Shigella (Bacterial Dysentery)

Shigella is one of the most infectious of bacteria and ingestion of as few as 100-200 organisms will cause disease. Most individuals are infected with shigellae when they ingest food or water contaminated with human fecal material.

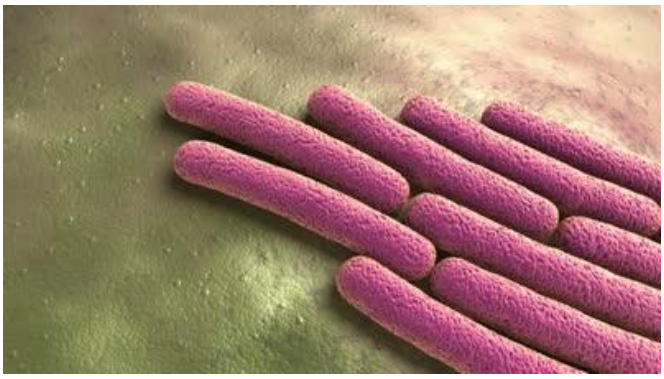


Figure 2-2 *Shigella dysenteriae* - rod prokaryote (bacterium)

Classification

4 Species/Subgroups Based on Biochemical and Serological Characters

- *Shigella Dysenteriae* : 12 Serotypes
- *Shigella Flexneri* : 6 Serotypes
- *Shigella Boydii* : 18
- *Shigella Sonnei* : 17 Colicins Types

Shigella dysenteriae

Figure 2-2 *Shigella dysenteriae* gram stain

Morphology

- Gram-negative rods, 2-4 × 0.6 μm
- nonmotile and nonflagellate
- nonsporing, noncapsulate

Cultural Characteristics

- Convex, circular, transparent colonies with intact edges
- They are aerobes and facultative anaerobes
- growth temperature range of 10-40°C and optima of 37°C
- In XLD medium they appear pinkish to reddish colonies

Figure 2-2 *Shigella spp* on XLD agar

Antigenic Structure

O antigen: Lipopolysaccharide (LPS) help the bacteria to survive the passage through the host defenses

Pathogenicity

Source of infection: Contaminated food or water, contact with an infected person.

Causative agent: *Shigella dysenteriae*

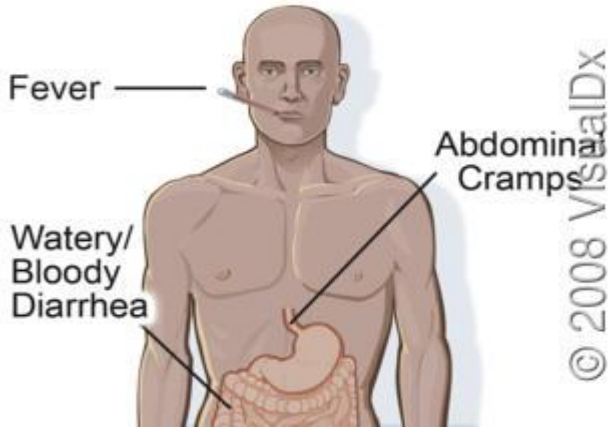
Name of the diseases: (bacillary dysentery) **Shigellosis**

- *S. dysenteriae* produce Exotoxin (**Shiga toxin**) disrupts protein synthesis and produces endothelial damage
- **Shigellosis** begins with symptoms of acute **gastro-enteritis** which is accompanied by **abdominal pain** and **watery diarrhea**
- diarrhea becomes more frequent and is usually accompanied colicky pain(ألم مصاب بمغص)
- Later diarrhea losses its fecal characteristic and is followed by mucus with pus and blood.

Symptoms

Shigellosis is characterized by

- **Abdominal cramps**
- **Diarrhea**
- **Fever**
- **Bloody stools**



Lab Diagnosis

A. Specimens include fresh stool, mucus flecks, and rectal swabs for culture

B. Culture

MacConkey, Hektoen Enteric Agar, and Salmonella-Shigella (SS) Agar. These media contain **bile salts** to inhibit the growth of other Gram-negative bacteria and pH indicators to differentiate lactose fermenters (Coliforms) from non-lactose fermenters such as Shigella

Figure 2-4 different culture media for Shigella

E. Identification

i. Biochemical reactions these are tested for motility and biochemical reactions.

ii. Slide agglutination

Treatment

1. Water and electrolytes replacement.

2. Antibiotic therapy is required to eliminate the organism. Due to the emergence of resistant strains of shigella, antibiotic sensitivity, must be performed on any shigella isolate to determine suitable antibiotics:

Sulfonamides, tetracycline, Chloramphenicol, ampicillin and streptomycin are known to be effective against shigella.

Prevention

- Supply Of Pure Water
- Personal Hygiene (Hands)
- Sewage Disposal
- Food Hygiene
- Insect Control (Flies)