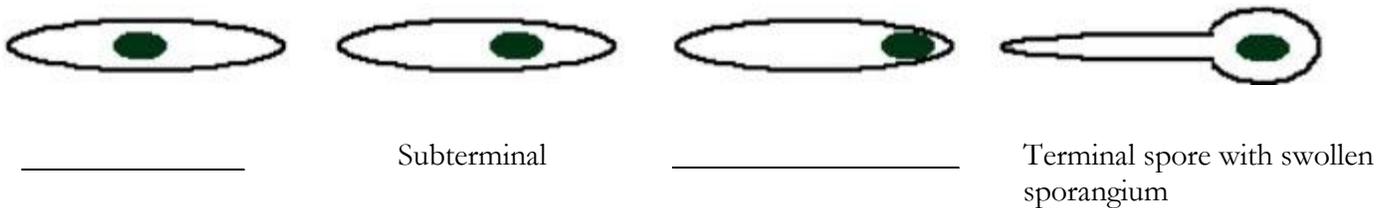


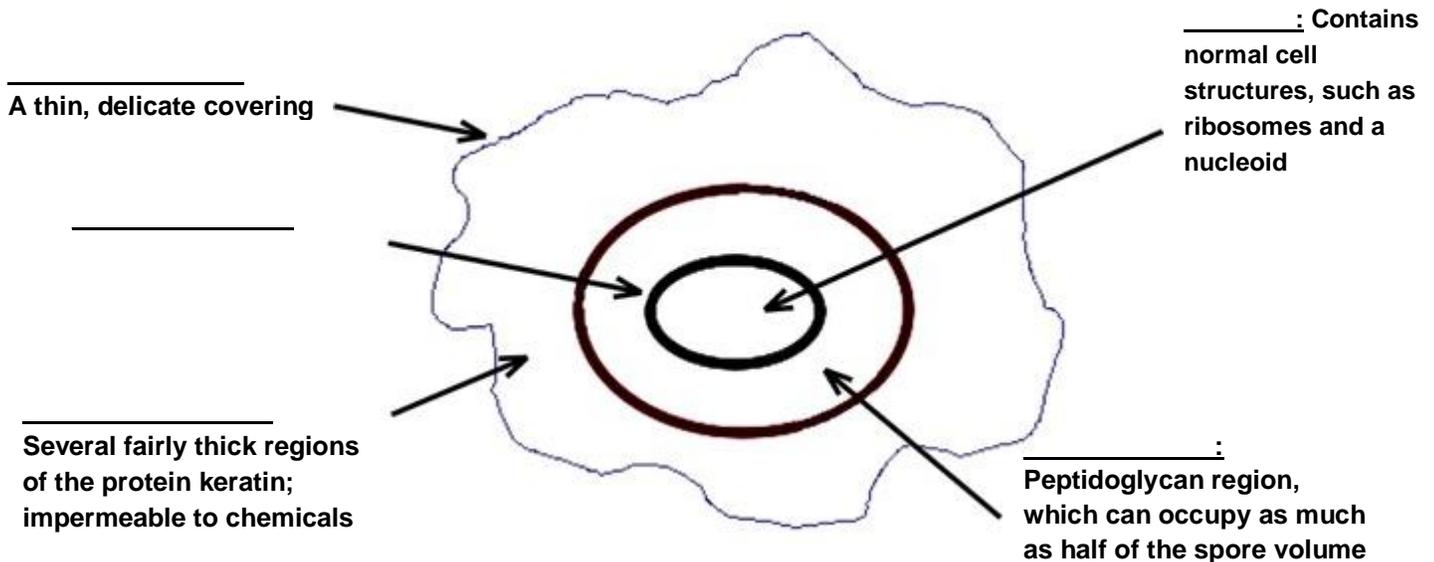
Lecture 11

I. The Bacterial Endospore

- A. A _____ that develops within vegetative cells of several genera
1. _____: rods, e.g. the pathogen *Bacillus anthracis*
 2. _____: rods, e.g. the pathogens *Clostridium botulinum* and *Clostridium tetani*
 3. _____: cocci
- B. Develop in nature to allow for survival _____.
- C. Extraordinarily resistant to _____ such as heat, UV light, chemical disinfectants, and desiccation. In fact, some spores have remained viable for 100,000 years or more! 1
- D. _____ in the mother cell frequently differs among species and can depend on the time lapsed after formation.



