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FUTURE DIRECTIONS IN FISHERIES AND AQUATIC ANIMAL HEALTH RESEARCH

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Abstract:

This abstract provides an overview of the diverse topics covered in the book chapter on "Future Directions in Fisheries and Aquatic Animal Health Research." The chapter explores the integration of technology in fisheries management and research, highlighting the potential of artificial intelligence, machine learning, and big data analytics in improving monitoring, management, and decision-making processes in aquatic animal systems. Additionally, the chapter delves into the applications of genetic tools and advances in genomics, highlighting the importance of genetic mapping, selective breeding, and gene editing technologies for disease resistance and improved productivity in aquaculture. Furthermore, the chapter discusses the emergence and spread of infectious diseases in aquatic ecosystems, emphasizing the impact of climate change and the importance of early detection, rapid diagnosis, and the One Health approach in combating zoonotic diseases. Moreover, the chapter explores the advances in vaccination and immunostimulants for enhancing the health and disease resistance of aquatic animals, including the potential of oral vaccines and mucosal immunity. Sustainable practices and environmental impacts in fisheries and aquaculture are also addressed, focusing on assessing environmental impacts, promoting sustainable aquaculture, and implementing ecosystem-based approaches for long-term sustainability. Additionally, the chapter examines the application of nanotechnology in aquatic animal health and fisheries, exploring how nanotechnology-enabled sensors, drug delivery systems, and antimicrobial agents can contribute to real-time monitoring, therapeutics, and disease prevention. The challenges and opportunities in marine conservation and restoration are discussed, highlighting conservation strategies, ecological restoration approaches, community engagement, and global cooperation. Furthermore, the chapter examines the impacts of climate change on fisheries and aquatic animal health, addressing the effects on physiology, behavior, and distribution, as well as the identification of adaptation strategies and mitigation measures. Lastly, the chapter considers socioeconomic and policy considerations,