

Oxygen Usage Definitions

Obligate Aerobe	Needs O ₂ - <i>Pseudomonas</i> , <i>Micrococcus</i> , <i>Bacillus</i>
Facultative	Grows with or without O ₂ - <i>Staph</i> , <i>Strep</i> , <i>Enterobacteriaceae</i>
Microaerophilic	Only requires a small amount of O ₂ - <i>Borrelia</i>
Obligate Anaerobe	Can't survive in O ₂ - <i>C. diff</i>

Anaerobic Basics

Basic Reservoirs

- Abscesses
- Body Fluid
- Mouth
- Deep Wound
- Intestine
- UTI

Examples of Infections/Diseases caused by Anaerobes

- Dental Infection
- C.diff
- Deep wound
- Gangrene
- Necrotic Tissue
- Botulism

Aerotolerance Testing

1. CDC BA colony plate with growth
2. Sub to regular BA and another CDC BA plate
3. See if they are *If they grow on the regular BA and the CDC BA anaerobes then they are not anaerobes*

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Specimens

Specimens (cont)

LKV agar	Laked blood and antibiotic. Has Vanco and Kanamycin, ONLY selective
<i>Bacteroides</i> Bile Esculin Agar	Special for <i>Bacteroides fragilis</i> . Selective and differential (20% bile tolerance)
Thioglycollate Broth	Broth media to grow bacteria. Can only grow medically significant organisms. Oxygen suppressed
Cooked Meat	looks like has chunks of beef in it. Has glucose.
Glucose Broth	Does same thing as thioglycollate broth

Incubation Environment

Gas Pack Jar	85% N ₂ ; 10% H ₂ ; 5% CO ₂
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Anaerobic Chamber

Gram Negative Bacilli

	<i>Fusobacterium necrophorum</i>	<i>Fusobacterium nucleatum</i>
Bile Tolerance (20%)	-	-
Brick Red Fluorescence (UV)	-	-
Brown/black colonies on CDC	-	-
Vancomycin	R	R
Penicillin	R	R
Kanamycin	S	S
Lipase	+	-
Esculin	-	-

Gram Negative Bacilli

	<i>Bacteroides fragilis</i>	<i>Porphyromonas gingivalis</i>	<i>Prevotella melaninogenica</i>
Bile Tolerance (20% Bile)	+	-	-
Brick Red Fluorescence (UV light)	-	+	+
Brown/Black Colonies on CDC	-	+	+
Vancomycin	R	S	R
Penicillin	R	S	R

Appropriate Specimens	Aspirates, body fluid, tissues, suprapubic aspiration, drainage, brain abscesses, sinus aspirates
Inappropriate (rejected) specimens	Swab of anything, anything respiratory b/c of normal flora, vaginal b/c normal flora, urine, stool
Anaerobic Media - All have no oxygen	
CDC Blood Agar	Blood Agar without O ₂
CCFA	Used for C. Diff. Both selective and differential



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Gram Negative Bacilli (cont)

Kanamycin	R	R	R
Lipase	-	-	-
Esculin	+	-	-

Gram Positive Bacilli

Catalase Positive

- Cutibacterium* (former *Propionibacterium*) - Moderate Growth Rate
- Diphtheroid Gram Stain

Catalase Negative

- Actinomyces* spp. - Slow growth rate
- Filamentous, branching GPB
- Lactobacillus* - Rapid Growth Rate - Looping, chaining GPB
- Resistant to Vancomycin

Clostridium spp.

- *Clostridium perfringens*
 - Lecithinase Positive
 - cloudy around colony
 - Double zone beta hemolysis
 - Lipase negative
 - Boxcar shape
 - Gangrene
- *Clostridium sporogenes*
 - Common in soil
 - Comes from stool samples
 - Lipase Positive
 - Smells like bad dirt
- *Clostridium difficile*
 - Should not be grown
 - Do toxin testing and PCR
 - Test of cure
 - PCR can pick up dead DNA so it can be false positive
 - If pt has firm stool, no longer transmissible
- *Clostridium septicum*
 - Gangrene
 - Spreading colony formation
 - Subterminal Spores
- *Clostridium tetani*
 - Cause of tetanus
 - Club like
 - Tennis racket like
- *Clostridium tertium*
 - Aerotolerant
 - Can grow in O₂

Gram Positive Cocci

- Peptostreptococcus* - Catalase Negative
- Staphylococcus saccharolyticus* - Catalase Variable

Gram Negative Cocci

- Veillonella* spp. - Sometimes in blood cultures from endocarditis



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