E. Endospore structure



1. The spore's mechanism of resistance is _____.

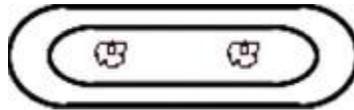
Following are some possibilities:

- i. _____ have been found that protect the DNA from heat, radiation, and desiccation.
- ii. The cortex may _____, protecting it from heat and radiation.
- iii. The high concentration of _____ appears to play a role in DNA protection, thus enhancing spore resistance to heat, H₂O₂, and desiccation
(Journal of Bacteriology, June 2006, p. 3740-3747, Vol. 188, No. 11 (Setlow et. al.))

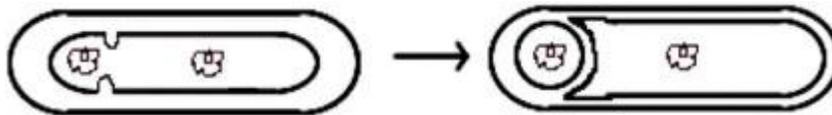
II. _____ (sporogenesis or sporulation)

A. Steps

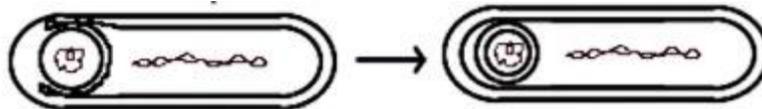
1. The cell stops growing and the _____.



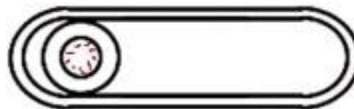
2. The cell _____. A copy of the DNA is enclosed and the _____.



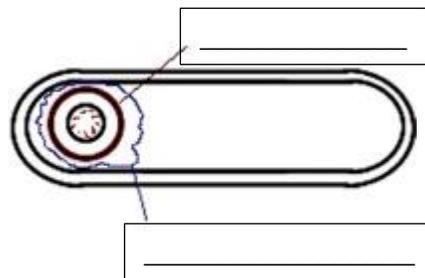
3. The immature spore is _____.



4. The _____ is laid down in the space between the two membranes



5. _____ are formed.



