

Ocular surface disease
really matters:
It's not just tears anymore

*An innovative approach
to diagnosis and treatment*

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Why Treat Dry Eye Disease?

- ▶ One of the most common eye diseases seen
 - ▶ 2005 Gallup Survey – 92.5 million Americans suffer from dry eye
 - ▶ Primary or secondary reason for seeing ECP:
 - ▶ 40% of Ophthalmologist visits; 45% of Optometrist visits*
- ▶ Patients with dry eye are extremely frustrated – 2009 Gallup Survey
 - ▶ 81% of patients report that their dry eye condition is frustrating (n = 782)[†]
 - ▶ 80% of patients wish there was something more effective to treat their dry eye[†]
- ▶ Dry eye disease (DED) is the “hot topic” in the United States
 - ▶ More public awareness with advertisements, new diagnostics and new treatments
 - ▶ Critical to address for better outcomes with laser correction vision, cataract surgery, and premium intraocular lenses (IOLs)

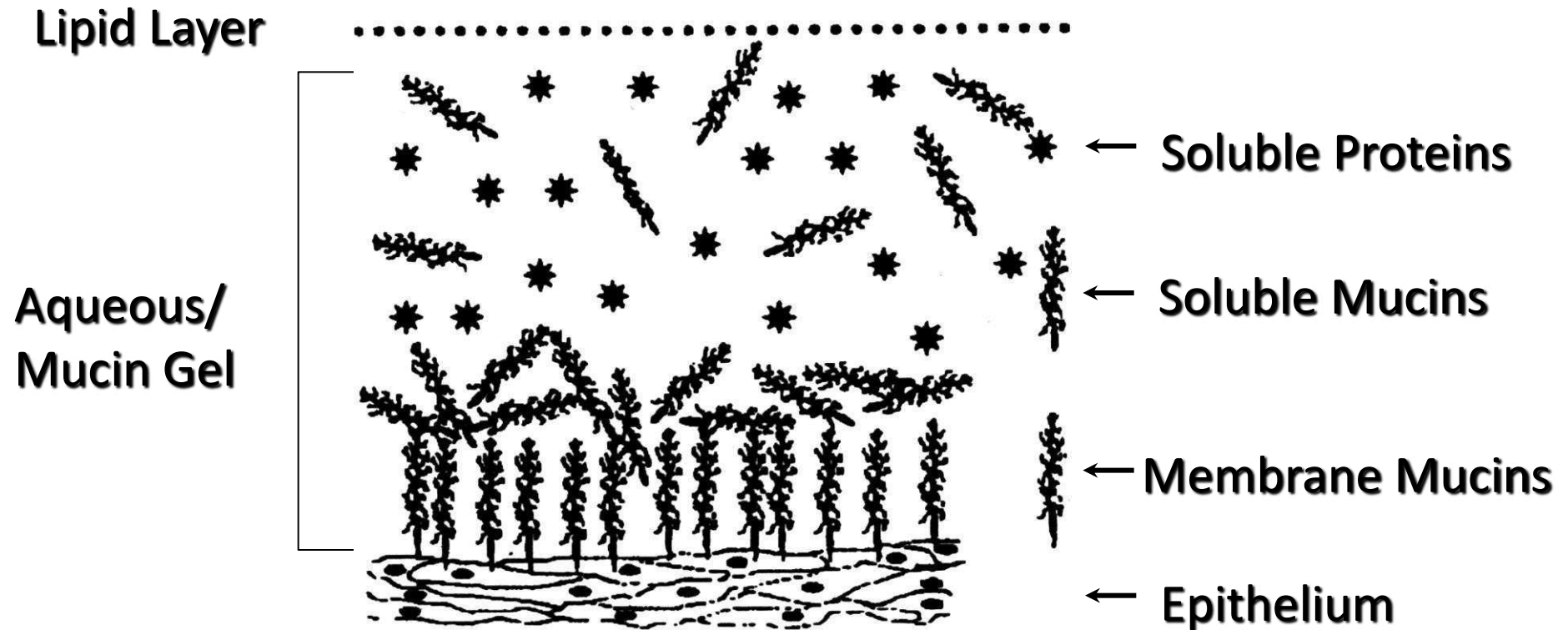
Dry Eye Disease Today vs 20 Years Ago

Dry Eye is an inflammatory process

Dry Eye Disease Today vs 20 Years Ago

- Dry Eye is an inflammatory process
- There are now treatments to treat the underlying cause of dry eye syndrome (not just palliative)
- Dry eye disease is a chronic progressive disease
- Dysfunctional Tear Syndrome (DTS) is a much better term (quality, not just quantity)

