

Will Residual Antibiotics in Hen Eggs Elicit Health Risks by Impairing Human Intestinal Microbiome?

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ABSTRACT

Various residual antibiotics have been detected in hen eggs and pose a health threat worldwide, especially in Developing Countries and Underdeveloped Countries. The opinion presented here asserts that infinitesimal antibiotics from dietary eggs may accumulate in the human intestines and gradually disturb the intestinal microbiome and further dysbiosis of intestinal microbiome may be a potential risk to human health via impairing the functions of multiple internal organs in human beings.

Keywords: Intestinal microbiome; Hen egg; Antibiotics; Microbial dysbiosis; Human disease

Introduction

According to recent studies, food-borne microorganisms are closely related to human diseases, and dysbiosis of the intestinal microbiome was found to be a common pathogenic mechanism underlying several kinds of human diseases such as cancer, cardiovascular disease, inflammatory bowel disease, neural deficiency, etc. [1-6]. Hen eggs provide people with abundant nutrients but may raise some health risks. For example, egg proteins may induce allergic responses, which is to some extent related to insufficient digestive function in the human intestine [7]. For another example, choline-class substrates in eggs can be decomposed by human intestinal microorganisms and then produce trimethylamine N-oxide (TMAO) which increases the risks of atherosclerosis and cardiovascular disorders [8,9]. These findings hint that intestinal microorganisms play a key role in mediating potential health risks of egg-derived molecules in human beings.

Discussions on Hen Eggs, Residual Antibiotics, Intestinal Microbiome and Human Diseases

Residual Antibiotics in Eggs Lead to Serious Dietary Problems

Recently, we noticed that residual antibiotics in hen eggs may pose numerous health risks. In order to improve hen survival and egg production rate, excessive addition of antibiotics into animal feed is very prevalent worldwide, especially in Developing and Underdeveloped Countries and those areas with weak supervisory measures. As a result, a variety of antibiotics have been detected in hen eggs and egg-products, including oxytetracycline hydrochloride, chloramphenicol, marbofloxacin, difloxacin, sarafloxacin, enrofloxacin, etc. [10-15]. Although the concentrations of these antibiotics in eggs may be low, the potential harm of their long-term accumulation should not be underestimated.

Antibiotics in Egg May Gradually Disrupt Microbial Composition in Intestines

In fact, hen egg is a kind of regular and popular food in many regions of the world. Theoretically, once residual antibiotics in eggs inhibit intestinal microorganisms for a long time, they

may gradually disrupt the bacterial compositions and species of human intestinal microbiome and even some beneficial metabolic products of intestinal microorganisms, which consequently results in dysbiosis of human intestinal microbiome and lays a pathogenic foundation for relevant human diseases.

Dysbiosis of Intestinal Microorganisms May Induce Various Human Diseases

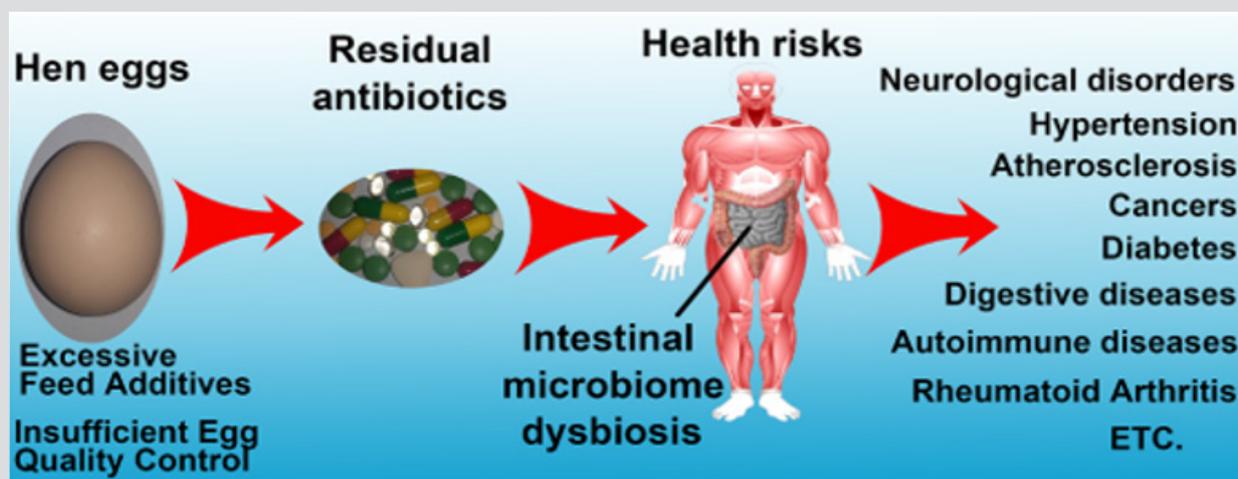


Figure 1: Residual antibiotics from hen eggs may impair the balance of intestinal microbiome and increase health risks in human beings.

There is a symbiotic relationship between beneficial intestinal microbiome and human beings, some substances produced by intestinal microorganisms have important effects on human health. Increasing evidence suggests that intestinal microbial dysfunction can cause a number of human diseases, possibly including but not limited to cancers, cardiovascular diseases, neurological disorders, diabetes, autoimmune problems, etc., as shown in Figure 1 [1-3,16-19]. Frankly, eggs may only contain a low concentration of residual antibiotics, and their potential suppression on intestinal microorganisms may not be obvious enough to cause disease in a short time. However, long-term health risks of residual antibiotics should not be neglected and deserves more safety concern and more medical attention.

Conclusion

Taken together, residual antibiotics in hen eggs may inhibit and disrupt human intestinal microbiome gradually leading to multiple health risks. This is a new and interesting medical prediction putting forward a pathogenic link between dietary antibiotics, intestinal microorganisms and future high-incidence human diseases. The opinion underlines the long-term health risks potentially induced by dietary antibiotics especially in some areas without strict limitation to antibiotic usage. Hence, it lays a novel foundation for diet-based pathogenesis of human diseases and calls for strictly controlling antibiotic additives in chicken breeding as well as strengthening detection of antibiotics in egg production, with the aim of reducing health risks to human beings in the future.

Conflict of Interest Statement

None.

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