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 techoic acids), that stain **purple** while Gram negative bacteria lack the techoic acids in their cell wall and therefore, statin **pink /red**.

Commonly encountered Gram Positive Cocci Bacteria

Commonly Encountered Gram Positive Cocci Bacteria*	Common Sites of Infection*	Common Treatment	Comments *common but not all inclusive
Staphylococcus species			
• Methicillin-sensitive *Staphylococcus aureus* (MSSA)	skin, soft tissue, lungs, heart, blood	cefazolin, cloxacillin, vancomycin	*vancomycin used for empiric or penicillin allergy*
• Methicillin-resistant *Staphylococcus aureus* (MRSA)	skin, soft tissue, lungs, heart, blood	vancomycin, linezolid daptomycin	*daptomycin cannot be used for lung infection*
• Coagulase negative staphylococcus (CoNS)	blood, heart, prosthetics material	vancomycin, daptomycin, linezolid	*CoNS is a frequent contaminant of blood cultures*
Streptococcus species*			**e.g. group A, B,C, G*
• Streptococcus-Group A	throat, skin, soft tissue, lung	penicillin, amoxicillin	
• Streptococcus-Group B	blood, lung, CNS, skin, soft tissues, bone, joint	penicillin, amoxicillin, cefazolin	
Enterococcus species			
• *Enterococcus faecalis*	blood, heart, wound, intra-abdominal, urinary tract	ampicillin, nitrofurantoin, vancomycin, daptomycin, linezolid	*1-nitrofurantoin used for cystitis 2-vancomycin, daptomycin, linezolid used for empiric use, penicillin allergy, or resistance*
• *Enterococcus faecium*	blood, heart, wound, intra-abdominal, urinary tract	ampicillin, nitrofurantoin, vancomycin, daptomycin, linezolid	*ampicillin resistance is common.*
• Vancomycin-Resistant Enterococci (VRE)	urinary tract, heart, blood, wound, intra- abdominal, pelvic	daptomycin, linezolid	*VRE usually E. faecium*

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

References

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