

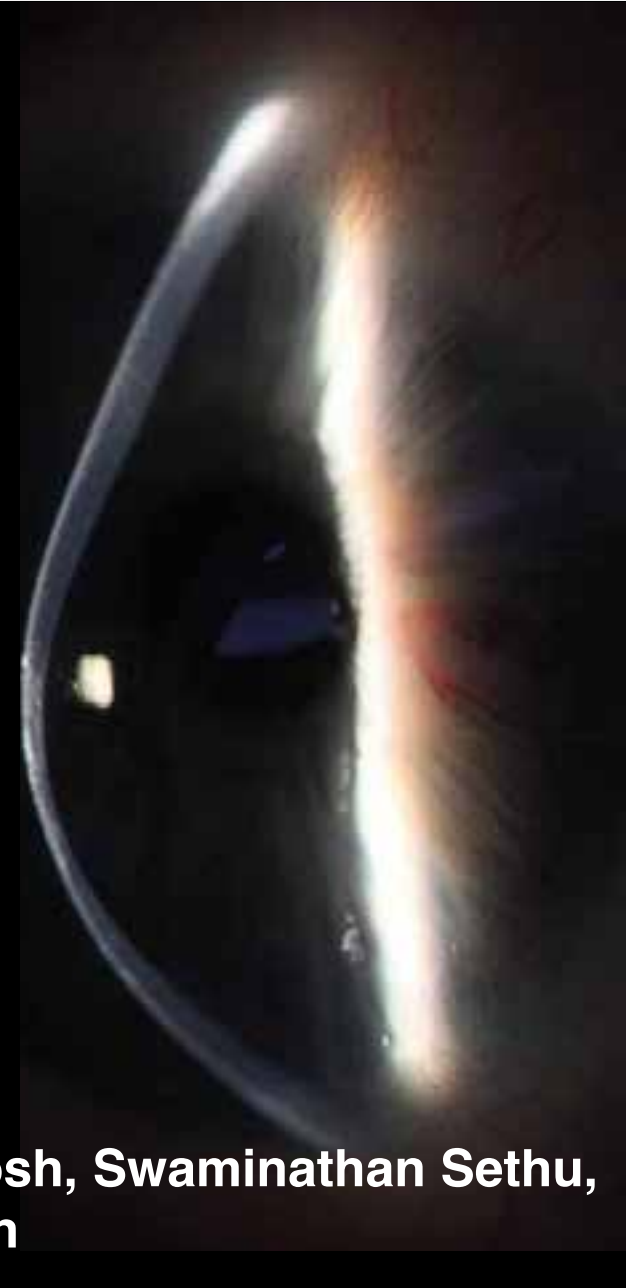
POST LASIK ECTASIA :