The Normal Tear Film: 3 Major Components



Healthy Tears

- ▶ A **complex mixture** of proteins, mucin, and electrolytes
 - ▶ Antimicrobial proteins: lysozyme, lactoferrin
 - ▶ Growth factors and suppressors of inflammation: epidermal growth factor (EGF), interleukin-1RA (IL-1RA)
 - ▶ Soluble mucin 5AC secreted by goblet cells for viscosity
 - ▶ Electrolytes for proper osmolarity

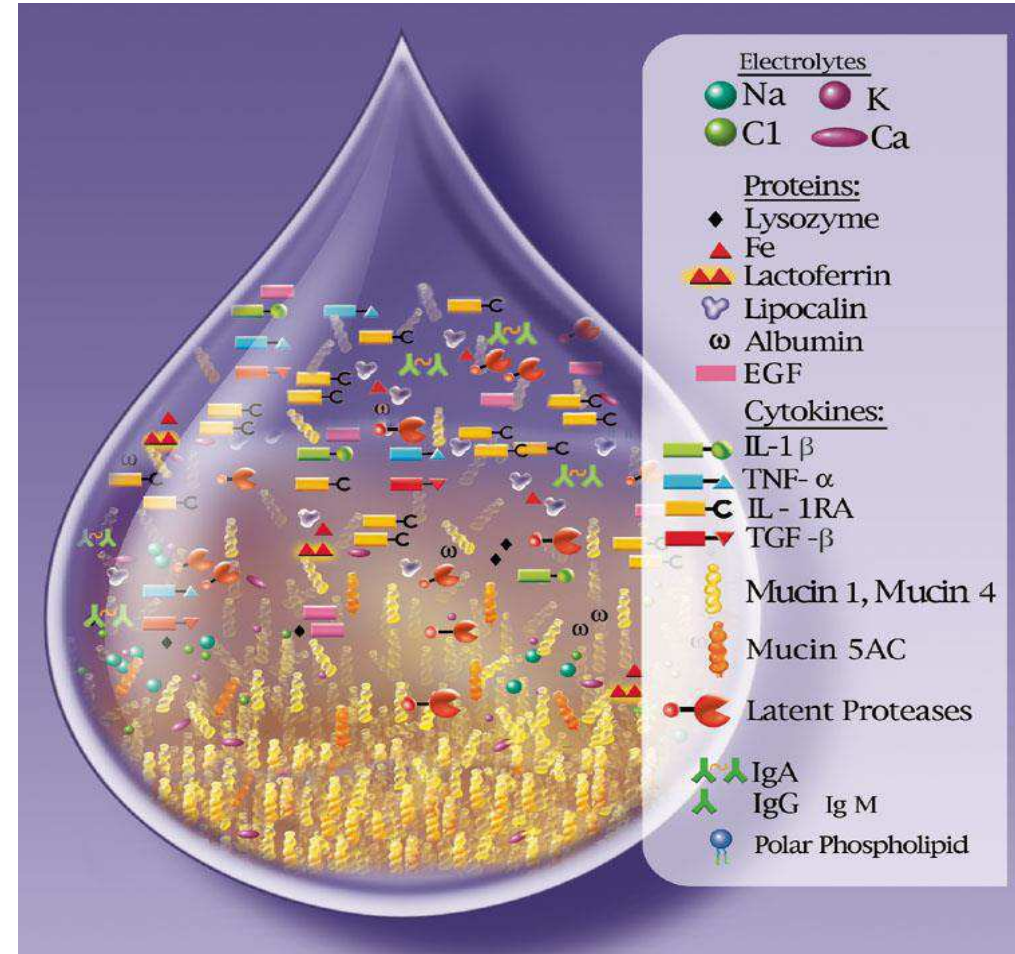


Image adapted from: *Dry Eye and Ocular Surface Disorders*; New York, NY: Marcel Dekker; 2004.

