



BACTERIAL APPENDAGES 3

Bacterial endospores

LAB5

Bacterial endospores

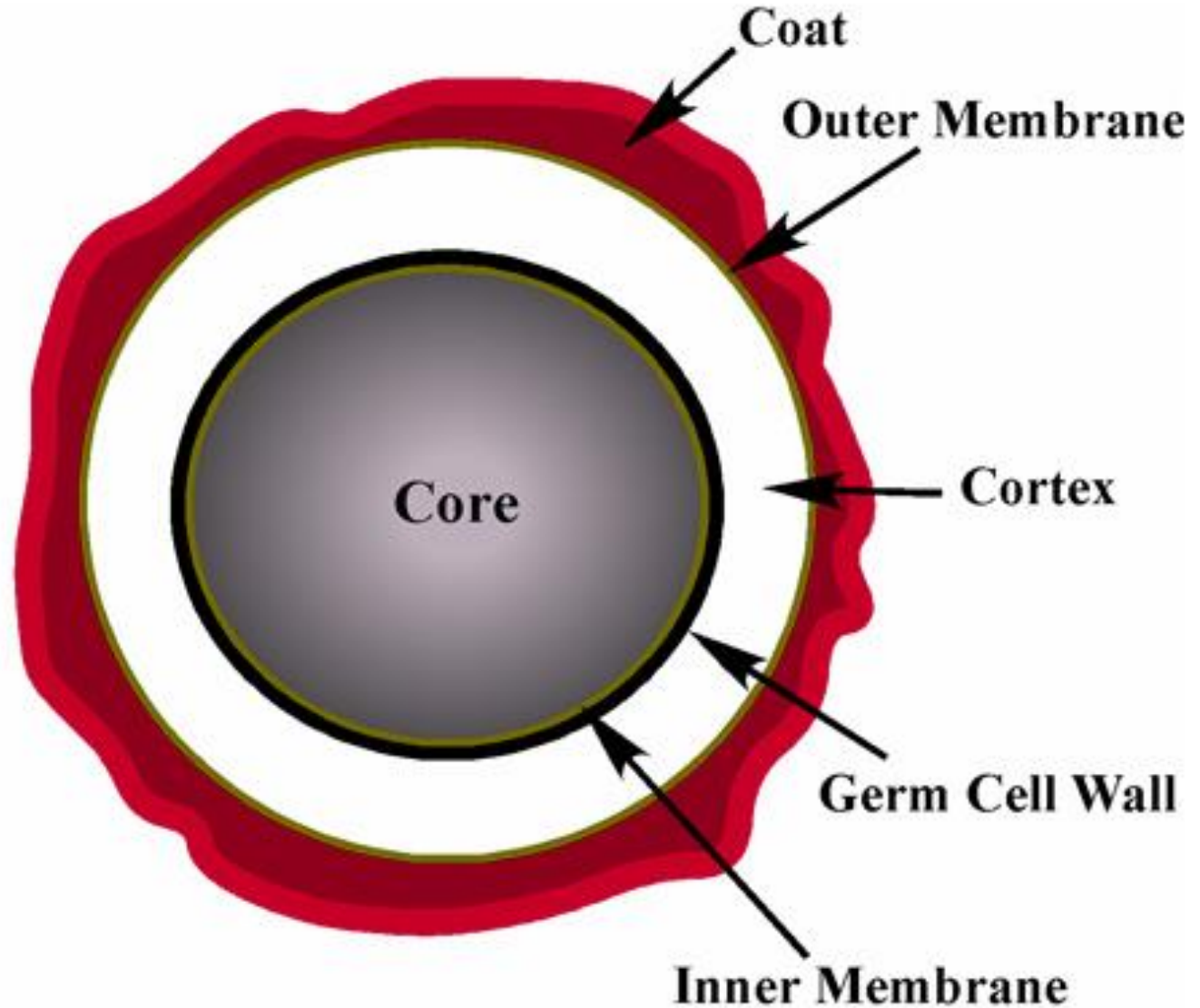
The **endospore** is a highly resistant differentiated bacterial cell that are highly resistant to heat, boiling and drying out and are difficult to destroy

