Montrealers are feeding fish Prozac

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This image shows Brook trout similar to those affected by anti-depressants in Montreal's river water. Credit: Credit: University of Montreal.

Around one in four Montrealers take some kind of anti-depressant, and according to new research, the drugs are passing into the waterways and affecting fish. The findings are internationally significant as the city's sewage treatment system is similar to that in use in other major cities, and moreover, it is reputed to be the third largest treatment system in the world. Lead by Dr. Sébastien Sauve at the University of Montreal's Department of Chemistry and Andre Lajeunesse, a PhD candidate, the research team found that the drugs accumulate in fish tissues and are affecting the fish's brain activity.

The Saint Lawrence is a major international waterway that connects the Atlantic Ocean to the Great Lakes, and it surrounds the island of

Montreal. Sauvé has been looking at the chemical pollution of the water system for years. "Montreal has a very basic sewage system – the city basically only removes solids, there's no disinfecting of the water," he explained. "In any case, the chemical structure of anti-depressants makes them extremely difficult to remove from sewage, even with the most sophisticated systems available."

"We know that antidepressants have negative side effects on human beings," Sauvé said, "but we don't know how exactly how these chemicals are affecting the fish, and by extension, the Saint Lawrence River's ecosystem." Despite a lack of information about the possible toxicity brought from these substances, the research group suggests an interesting tool to track the early biological effects of antidepressants. "Since the acute toxicity of antidepressants is less probable toward aquatic organisms, chronic toxicity remained possible. In this way, the suggested biomarker involved in the serotonin regulation in the brain may represent a promising means of determining subtle biological effects to fish," explained Lajeunesse. Chronic toxicity means harm resulting from long-term exposure, whereas acute relates to more immediate harm following a single high-dose incident. Serotonin is an important chemical that plays a role in feelings of happiness – it's sometimes referred to as the "happy hormone."

This is a sewage treatment plant in Montreal. Credit: Credit: University of Montreal.

Sauvé was quick to point out that there is no immediate danger to humans. "The amount of anti-depressants being released into our river works out to roughly the equivalent of a grain of salt in an Olympic-size swimming pool," he said. "That's not enough to affect people, should they are brave enough to go fishing out there – I'd be more worried about the trace metals! Nevertheless, we are seeing an impact on the river's ecosystem, which should concern cities everywhere." Further research by other teams will look at exactly what the consequences might be.

Provided by University of Montreal