

Title:

**THERMOSENSITIVE GLYCOL CHITOSAN-BASED
HYDROGEL AS A TOPICAL OCULAR DRUG
DELIVERY SYSTEM FOR ENHANCED OCULAR
BIOAVAILABILITY**

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Advisor:

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Thermosensitive glycol chitosan-based hydrogel as a topical ocular drug delivery system for enhanced ocular bioavailability



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ISSN: 0378-5173

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No.	Title	Subject Category	Publisher/Holder	IF	IF Quartile	CiteScore	CiteScore Quartile	H-Index	Indexed in	Details
1	International Journal of Pharmaceutics ISSN/ISBN: 0378-5173, 1873-3476	Pharmacology Pharmaceutical... + 1 more ...	Elsevier	4.845	Q1	7.60	Q1	204	ISI, Scopus, PubMed, Embase	
2	International Journal of Applied Pharmaceut... ISSN/ISBN: 0975-7058	Pharmacology Pharmaceutical... + 1 more ...	Other			1.00	Q3	12	Scopus, Embase	
3	International Journal of Pharmaceutics: X ISSN/ISBN: 2590-1567		Elsevier			0.30	Q4	2	ISI (ESCI), Scopus, PubMed	

Introduction

Materials and
methods

Result and
discussion

Conclusion

Introduction

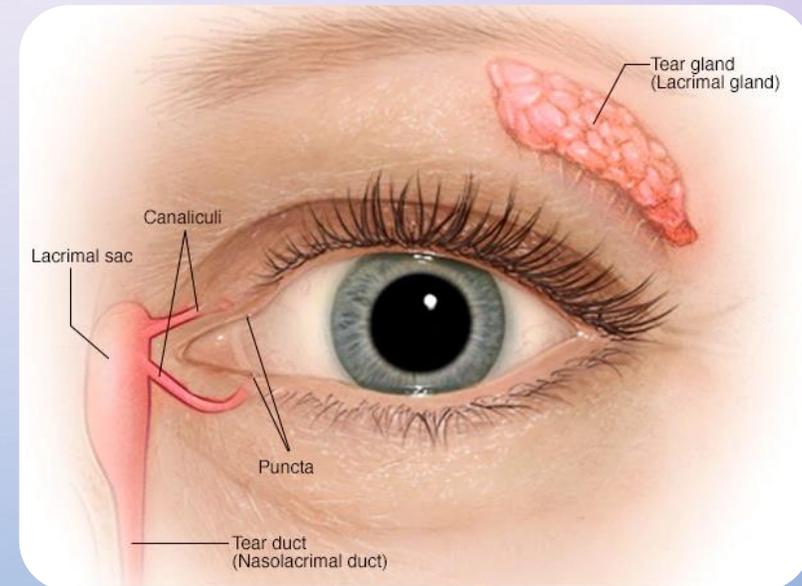
- ❑ Drug delivery system
- ❑ Ophthalmic drug delivery
 - ✓ eye drops
- ❑ Advantages of conventional formulations
 - ✓ Non-invasive administration
 - ✓ Low production cost
 - ✓ Great patient compliance



Introduction

❑ Disadvantage of conventional formulations:

