



PATHOGENIC MICROBES PART 2

E. coli



E. COLI

What are *E. coli*?

- They are bacteria.
- Locations found
 - The environment
 - Foods
 - Intestines of animals and humans

Facts about *E. coli*

- *E. coli* is an abbreviation for *Escherichia coli*
- Not all *E. coli* strains (aka types) are harmful



WHAT ARE THE SYMPTOMS OF AN *E. COLI* INFECTION

- The symptoms can vary as there are different types of *E. coli*.
- The symptoms can include
 - Diarrhea
 - Urinary tract infections
 - Respiratory issues
 - Pneumonia
 - Other illnesses
 - Vomiting
 - Fever



E. COLI STRAINS

- There are many types of *E. coli*, but there are a few important ones that need to be considered
- Some produce toxins
 - Shiga toxin producing *E. coli* (abbreviated to STEC)
 - This type of *E. coli* produces the Shiga toxin
 - This toxin is associated with the following symptoms
 - Severe stomach cramps
 - Diarrhea (often bloody)
 - Vomiting
 - Fever if present is a low grade fever less than 38.5°C



STEC SYMPTOMS CONTINUED

- The symptoms typical range between 5 to 7 days
- The infections can vary from mild to severe and in some cases life threatening
- A small percentage 5 to 10 % will develop severe complications
 - This includes the condition called hemolytic uremic syndrome (HUS)



HUS SYMPTOMS

- Urgency to urinate (pee)
- Feeling lethargic (very tired)
- Loss of pinkness in cheeks and inner lower eyelids

- Some individuals will need to be hospitalized as their kidneys stop functioning (working)



STEC INCUBATION

- Incubation is a term used to describe how long it takes from being exposed to an infection to when you start to show symptoms
- The incubation time for STEC tends to range between 3 and 4 days for most individuals
- However, symptoms may appear as early as 1 day or as long as 10 days after exposure

TYPES OF TRANSMISSION (REMINDER FROM SCIENCE 8)

- Direct Contact
 - Person to person contact (example shaking hands)
 - Droplet spread (sneezing or coughing)
- Indirect Contact
 - Airborne Transmission (entered a place where a person that was ill was an hour ago e.g. measles)
 - Contaminated objects (touch a door knob that was touched by an infected person)
 - Food and drinking water (can be contaminated with *E. coli* including STEC)
 - Animal to person contact (animal bites or scratches)
 - Animal Reservoirs
 - Insect bites (vector-borne disease e.g.)
 - Environment reservoirs (water, soil and vegetation)

TRANSMISSION OF STEC

- STEC is transmitted to humans mostly from cattle
- Animals that carry STEC in their intestines include
 - Cattle
 - Goats
 - Sheep
 - Deer
 - Elk
- Animals rarely get sick with STEC
- However , there are a few animals that may become infected with STEC include pigs and birds who pick it up from their environment and can spread it to each other



TRANSMISSION OF STEC

- STEC is consumed (swallowed) on contaminated items in the form of feces
- This means that one has eaten a small quantity of feces from animals or humans
- Examples:
 - Contaminated foods can be any food item
 - Under cooked meats especially hamburger
 - Unpasteurized (raw) milk or juices
 - Infected water
 - Eating food prepared by people that have not washed their hands
 - Petting Zoos
 - Stagnant lake, pond or stream water

TRANSMISSION OF STEC

- Activity:
 - Can a person order a medium rare hamburger?
 - Is it wise to eat a medium rare hamburger? Explain.





HOW DOES A PERSON KNOW HOW THEY GOT INFECTED?

- A person likely does not know how they got infected.



STATS

- Annually in the U.S. approximately 265,000 individuals are infected with STEC
- The exact numbers are not known because many individuals do not seek medical attention or provide a stool sample

Diagnosis:

- A stool sample is required to confirm the diagnosis of STEC



TREATMENT

- Antibiotics and antidiarrheal agents are not recommended for this type of infection as it increases the risk for complications
- Keeping hydrated and adequate (enough) rest are the main types of treatment
- Time off work or school may be recommended but it is based on local and provincial health department codes



PREVENTION

- Wash your hands
 - After using the washroom
 - Before preparing food
 - After touching your shoes
- Cook meats completely
 - Especially ground beef
- Avoid Raw milk, unpasteurized dairy products (some soft cheeses), and unpasteurized juice
- Avoid swallowing water in lakes, ponds and streams
- Avoid cross contaminations by thoroughly washing your hands, cutting boards, utensils and counters after they have come in contact with raw meat.



REFERENCES

1. E. coli:

<https://www.cdc.gov/ecoli/index.html>

2. Types of Transmission:

<http://www.healthline.com/health/diseases-transmission#overview1>