ASCRS 2021
Webinar

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The authors have no financial or proprietary interest in the materials or methods mentioned.

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Impact of temperature on the biomechanical effect in epithelium-off corneal cross-linking

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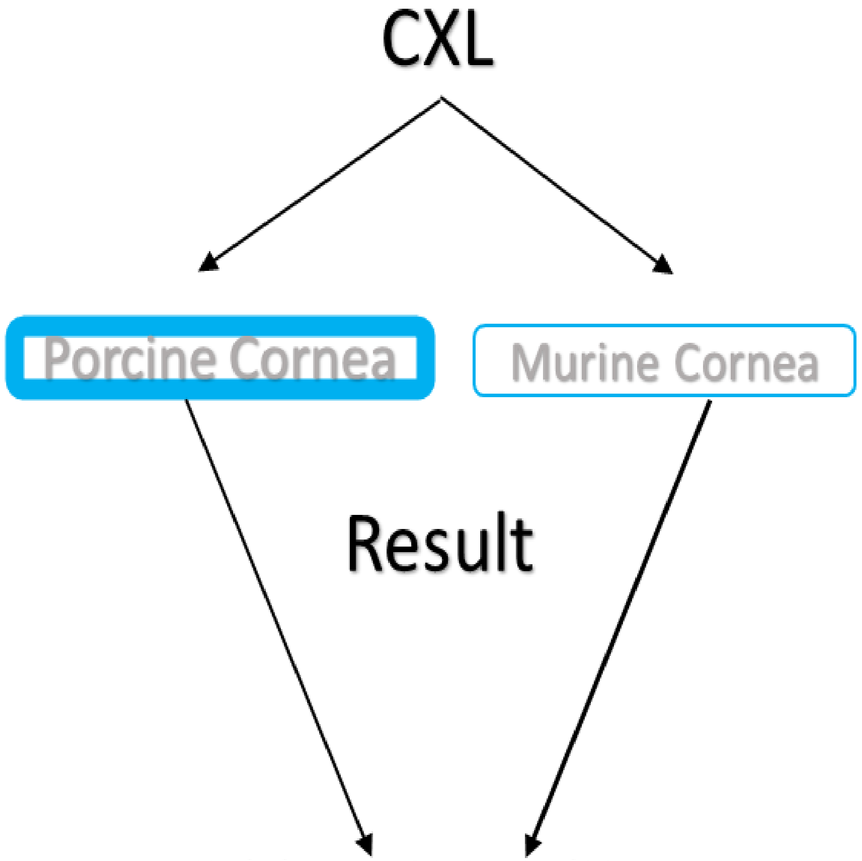
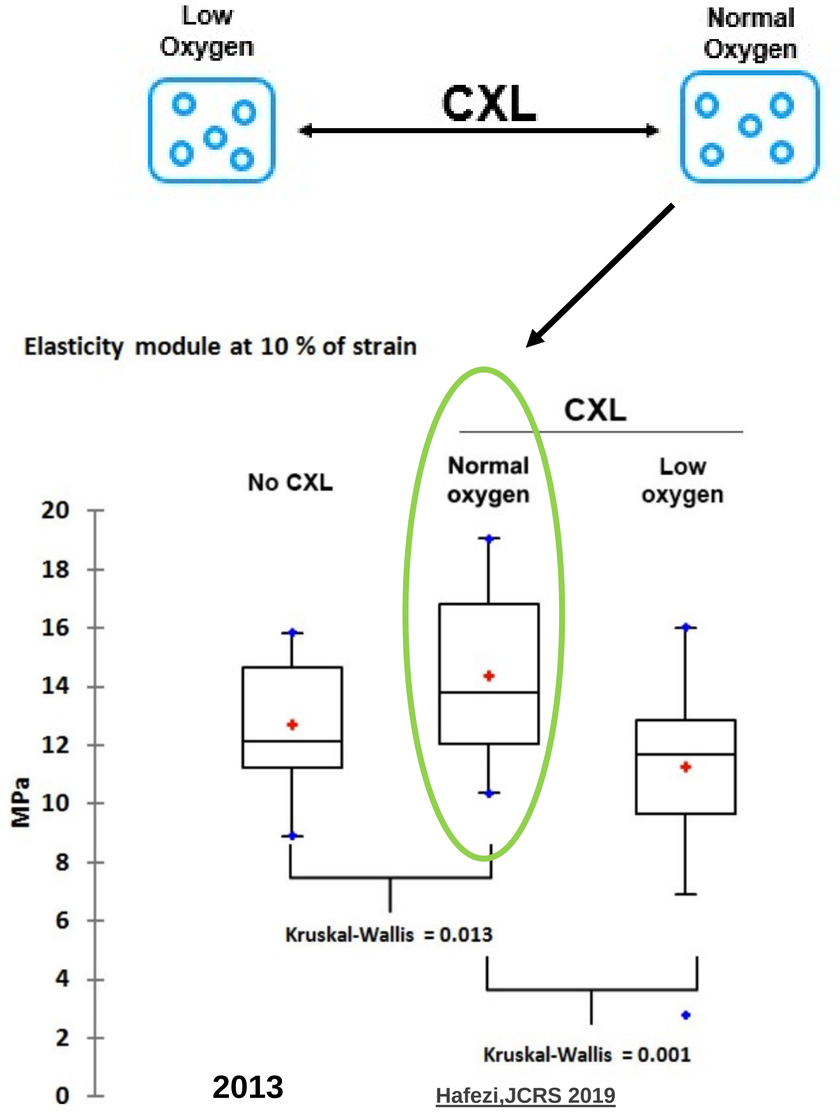
1. Background