- ✓ Short retention time
- ✓ Nasolacrimal drainage
- ✓ Rapid clearance of tears



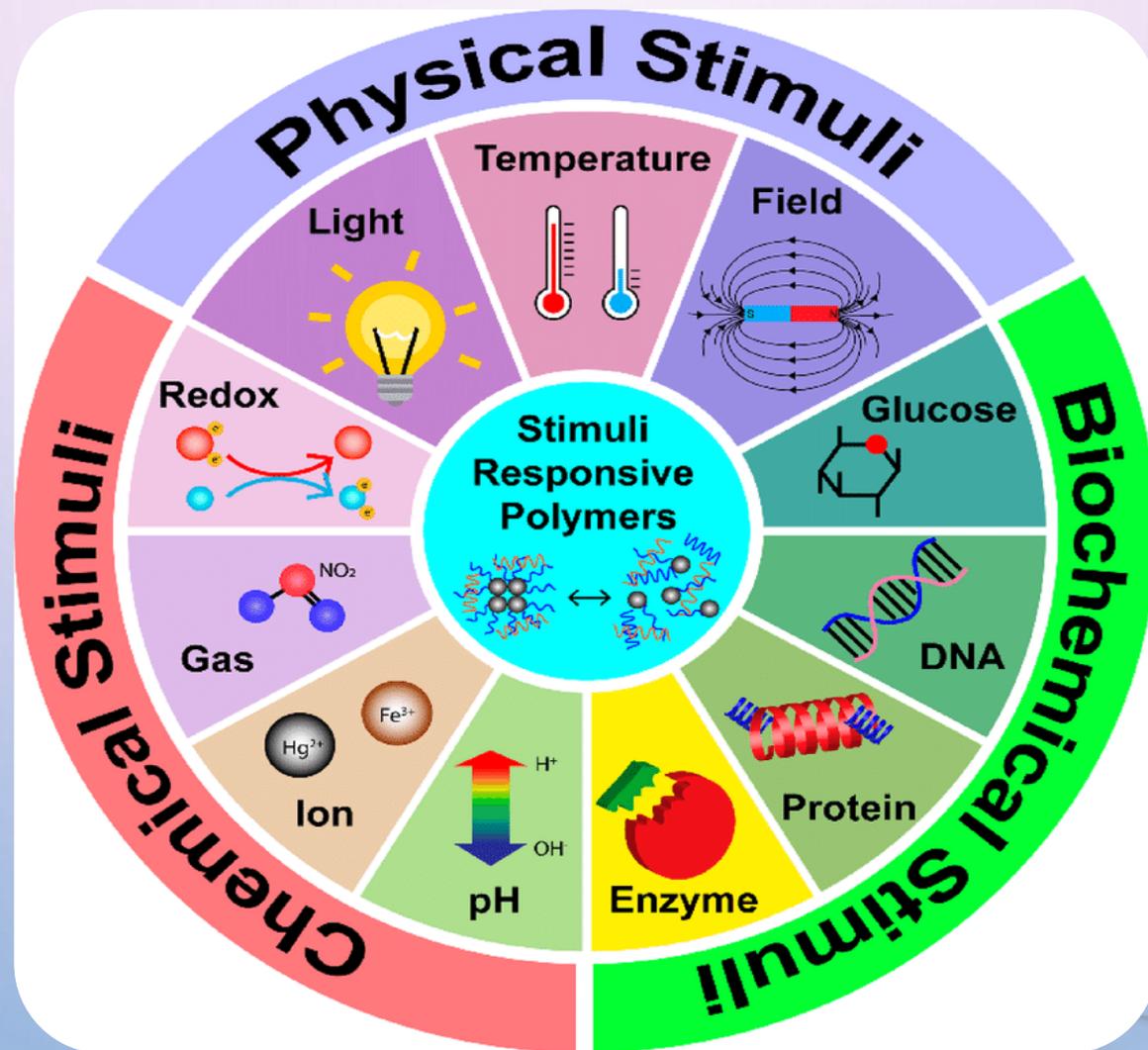
Introduction

- Hydrogels are three-dimensional networks
- Biocompatible
- Hydrogel classification
 - ✓ Source
 - ✓ Response to environmental change



