

# Gram Positive versus Gram Negative bacteria



In 1884 Christian Gram, a Danish bacteriologist, performed a test that introduced dye to the bacteria, to identify if bacteria had a peptidoglycan wall or a mesh-like layer of amino acids and sugars. This method is called "**Gram staining**" and it is used to distinguish between **Gram positive** and **Gram negative** bacteria. Gram positive bacteria contain a thick peptidoglycan layer (with teichoic acids), that stain **purple** while Gram negative bacteria lack the teichoic acids in their cell wall and therefore, stain **pink /red**.

## Commonly encountered Gram Positive Bacilli Bacteria

Commonly Encountered Gram Positive Bacilli Bacteria*	Common Sites of Infection*	Common Treatment	Comments <i>*common but not all inclusive</i>
• <b>Bacillus species</b>	blood, CNS, bones, intra-abdominal	vancomycin, clindamycin	frequently non-pathogenic
<i>B. cereus</i>	intra-abdominal, blood	vancomycin, clindamycin	
• <b>Clostridial species</b>			
<i>C. difficile</i>	intra-abdominal	vancomycin, metronidazole	
<i>C. tetani</i>	wound	penicillin, metronidazole, doxycycline	
<i>C. botulinum</i>	intra-abdominal, wound	penicillin, metronidazole	
<i>C. perfringens</i>	intra-abdominal	penicillin, metronidazole, clindamycin, doxycycline	
• <b>Corynebacterium species</b>			
<i>C. jeikeium</i>	blood, endovascular	vancomycin + gentamicin	combination therapy
• <b>Listeria species</b>	blood, CNS	ampicillin + gentamicin	combination therapy
• <b>Lactobacillus species</b>	intra-abdominal, pelvic, wound	vancomycin, penicillin , ampicillin	
• <b>Mycobacterium species</b>			
<i>M. tuberculosis</i>	lungs, extrapulmonary (bone, intra-abdominal, uterine)	rifampin, pyrazinamide, ethambutol, isoniazid	
<i>M. non-TB</i>	skin, CNS	clarithromycin, azithromycin, Rifampin, pyrazinamide, ethambutol, isoniazid	
• <b>Propionibacterium species</b>	blood, prosthetic material, heart, skin	penicillin, ceftriaxone, vancomycin, daptomycin, linezolid	not acne

**Note:** This is only an introduction to the gram positive cocci. If you have any questions or suggestions please email: [Linda.Jorgoni@uhn.ca](mailto:Linda.Jorgoni@uhn.ca) , or [Linda.Dresser@uhn.ca](mailto:Linda.Dresser@uhn.ca).

## **References**

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