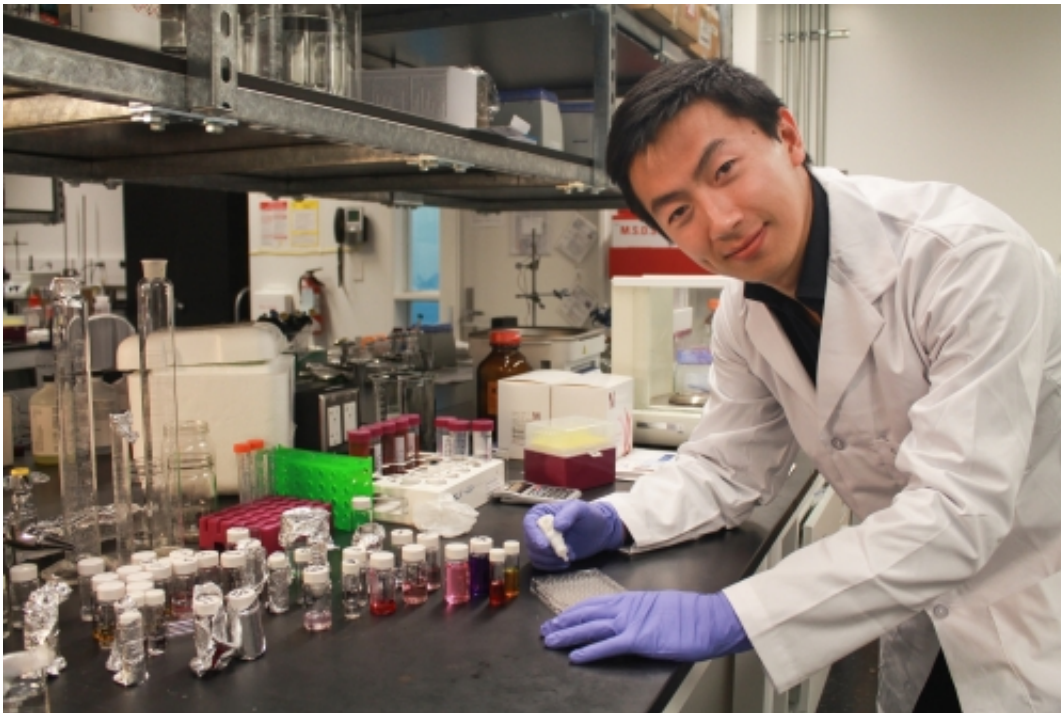


# Drug-infused nanoparticle is right for sore eyes

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For the millions of sufferers of dry eye syndrome, their only recourse to easing the painful condition is to use drug-laced eye drops three times a day. Now, researchers from the University of Waterloo have developed a topical solution containing nanoparticles that will combat dry eye syndrome with only one application a week.

The eye drops progressively deliver the right amount of drug-infused [nanoparticles](#) to the surface of the eyeball over a period of five days before the body absorbs them. One weekly dose replaces 15 or more to treat the pain and irritation of [dry eyes](#).

The nanoparticles, about 1/1000th the width of a human hair, stick harmlessly to the eye's surface and use only five per cent of the drug normally required.

"You can't tell the difference between these nanoparticle eye drops and water," said Shengyan (Sandy) Liu, a PhD candidate at Waterloo's Faculty of Engineering, who led the team of researchers from the Department of Chemical Engineering and the Centre for Contact Lens Research. "There's no irritation to the eye."

Dry eye syndrome is a more common ailment for people over the age of 50 and may eventually lead to [eye damage](#). More than six per cent of people in the U.S. have it. Currently, patients must frequently apply the medicine three times a day because of the eye's ability to self-cleanse—a process that washes away 95 per cent of the drug.

"I knew that if we focused on infusing biocompatible nanoparticles with Cyclosporine A, the drug in the eye drops, and make them stick to the eyeball without irritation for longer periods of time, it would also save patients time and reduce the possibility of toxic exposure due to excessive use of eye drops," said Liu.

The research team is now focusing on preparing the nanoparticle [eye drops](#) for clinical trials with the hope that this nanoparticle therapy could reach the shelves of drugstores within five years.

Liu's research article, co-authored by eight others including Professors Frank Gu and Lyndon Jones from Waterloo, recently appeared in Nano

Research, the leading publication on nanotechnology and nanoscience. The Natural Sciences and Engineering Research Council of Canada (NSERC) and 20/20: Ophthalmic Materials Network supported the research.

**More information:** Phenylboronic acid modified mucoadhesive nanoparticle drug carriers facilitate weekly treatment of experimentally induced dry eye syndrome, *Nano Research*, September 2014. [link.springer.com/article/10.1007%2Fs12274-014-0547-3#page-1](https://link.springer.com/article/10.1007%2Fs12274-014-0547-3#page-1)

Provided by University of Waterloo

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