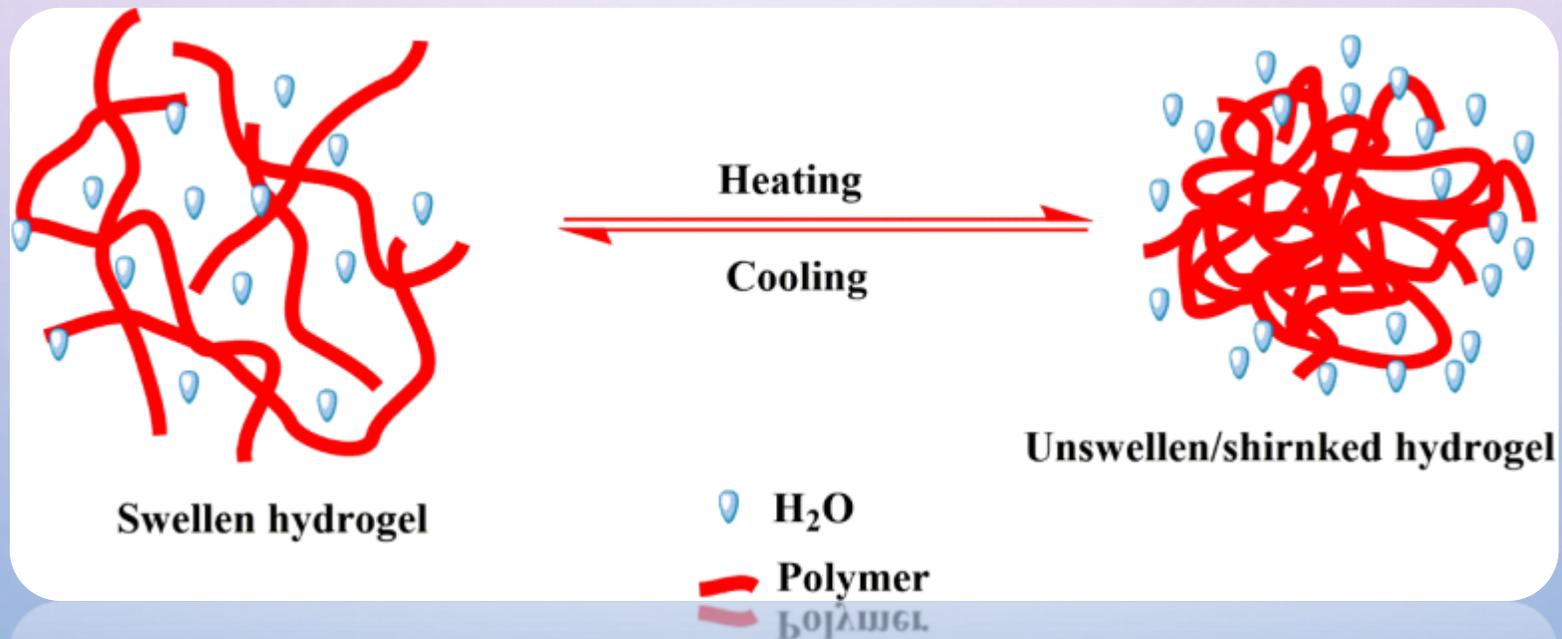
Introduction

Smart hydrogel



Introduction

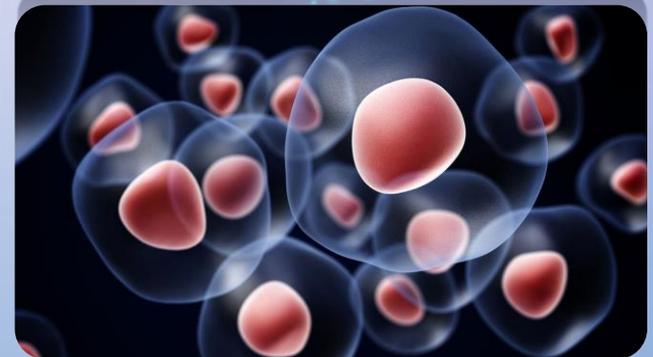
Temperature sensitive hydrogel



Introduction

Application of Thermo-Sensitive Hydrogels

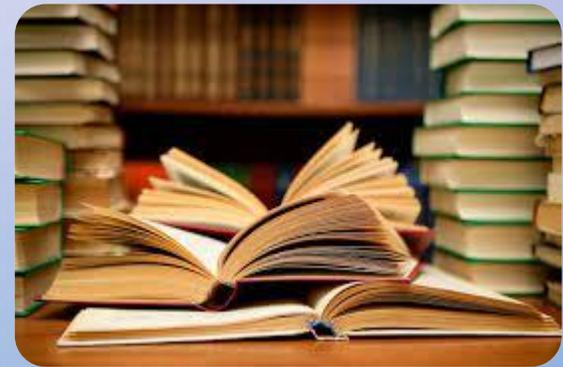
- Therapeutic agent delivery
- Cell therapy and tissues regeneration
- Bone/cartilage repairing and wound healing



