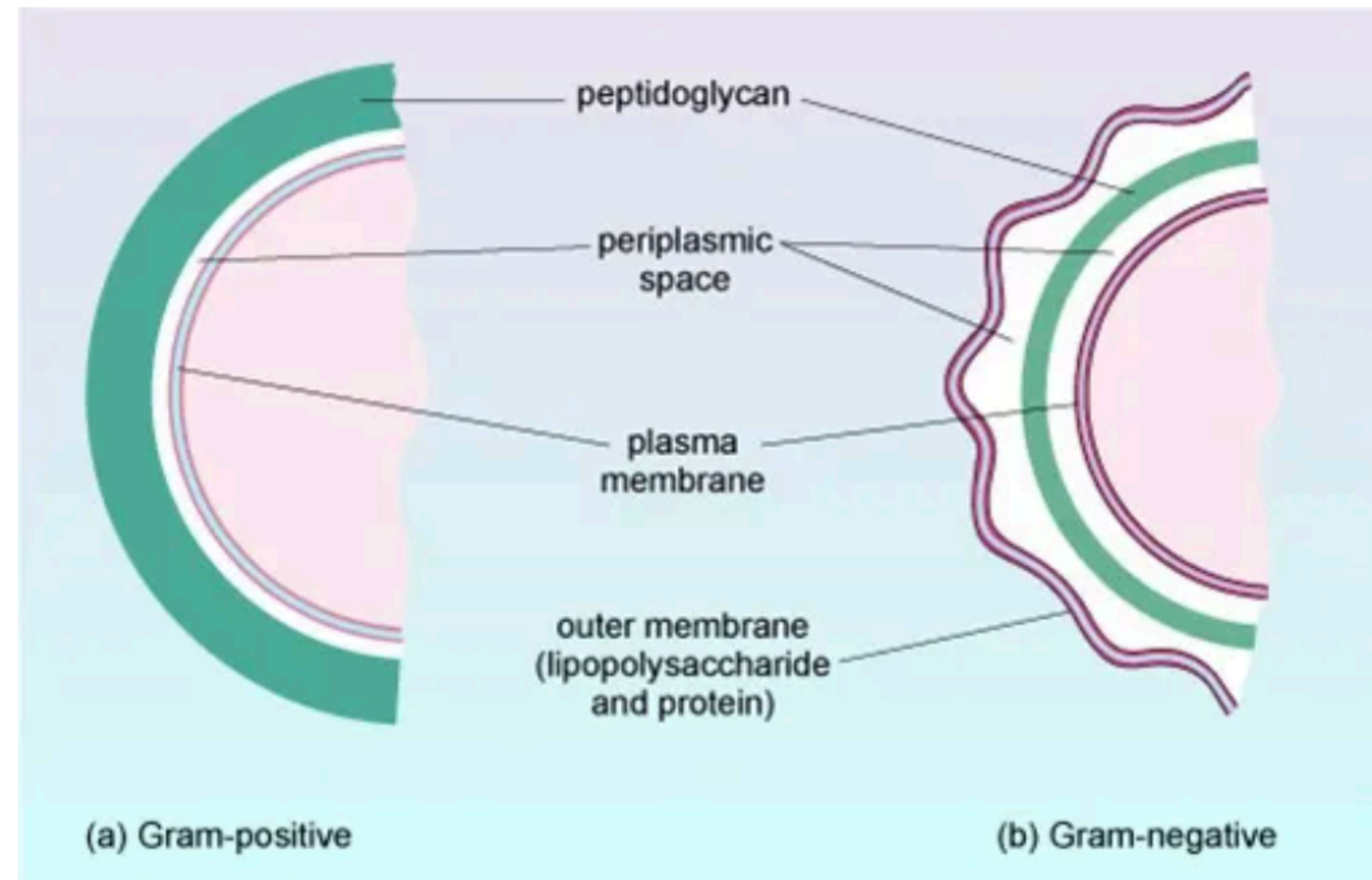


# On the basis of Cell Wall

- Bacteria with thick cell walls can be stained by applying special chemicals (stains). One common staining process is **Gram staining** (using crystal violet or methylene blue as primary colour).

- **Gram-Positive:** They get stained and appear blue to purple under a Gram stain. Examples: *Corynebacterium*, *Clostridium*, *Listeria*
- **Gram-Negative:** They do not get stained and appear red to pink. Examples: *Pseudomonas*, *Proteus*, *Klebsiella*

## Cell Wall





# Why in NEWS ?

After Corona, a new dangerous disease has now emerged in Japan. In this, bacteria start eating the flesh of the patient's body.

The name of the disease is Streptococcal Toxic Shock Syndrome (STSS).

According to the report, due to this disease the patient dies within 48 hours.



# Spread of disease

So far 977 cases have been reported in Japan.

This disease is caused by Group A Streptococcus (GAS) bacteria. It is most dangerous for children and the elderly.

People infected with this first suffer from swelling and sore throat.







Apart from this, problems like body pain, fever, low blood pressure, necrosis (body tissues die), breathing problems, organ failure also occur.

Death occurs within a few hours.

Streptococcus disease has now spread to 5 countries in Europe. These include Britain, France, Ireland, Netherlands and Sweden.

Here this bacteria has attacked children the most.



# **2500 patients may come in a year, mortality rate 30%**

According to Ken Kikuchi, a female doctor from Tokyo, first swelling appears in the patient's body, especially in the legs, then after a few hours it spreads throughout the body. After this the patient dies within 48 hours.

Kikuchi appealed to people to wash hands frequently and treat open wounds immediately.

According to media reports, given the rate at which this disease is increasing, it has been estimated that in the future, 2500 cases of this disease may occur in Japan every year. At the same time, the mortality rate due to this can reach 30%.



# स्ट्रेप्टोकोकस बीमारी के लक्षण



बुखार



सिरदर्द



लाल और  
बैंगनी धब्बे



लिम्फ नोड्स बढ़ना



लालपन



सफेद  
धब्बे



सूजन



गले में खराश



# Precautions

According to doctors, to avoid the disease, its early identification, care and immediate treatment is necessary.

To deal with STSS, a vaccine named J8 is also available in the market, which produces antibiotics in the body.

The big thing is that this disease spreads from one person to another.



# How do bacteria spread in our body?

While talking to The Indian Express, public health intellectual Dr. Jagdish Hiremath said that this bacteria produces toxic substances in the body, which causes burning sensation.

Then it damages the tissue in the body, due to which inflammation starts spreading. After this the tissue starts eating the patient's flesh, causing severe pain.



Dr. Hyermath of Japan said that the health authorities are constantly taking stock of the situation to fight this disease in the country. Campaigns are being run to make people aware. In this, the seriousness and dangers of the disease are being explained.

All hospitals in Japan have been put on alert. They have been given guidelines for immediate treatment of STSS patients.



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