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Effect of pharmaceutical residues on water habitats studied in £7 million project

Researchers at Glasgow Caledonian University (GCU) have begun a £7 million study to raise awareness of the presence of pharmaceutical residues in waste water and to explore new methods of reducing them.

The concentrations in water are very low and are not thought to be harmful to humans though there are some concerns over the effects these residues may have on water habitats.

There is evidence to suggest that the residues created by the use of some common pharmaceutical products, including pills and creams, can harm fish populations.

The European Union funded research project “noPILLS” will focus on the residue medicines and other pharmaceutical products leave in water when they pass through the human body, or are washed off.

Around 3000 pharmaceutical active substances are licensed for use in Europe. Tests have shown that up to 70% of medicines used in a hospital may be excreted or washed off.

The ‘noPILLS’ team will inform the public about the issue and widen the current debate. GCU academics have been involved in research in this area of pharmaceutical residues in waste water for more than five years.

The team will also gather data on pharmaceutical residues and explore various strategies to reduce their levels in the water cycle.

The EU is considering new quality standards for surface water, such as rivers and streams, that may – for the first time – restrict maximum levels for pharmaceutical substances. These would come into force by 2021.

The noPILLS project see a GCU team working with four partners across Europe, including water companies and universities. The project has an overall budget of almost £7 million (Euros 9 million), with the GCU team's work accounting for £2 million of the total.

GCU's interdisciplinary team will work on detecting pharmaceuticals and their biological effects in a field study area in central Scotland. Social scientists at GCU will also investigate if – and under which circumstances – people may be most willing to consider a change in their pharmaceutical consumption and disposal habits.

Professor Lynne Baillie will lead the technology focused part of the group which will build innovative mobile applications that will aim to communicate to people in the community complicated pharmaceutical data and its impact on the quality of the water in their environment.

GCU's Dr Ole Pahl, an environmental engineer from the School of Engineering and Built Environment, will lead the noPILLS team in Scotland. He said:

“The project will investigate whether, and how, pharmaceutical product input may be reduced by raising awareness, encouraging different consumption or prescription practices, and promoting better disposal, as an alternative to expensive ‘high-tech’ adaptation of wastewater treatment facilities. It addresses in general the need to reduce pharmaceutical and other micro-pollutants.”

The project will be officially launched at an event being held to communicate the findings of an earlier, linked project - ‘Pharmaceutical Input and Elimination from Local Sources’ (PILLS). This study, also with European partners, ended last year and investigated various methods of removing pharmaceutical waste from waste water when it leaves hospitals.

One of these methods, ferrate treatment, will also be further investigated in the noPILLS project. This work will fill a gap in previous research and will accurately gauge operating cost of such a treatment.

These methods, however, can only deal with the 20 per cent of waste which enters the water cycle in this way. A further 80 per cent enters through use of pharmaceutical products in the community

GCU's Karin Helwig, who has worked on both projects, said:

“One of the key finding from PILLS was that it is possible to eliminate pharmaceuticals at one important point of use, the hospitals, and that it could make sense to do so from certain points of view. However, that would be expensive and it is not certain this is definitely warranted.

“We want to feed into the public European debate on how much benefit can be achieved by avoiding, reducing or substituting some compounds. There is an opportunity to enlighten the public on what consumer behaviour means for the development of waste water treatment costs and biodiversity. Over time, this may

lead to changing prescription and consumption patterns and start an increased demand for 'green pharmacy'."

For further information please contact:

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Notes

Glasgow Caledonian University is an international university delivering excellence, with a strong commitment to the common good. With 17,000 students at our Glasgow campus and outreach campuses in London, Bangladesh and Oman, the University offers a modern environment for learning, teaching and applied research.

The university has particular applied research strengths in the fields of health and the environment. Glasgow Caledonian University is rated among the top 10 in the UK for its allied health research and in the top 20 in the built and natural environment.