6. The spore _____ and _____.

III. Transformation of dormant spores into active, vegetative cells.

A. Stages

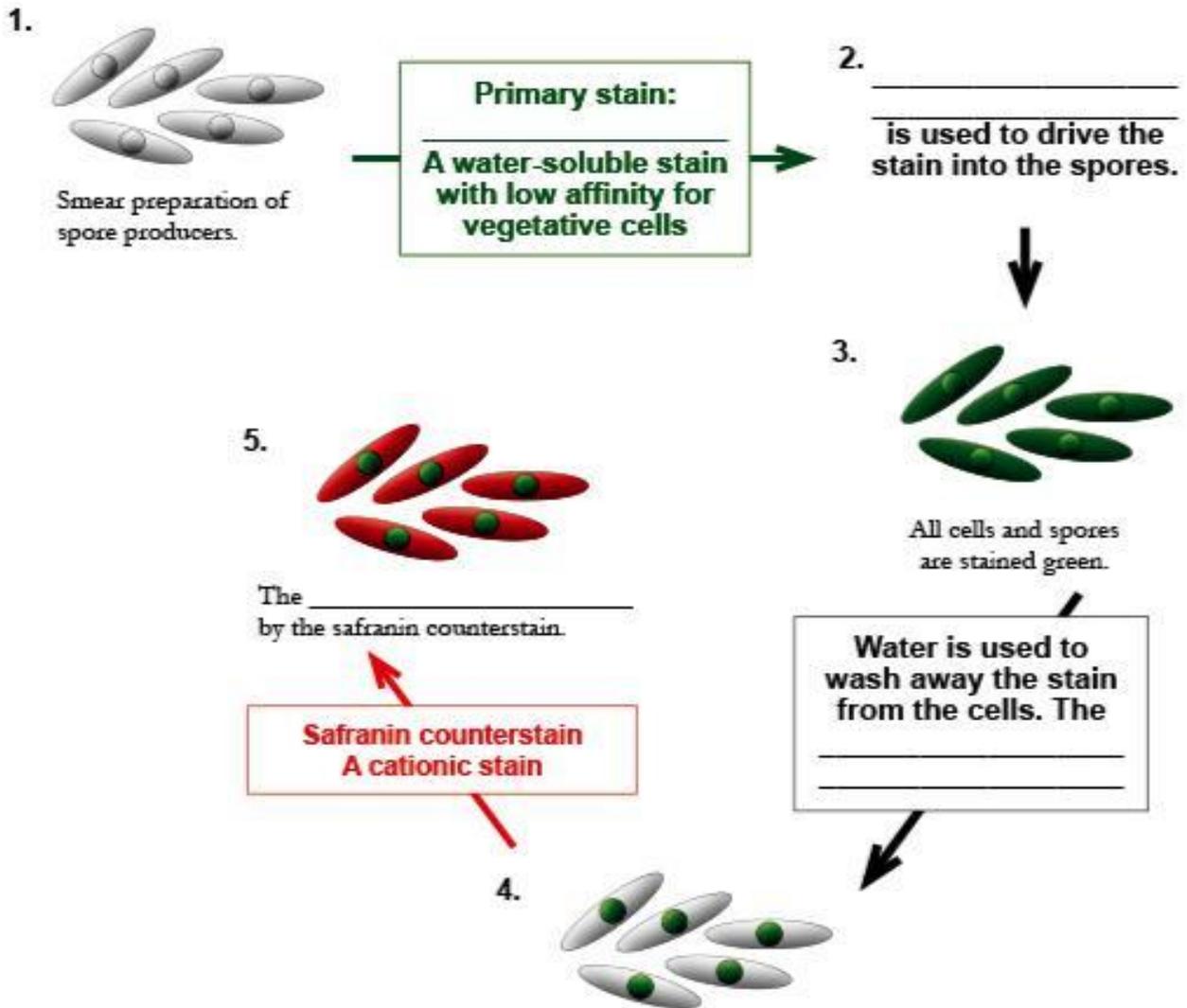
1. _____: Some change in environment (usually exposure to **heat** or certain chemicals) causes the spore to prepare for germination.
2. _____
 - a. Often triggered by the _____.
 - b. The spore takes on water, _____.
 - c. _____ begins to increase.
3. Outgrowth
 - d. The spore coat makes new components, emerges from the remains of the spore coat and _____.

IV. _____ Endospores

A. Only _____ produce endospores so these should be the cells used for staining.

B. In addition to resisting heat and chemicals, the protein coat of an endospore is also _____. Therefore, the staining procedure must be fairly _____.

So, how does an endospore stain work?



V. Bacterial _____

- A. A well-organized _____.
- B. Generally composed of _____.
- C. Help bacteria resist _____ by host phagocytic cells, therefore increasing the _____ of these bacteria (e.g. _____.)
- D. Contain a _____ and can protect _____.
- E. Exclude bacterial _____ and most hydrophobic _____.
- F. Can enhance the ability of certain bacteria to _____ (e.g. *Streptococcus mutans* _____).

VI. _____ bacteria with capsules

- A. The polysaccharides in the capsule make staining difficult, therefore capsule staining procedures generally _____, leaving the capsule _____. It appears as a _____ around the cell.
- B. Cells with capsules are not heated as heat treatment _____ and the shrinkage of the cell can cause a _____.

So, how does a capsule stain work?

