



One Health Day: COST Action CA2111 objectives and the collective effort of scientists to pursue a global One Health

What actions should we as scientists take to embrace One Health principles and goals?

November 3, 2024 at OneHealthdrugs

As scientists, we can take a number of practical steps to advance One Health. We should strive to promote cross-sectoral collaboration. Indeed, scientists from human, veterinary and environmental health and drug discovery can work together to share data, research and resources. This is the case of COST Action CA2111, where wildlife veterinarians, epidemiologists and ecologists are working together with chemists and biologists and parasitologists to raise awareness about the surveillance of zoonotic diseases in animal populations and their impact on humans. By building integrated systems for understanding health data across species and environments, we can improve early detection of infectious disease outbreaks and develop more targeted antiparasitic drugs with lower toxicity. For example, collecting and analyzing data from animal populations, human health records and environmental sources can help identify patterns that may indicate emerging health threats.

Restoring natural habitats and promoting sustainable land use are also essential measures to prevent disease spillovers. It is also our duty to promote public awareness and education to limit human encroachment on natural habitats and prevent stressors to wildlife that can increase the spread of disease. For example, in areas where people work closely with animals (such as farming communities), scientists and veterinarians can provide specific training to minimize the risk of disease transmission, such as safe handling of livestock or reducing contact with wildlife. By integrating scientific expertise with local knowledge and community-based interventions, One Health initiatives can be made more sustainable and impactful at the capillary level. This approach creates a proactive, collaborative health strategy that empowers communities to protect their ecosystems while improving their own resilience to health risks.

In the *OneHealthdrugs COST Action environment*, we consider other concepts

Environmental medicine (EM) and ecotoxicology in Medicinal Chemistry

Ecotoxicology and Environmental Impact is a key WP of our COST Action. Environmental medicine (EM) is a new, holistic and multidisciplinary branch of biomedicine that studies the interaction between the human and animal body and the environment. Ecotoxicology, in particular, is a discipline under the EM umbrella that considers the effects of chemical compounds on biological organisms, both at the individual level and from a larger perspective (a site-specific community or the entire world population). Pesticides, mycotoxins, dioxins, halogenated compounds and other chemicals found in wastewater and entering the known water cycle can accumulate in human tissues and cause human health problems. In addition to waste from the pharmaceutical industry, human and animal metabolism itself contributes to the elimination of hazardous chemical catabolites. Therefore, our COST Action focuses on the use of advanced technologies such as omics strategies and the development of new bioinformatics tools that can predict metabolic biotransformation and the environmental impact of metabolic waste in order to minimize the impact of the so-called "pharmaceutical residue". The recent definition of essential use by the EU Commission will help to limit the excessive use of some undesirable substances.

The One Health approach supports global health by improving coordination, collaboration and communication across sectors. In drug discovery, this means addressing key issues such as: (i) focusing



on targets unlikely to develop resistance to prevent hyper-resistant strains, (ii) designing drugs for specific human or animal uses early in the research process, (iii) incorporating green chemistry practices from drug development to large-scale production, (iv) exploring innovative sources of drug synthesis such as plant- and insect-derived materials, and (v) incorporating ecotoxicology and environmental impact assessment into pharmacokinetic studies and optimization of drug profiles.