OXIGEN IS ESSENTIAL TO CXL



2015



2013

Hafezi,JCRS 2019

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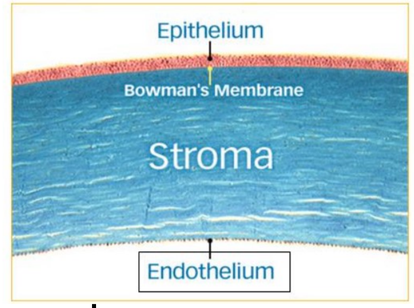
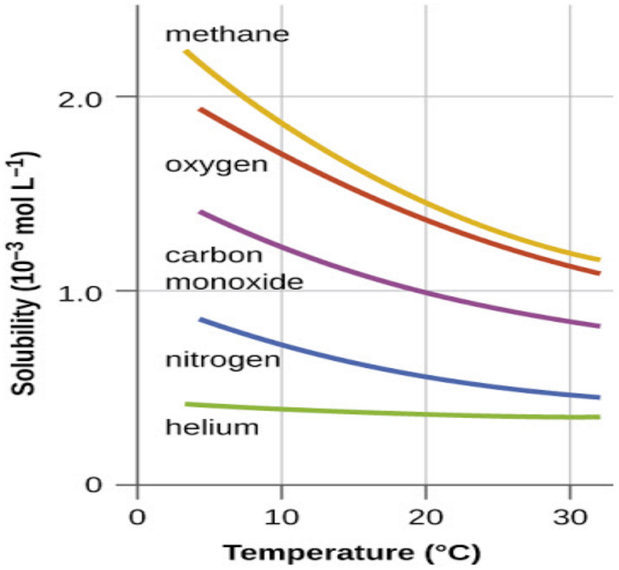
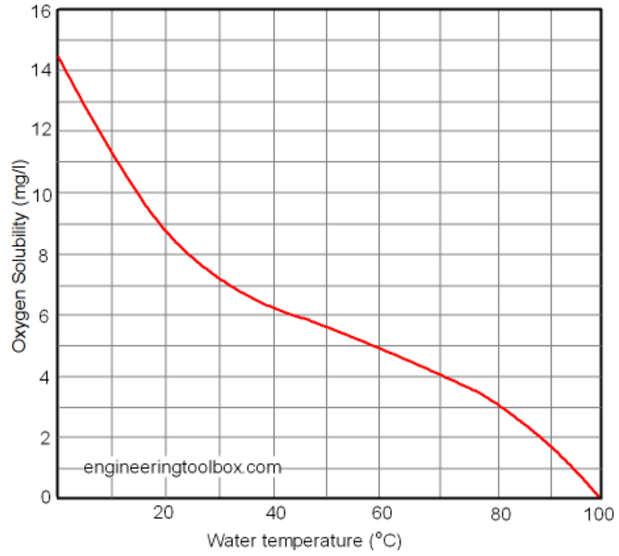
Oxygen availability and Temperature

- Hypothesis: does reduction of corneal temperature increase oxygen availability and therefore might change the biomechanical stiffening effect of CXL.