*understanding the
mechanistic pathway
beyond topography*

Dr Kanchan R. Sainani
Fellow, Narayana Nethralaya
Bangalore, India

**Co-Authors : Natasha Pahuja, Rohit Shetty, Arkasubhra Ghosh, Swaminathan Sethu,
Pallak Kusumgar, Rashmi Deshmukh**

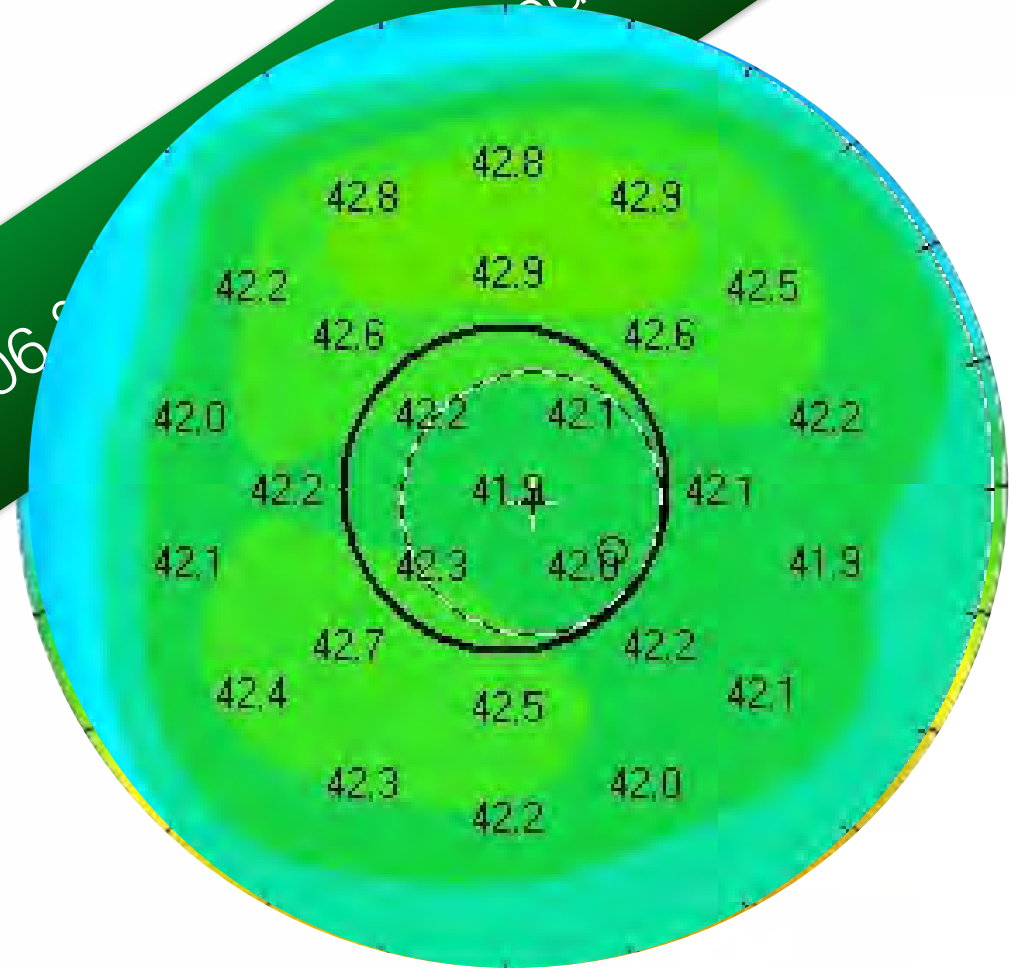
No financial disclosures



POST LASIK



POST LASIK ECTASIA: Rare (0.04-0.06%)



Randleman JB. Evaluating risk factors for ectasia: what is the goal of assessing risk? *J Refract Surg.* 2010;26:236–237.

Post LASIK ectasia

Known factors

Unknown factors

Natural
course of
Keratoconus

Ectasia Risk
scoring
factors

Corneal
Biomechanics

Missed FFKC

Current screening Modalities

Risk Assessment for Ectasia after Corneal Refractive Surgery

J. Bradley Randleman, MD,^{1,2} Maria Woodward, MD,¹ Michael J. Lynn, MS,³ R. Doyle Stulting, MD, PhD^{1,2}

Table 5. Ectasia Risk Factor Score System

Parameter	Points
Topography pattern	0-11
RSB thickness (μm)	0-11
Age (yrs)	0-11
CT (μm)	0-11
MRSE (D)	0-11

Original research

Pentacam top indices for diagnosing subclinical and definite keratoconus

ABT = asymmetric bowtie; CT = preoperative corneal thickness; D = diopters; FFKC = for

Is this sensitive and specific enough?

Association Between the Percent Tissue Altered and Post-Laser In Situ Keratomileusis Ectasia in Eyes With Normal Preoperative Topography

MARCONY R. SANTHIAGO, DAVID SMADJA, BEATRIZ F. GOMES, GLAUCO R. MELLO, MARIO L.R. MONTEIRO, STEVEN E. WILSON, AND J. BRADLEY RANDLEMAN