Introduction

literature review

- ❑ Chitosan-poly(N-isopropyl acrylamide) (PNIPAAm) a thermosensitive for topical ocular delivery of timolol maleate
- ❑ Chitosan-gelatin hydrogel for sustained intraocular drug delivery



Materials and methods

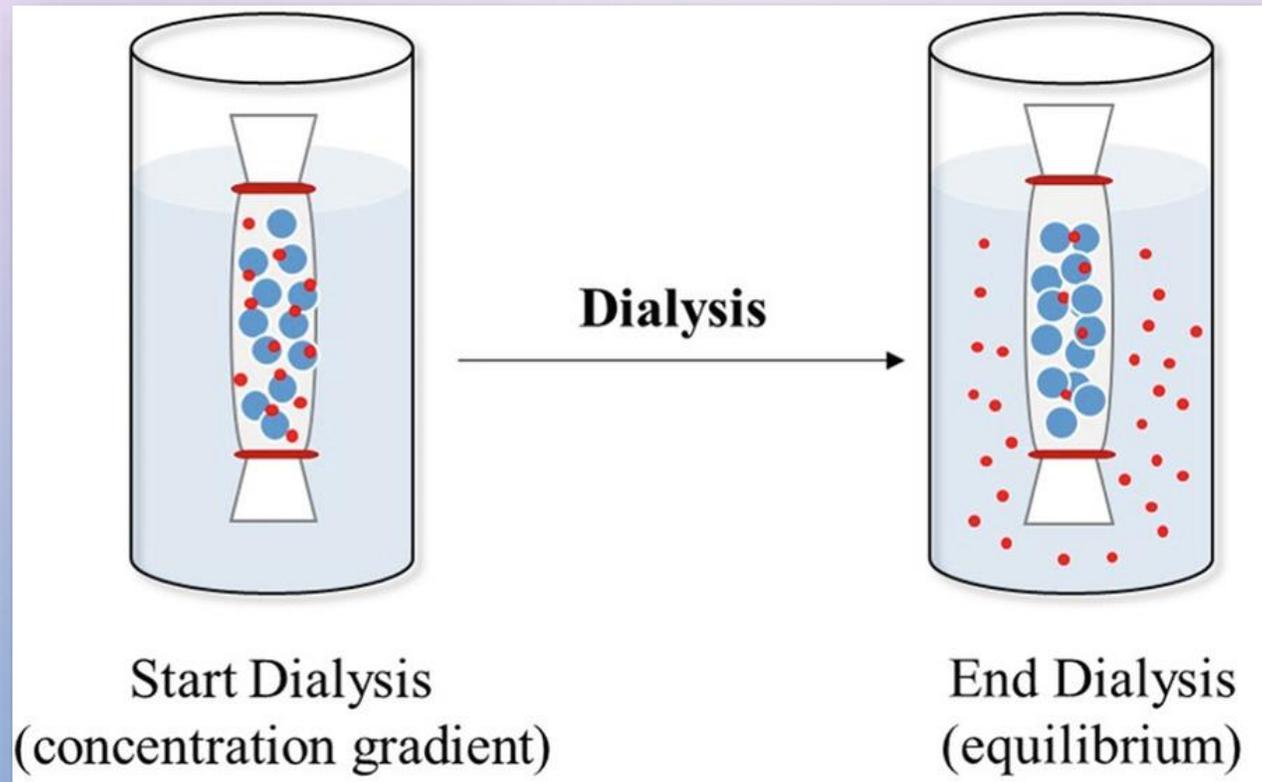
□ Synthesis and characterization of hydrogel

- ✓ Freeze drier
- ✓ Levofloxacin-loaded H-GCS hydrogel
- ✓ Scanning electron microscopy (SEM)



Materials and methods

In vitro drug release study



Materials and methods

In vitro cytotoxicity test

- ❑ cell-counting kit-8 (CCK-8) assay
- ❑ In vitro cytotoxicity of H-GCS against (HCEC)



