HIGHLIGHTS

- NARMS indicated that retail meat and poultry products are often contaminated with pathogenic bacteria
- *Staphylococcus aureus* can contribute to superficial skin lesions, soft tissue infections and life threatening septicemia
- If *S. aureus* continues to adapt, the bacteria will become more lethal
- RNA viruses usually contaminate meat products
- RNA viruses are resistant to heating and cooling
- Poor hygienic practices contribute to foodborne illnesses
- Preventative measures perform poorly
- Diagnostic techniques used to measure virus contamination in meat are inadequate
- Hep E and A and Norovirus have been found in meat products

MEAT: IS IT SAFE TO EAT?

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BACTERIA CONTAMINATION

There are many ways meat can get contaminated. Certain things such as insufficient environmental controls, poor pest management, unsanitary conditions, and inadequate employee hygiene can increase the risk of acquiring foodborne illnesses. The United States National Antimicrobial Resistance Monitoring System had indicated that retail meat and poultry products are often contaminated with multidrug resistant *Campylobacter* species, *Salmonella* species, *Enterococcus* species, and *Escherichia coli*. According to research findings from the year 2011, a startling 47% of U.S.A meat and poultry samples were contaminated with *Staphylococcus aureus*. Multidrug resistant strains were found in more than 50% of isolates.

WHAT'S SO BAD ABOUT S.AUREUS?

Staphylococcus aureus is a commensal pathogen which can be found living on animals and humans. *S. aureus* can contribute to superficial skin lesions and soft tissue infections and life threatening septicemia. ST398 *S. aureus* is well adapted to survive on human hosts, and it has the potential to acquire the adaptation to produce the PVL toxin. This toxin is associated with community acquired MRSA (methicillin-resistant *Staphylococcus aureus*) infection. The ST398 *S. aureus* is pandemic, in nature, and exists in a very large reservoir of livestock animals; therefore, *S. aureus* poses a real threat to human health. If *S. aureus* continues to adapt, the bacteria will become more lethal.

MEAT PRODUCTS AND VIRUSES

RNA stranded viruses are the most common viruses that contaminate meat products. All it takes to become ill is to ingest less than 100 virus particles. They are resistant to environmental stress factors such as cooking and cooling. Meat becomes contaminated with pathogenic viruses usually through poor hand hygiene. For example, a person who is carrying a virus sheds it through their feces. After defecation, a person neglects to wash their hands properly and then handles meat. Also, people can shed virus and contaminate meat by saliva aerosols generated when coughing or sneezing. Viruses need a living host in order to reproduce. Once contaminated food is ingested, the virus begins to replicate and the person quickly becomes ill. Preventative measures to reduce the likelihood of contamination perform poorly. Even diagnostic techniques are inadequate for foodborne illness prevention. Viruses such as hepatitis E, hepatitis A and norovirus are found in meat.

- Animals may be contaminated with large amounts of heavy metals and other pollutants
- We need very small amounts of certain metals to live
- Large quantities of heavy metals (relative to biological requirements) can be harmful to the human body
- POPs can be found in meat
- Many POPs are carcinogenic
- Eating organic meat will not reduce carcinogenic risk
- The best diet for humans is a whole foods plant based diet

HEAVY METALS & POLLUTANTS

Commonly raised animals may be contaminated with heavy metals. For example, swine (pigs) are known to contain heavy metals such as copper, zinc, cadmium and lead. We do need very small amounts of copper in order to live; however, excessive amounts of copper can cause liver and kidney damage, anemia, immunotoxicity and developmental toxicity. Cadmium is carcinogenic and poses other risks to human health effecting the lungs, gastrointestinal tract and musculoskeletal system. Zinc and lead are endocrine disrupting metals. Furthermore, studies have shown that the carcinogenicity of meat is related to the contaminants in it. For example, several types of persistent organic pollutants (POP's) have been detected in meat. Many POP's are carcinogenic. Some people may opt to choose organic meat; however, organic meat is not a better option. A study found that the consumption of organically produced meat does not reduce the carcinogenic risk. Disturbingly, this same study concluded that people who ate organically produced meat are at a higher carcinogenic risk!

SHOULD WE EAT MEAT?

Back in the Garden of Eden before there were illnesses and suffering, God had said "Behold, I have given you every herb bearing seed, which is upon the face of all the earth, and every tree, in the which is the fruit of a tree yielding seed; to you it shall be for meat." (Genesis 1:29). After sin, God had then permitted Adam and Eve to eat the herb of the field (Genesis 3:18). The original diet for all human beings was a plant based diet such as grains, seeds, nuts, fruits and vegetables. Considering all of the health hazards associated with the consumption of meat, it would be in our best interest to choose a healthy plant based diet.

Readings for this Article:

Fluit, A. C. (2012). Livestock-associated staphylococcus aureus. Clinical Microbiology and Infection, 18(8), 735-744. doi:10.1111/j.1469-0691.2012.03846.x

Georgescu, B. (2014). Heavy metals in swine meat and manure. Porcine Research, 4(1), 15-18.

Hernández, Á. R., Boada, L. D., Mendoza, Z., Ruiz-Suárez, N., Valerón, P. F., Camacho, M., . . . Luzardo, O. P. (2017). Consumption of organic meat does not diminish the carcinogenic potential associated with the intake of persistent organic pollutants (POPs). Environmental Science and Pollution Research, 24(5), 4261-4273. doi:10.1007/s11356-015-4477-8

Toxicological Data for Cadmium. See: https://www.atsdr.cdc.gov/toxprofiles/tp5.pdf

Toxicological Data for Copper. See: https://www.atsdr.cdc.gov/toxprofiles/tp132.pdf

Waters, A. E., Contente-Cuomo, T., Buchhagen, J., Liu, C. M., Watson, L., Pearce, K., . . . Price, L. B. (2011). Multidrug-resistant staphylococcus aureus in US meat and poultry. Clinical Infectious Diseases, 52(10), 1227-1230. doi:10.1093/cid/cir181

Velebit, B., Radin, D., & Teodorovic, V. (2015). Transmission of common foodborne viruses by meat products. Procedia Food Science, 5, 304-307. doi:10.1016/j.profoo.2015.09.069