Post LASIK ectasia

Known factors

Unknown factors

Natural course of Keratoconus

Ectasia Risk scoring factors

Corneal Biomechanics

Missed FFKC

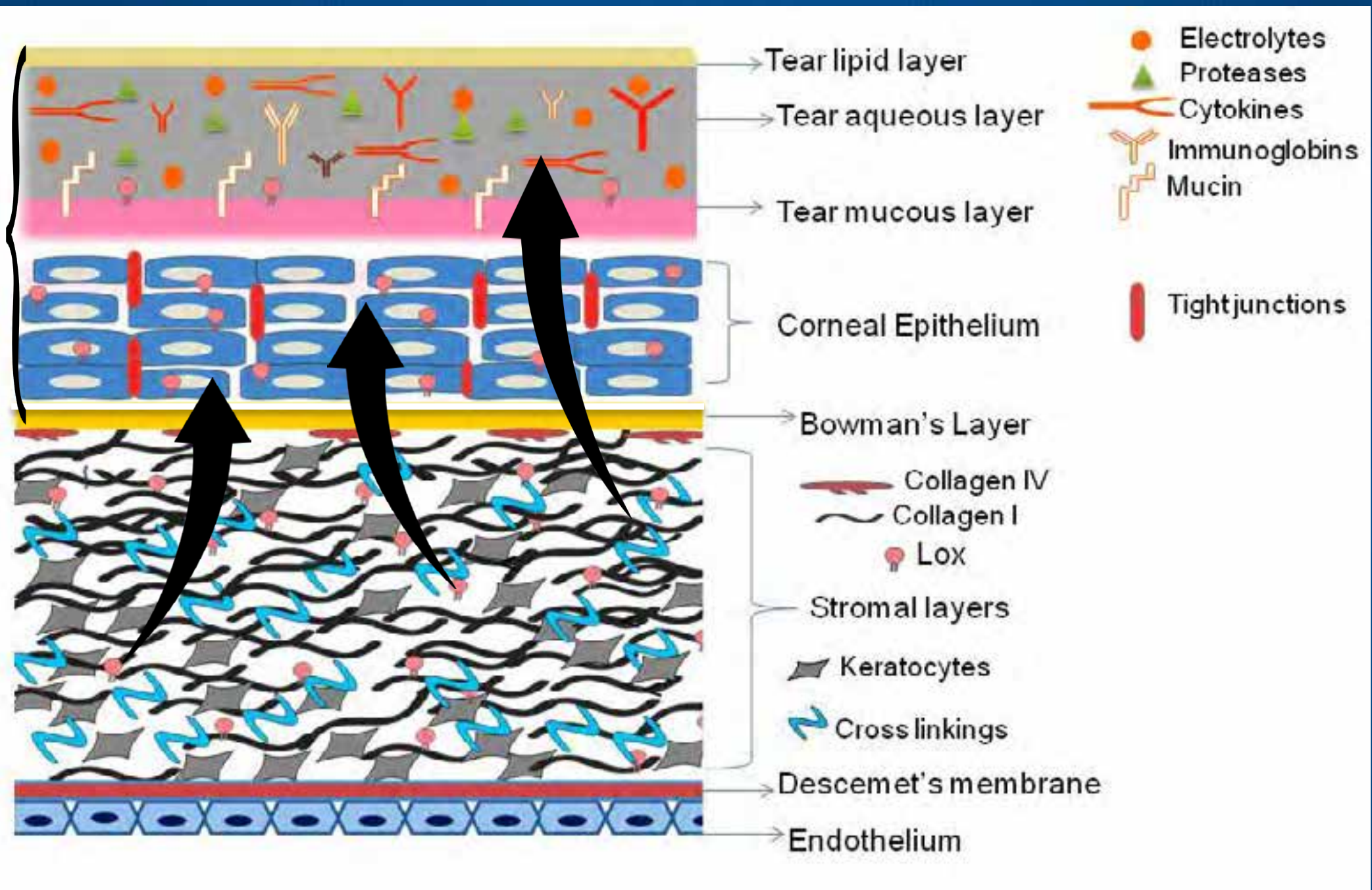
?

What is ectasia ?

Research question: Study this molecular signature



Molecular signature causing collagen degradation

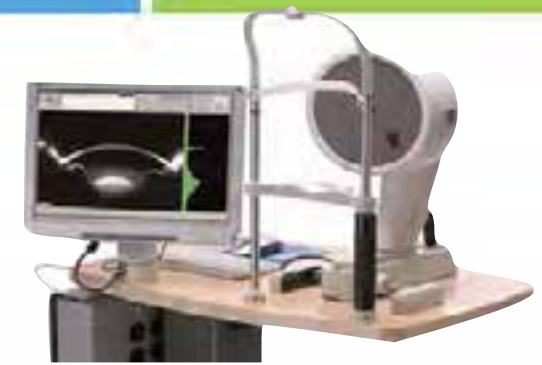


What causes ectasia beyond topography?