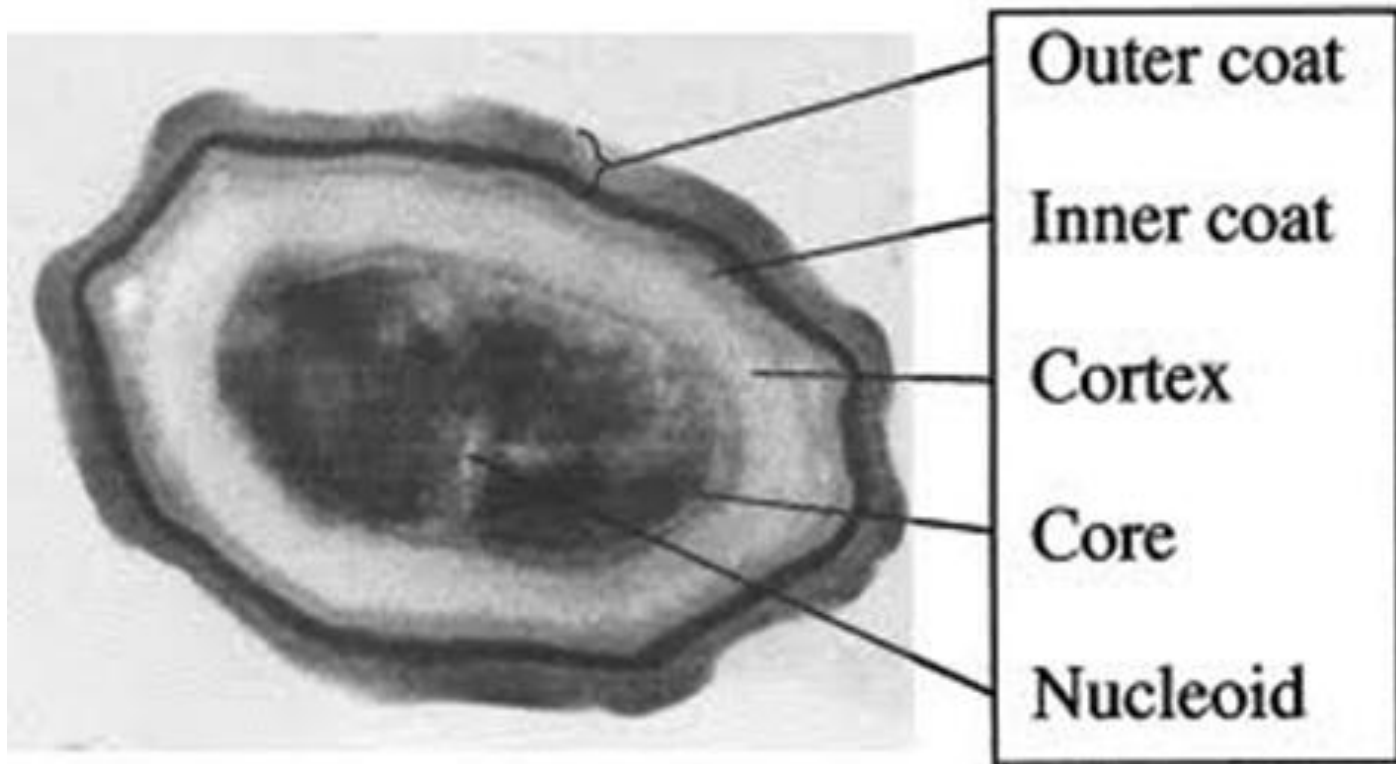
Resting structures formed by some bacteria for survival during adverse environmental conditions (**nutrient limitation or extreme environments**)

Endospores can remain dormant indefinitely (not reproductive), but germinate quickly when the environment becomes more favorable

Usually formed by Gram positive bacteria
(e.g. *Bacillus*, *Clostridium*)

