

Meat as a source of viral foodborne infections – arising problem



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According to WHO:

- 1 in 10 people fall ill after eating contaminated food worldwide
- 420 000 people die every year due to eating contaminated food globally, of which 125 000 are children under 5 years of age
- foodborne illnesses are most frequently caused by **norovirus**
- **norovirus** is the main agent responsible for deaths in the enteric diseases

Routine meat inspection is focused on bacterial pathogens and, to a lesser extent, parasites, while **viruses are most commonly neglected**. However, there is a wide range of foodborne viruses that create a substantial risk for consumers of meat and meat products, especially those served raw or mildly processed.

The foodborne viruses are shed in human feces and infectious when ingested via the oral route. These viruses can be divided into 3 main categories:

1. responsible for gastroenteritis:

- manifested by vomiting and diarrhea
- represented by noroviruses, rotaviruses, astroviruses, adenoviruses and sapoviruses.
- most commonly the acute human cases of gastroenteritis worldwide are related to **norovirus**
- noroviruses can also be found in the variety of other food animals including pigs and cattle. The similarity between human and porcine noroviruses suggests the possibility of **zoonotic transmission**.

2. causing **enterically transmitted hepatitis** after they migrate to the liver, with **hepatitis A virus (HAV)** and **hepatitis E virus (HEV)** as examples.

3. replicating in the human intestines but only **causing illness after migration to other organs**, such as the central nervous system (**enterovirus**).

There is also an additional group of viruses that may **occasionally be transmitted via food**, although their typical mode of infection is different, like in case of **SARS-coronaviruses** and **highly pathogenic avian influenza virus (HPAIV)**.

Virus contamination:

- occurs in the primary production environment - which applies to minimally processed food (raw or semi-raw products)
- is related to an infected food handler – mainly in case of prepared, ready-to-eat products.

Foodborne viruses are hardy and persistent in the environment, and usually **are able to resist mild food production processes** that inactivate bacterial pathogens. Although most gastrointestinal tract viruses induce disease with prominent symptoms, the infection may as well be asymptomatic and limited to viral shedding.

The additional risk is created by **zoonotic foodborne viruses**, like **hepatitis E virus genotype 3 and 4 (HEV-3 and HEV-4)** that are endemic in piggeries and can be found in wild boar. The highest virus prevalence was found in pork liver pâtés, dry-cured sausages containing pig liver, game meat and food contaminated by pig/wild boar feces. Most HEV infections in humans are subclinical and become more severe in patients with liver dysfunctions.

There is also an important risk of non-oral transmission of foodborne zoonotic viruses for occupational groups like abattoir workers, veterinarians and butchers that can be infected through animal blood, body fluids and excretions via skin lesions, mucous membranes or by inhalation of aerosols. Such a scenario is assumed in case of **HIV, SARS coronaviruses** and **Ebola** crossing the species barrier during the butchering process of infected animals.

Conclusions: The control of viral hazards requires different measures to those routinely employed to eliminate bacterial agents. The current food hygiene guidelines need to be updated for the prevention of viral infections. It is an issue of growing importance nowadays, facing high human immigration/migration, travelling and new cuisine habits.

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