Materials and methods

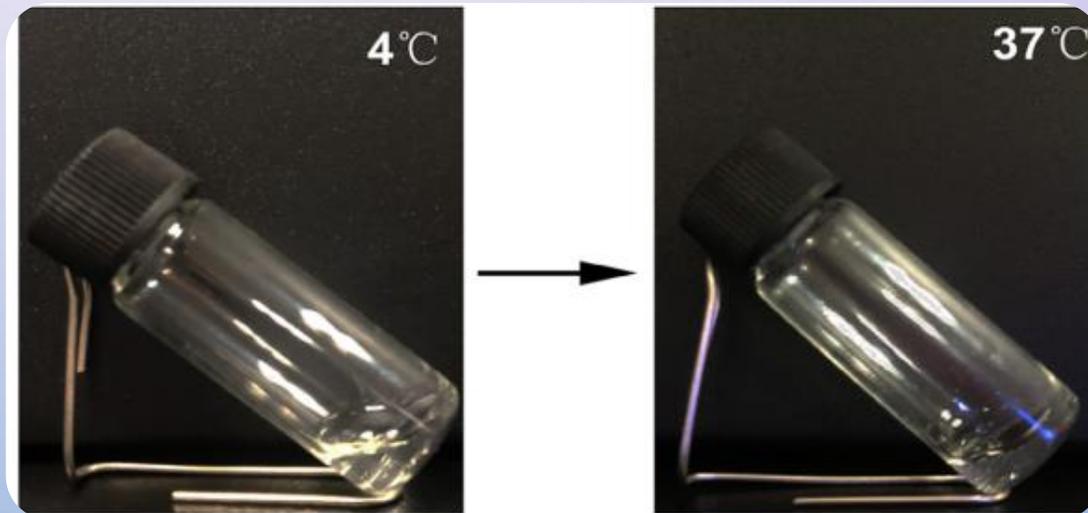
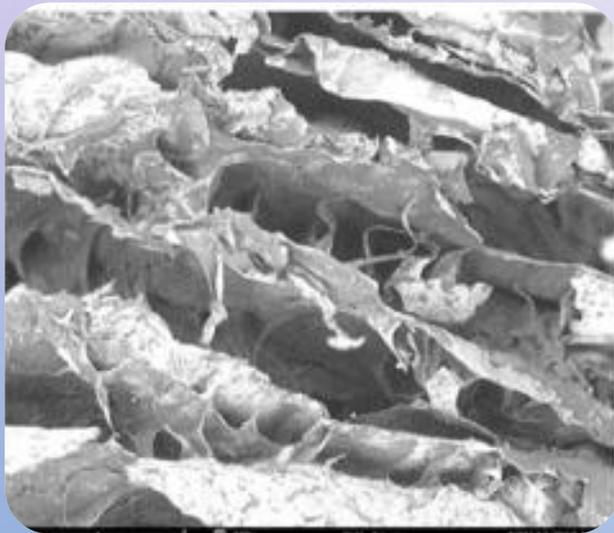
Animal experiment