Study design

Post LASIK Ectasia cases (n=6)
referred from other centres (over 8
months)

Post LASIK controls cases (n=7)
From our centre (Age, gender,
duration since sx matched)



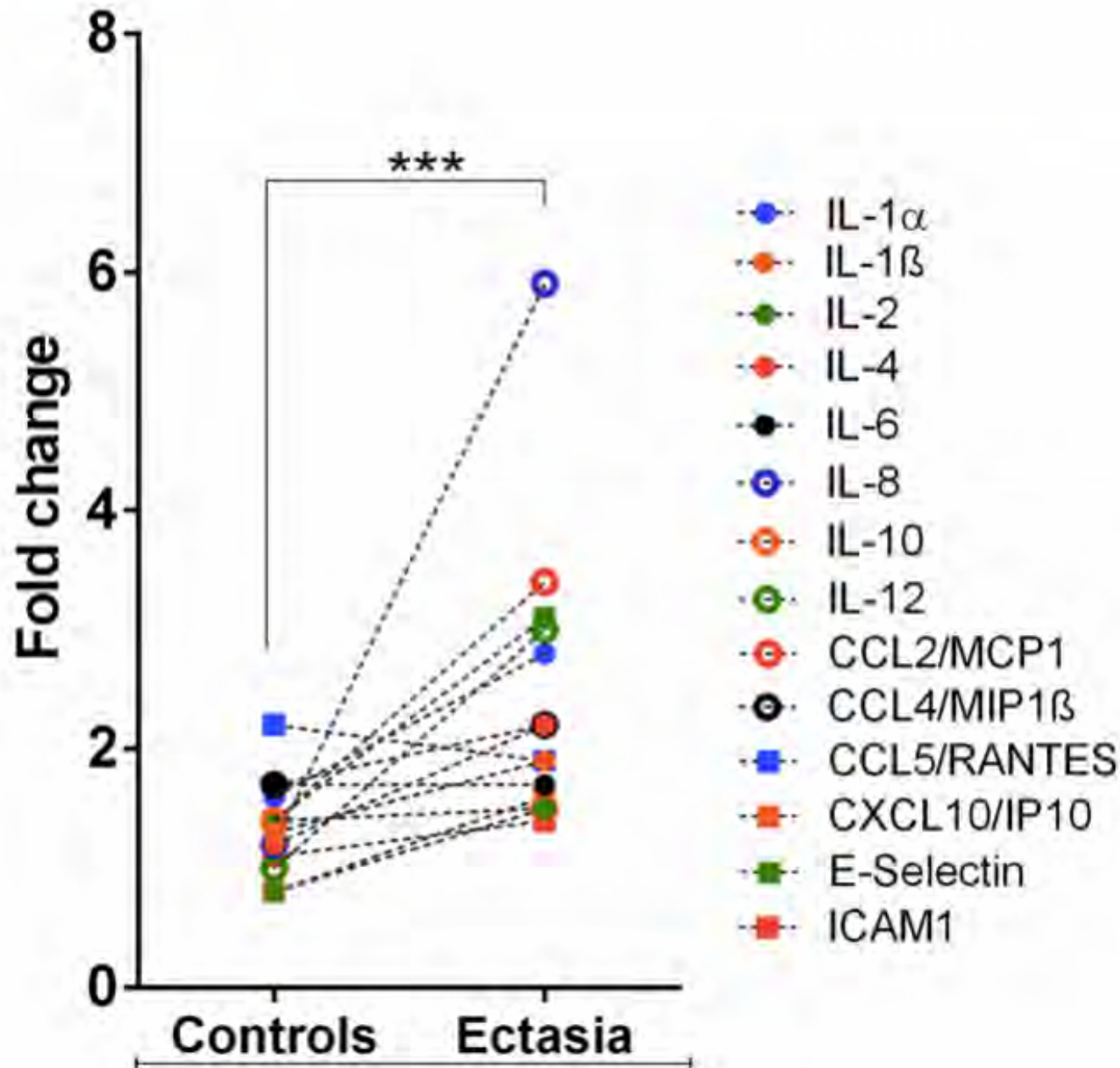
Corneal topography



Tear collection
and analysis



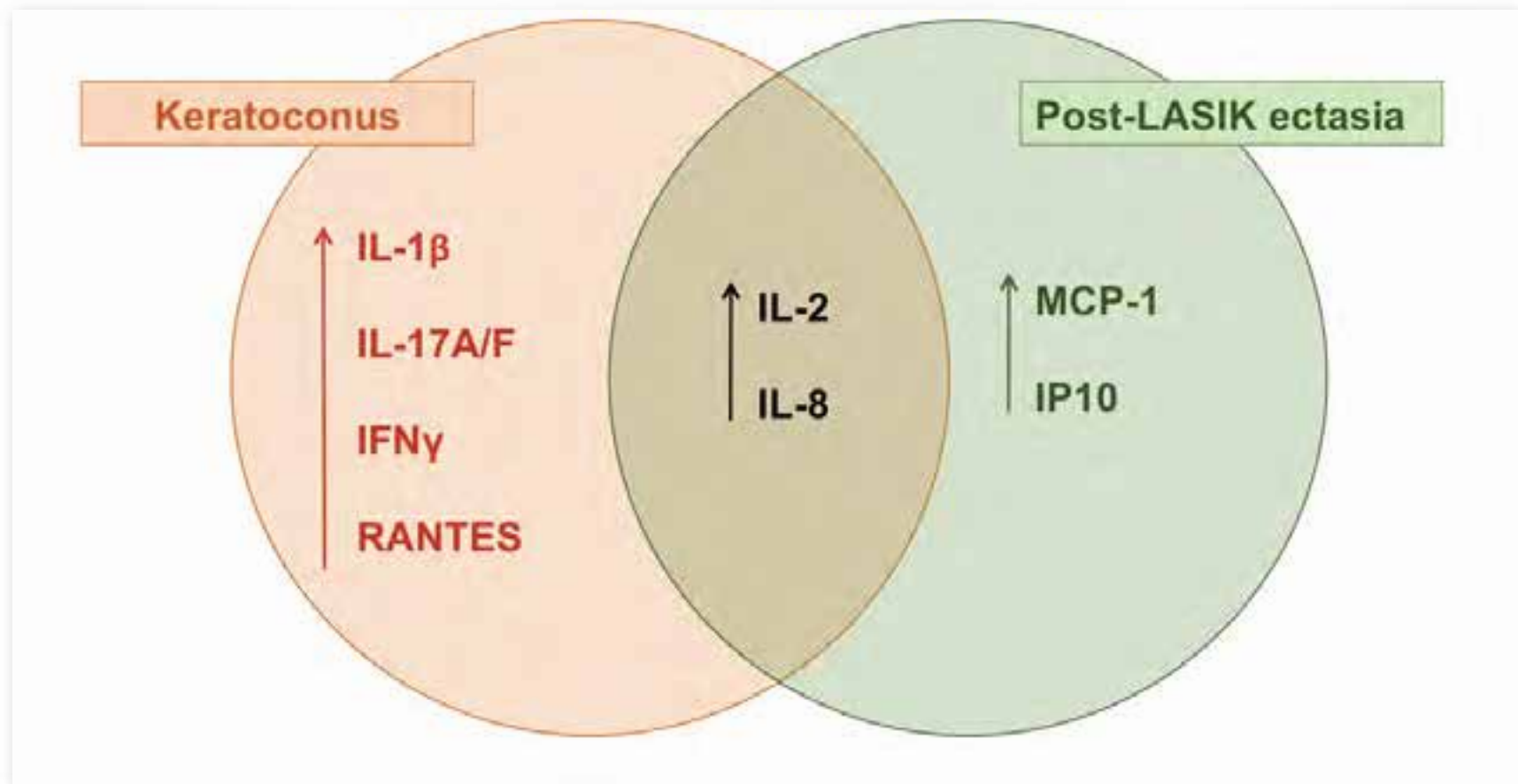
In vivo confocal
microscopy



Tear Inflammatory Mediators in controls and Ectasia cases

Increased inflammatory markers

When compared to Progressive keratoconus



	Control (n = 7; 14 eyes)			Ectasia			P value
	Mean ±SEM	Media n	Range	Mean ±SEM	Median	Range	
Total	5.3±1.3	8.3	0.0-12.5	82.6±2.8	81.2	66.7-95.8	<0.0001
OSDI - Discomf ort scale	9.2±0.8	8.3	6.3-14.6	74.3±2.1	73.9	64.6-85.4	<0.0001
OSDI - Vision scale	13.0±0.9	12.5	8.3-20.8	65.9±1.7	64.6	58.3-75.0	<0.0001

Ectasia
(Biomarkers study)

Tears-
Inflammatory
mediators



How does this
change my
practice ?