Functions of a Healthy Tear Film

- Optical clarity, refractive power
- Ocular surface comfort, lubrication
- Protection from environmental and infectious insults
 - Antibacterial proteins, antibodies, complement
 - Reflex tears flush away particles
- Trophic environment for corneal epithelium
 - Necessary electrolytes maintain pH
 - Protein factors for growth and wound healing
 - Antioxidants

Tears in Chronic Dry Eye

- Decrease in many proteins
- Decreased growth factor concentrations
- Altered cytokine balance promotes inflammation
- Soluble mucin 5AC greatly decreased
 - Due to goblet cell loss
 - Affects viscosity of tear film
- Proteases activated
- Increased electrolytes

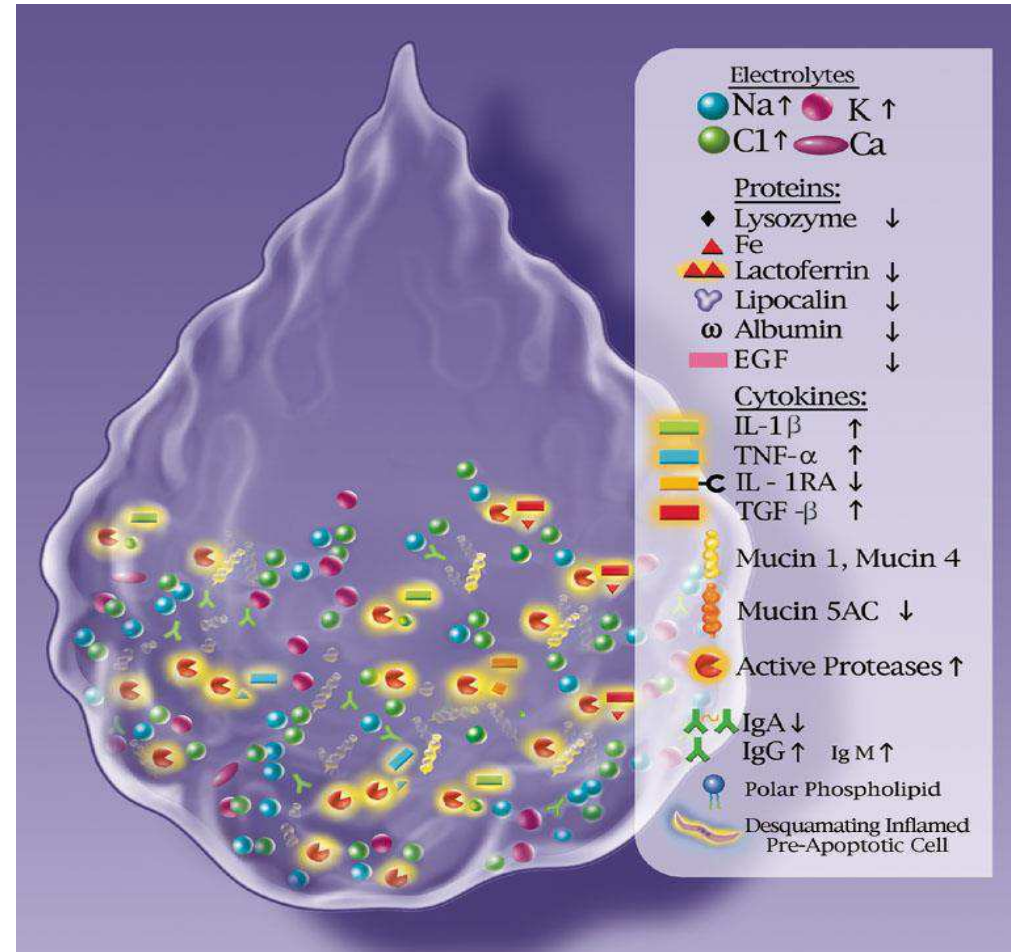


Image adapted from: *Dry Eye and Ocular Surface Disorders*; New York, NY: Marcel Dekker; 2004

Effects of Altered Tear Composition in Chronic Dry Eye

- Ocular surface tissue environment altered
 - Lubrication compromised due to poor viscosity
 - Increased osmolarity
 - Imbalanced growth factors and cytokines fail to promote normal epithelial growth
- Ocular surface damage
 - Loss of corneal epithelial integrity
 - Squamous metaplasia of conjunctival epithelium

ITF Guidelines- Severity Based Approach

Severity Level	1	2	3	4
Symptoms	Mild to moderate	Moderate to severe	Severe	Extremely severe
Conjunctival Signs	Mild to moderate	Staining	Staining	Scarring
Corneal Staining		Mild punctate staining	Marked punctate staining; central staining; filamentary keratitis	Severe staining; corneal erosions
Other Signs		Tear film; vision (blurring)		

