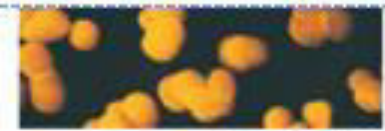


THE SIZE, SHAPE, AND ARRANGEMENT OF BACTERIAL CELLS

- Most bacteria range from 0.2 to 2.0 μm in diameter and from 2 to 8 μm in length.
- They may be spherical-shaped coccus (plural: cocci, meaning berries), rod-shaped bacillus (plural: bacilli, meaning little rods or walking sticks), and spiral.
- The species holds the record for the largest bacterium is *Thiomargarita namibiensis*, commonly known as **sulfur pearl**.

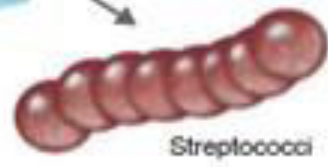
Cocci are usually round but can be oval, elongated, or flattened on one side. The cocci are spherical or oval bacteria having one of several distinct arrangements based on their planes of division.

- Division in **one plane** produces either a diplococcus or streptococcus arrangement.
 - i. Cocci that remain in pairs after dividing are called **diplococcic** (*Diplococcus pneumonia*).
 - ii. Those that divide and remain attached in chain like patterns are called **streptococci** (*Streptococcus pyogenes*).
- Division in **two planes** produces a tetrad arrangement.
 - iii. Those that divide in two planes and remain in groups of four are known as **tetrads** (*Micrococcus luteus*).
- Division in **three planes** produces a sarcina arrangement.
 - iv. Those that divide in three planes and remain attached in cube-like groups of eight are called **sarcinae** (*Sarcina ventriculi*).
- Division in **random planes** produces a staphylococcus arrangement.
 - v. Those that divide in multiple planes and form grape-like clusters or broad sheets are called **staphylococci** (*Staphylococcus aureus*).



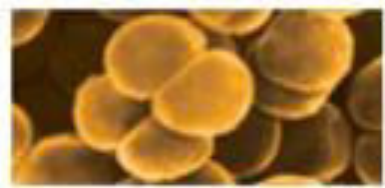
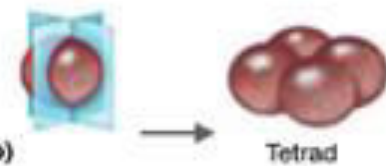
SEM 2.5 μm

(a)



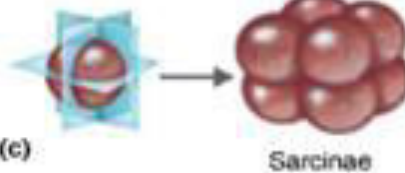
SEM 2.5 μm

(b)



SEM 2 μm

(c)



SEM 1 μm

(d)



Staphylococci



SEM 2 μm

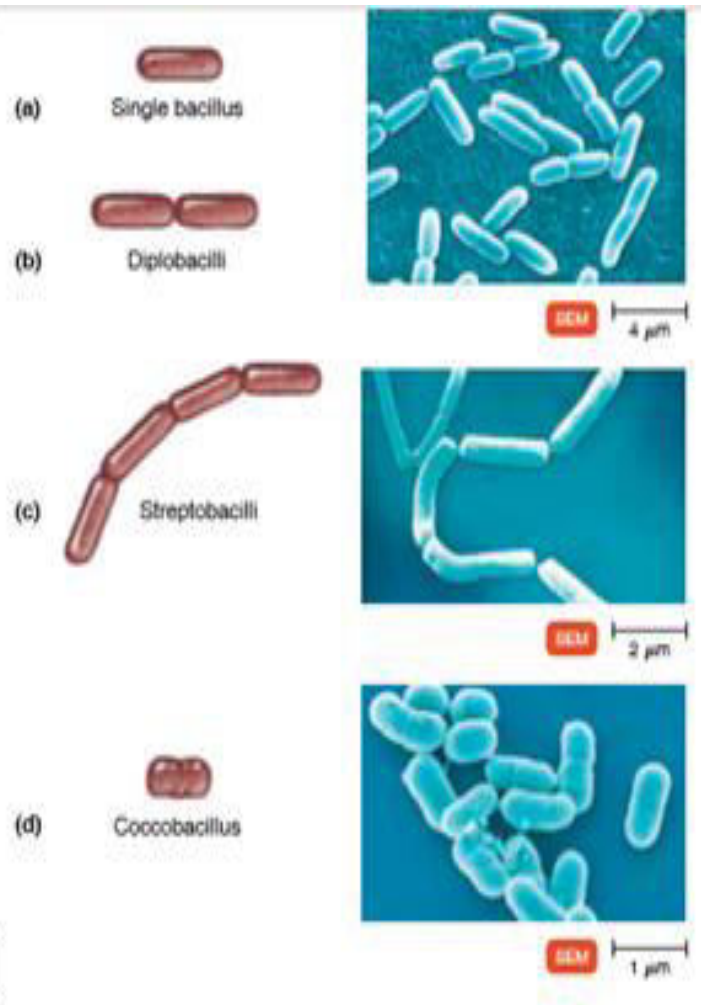
➤ **Bacilli** divide only across their short axis, so there are fewer groupings of bacilli than of cocci.

i. Most bacilli appear as single rods, called **single bacilli**.

ii. **Diplobacilli** (*Klebsiella rhinoscleromatis*) appear in pairs after division.

iii. **Streptobacilli** (*Streptobacillus moniliformis*) occur in chains.

iv. Some bacilli oval and look so much like cocci that they are called **coccobacilli** (*Haemophilus influenzae*).



- Spiral bacteria have one or more twists; they are never straight.
 - i. Bacteria that look like curved rods, comma like, are called **vibrios** (*Vibrio cholerae*).
 - ii. Others, called **spirilla** (singular: spirillum), have a helical shape, like a corkscrew, and fairly rigid bodies.
 - iii. Another group of spirals are helical and flexible; they are called **spirochetes** (*Treponema pallidum*).

(a) *Vibrio*



SEM 4 μm

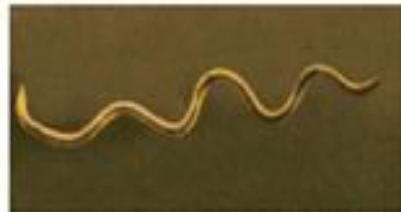
(b) *Spirillum*



SEM 4 μm



(c) Spirochete



SEM 1 μm