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Brief history of Fish Pathology

Abhijit Mitra*

Professor of Marine Science Techno India, University, Kolkata India

Corresponding author:
Abhijit Mitra

obinna@yahoo.com

Professor of Marine Science Techno India, University of Kolkata India

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Abstract

There are ongoing developments in the understanding of bacterial fish pathogens. New and emerging diseases are regularly recognised especially in aquaculture. Great emphasis is placed on better diagnoses, pathogenicity mechanisms, and disease control especially by immunoprophylaxis [1]. There is an interaction between some pollutants and occurrence of fish diseases. Some fish pathogens may also cause disease of humans, and include Edwardsiella tarda, Mycobacterium fortuitum, Myc [2]. marinum, Photobacterium damselae, Pseudomonas fluorescens, Streptococcus iniae and Vibrio vulnificus.

1966. The Japanese Society of Fish Pathology (formerly The Japan Research Group of Fish Pathology) was founded, and started issuing the quarterly academic journal "Fish Pathology". This journal is the oldest of its kind and keeps providing many significant and important data on fish diseases of the world [3].

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Fish Health and Stress and Welfare

One of the main constraints in aquaculture production is farmed fish vulnerability to diseases due to husbandry practices or external factors like pollution, climate changes, or even the alterations in the dynamic of product transactions in this industry [4]. It is though important to better understand and characterize the intervenients in the process of a disease outbreak as these lead to huge economic losses in aquaculture industries.

The demand for animal protein for human consumption is rising as a result of an exponential increase in the world population [5]. Aquaculture is becoming an increasingly important source of protein available for human consumption since is an industry capable of providing solutions to feed a rapidly growing human population and reduce poverty in many countries. To achieve that, the scale of aquaculture production and the range of farmed species have increased dramatically over the last two decades. Despite being the most consumed animal, fish are seldom afforded the same level of concern regarding their welfare as other vertebrates [6]. The scientific research around fish welfare is at an early stage compared with other land animals produced for human consumption. In part, this lack of consideration is due to the gap between public perception of their intelligence and the scientific evidence, along with the absence of a unified definition of the concept.

The spread of disease caused by the presence of bacteria, algae, protozoa, and fungi in a fish pond can cause biological pollution and reduce fish product production. Water can quickly lose its ability to support life, reproduction, waste excretion, growth,

The first action that a farmer usually takes when faced with a population of sick or dying fish is to call a veterinarian or fish pathologist. If on examining the fish no recognisable disease organism is found (ie. bacteria, virus or parasite) then the incriminating finger is usually pointed toward the diet of the fish or to water quality as being the cause of the problem. However, on calling the local feed manufacturer the sales representative more often than not tries to place the blame on poor water quality or on other non-feed related factors. Throughout the above chain of events the farmer generally still remains in the dark, continues to suffer heavy fish mortalities, and is desperately in need of an unbiased opinion and solution to his or her problem. Although the above scenario is gradually improving with the development of modern disease diagnostic laboratories, nutritionally related 'disease' problems still remain a largely uncharted territory, veterinarians usually being too busy coping with their routine disease diagnostic duties, and nutritionists usually not being interested nor scientifically qualified to undertake pathological

analyses or make judgements on pathology related issues. Clearly, fish pathologists and nutritionists will have to work in tandem in the future if rapid strides are to be made in the emerging and commercially important field of nutritional fish pathology; nutritional fish pathology being concerned with the study of those health disorders/ailments (often inappropriately referred to as 'diseases') which result from nutrient deficiencies or dietary imbalances.

In 2016, National Fisheries Development Board (NFDB) has sanctioned the Aquatic Animal Health and Environment Laboratory at a cost of 56.0 lakhs which was established and started functioning in the Department of Fish Pathology and Health Management during 2016-2017.

Our current projects investigate the effects of high concentrations and imbalances of ions on two cyprinids, Danio rerio and Rutilus rutilus. High amounts of ion-rich waste waters released by the potash mining industry into rivers pose a threat to many freshwater organisms as recorded by several ecological studies.

Alternative treatments

With the topic ´alternative treatment´ we aim to maintain hygienic living conditions for fish in aquaculture in order to prevent pathogen-induced diseases. One candidate we are working on is peracetic acid (PAA). With frequent and correct applications, PAA can effectively inhibit pathogen growth and maintain a good water quality without adversely affecting fish, or suppressing the fish's immunity. Our next step is to transfer our knowledge to fish farmers and help them to improve their hygiene management.

Fluorescence in situ hybridization (FISH) is a test that "maps" the genetic material in human cells, including specific genes or portions of genes.

Fish Test

Because a FISH test can detect genetic abnormalities associated with cancer, it's useful for diagnosing some types of the disease. When the type of cancer has previously been diagnosed, a FISH test also may provide additional information to help predict a patient's outcome and whether he or she is likely to respond to chemotherapy drugs.

Scope of Fish pathology

The society aims to advance the study of fish pathology and the dissemination of knowledge specific to fish and shellfish diseases. This is promoted through its annual meetings and symposia; supported by the publication of its internationally renowned official society journal "Fish Pathology". The activities of the society cover a wide spectrum of basic and applied fish pathology, providing privileged information to fish pathologists worldwide.

Conclusion

Overall, we can look at proteomics as a very promising tool for fish pathology research and diagnostic, allowing a more holistic approach to pathogenesis processes, giving important information on pathogen identification and virulence mechanisms characterization and in host-pathogen interactions, enlightening new stress response routes and previously unknown physiological host responses.

However, the use of proteomics in fish aquaculture is still in its early days and limited to some sequenced organisms. Further progress in defining aquacultural proteomes and large-scale datasets from diseased fish and fish pathogens will boost the use of proteomic techniques in aquaculture, that will lead to new and exciting discoveries on this field. But one of the most promising and interesting areas and one that we believe being the future trend in further understanding the fish response to pathogens, is the study of the interaction holobiome-host-pathogen, with a strong potential for new and more detailed and integrated knowledge of fish pathogenesis.

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