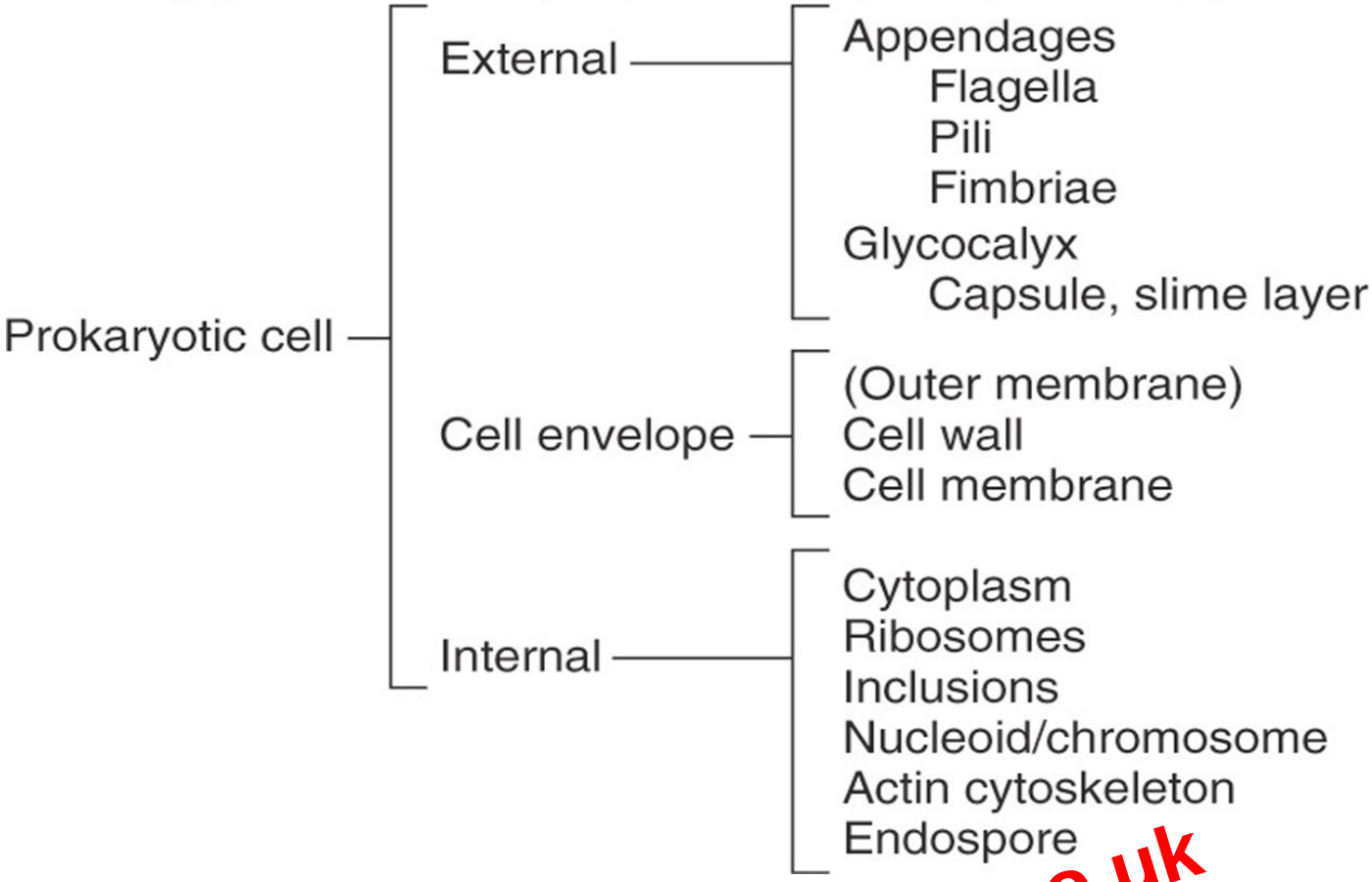

Bacterial Cell Walls

It is important to note that not all bacteria have a **cell wall**. Having said that though, it is also important to note that **most** bacteria (about 90%) have a cell wall and they typically have one of two types: a **gram positive** cell wall or a **gram negative** cell wall.

The two different cell wall types can be identified in the lab by a differential stain known as the **Gram stain**.

Gram Positive Cell walls

The cell walls of gram positive bacteria are composed predominantly of peptidoglycan. In fact, peptidoglycan can represent up to 90% of the cell wall, with layer after layer forming around the cell membrane.

Gram-positive bacteria are classified by the color they turn after a chemical called Gram stain is applied to them. Gram-positive bacteria stain blue when this stain is applied to them. Other bacteria stain red. They are called gram-negative. Gram-positive and gram-negative bacteria stain differently because their cell walls are different. They also cause different types of infections, and different types of antibiotics are effective against them.

Prokaryotes are also essential in microbial **bioremediation**, the use of prokaryotes (or microbial metabolism) to remove pollutants, such as agricultural chemicals (pesticides, fertilizers) that leach from soil into groundwater and the subsurface, and certain toxic metals and oxides, such as selenium and arsenic compounds.

One of the most useful and interesting examples of the use of prokaryotes for bioremediation purposes is the cleanup of oil spills.

To clean up these spills, additional inorganic nutrients that help bacteria to grow are added to the area, and the growth of bacteria breaks down the excess hydrocarbons.