Chiraz Atri

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Chiraz Atri is a post-doctoral researcher at the "Transmission, Control and Immunobiology of Infections" Laboratory, Institut Pasteur de Tunis. She got her PhD in Biological Sciences on December 2018.

With her hybrid scientific profile as a Biologist and Bioinformatician, Chiraz is involved in several funded projects dealing with infectious diseases, host-pathogen interactions and epidemiological surveillance. She started working on Cutaneous Leishmaniasis since 2011. More specifically, she is implicated in analyzing the impact of Leishmania parasite infection on innate immune responses through genomics and transcriptomics features of hyper- and hypo-virulent isolates of Leishmania parasites using high-throughput datasets. During the Covid-19 pandemic, she has been involved in the SARS-CoV-2 Wastewater Based Epidemiology in Africa where laboratories are often poorly equipped and lack adequately trained personnel for being able to react appropriately. She is extending such gained expertise to the AMR surveillance in African settings in general and Tunisian settings in particular.

Project

Anti-microbial resistance monitoring in Tunisian wastewater treatment plants

Anti-Microbial Resistance (AMR) illustrates the need for a multi-sectoral One Health approach involving the implementation of coordinated programs and strategies to optimize the health of humans, animals and the environment. The broad spectrum of antibiotic use has led to the emergence and spread of bacterial resistance, posing major risks. Tunisia is ranked second worldwide in the list of highest antibiotics consumption countries. Antibiotics have become less effective and infections are becoming more severe, causing serious and even incurable diseases. Wastewater treatment plants represent a major source of dissemination and development of antibiotic resistance. Resistant bacteria and Antimicrobial Resistance genes (ARGs) are increasingly being studied in wastewater treatment plants due their presence even after treatment and the reuse of wastewater for agricultural purposes or its discharge into the oceans. This could subsequently constitute a potential health risk, which is further amplified by water stress worldwide in general and in Tunisia in particular. The aim of this study is to measure the abundance of circulating ARGs in influents samples and those that are resistant after the different treatments implemented in different wastewater treatment plants in Tunisia. Grab samples will be collected monthly and processed through centrifugation for debris removal. Total Nucleic Acids will be extracted and used for ARGs quantification by quantitative PCR. The results will be used to identify areas and populations at risk and/or with high antibiotic. A comparative analysis will provide insight into the effectiveness of different disinfection technologies and will help in the adaptation of treatments to risks. The output of this work will be communicated to stakeholders to implement strategies to control AMR spread and provide a general profile of resistance evolution that can complement ongoing AMR programs. This study will finally contribute to the implementation of a cost-effective wastewater-based epidemiology surveillance approach for AMR.