- Eye irritation test
- Precorneal retention test



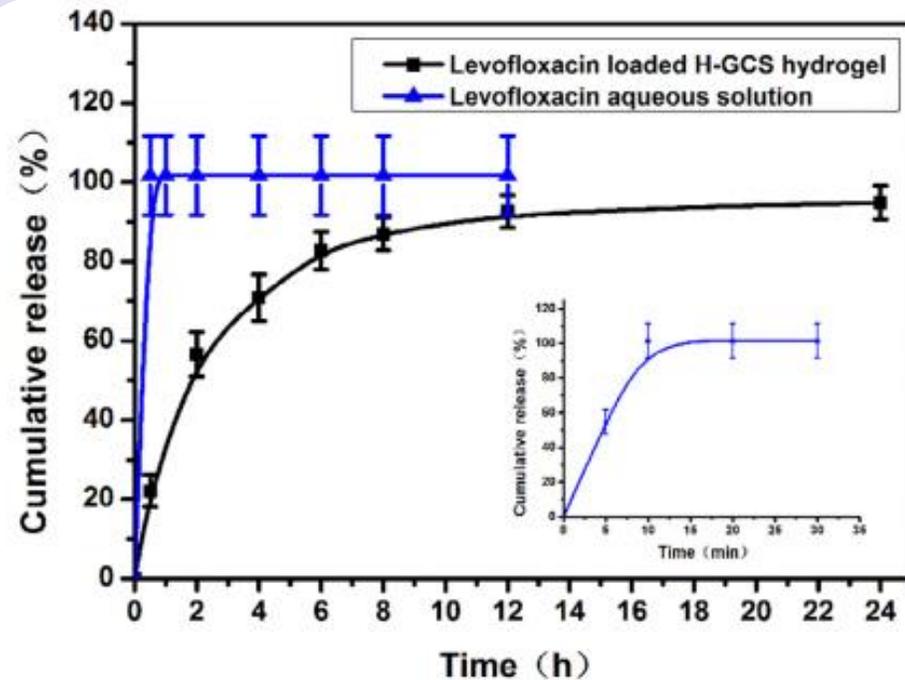
Results and discussion

- Formation and characterization of H-GCS hydrogel



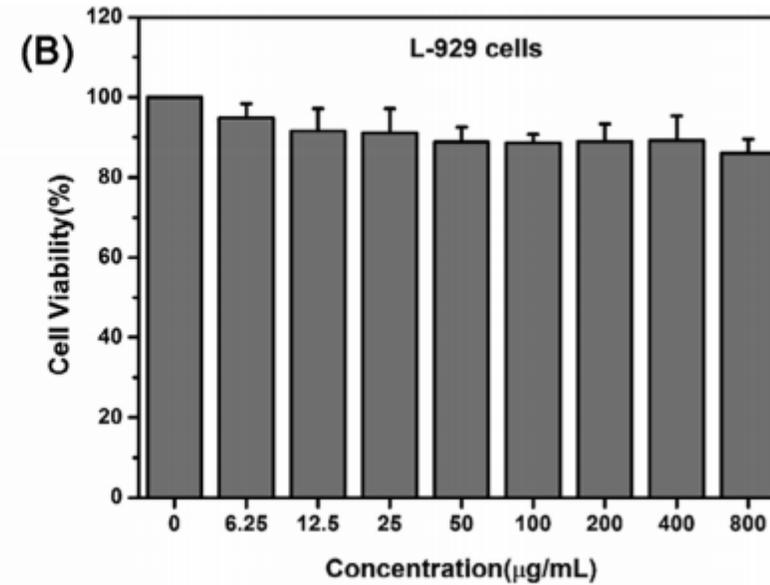
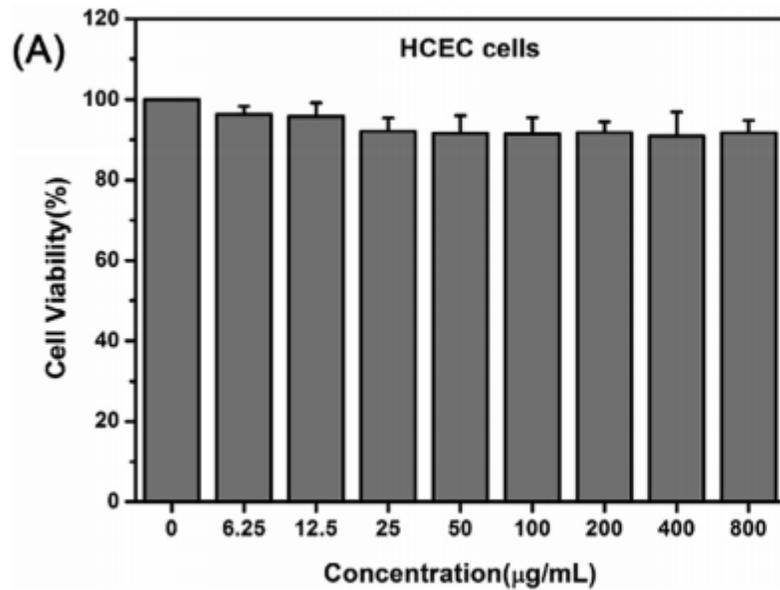
Results and discussion

