

Human Infection Caused by EHEC and the Relation to Cattle Farms

Lina Najmaldin

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Biology Education Centre, Uppsala University

Escherichia coli, more known as *E. coli*, is a bacterium that inhabits the gut of humans and warm-blooded animals. While *E. coli* often is harmless to humans, a variant of the bacterium referred to as EHEC causes diarrhea and kidney failure in humans, which can be lethal. EHEC is spread to humans by contact with infected animals or contaminated food and water. EHEC mostly found in and spread from cattle farms. Scientists are searching for new methods for identifying this bacterium, as well as new treatments.

General characteristics of EHEC

EHEC is a pathogenic bacterium that has properties to induce disease in humans. The ability of bacteria to produce toxins cause colon and kidney damages of the host organism. The bacterium can survive in acidic environments, therefore contaminate foods that are otherwise considered safe, such as youghurt, salami and juice. EHEC can spread by unpasteurized dairy products, meat products, vegetables and fruits. Contaminated water such as drinking water or bathing water can also cause infection. Because of its low infection dose, the bacterium can easily spread from person to person, for example within a family.

EHEC was first recognized as a human pathogen in 1982 in USA. As it was associated with consumption of undercooked hamburgers it became known as 'the hamburger bug'.

Harmfulness factors of EHEC

The most harmful factors of EHEC are verocytotoxin 1 and 2 (VT1 and VT2; corresponding genes are called *vtx1* and *vtx2*) which shut down the protein synthesis in the colon epithelium of the host cell.. That means the toxins cause cell death (apoptosis) in the intestinal cells and occur injury of blood vessels which lead to bloody diarrhea. The toxin enters the bloodstream from the damaged area and occur kidney injuries. Intimin, is another factor of EHEC that occur adherence to the intestinal mucosa (the corresponding gene is called *eae*). That means the protein Intimin helps the bacterium to attach to the intestinal cells of the host organism.

Prevention and control

To control and prevent the spread of EHEC, measures must be taken to include all levels of food production. That means control of the production from farm to fork. In addition, many strategies have been developed for use in the slaughter and food industry. In farm level vaccination of cattle carrying the bacteria. Teratment of food by irradiation or cooking to diminish the bacterium. Vaccination of humans to prevent EHEC spreading and prevent infections or disease. Despite these efforts, many studies and technical challenges remain in control and prevention of EHEC-associated human disease, especially EHEC-O157: H7 bacterium.

More information

Najmaldin L. 2017. Varför *E. coli* orsakar tarminfektion. Independent Project in Biology, Uppsala University.