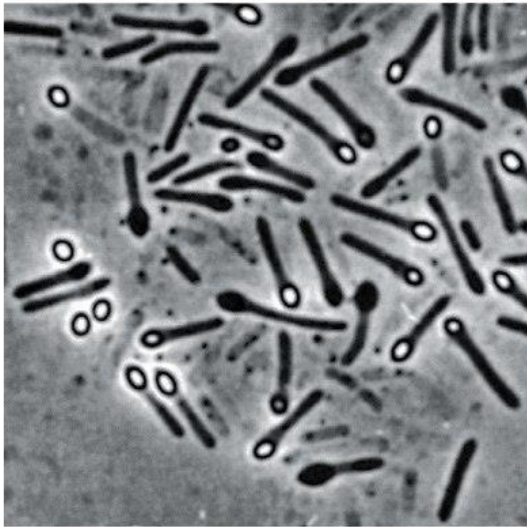
Endospore structure





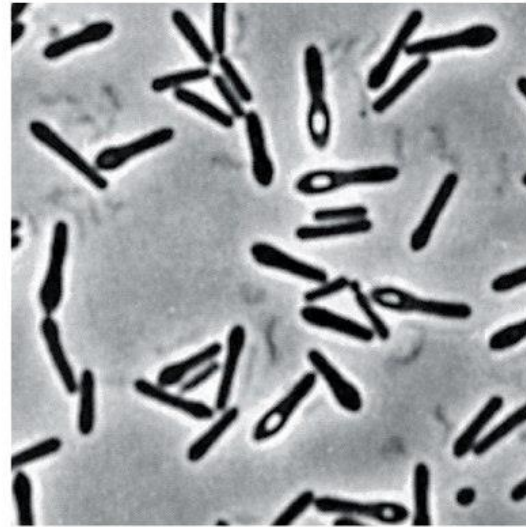
- Cross-section of a spore of *B. subtilis*. The DNA is contained in the nucleoid (electron-light regions) within the spore core. The core is surrounded by the protective cortex and the lamellar inner spore coat and electron-dense outer spore coat. The long axis of the spore is 1.2 μm ; the core area is 0.25 μm^2 . (The electron micrograph was kindly provided by S. Pankratz.)

Bacteria	disease
<i>Bacillus anthracis</i>	anthrax
<i>Clostridium botulinum</i>	botulism
<i>Clostridium perfringens</i>	gas gangrene
<i>Clostridium tetani</i>	tetanus



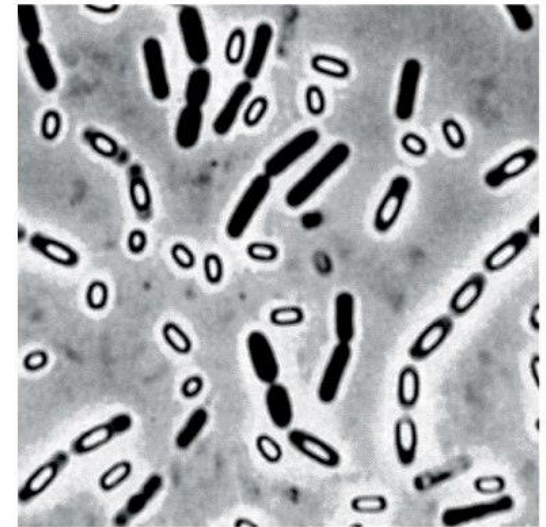
H. Hippe

(a)



H. Hippe

(b)



H. Hippe

(c)

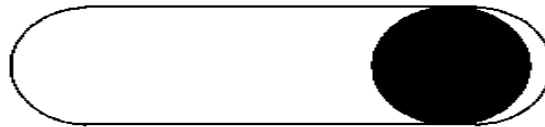
Figure 4-47 Brock Biology of Microorganisms 11/e
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Central endospore



