

Antibiotics come with 'environmental side effects,' experts say

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Researchers writing in *Microchemical Journal* are bringing attention to the fact that commonly used antibiotic drugs are making their way out into the environment, where they can harm microbes that are essential to a healthy environment. Their review article has been selected for the Elsevier Atlas Award, which recognizes research that could significantly impact people's lives around the world or has already done so.

"The amount of antibiotics is very, very low—there are normally nanograms per liter of these molecules found in natural environments," said Dr. Paola Grenni, a microbial ecologist at the National Research Council's Water Research Institute in Italy. "But the antibiotics and also other pharmaceuticals can have an effect even in low concentrations, the so-called environmental side-effects."

When people take antibiotics, their bodies break down and metabolize only a portion of the drugs. The rest is excreted and enters wastewater. Because [wastewater treatment plants](#) aren't designed to fully remove antibiotic or other pharmaceutical compounds, many of those compounds reach natural systems where they can accumulate and harm microbes in nature.

That's a big concern, Dr. Grenni said, because many microbial species found in the [environment](#) are beneficial, playing important roles in natural cycles of nutrients, primary production and climate regulation. Some microbes also degrade organic contaminants, such as pesticides.

The review paper published by Dr. Grenni along with colleagues Drs. Valeria Ancona and Anna Barra Caracciolo highlights commonly used antibiotic compounds and their active ingredients. Some of those medications are used to treat people. Many others are used in veterinary medicine, especially to treat farm animals including cattle, pigs and poultry.

The release of antibiotics into [natural systems](#) is a "real-life experiment" with consequences that aren't yet fully known. Dr. Grenni and her colleagues say there's a need for more specific protections of environmental microbes given their importance to functioning ecosystems.

It's important for nations to work to reduce unnecessary antibiotic use and the release of those antibiotics that are needed into the environment. To that end, efforts should be made to equip wastewater treatment plants for removal of those compounds and to devise methods to improve the degradation of antibiotics once they reach [natural environments](#). Members of the public can help by taking care to use [antibiotics](#) only when they are truly needed, and by disposing of expired medications properly.

"There are only a few researchers working in this field, but it's very important," Dr. Grenni said. "We need to know the different molecules we normally use that are in the environment and the effect they have. We need more research in this field."

More information: Paola Grenni et al. Ecological effects of antibiotics on natural ecosystems: A review, *Microchemical Journal* (2017). [DOI: 10.1016/j.microc.2017.02.006](https://doi.org/10.1016/j.microc.2017.02.006)

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