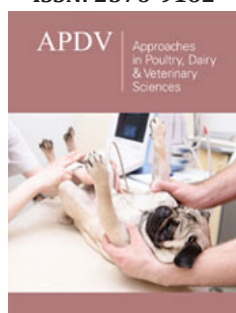


Necessity of Studying the Relationship between Intestinal Microbes of Grassland Rodents and those of Poultry and Livestock

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Urgent Needs from the Perspective of Disease Prevention and Control

At the level of preventing and controlling zoonotic diseases, grassland rodents often serve as natural hosts for various pathogens, such as *Yersinia pestis* and *Francisella tularensis*. These pathogens can spread and evolve through their intestinal microbial communities. When poultry and livestock share the grassland ecological environment with rodents, they are highly likely to be infected with pathogens due to contact. For example, *Yersinia pestis* can be transmitted to poultry and livestock through the feces and ectoparasites of rodents, thus threatening human health. By studying the relationship between the intestinal microbes of the two, we can deeply understand the survival, reproduction, and transmission mechanisms of pathogens in the intestines of different hosts, which helps to develop more effective disease early warning systems and prevention and control strategies, and reduce the risk of zoonotic disease outbreaks.

In addition, the problem of antibiotic resistance has become a major global public health challenge. In the grassland ecosystem, both rodents and poultry and livestock may come into contact with antibiotics in the environment, leading to the generation of resistance genes in their intestinal microbes. Studies have found that there are various drug - resistant bacteria in the intestines of rodents, and these drug - resistant bacteria may spread to the intestines of poultry and livestock through food chains, water sources, etc., accelerating the spread of antibiotic resistance. Studying the relationship between the intestinal microbes of the two can trace the transmission path of resistance genes between different hosts, providing a scientific basis for formulating reasonable antibiotic use norms and preventing the spread of antibiotic resistance.

The Significance of Maintaining Ecological Balance

In the grassland ecosystem, rodents and poultry and livestock play different roles in the material cycle and energy flow. Rodents affect the grassland vegetation structure and soil physical and chemical properties through behaviors such as burrowing and grazing; poultry and livestock change the composition of grassland vegetation through grazing activities. As important participants in host metabolism, intestinal microbes have a crucial impact on the host's physiological processes such as digestion and nutrient absorption. Studying the relationship between the intestinal microbes of the two helps to reveal the differences in the utilization of food resources by the intestinal microbial communities of different hosts, and how these differences affect the material cycle and energy flow of the grassland ecosystem. For example, if it is found that certain intestinal microbes can promote the host's digestion and absorption of specific plants, the grassland vegetation structure can be optimized and the ecological balance can be maintained by regulating the host's intestinal microbial community.

At the same time, the biodiversity of the grassland ecosystem is closely related to the intestinal microbial community. A rich intestinal microbial community helps the host better adapt to environmental changes and enhance the host's survival ability. Research shows that when the biodiversity of intestinal microbes decreases, the host is more vulnerable to diseases. The interaction between the intestinal microbial communities of rodents and poultry and livestock may affect the maintenance of biodiversity. By studying the relationship between the intestinal microbes of the two, we can understand the impact mechanism of the intestinal microbial communities of different hosts on biodiversity, providing theoretical support and practical guidance for protecting grassland biodiversity.

The Potential Value for the Development of the Livestock Industry

In terms of the healthy breeding of poultry and livestock, understanding the relationship between the intestinal microbes of grassland rodents and those of poultry and livestock helps to discover new probiotic resources. During the long - term evolution process, grassland rodents have formed a unique intestinal microbial community, in which there may be some probiotics with special functions, such as strains that can improve feed conversion rates and enhance immunity. Applying these probiotics to the breeding of poultry and livestock is expected to develop new microbial feed additives, reduce the use of antibiotics, and improve the health level and production performance of poultry and livestock.

In addition, studying the relationship between the intestinal microbes of the two can also provide a basis for precision breeding. Different types of poultry, livestock, and rodents have differences in the structure and function of their intestinal microbial communities.

By analyzing these differences, personalized breeding plans can be formulated according to factors such as the breed and growth stage of poultry and livestock, including optimizing the feed formula and regulating the breeding environment, improving breeding efficiency and economic benefits, and promoting the sustainable development of the livestock industry.

The Expanding Needs in the Field of Scientific Research

The study of intestinal microbes is one of the hot topics in the current field of life sciences. Studying the relationship between the intestinal microbes of grassland rodents and those of poultry and livestock can enrich the research content of intestinal microbiology and expand the research perspective. Previous studies mostly focused on the structure and function of the intestinal microbial community of a single host, while relatively few studies focused on the relationship between the intestinal microbes of different hosts. By carrying out this research, we can deeply understand the transmission and evolution laws of intestinal microbes between different hosts, as well as the interaction mechanism between the host and microbes, providing new evidence and ideas for the theoretical development of intestinal microbiology.

At the same time, this research also involves multiple disciplines such as microbiology, ecology, and animal husbandry, and requires the use of multi - disciplinary research methods and technical means. This will promote the cross - integration of disciplines, drive the development and innovation of related disciplines, cultivate professional talents with interdisciplinary research capabilities, and inject new vitality into the continuous progress of scientific research.