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| Project Title: | Medicinal products in the environment: novel strategies reducing environmental exposure |
| Lead Supervisor and co-supervisors: | Prof Barbara Kasprzyk-Hordern (lead); Dr Kishore Jagadeesan |
| Industrial Partner: | Wessex Water |

Project Summary

There is an urgent need to reduce pharmaceutical levels in the environment due their impact on natural environment and humans, as well as to comply with changing water quality regulations. Pharmaceuticals in the environment are mainly attributed to the discharge of treated effluent from wastewater treatment works. To reduce the load of pharmaceuticals in the environment, greater control and treatment at wastewater treatment works is needed.

This project will provide the data and evidence to help prompt change and will focus on the development of water fingerprinting approaches through utilisation of powerful mass spectrometry techniques: triple quadrupole analysis for selected pharmaceutical targets and high-resolution mass spectrometry for non-target/retrospective analysis of environmental and public health determinants.

Water fingerprinting has the potential to revolutionise health-care provision as it can provide real-time and cost-effective community-wide public health diagnostics, since urban water can be considered as a diagnostic medium for the health status of a community and surrounding environment.

The project will:

1. Develop mass spectrometry-focused frameworks for spatiotemporal water fingerprinting.
2. Undertake analysis of longitudinal samples collected in the Somer Valley (wastewater and receiving environment) to establish spatiotemporal trends in environmental and public health determinants (pharmaceuticals, metabolites, endogenously formed markers).
3. Undertake data triangulation to verify environmental and public health status and risk assessment.

The successful candidate will work at the University of Bath and closely with Wessex Water, alongside a postdoctoral researcher (focused on modelling, data representation and risk assessment) towards the development and application of the approach as a measure of public health status in the studied region and as a tool for evaluating the effectiveness of interventions.

The project is supported by EPSRC and Wessex Water and feeds into the wider Somer Valley project consortium which includes Wessex Water, University of Bath, Bath and North East Somerset Council, Department of Environment, Food and Rural Affairs and Natural England. The consortium is aiming to reduce pharmaceutical levels in the aquatic environment using interventions targeting 'control at source' i.e. reducing the level of pharmaceuticals reaching wastewater treatment works.



Sustainability issues addressed

This project aims to develop diagnostic technologies that have the potential to reduce costs and pollution in wastewater treatment and reduce the levels of medicinal products discharged into the aquatic environment. These technologies will therefore contribute directly to four UN Sustainable Development Goals: good health and wellbeing; clean water and sanitation and sustainable cities and communities; and life below water.