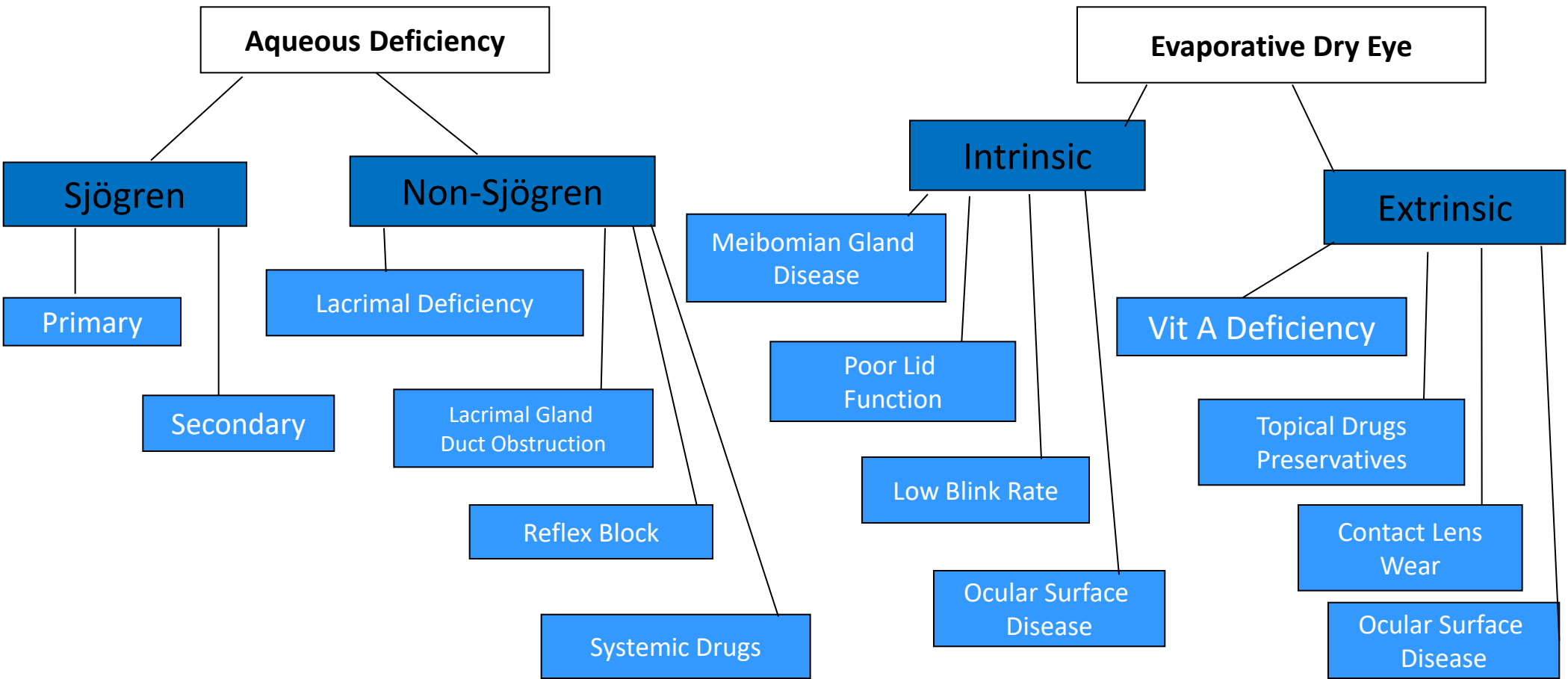
Treatment Options

<ul style="list-style-type: none"> • Patient education • Environmental modification • Preserved tears • Control allergy 	<ul style="list-style-type: none"> • Unpreserved tears • Gels, ointments • Cyclosporine A • Topical steroids • Secretagogues • Nutritional support 	<ul style="list-style-type: none"> • Oral tetracyclines • Punctal plugs (once inflammation is controlled) 	<ul style="list-style-type: none"> • Systemic anti-inflammatory therapy • Oral cyclosporine • Acetylcysteine • Moisture goggles • Surgery (punctal cautery)
<i>If no improvement, add level 2 treatments</i>	➔ <i>If no improvement, add level 3 treatments</i>	➔ <i>If no improvement, add level 4 treatments</i>	➔

