



24

SHIGELLA

24.1 INTRODUCTION

Bacillary dysentery is caused by genus *Shigella*, named after Shiga who isolated them.



OBJECTIVES

After reading this lesson, you will be able to:

- describe the characteristics of *Shigella* species
- classify *Shigella* species
- describe the laboratory diagnosis of shigellosis

24.2 MORPHOLOGY

Shigellae are short, Gram-negative rods. They are non-motile, non sporing and non capsulated

Cultural characteristics

They are aerobes and facultative anaerobes, with growth temperature range of 10-40°C and optima of 37°C and pH 7.4. They grow on ordinary media. Deoxycholate citrate Agar (DCA) is a useful selective medium. Growth is inhibited on Wilson and Blair's bismuth sulphite medium

Resistance

Shigella are not specially resistant. They are killed at 56°C in one hour and by 1% phenol in 30 minutes. In ice they last for 1-6 months. They remain viable in moist environment, in faeces they die within few hours due acidity produced by growth of coliforms.



Notes

Biochemical reactions

Shigella are MR positive and reduce nitrates to nitrites. Catalase is produced, except in Sh.dysenteriae type I. glucose is fermented with the production of acid, without gas. Fermentation of mannitol is of importance in classification & based on these shigella is divided as mannitol fermenting and non-fermenting species.

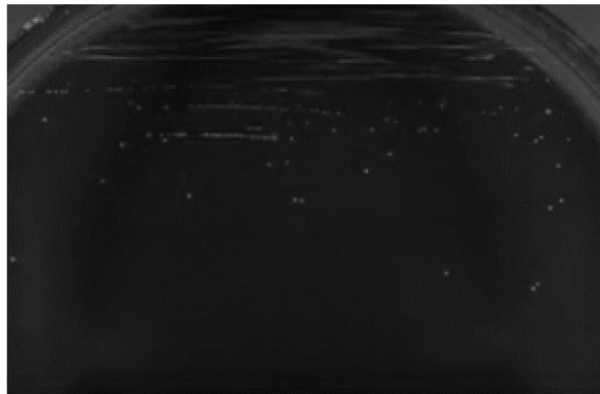


Fig. 24.1



INTEXT QUESTIONS 24.1

1. Shigellae are Gram rods
2. Culturally shigellae are facultative
3. agar is used as a selective medium
4. Shigella is divided as & species

24.3 CLASSIFICATION

Shigella are classified into four species based on combination of biochemical and serological characteristics

Sh.dysenteriae (subgroup A)

This is mannitol nonfermenting bacilli consisting of ten serotypes. It is indole negative and is always catalase negative. Sh.dysenteriae type 1 forms a toxin. Three types of toxic activity have been demonstrated

- (i) Neurotoxicity
- (ii) Entereotoxicity
- (iii) Cytotoxicity

Shigella

Sh. dysenteriae type 2 forms indole and ferments sorbitol and rhamnose

Sh. Flexneri (subgroup B)

These are mannitol fermenting species, which are biochemically heterogeneous and antigenically complex.

Sh. Boydii (subgroup C)

This group consists of dysentery bacilli and named after Boyd who described this

Sh. Sonnei (Subgroup D)

This was described by Sonne, ferments lactose and sucrose late. It is indole negative, this causes mildest form of bacillary dysentery.

Pathogenicity

Shigellae cause bacillary dysentery. Infection occurs by ingestion. The minimum infective dose is as low as 10-100 bacilli as they can survive gastric acidity. Human beings are the only natural hosts for Shigella

Bacillary dysentery has short incubation period 1-7 days usually 48 hours. The onset and clinical course are variable and are largely determined by the virulence of the strain. The clinical features are frequent passage of loose, scanty feces containing blood and mucus with abdominal cramps and tenesmus. Complications include arthritis, toxic neuritis, conjunctivitis, parotitis and intussusceptions, Hemolytic Uremic Syndrome may also occur. Shigellosis includes a whole spectrum of disease caused by shigellae.

Subgroup	A	B	C	D
Species	Sh.dysenteriae	Sh.flexneri	Sh.boydii	Sh.sonnei
Mannitol	-	A	A	A
Lactose	-	-	-	A late
Sucrose	-	-	-	A late
Dulcitol	-	-	D	-
Indole	d	d	d	-
Ornithine decarboxylase	-	-	-	+
A – acid, d – variable				

MODULE

Microbiology



Notes



Notes

Laboratory diagnosis

Diagnosis may be made by isolating bacilli from feces. Fresh feces should be inoculated without any delay or transported in medium such as Sachs' buffered glycerol saline, pH 7.0 – 7.4. For inoculation it is best to use mucus containing feces. MacConkey and DCA plates are inoculated. After overnight incubation at 37°C, the plates are inspected for nonlactose fermenting colonies, which are tested for motility and biochemical reactions.



INTEXT QUESTIONS 24.2

1. Shigella causes
2. Natural host of shigella are
3. Incubation period of Bacillary dysentery is
4. is the spectrum of disease caused by shigellae



WHAT YOU HAVE LEARNT

- Shigella is a genus of the family Enterobacteriaceae, which are rod shaped bacteria that are nonmotile facultatively anaerobic usually catalase positive and oxidase negative and Gram negative bacteria.



TERMINAL QUESTIONS

1. Describe the cultural characteristics of shigella
2. Classify shigella and explain any two species in detail
3. Describe the laboratory diagnosis of shigella



ANSWERS TO INTEXT QUESTIONS

24.1

1. Negative
2. Anaerobes

Shigella

3. Deoxycholate Citrate
4. Mannitol fermenting & mannitol non-fermenting

24.2

1. Bacillary dysentery
2. Human beings
3. 1-7 Days
4. Shigellosis

MODULE

Microbiology



Notes