➤ In vitro release study



Results and discussion

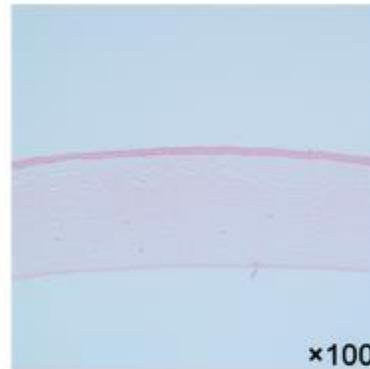
➤ In vitro cytotoxicity



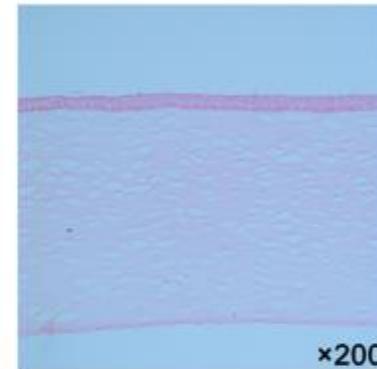
Results and discussion

➤ Ocular irritation and biocompatibility

Phosphate buffered saline

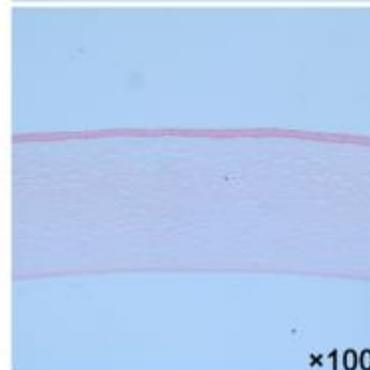


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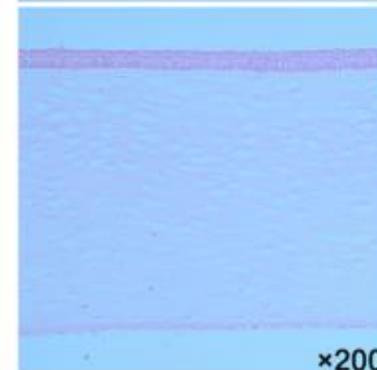


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H-GCS hydrogel



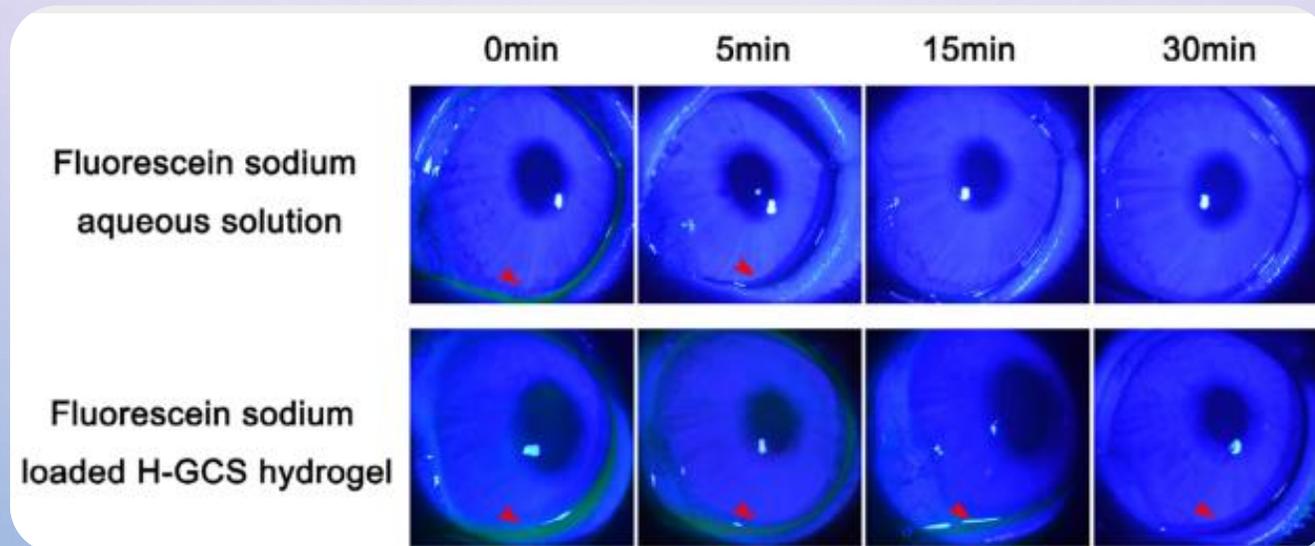
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Results and discussion