Looking beyond
topography

What causes ectasia beyond topography?

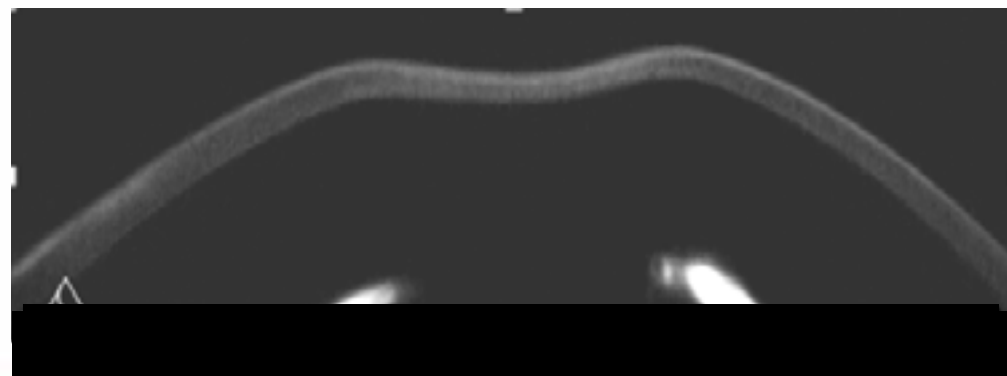
Points to ponder

Cornea

Elevated Expression of Matrix Metalloproteinase-9 and Inflammatory Cytokines in Keratoconus Patients Is Inhibited by Cyclosporine A

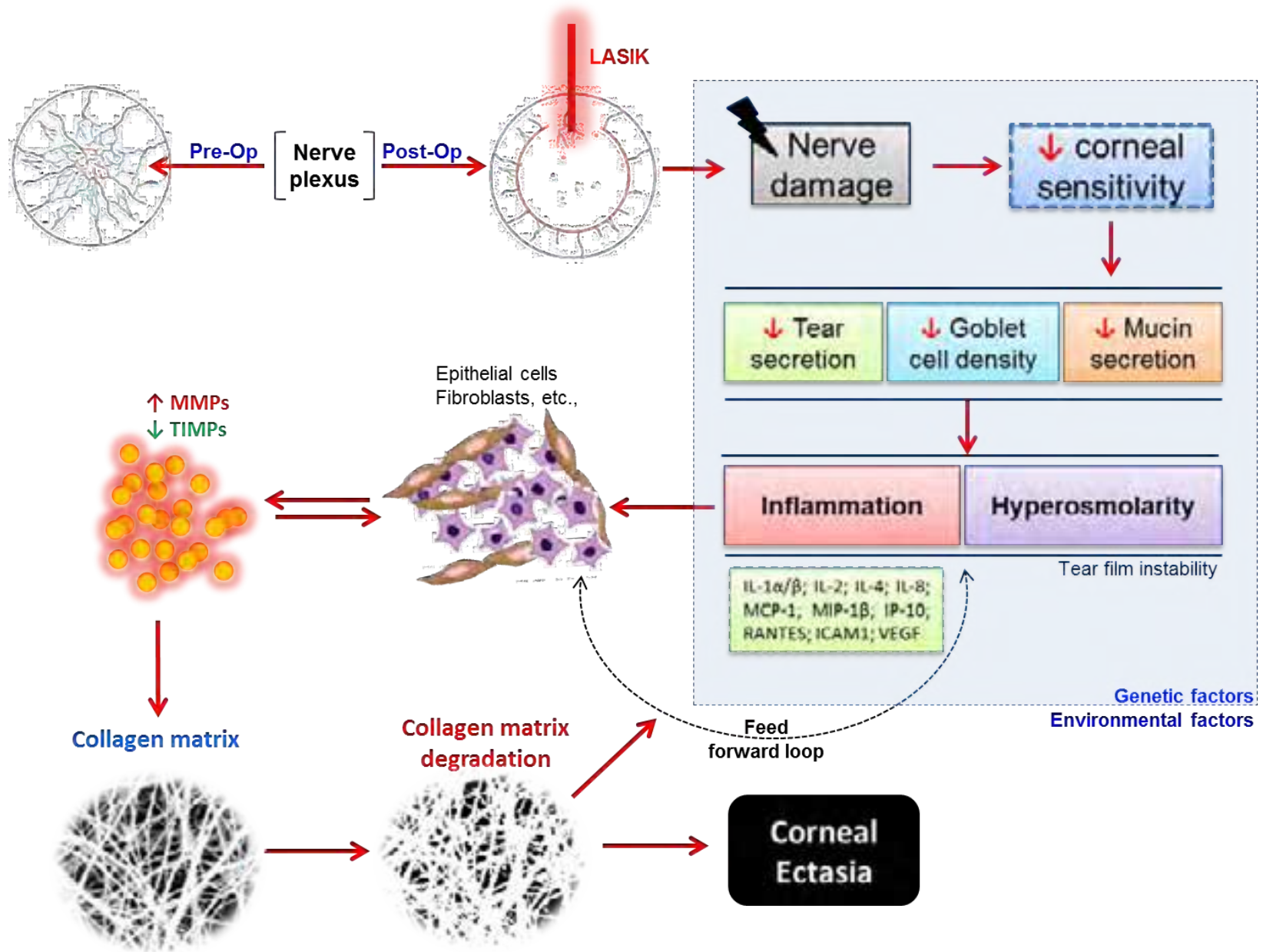
Rohit Shetty,¹ Anuprita Ghosh,² Rayne R. Lim,³ Murali Subramani,² Krina Mihir,² Reshma A. R.,² Ashwini Ranganath,¹ Sriharsha Nagaraj,¹ Rudy M. M. A. Nuijts,⁴ Roger Beuerman,³ Reshma Shetty,² Debashish Das,² Shyam S. Chaurasia,^{3,5,6} Abhijit Sinha-Roy,² and Arkasubhra Ghosh^{2,3}

