

# Redefining Scenarios of Ecotoxicology: A Crossroad for Healthy Biome <sup>†</sup>

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<sup>†</sup> Presented at Environmental Toxicology: Impact on Human Health (Environ Tox 2021)

Received: 5.11.2021; Revised: 18.11.2021; Accepted: 20.11.2021; Published: 30.11.2021

**Abstract:** In the context of toxicology, which is at the center of environmental monitoring activities, our ability to forecast and evaluate ecological changes such as pollution and climate change is critical. Ecotoxicology is concerned with speculating the potential effects of toxic anthropogenic pollutants at various bio-scales. The plethora of research is now being conducted to acquire a better understanding of the molecular and cellular elements of ecotoxicity. Because fish may be used in the field research and cultured in laboratory simulated circumstances, the fish model has been established as the utmost applicable, time- and cost-effective *in vivo* model in ecotoxicology. Fishes are particularly vulnerable to the toxicity of anthropogenic substances such as hormone-disrupting agents, pesticides, and heavy metals due to fish-specific organs such as the gills and their metabolic functions. Cellular response networks, physicochemical biomarkers, and cell-based testing are effective molecular tools for determining the future of ecotoxicology in terms of environment and human health. However, biochemical analysis to monitor toxicity in the environment is not completely reliable in predicting hazardous consequences on ecosystem. This is due to the presence in the environment of the rising number of unknown substances and pollutant combinations. As a result, innovative methodologies are required to establish a well-founded balance between chemical exposure and its biological effects. For a more comprehensive examination of toxicological paradigms and better knowledge of eco-health, a combinatorial approach of ecotoxicological experiments and models is thus essential.

**Keywords:** Toxicity; pollutants; ecotoxicology; fishes.

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## Funding

This review received no external funding.

## Acknowledgments

This review has no acknowledgment.

## Conflicts of Interest

The authors declare no conflict of interest.