Gram Negative Rods, oxidase positive, glucose fermenters, growth on MacConkey agar

- General characteristics and morphology
  - Facultative gram negative rod
  - Ferments glucose
  - Oxidase positive (must test from blood agar plate)
  - Grows on Blood agar and MacConkey agar
  - When motile, has polar flagella

A. Vibrio species

1. **Vibrio cholera**
   a. Morphology and characteristics
      i. Isolation and colonial morphology
         - Isolate on Thiosulfate citrate bile salts, sucrose (TCBS) agar (pH 8.6) – colony color is yellow
         - Alkaline peptone broth – pH 8.6
         - MacConkey agar
         - Blood agar
      ii. Gram stain morphology
          - Straight or slightly curved gram negative rod
      iii. Identification
          - Lactose = non-“F”
          - Sucrose = “F”
          - ODC and LDC = positive
          - Indole positive
          - Growth in 0% NaCl
          - Variable growth in 6% NaCl
   b. Disease states
      i. Cholera
         - Rice water stools – enterotoxin production
         - Dehydration
         - Man is the only host
         - Transmission
         - Treatment

2. **Vibrio parahemolyticus**
   a. Morphology and characteristics
      i. Isolation and colonial morphology
         - Isolate on Thiosulfate citrate bile salts, sucrose (TCBS) agar (pH 8.6) – colony color is green
         - Halophilic – requires at least 0.5% NaCl for growth, tolerates up to 8% NaCl
      ii. Gram stain morphology
          - Straight or slightly curved gram negative rod
iii. Identification
- Lactose = non-"F"
- Sucrose = non-"F"
- ODC and LDC = positive
- Indole = positive
- No growth in 0% NaCl
- Growth in 6% NaCl

b. Disease states
  i. Food poisoning
    - Common in Japan, incidence increasing in U.S.
    - Raw seafood, steamed clams

3. *Vibrio vulnificus*
   a. Morphology and characteristics
      i. Isolation and colonial morphology
         - Isolate on Thiosulfate citrate bile salts, sucrose (TCBS) agar (pH 8.6) – colony color is green
      ii. Gram stain morphology
         - Straight or slightly curved gram negative rod

iii. Identification
- Lactose = variable
- Sucrose = variable
- ODC = variable
- LDC = positive
- Indole = positive
- No growth in 0% NaCl
- Variable growth in 6% NaCl

b. Disease states
  i. Intestinal – highly invasive
     - Can cause fatal septicemia
     - Increased incidence in patient with underlying liver disease
  ii. Wound infections

B. *Aeromonas species*
   1. *Aeromonas hydrophila*
      a. Morphology and characteristics
         i. Colonial morphology
            - Beta-hemolytic on SBA
         ii. Gram stain morphology
            - Straight gram negative rod

Gram-Negative Rods – Oxidase Positive Fermenters
iii. Identification
   • Lactose = non-“F”
   • Sucrose = “F”
   • LDC and ADH = positive
   • ODC = negative
   • Indole = positive
   • Growth in 0% NaCl
   • No growth in 6% NaCl
   • Esculin = positive
   • Gelatin = positive

b. Habitat
   i. Water and sewage

c. Disease states
   i. Diarrhea, urinary tract infections, wound infections, septicemia (hepatic, biliary, or pancreatic malignancy), osteomyelitis

C. Plesiomonas species
   1. *Plesiomonas shigelloides*
      a. Morphology and characteristics
         i. Colonial morphology
            • Non-hemolytic on SBA
         ii. Gram stain morphology
            • Pleomorphic gram negative rod
         iii. Identification
            • Lactose = non-“F”
            • Sucrose = non-“F”
            • LDC, ADH and ODC = positive
            • Indole = positive
            • Growth in 0% NaCl
            • No growth in 6% NaCl
            • Esculin = negative
            • Gelatin = negative

b. Habitat
   i. Fresh water in tropical areas

c. Disease states
   i. Gastroenteritis
Gram negative rods, oxidase positive, glucose fermenters, no growth on MacConkey agar
- General characteristics and morphology
  - Short, straight gram negative rod
  - Ferments glucose
  - Oxidase positive
  - Grows on Blood agar
  - No growth on MacConkey agar
  - Non-motile

A. Pasteurella species
1. Pasteurella multocida
   a. Morphology and characteristics
      i. Colonial morphology
         - On SBA: convex, smooth, gray, nonhemolytic
         - May have a musty or mushroom smell
         - No growth on MacConkey agar
      ii. Identification
         - Glucose = weak fermenter (apple-green color)
         - Indole = positive
         - ODC = positive
         - Urease = negative
         - Penicillin (2 units) = very sensitive
   b. Disease states
      i. Wound infection
         - From animal bites (cats and dogs)
      ii. Other infections
         - Meningitis, brain abscess, abdominal abscess, bacteremia, chronic pulmonary problems