70% water → Oxygen Solubility in water





https://chem.libretexts.org/Courses/University_of_British_Columbia/CHEM_100%3A_Foundations_of_Chemistry/13%3A_Solutions/13.04%3A_Solutions_of_Gases_in_Water

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Methods

112 porcine corneas

4°C

Control
G4

5.4 J/cm²
G3

56

Cold room

Soaked with riboflavin

24°C

5.4 J/cm²
G1

Control
G2

56

Room temperature

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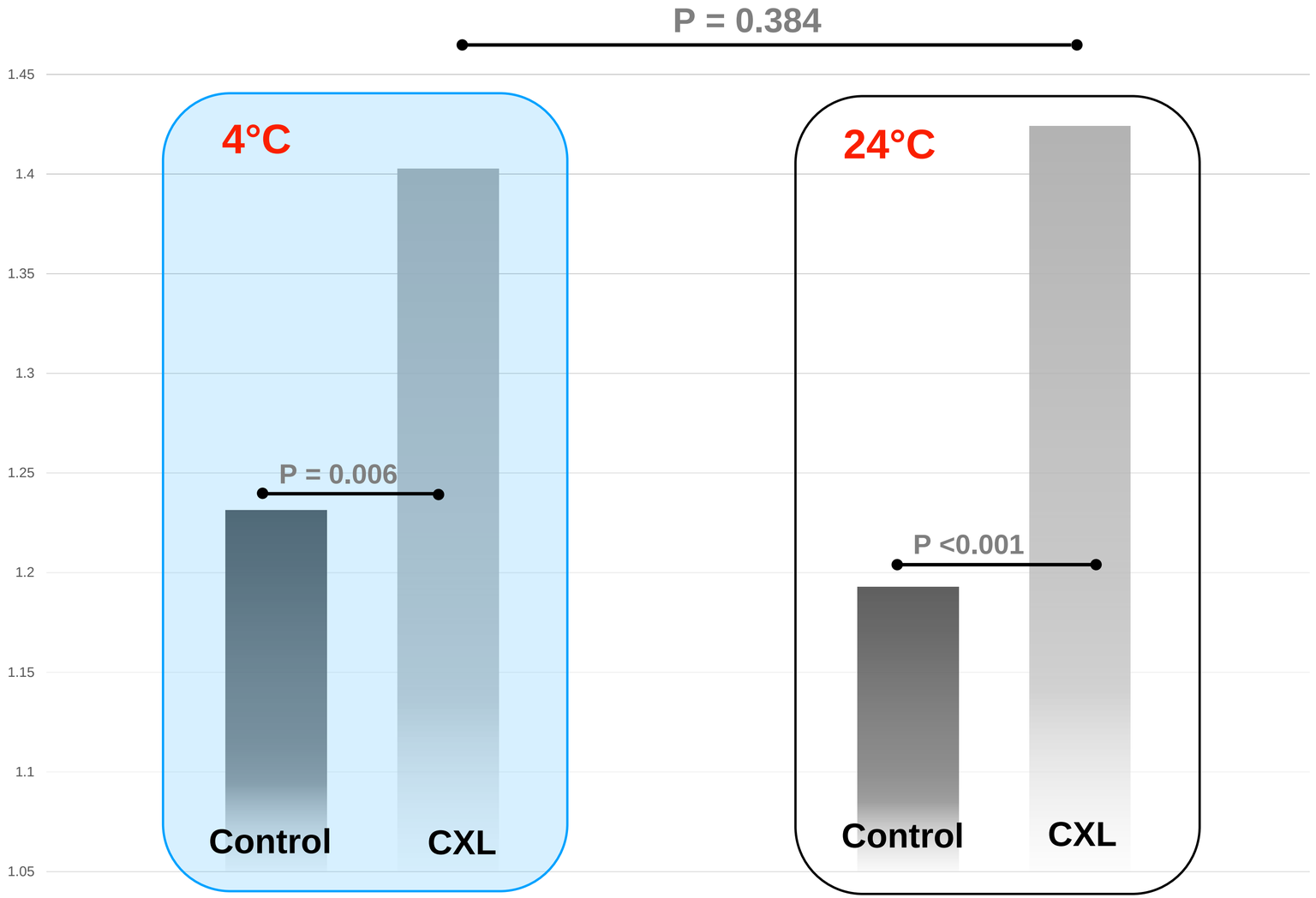
Mean elastic modulus (1-5%)



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Final Messages

- **Oxygen plays a central role in CXL photochemical reaction;**
- **Although oxygen should be present in greater concentrations in the corneal stroma at lower tissue temperatures, decreasing corneal temperature during a CXL procedure did not significantly change the CXL stiffening effect.**

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