Meibomian Gland Disease – Treatment Options
Lid hygiene; thermomassage; oral tetracyclines

Dry Eye Disease

Traditional Diagnostic Subcategories



Dysfunctional Tear Syndrome

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CME Supplement to:

Current Opinion in Ophthalmology

Dysfunctional Tear Syndrome: Dry Eye Disease and Associated Tear Film Disorders - New Strategies for Diagnosis and Treatment

Co-chairs: Mark S. Milner, MD, Kenneth A. Beckman, MD, and Jodi I. Luchs, MD, on Behalf of the Cornea, External Disease, and Refractive Society (CEDARS) Dysfunctional Tear Syndrome Panel


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CME SUPPLEMENT

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Dysfunctional tear syndrome: dry eye disease and associated tear film disorders - new strategies for diagnosis and treatment

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Dysfunctional tear syndrome (DTS) is a common and complex condition affecting the ocular surface. The health and normal functioning of the ocular surface is dependent on a stable and sufficient tear film. Clinician awareness of conditions affecting the ocular surface has increased in recent years because of expanded research and the publication of diagnosis and treatment guidelines pertaining to disorders resulting in DTS, including the Delphi panel treatment recommendations for DTS (2006), the International Dry Eye Workshop (DEWS) (2007), the Meibomian Gland Dysfunction (MGD) Workshop (2011), and the updated Preferred Practice Pattern guidelines from the American Academy of Ophthalmology pertaining to dry eye and blepharitis (2013). Since the publication of the existing guidelines, new diagnostic techniques and treatment options that provide an opportunity for better management of patients have become available. Clinicians are now able to access a wealth of information that can help them obtain a differential diagnosis and treatment approach for patients presenting with DTS. This review provides a practical and directed approach to the diagnosis and treatment of patients with DTS, emphasizing treatment that is tailored to the specific disease subtype as well as the severity of the condition.

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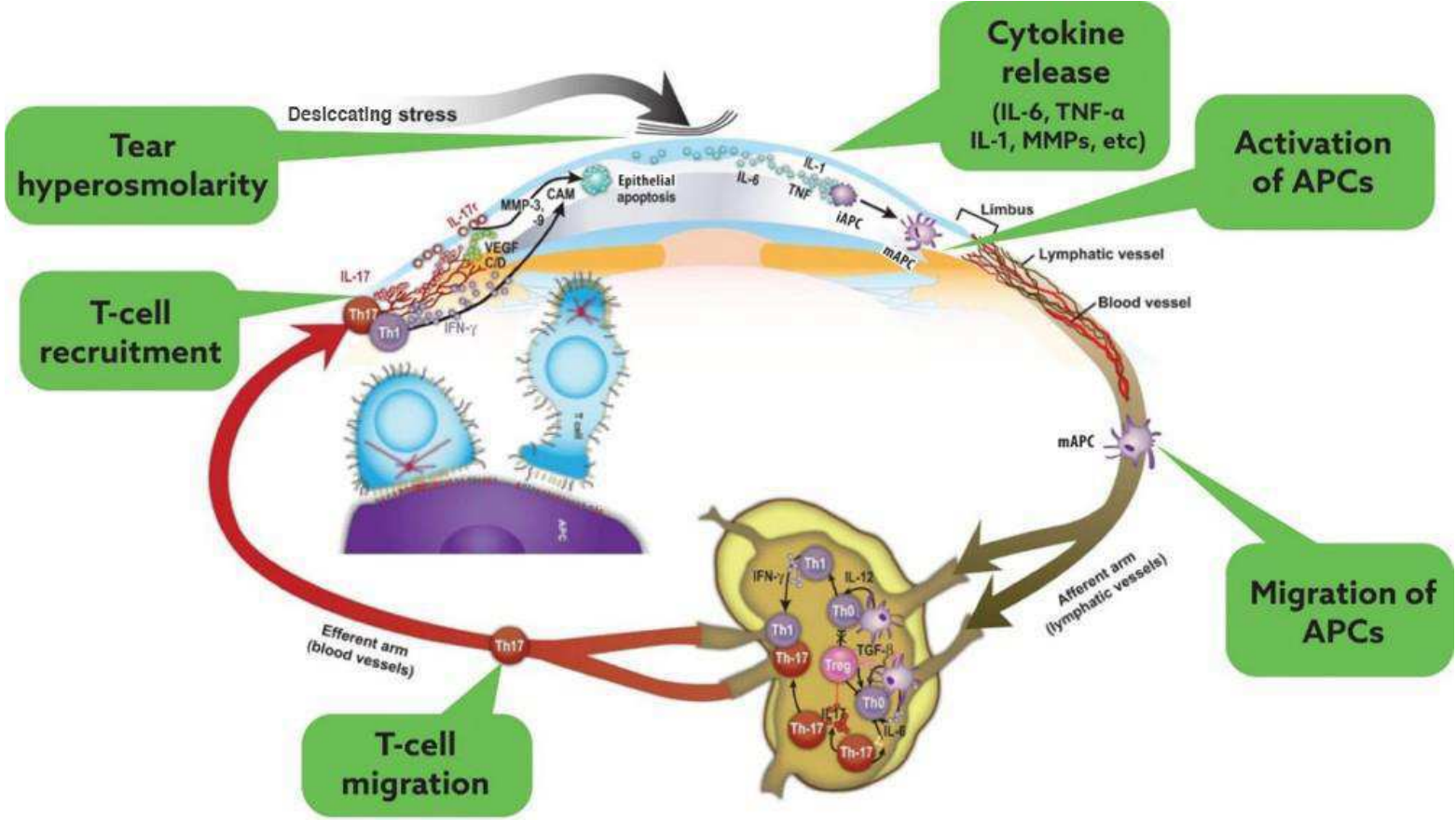
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A fluorescein angiography image of an eye, showing a bright spot in the retina. The image is in shades of blue and black, with a prominent bright spot in the upper right quadrant. The text "Pathophysiology of Dry Eye Disease" is overlaid on the image.

