Lactoferrin liposomal eyedrops: physicochemical characterization, cytotoxicity and ocular tolerance

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INTRODUCTION

Ocular inflammation and immunodulatory activity constitute one of the most common comorbidities associated to ophthalmic disorders. Conventional topical ophthalmic treatments present disadvantages such as low bioavailability and side effects.

Lactoferrin (LTF), a high molecular weight protein, is a promising alternative against inflammation. However, instability and high nasolacrimal duct drainage compromises its potential effectiveness[1].

PURPOSE

LTF Lactoferrin (LTF), an ocular antimicrobial, immunomodulatory and anti-inflammatory protein has been encapsulated into liposomes to be applied as eyedrops. Physicochemical characterization, safety and ocular delivery had been assessed.

METHODS

Average size and polydispersity index were assessed using Malvern zeta-sizer.

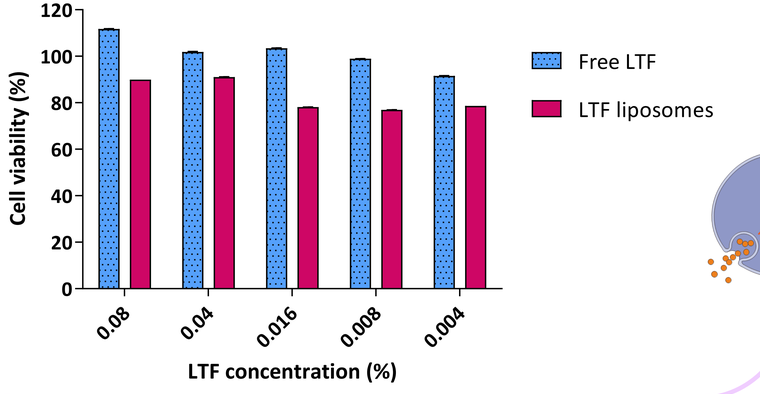
Cell viability was assessed in human corneal epithelial cells (HCE-2) using the MTT test.

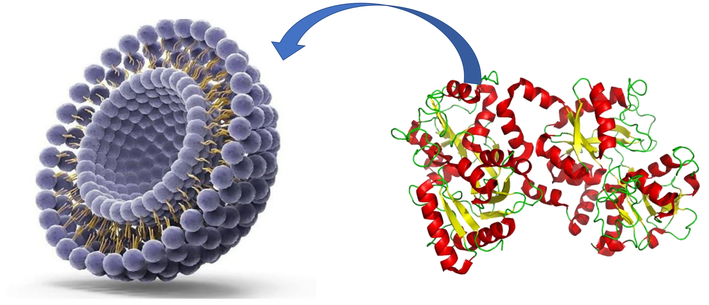
In vitro ocular tolerance (HET-CAM and HET-CAM TBS) was carried oud by using fertilized chicken eggs.

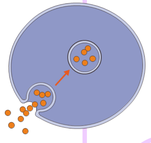
In vivo ocular tolerance was assessed in New Zealand rabbits by applying LTF liposomes as eyedrops for 3 days.

CELL VIABILITY

LTF liposomes were safe at all the concentrations studied (cell viability >80 %)



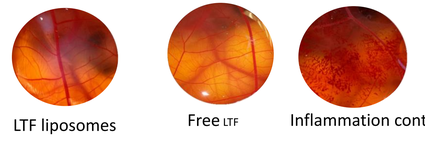




- ✓Average size below 100 nm
- ✓Monomodal population
- ✓Isosmolar

OCULAR TOLERANCE

In vitro ocular tolerance (HET-CAM and CAM-TBS) confirmed that neither LTF nor LTF liposomes were irritating.



In vivo studies confirmed that LTF liposomes possess suitable ocular tolerance

Formulation	Medium Score		Classification
	HET-CAM	Draize	
LTF liposomes	0.07 ± 0.00	0.00 ± 0.00	Non-irritant
Free LTF	0.07 ± 0.00	0.00 ± 0.00	Non-irritant

CONCLUSIONS

LTF liposomes accomplish suitable physicochemical properties to be administered for topical ocular delivery. In addition, they are not cytotoxic in corneal cells and did not cause ocular irritation.

REFERENCES

1. Pharmaceutics 2021 Oct 15;13(10):1698. doi:10.3390/pharmaceutics13101698

ACKNOWLEDGEMENTS

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