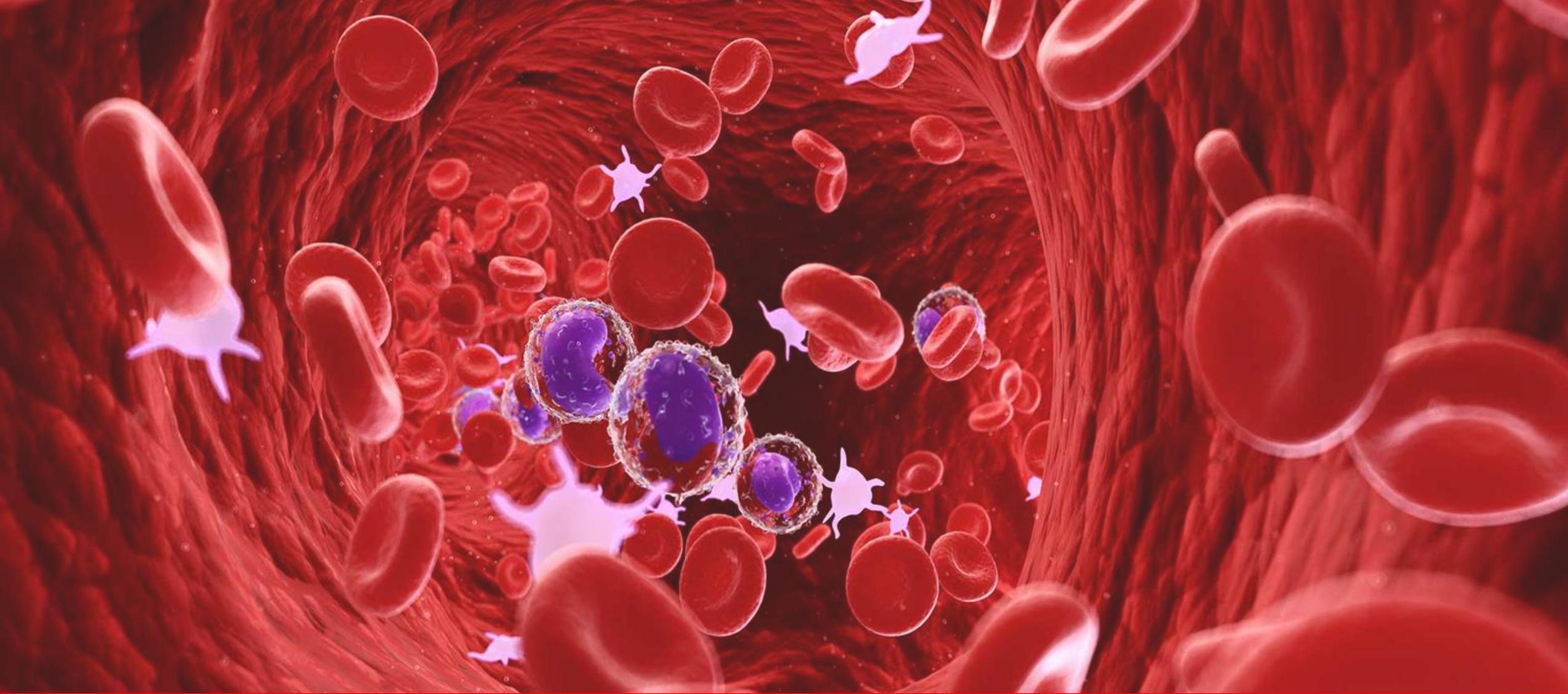
➤ Precorneal retention study



Conclusions

- ❑ In situ gelling system based on H-GCS for topical ocular delivery of levofloxacin
- ❑ Minimal cytotoxicity
- ❑ Not irritate rabbit eyes
- ❑ Prolonged the precorneal retention of drugs
- ❑ Increased ocular bioavailability





Thanks for your attention