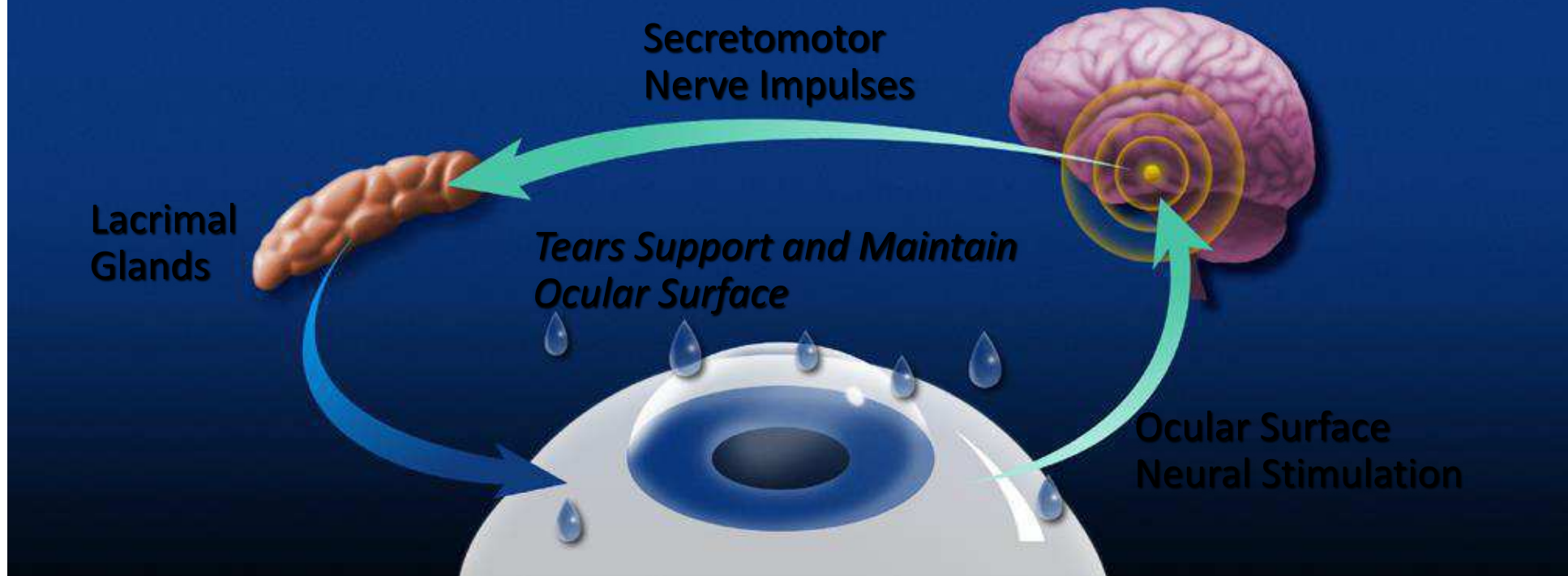
Pathophysiology of Dry Eye Disease

Dry Eye Immuno-inflammatory Pathway

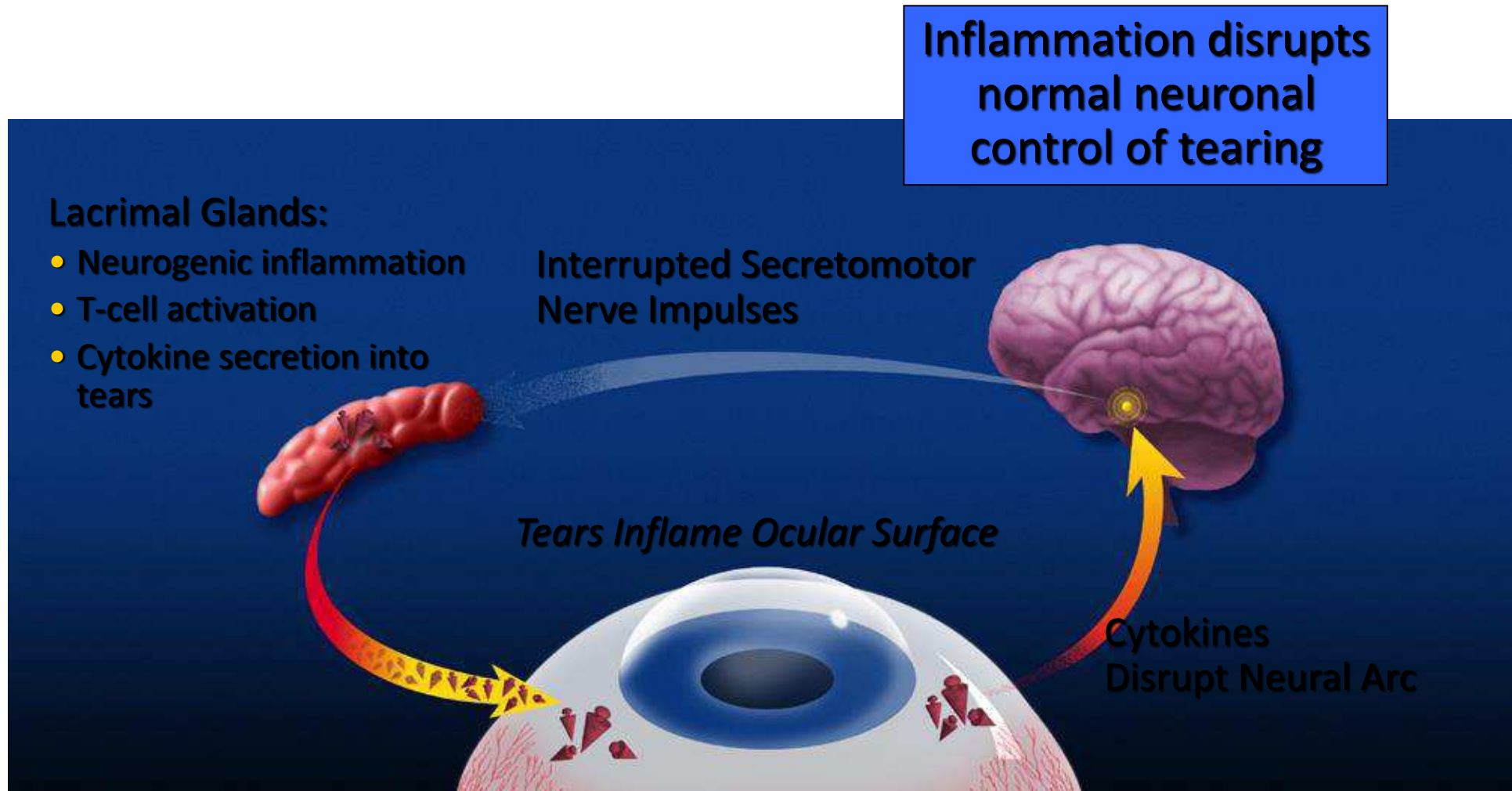


The Healthy Eye

Normal tearing depends on a neuronal feedback loop



Dry Eye Disease: An Immune-Mediated Inflammatory Disorder



Dry Eye Disease: Predisposing Factors

- Aging
- Menopause - decreased androgens
- Allergy response
- Environmental stresses
 - Contact lens wear
 - Wind
 - Air pollution
 - Low humidity: Heating/Air conditioning
 - Lack of sleep
 - Use of computer terminals
- Ocular surgery (LASIK, corneal transplant)
- Medications

