

ONE HEALTH EPIGENOMICS, WASTEWATER-BASED EPIDEMIOLOGY AND ANTIMICROBIAL RESISTANCE (AMR): A ROLE FOR GLYPHOSATE-BASED HERBICIDES, *Bacillus thuringiensis*, *Vibrio sp.*, METALS CHELATED BY GLYPHOSATE, ORGANOPHOSPHATES, DISINFECTANTS, AND PERSISTENT ORGANIC POLLUTANTS (PCBs, PAHs) IN EMERGING RESISTANT PATHOGENS OF PUBLIC HEALTH CONCERN

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Pathogens impact growth, reproduction, immunity, and behavior. Some environmental contaminants like metals, the herbicide glyphosate (GLY), organophosphates, and persistent organic pollutants (POPs) are considered endocrine disrupting chemicals (EDCs). Some metals are chelated by GLY, and metal concentrations vary in different tissues and species depending on environmental factors. Little is known about the interactions in wastewater of COVID disinfectants, antimicrobial resistance (AMR), and changes in the host epigenome, particularly in the presence of the antimicrobial herbicide GLY, pathogens like *Bacillus thuringiensis* (Bt), *Vibrio sp.*, GLY-based herbicides (GBH), metals chelated by GLY, organophosphates (chlorpyrifos, malathion), and POPs like PCBs and PAHs. GBHs can modify toxicity and epigenetic marks in animals and people.

Recent findings of portions of the SARS-Cov-2 coronavirus RNA in bivalve mollusks and in wild carp of Wuhan, China, as well as the potential association of parasite co-infection with a reduced risk of severe COVID-19 in African patients, suggest the need for a more holistic One Health approach to studying interactions of pathogens, AMR, and their host's genomes and epigenomes.

A review of the molecular and epigenetic mechanisms involved in these interactions will be presented using metals chelated by GLY, Bt and AHPND-causing Vibrios, GLY-based herbicides, and COVID-19 disinfectants in wastewater as examples.

Research is needed to (a) monitor multiple contaminants in wastewater, estuarine seawater, shellfish, fish, and people living in the mangroves, and (b) study transgenerational epigenetic inheritance of health effects caused by exposure to the above-mentioned chemicals. Studies on the interactions of host's (epi)genome, environmental contaminants, and emerging resistant pathogens should be a priority.