Subterminal endospore



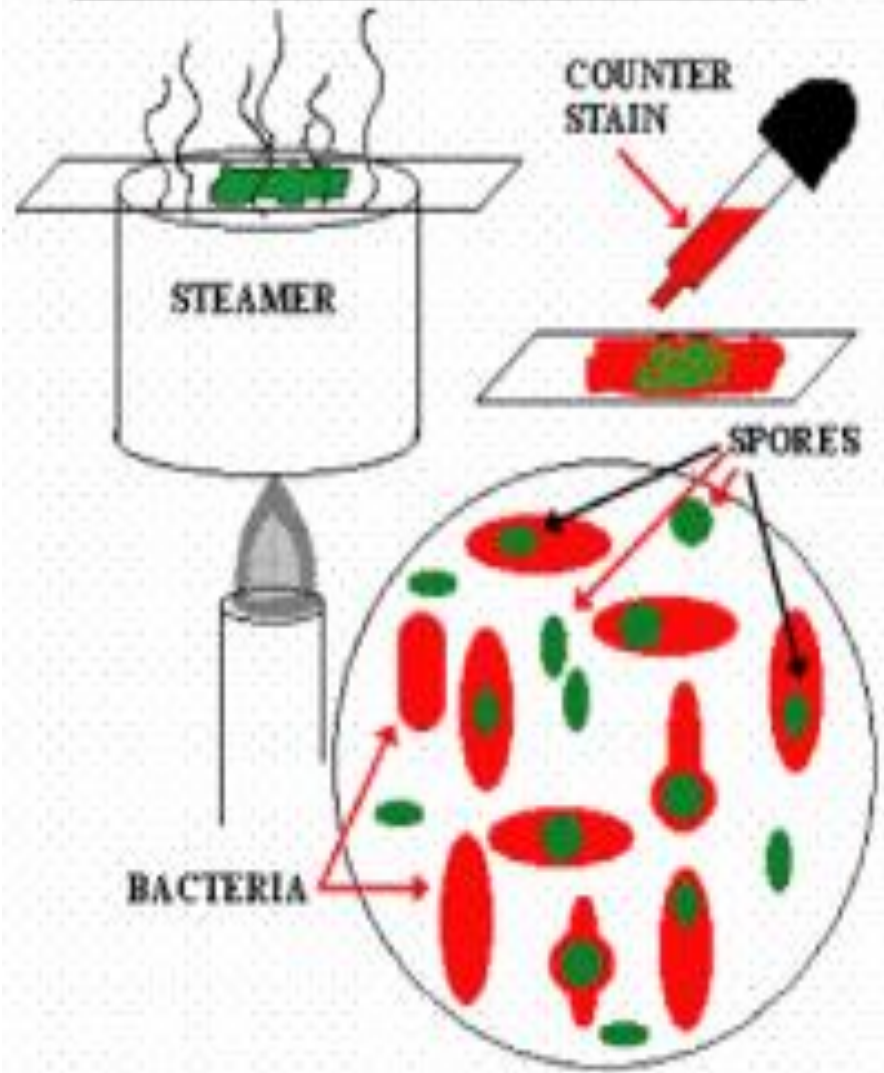
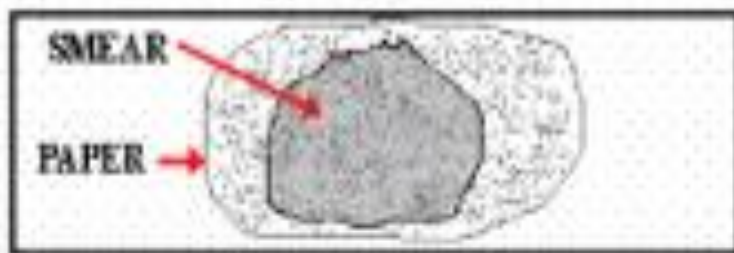
Terminal endospore

