## SHIGELLOSIS

**Causative agent:**
*Enterobacteriaceae* family
*Shigella genus*
*Species:* S. dysenteriae, S. flexneri, S. sonnei, S. boydii

### Morphology

<table>
<thead>
<tr>
<th>Spore</th>
<th>Capsule</th>
<th>Flagella</th>
<th>Pili</th>
<th>Gram Stain</th>
<th>Picture</th>
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### Special methods of staining

- Acridine
- Otochrome
- Facultative anaerobic

### Cultural characteristics

- Difficult to grow in universal media
- Differential and selective media

### Character of colonies

- Colourless (lactose-negative), shallow (1–1.5 mm), convex, circular, transparent, smooth
- MacConkey, EMB or DCA, Hektoen enteric agar

### Toxins

- Exotoxin
- Endotoxin

### Pathogenesis:
Adhesion, colonization, inversion of shigella into the cytoplasm of enterocyte, their endocellular reproduction, destruction of enterocyte and tearing away of epithelium, output of causative agents into the gut, forming of delayed hypersensitivity. Proteins of external membrane (invasines) and proteins of endocellular distribution provide penetration of *Shigella* in enterocyte, reproduction in enterocytes and macrophages, cause apoptosis of macrophages, lysis of cell membranes, providing endocellular and intercellular distribution of shigella. Shiga toxin activities: enterotoxic (aggravation of diarrhoeal syndrome is a result of adenylate cyclase activation, increase of water excretion in the intestine cavity) and cytotoxic (deranged synthesis of the proteins, absorption of Na⁺ and water causing death of enterocyte and increases liquid in the center of an inflammation). Toxins strike endothelium of submucous membrane of intestine (causes diarrhoea with blood), glomeruli of kidney (resulting in the haemolytic syndrome of uremia with development of kidney insufficiency). Shigella endotoxin activities: it protects shigella from action of bile. Lipid A has immunosuppressive activity (represses activity of cells of immune memory).

### Material for research

<table>
<thead>
<tr>
<th>Mucus from</th>
<th>Blood</th>
<th>Faeces</th>
<th>Urine</th>
<th>Vomiting</th>
<th>Discharges</th>
<th>Sputum</th>
<th>Pus from</th>
<th>Foodstuffs</th>
<th>Others</th>
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### Methods of research

<table>
<thead>
<tr>
<th>Microscopic examination</th>
<th>Bacteriological</th>
<th>Biological</th>
<th>Serological (reactions)</th>
<th>Skin allergic reaction</th>
<th>Feature of Immunity</th>
<th>Illness</th>
<th>Express-methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td></td>
<td></td>
<td>tube agglutination test, PHAT</td>
<td>-</td>
<td>Active. Typespecific cellular and humoral. Local immunity of mucous membrane of the intestine (sIgA)</td>
<td>-</td>
<td>IFT, ELISA, PCR</td>
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</tbody>
</table>

### SPECIFIC PROPHYLAXIS AND TREATMENT

<table>
<thead>
<tr>
<th>Prophylaxis</th>
<th>Live</th>
<th>Killed</th>
<th>Chemical</th>
<th>Toxoid</th>
<th>Mixed</th>
<th>Serum</th>
<th>γ-globulin</th>
<th>Bacteriophage</th>
<th>Antibiotics</th>
<th>Eubiotics</th>
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<th>Treatment</th>
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### Transmission of Infectious Microorganisms

- Fecal oral
Scheme of shigellosis laboratory diagnosis

Stage 1

- Faeces, rectal swabbing, pathological material
- Bacteriological investigation
  - Quick test method of diagnosis: IFT, ELISA
  - Primary inoculation of differential diagnostic media (MacConkey, Endo, and EMB) in order to receive isolated colonies
  - Growth in enrichment medium: selenite medium
- Preliminary response
  - Serological diagnosis (retrospective diagnosis)
    - Serum
    - PHAT, tube agglutination test

Stage 2

- Recording of the inoculation results

<table>
<thead>
<tr>
<th>Character and colour of colonies</th>
<th>Smear preparation, Gram staining</th>
<th>Serological identification: reference slide agglutination tests with material from separate lactose-negative colonies with mixture of shigellosis sera</th>
</tr>
</thead>
</table>

- Preliminary response
  - Inoculation of agglutinable colonies of triple sugar iron agar

Stage 3

- Identification of the pure culture

| Characteristics of sugar fermentation: growth of Hiss medium | Study of resistance to antibiotics | Serotyping:
  - Reference slide agglutination tests with mixture of shigellosis sera.
  - Reference slide agglutination tests with monovalent species-, group-, and type-specific shigellosis sera |

END RESULT