

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 Glucose Broth | looks like has chunks of beef in it. Has glucose. Does same thing as thioglycollate broth |

Incubation Environment

Gas Pack Jar 85% N; 10% H; 5% CO₂

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

| | |
|---------------------------------------|-------------------|
| <i>Peptostreptococcus</i> | Catalase Negative |
| <i>Staphylococcus saccharolyticus</i> | Catalase Variable |

Gram Negative Cocci

| | |
|-------------------------|---|
| <i>Veillonella</i> spp. | Sometimes in blood cultures from endocarditis |
|-------------------------|---|