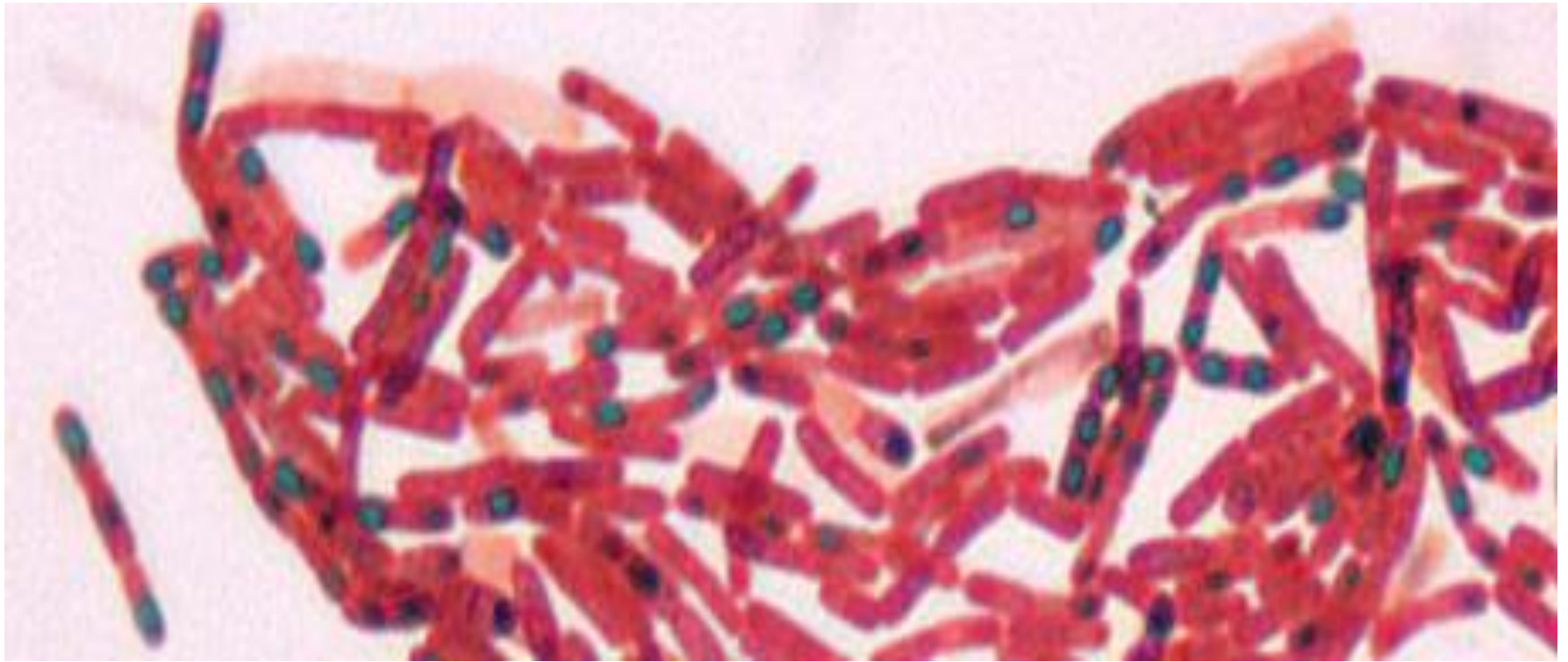
Staining procedures

Procedure:

