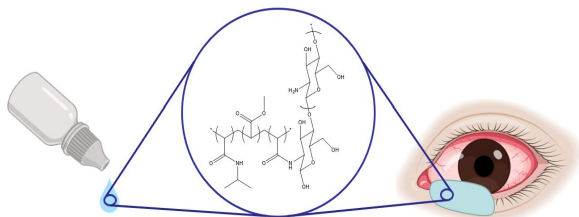


# Thermo-Gel Polymer System for Improved Ophthalmic Drug Delivery



*Schematic of thermo-responsive eyedrops for controlled degradation and sustained drug delivery.*

McMaster - Industry Liaison Office

## Tech ID

20-078

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## Patent Status

US and Canada applications filed

## Stage of Research

Proof of principle  
has been performed

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## Abstract

Eye drops are the most common and easily administered form of ophthalmic drug delivery, however, they produce considerable waste and must be frequently reapplied. Replacing conventional eyedrops with a hydrogel based system can improve bioavailability and provide sustained drug release, however, the mechanical loading from blinking causes rapid deterioration of the applied gel. Application to the inferior fornix (the pocket below the lower eyelid) has been investigated such that the hydrogels do not deteriorate as quickly while blinking or obstruct vision. However, these developed systems are often non-degradable, uncomfortable and difficult to place accurately. Therefore, there is a need for degradable eye drops that offer prolonged drug release and simple application.

Researchers at McMaster have developed a gel formula consisting of a thermo-sensitive synthetic polymer which forms a gel when introduced to ocular heat, and the natural polymer chitosan to improve ophthalmic drug delivery. The gel degrades over a period of days, during which therapeutic can be steadily released into the eye. This thermo-gel can be easily applied to the inferior fornix. By administering the gel to the inferior fornix non-transparent interventions can be administered without causing visual impairment.

## Applications

- Ocular drug delivery to treat many ophthalmic conditions, including allergies, dry eyes, infection, and glaucoma.
- Post-surgical applications to increase the rate of healing.
- Contact lens materials.

## Advantages

- Greater control of compound degradation and sustained drug delivery.