

Please read this bit first

This CPD/ CEU exercise is designed to take approximately two hours as a small group exercise within your laboratory. The Thistle QA CPD No is: **MT00025**.

Please keep a register of those taking part in the exercise. When the exercise is completed, please ask using the above email address, and we will send you a sheet showing the correct responses to each question.

Each attendee should claim two CPD points for completing the questions correctly, by retaining a copy of the relevant Thistle QA Participation Certificate as proof of registration on a Thistle QA EQA.

Cycle 19 Organism 9

The causative organism was *Shigella* and *Shigellosis*.

Shigella is a genus of the bacterial family **Enterobacteriaceae**. Shigellae are Gram-negative, nonmotile, non-spore forming, rod-shaped bacteria, very closely related to *Escherichia coli*. *Shigella* are isolated on selective and differential media, identified by means of biochemical reactions and serotyping to the species.

Shigellosis is an infectious disease caused by various species of *Shigella*. People infected with *Shigella* develop diarrhea, fever, and stomach cramps starting a day or two after they are exposed to the bacterium. The diarrhea is often bloody. Shigellosis usually resolves in 5 to 7 days, but in some persons, especially young children and the elderly, the diarrhea can be so severe that the patient needs to be hospitalized. A severe infection with high fever may also be associated with seizures in children less than 2 years old. Some persons who are infected may have no symptoms at all, but may still transmit the *Shigella* bacteria to others

Shigella were discovered over 100 years ago by a Japanese microbiologist named Shiga, for whom the genus are named. There are four species of ***Shigella: boydii, dysenteriae, flexneri, and sonnei***.

Treatment

Shigellosis can usually be treated with antibiotics. The antibiotics commonly used are ampicillin, trimethoprim/sulfamethoxazole, nalidixic acid and the fluoroquinolone, ciprofloxacin. Appropriate treatment kills the bacteria present in the gastrointestinal tract and shortens the course of the illness.

Some *Shigella* have become resistant to antibiotics and inappropriate use of antibiotics to treat shigellosis can actually make the organisms more resistant in the future. Persons with mild infections will usually recover quickly without antibiotic treatment. Therefore, when many persons in a community are affected by shigellosis, antibiotics are sometimes used selectively to treat only the more severe cases. Antidiarrheal agents such as loperamide (Imodium) or diphenoxylate with atropine (Lomotil) are likely to make the illness worse and should be avoided.

Reiters syndrome

Persons with diarrhea usually recover completely, although it may be several months before their bowel habits are entirely normal. About 3% of persons who are infected with *Shigella flexneri* may subsequently develop pains in their joints, irritation of the eyes, and painful urination. This condition is called **Reiter's syndrome**. It can last for months or years, and can lead to chronic arthritis which is difficult to treat. Reiter's syndrome is a late complication of *S. flexneri* infection, especially in persons with a certain genetic predisposition, namely HLA-B27.

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Hemolytic Uremic Syndrome (HUS)

Hemolytic-uremic syndrome (HUS) can occur after *S. dysenteriae* type 1 infection. Convulsions may occur in children; the mechanism may be related to a rapid rate of temperature elevation or metabolic alterations, and is associated with the production of the Shiga toxin.

Transmission

Shigella are transmitted from an infected person to another who become infected. *Shigella* are present in the diarrhoeal stools of infected persons while they are sick and for a week or two afterwards. Most *Shigella* infections are the result of the bacterium passing from stools or soiled fingers of one person to the mouth of another person. This happens when basic hygiene and handwashing habits are inadequate. It is particularly likely to occur among toddlers who are not fully toilet-trained. Family members and playmates of such children are at high risk of becoming infected. The spread of *Shigella* from an infected person to other persons can be stopped by frequent and careful handwashing with soap, a practice that is important among all age groups.

Part of the reason for the efficiency of transmission is because a very small inoculum (10 to 200 organisms) is sufficient to cause infection. As a result, spread can easily occur by the fecal-oral route and occurs in areas where hygiene is poor. Epidemics may be foodborne or waterborne. *Shigella* can also be transmitted by flies.

Shigella infections may be acquired from eating food that has become contaminated by infected food handlers. Vegetables can become contaminated if they are harvested from a field with contaminated sewage or wherein infected field workers defecate. Flies can breed in infected feces and then contaminate food. *Shigella* infections can also be acquired by drinking or swimming in contaminated water. Water may become contaminated if sewage runs into it, or even if someone with shigellosis swims or bathes or, much less, defecates, in it.

References

1. Ewing, WH. 1986. Edwards and Ewing's Identification of Enterobacteriaceae, 4th edition. Elsevier Science Publishing Co. Inc, New York.
2. Acheson, DWK and T. Keusch. 1995. *Shigella* and enteroinvasive *E. coli*, p. 763-784. In MJ Blaser *et al.*, Infections of the gastrointestinal tract. Raven Press, New York.
3. Sack, RB *et al.* 1997. Antimicrobial resistance in organisms causing diarrheal disease. *Clin. Infect. Dis.* 24(suppl.1): S102-S105.

CPD QUESTIONS.

1. How does the genus *Shigella* differ from *E. coli*?
2. How are the *Shigella* species transmitted from one person to the other?
3. What antibiotics are usually used to treat shigellosis?

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