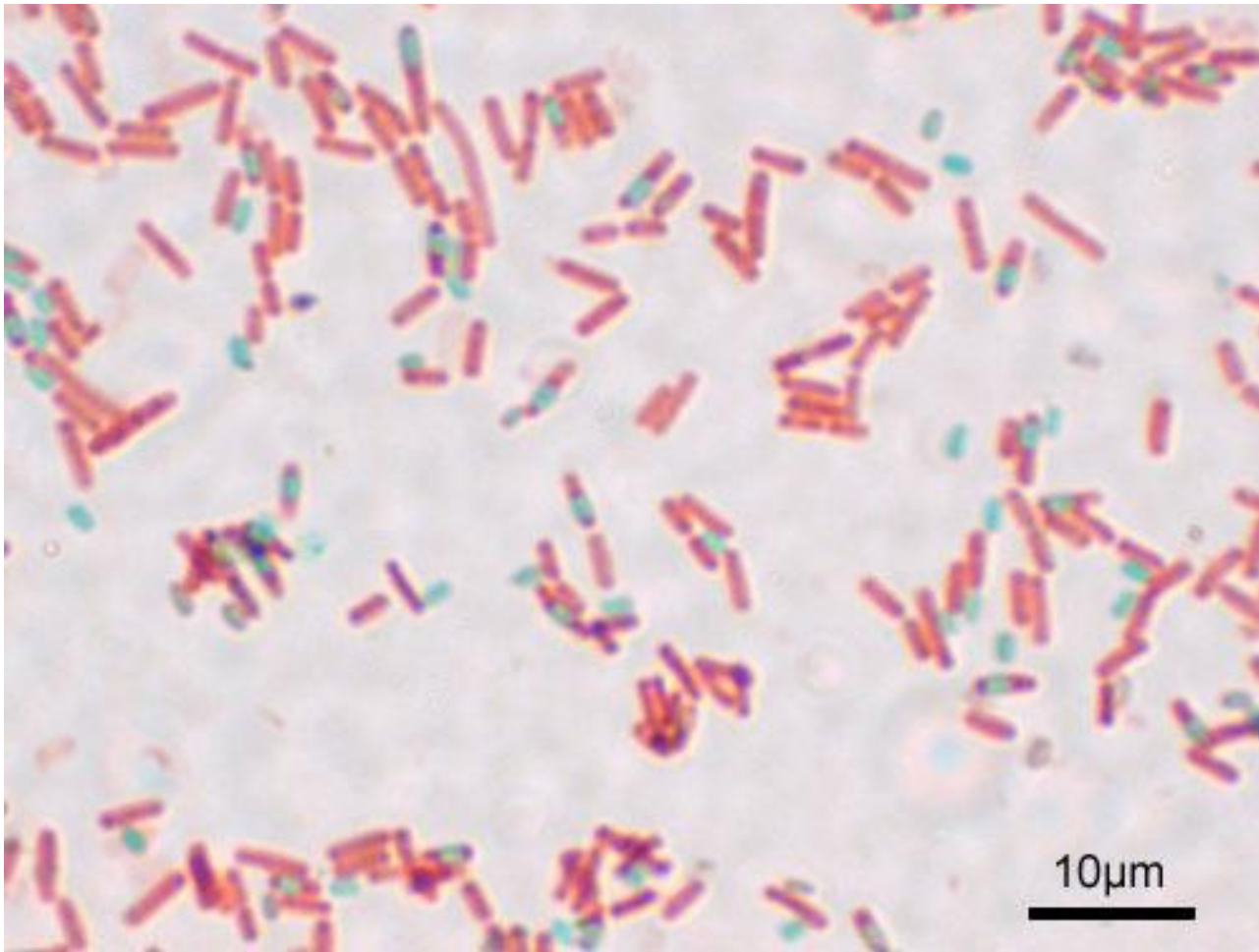
- 1) Smear the organism and heat fix to a slide
- 2) Place the slide over a steam bath and cover with Malachite Green
- 3) Keep the stain over the bath for 3 - 5 minutes, recovering the slide with Malachite Green if some evaporates
- 4) Dump the Malachite Green off and allow to cool
- 5) Rinse the slide with water to remove excess stain
- 6) Cover the smear with Safranin for two minutes
- 7) Rinse the slide with water to remove excess stain
- 8) Blot dry the stain and view under a microscope

Do not allow the stain evaporate. to prevent formation of metallic sheet





Spore stain of a *Bacillus* species. The staining technique employed is the Schaeffer-Fulton method



microscopic image of the bacterial spore formation of *Bacillus subtilis*
Spore staining, magnification:1,000. (green) spores, (red) vegetatives

Thanks

Dalia AL Sarar