Weaker Biomechanics



Mechanistic trigger

PROPOSED ECTASIA MODEL



What was known

Cornea

Elevated Expression of Matrix Metalloproteinase-9 and Inflammatory Cytokines in Keratoconus Patients Is Inhibited by Cyclosporine A

Rohit Shetty,¹ Anuprita Ghosh,² Rayne R. Lim,³ Murali Subramani,² Krina Mibir,² Reshma A. R.,² Ashwini Ranganath,¹ Sriharsha Nagaraj,¹ Rudy M. M. A. Nuijts,⁴ Roger Beuerman,⁵ Reshma Shetty,² Debashish Das,² Shyam S. Chaurasia,^{5,6} Abhijit Sinha-Roy,² and Arkasubhra Ghosh^{1,3}

Inflammation - Collagen degradation - Cornea ectasia

Novel finding

Novel biomarkers (MCP1) causing dendritic cell migration - targeted approach

Corneal topography

Corneal Biomechanics

Cellular mechanisms

Ectasia
(Biomarkers study)

Tears-
Inflammatory
mediators



How does this
change my
practice ?

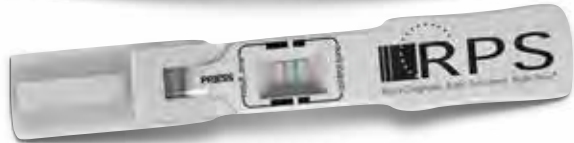


Looking beyond
topography

What causes ectasia beyond topography?

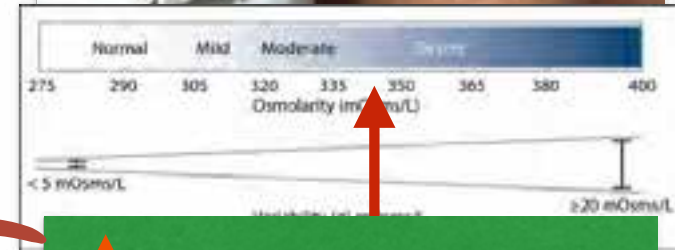
Change my practice?

Tear MMP 9 Kit



↑ OSDI

Tear osmolarity



↑ Inflammation

↑ Inflammation

Treat inflammation


Refractive surgery



Clinicians



Scientists



Genes,
Repair & Regeneration in
Ophthalmic
Workstation



Translating Research in to Practice»

Thank you