Medications That May Contribute to Dry Eye Disease

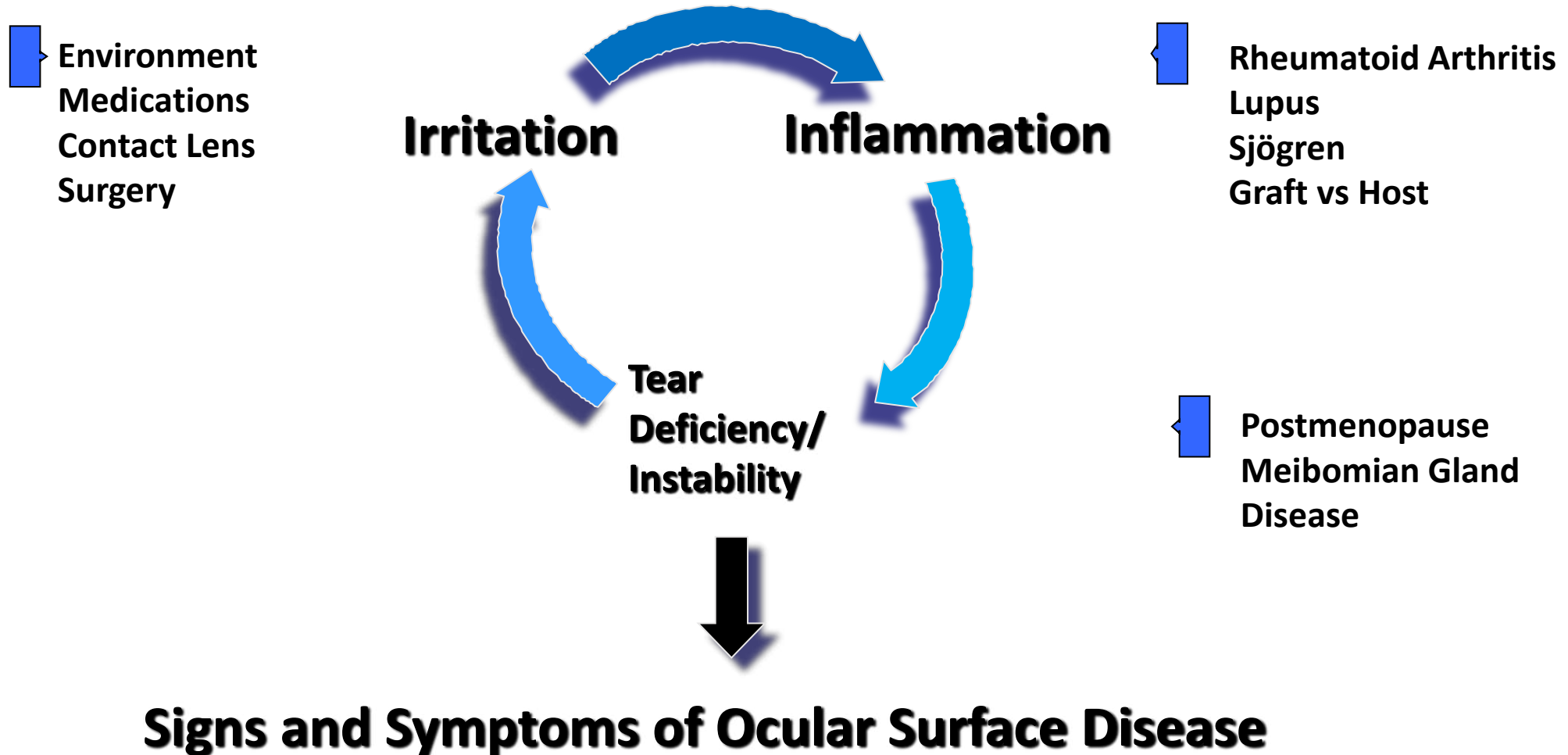
- Systemic

- Antihypertensives
- Antiandrogens
- Anticholinergics
- Antidepressants
- Cardiac antiarrhythmic drugs
- Parkinson disease agents
- Antihistamines

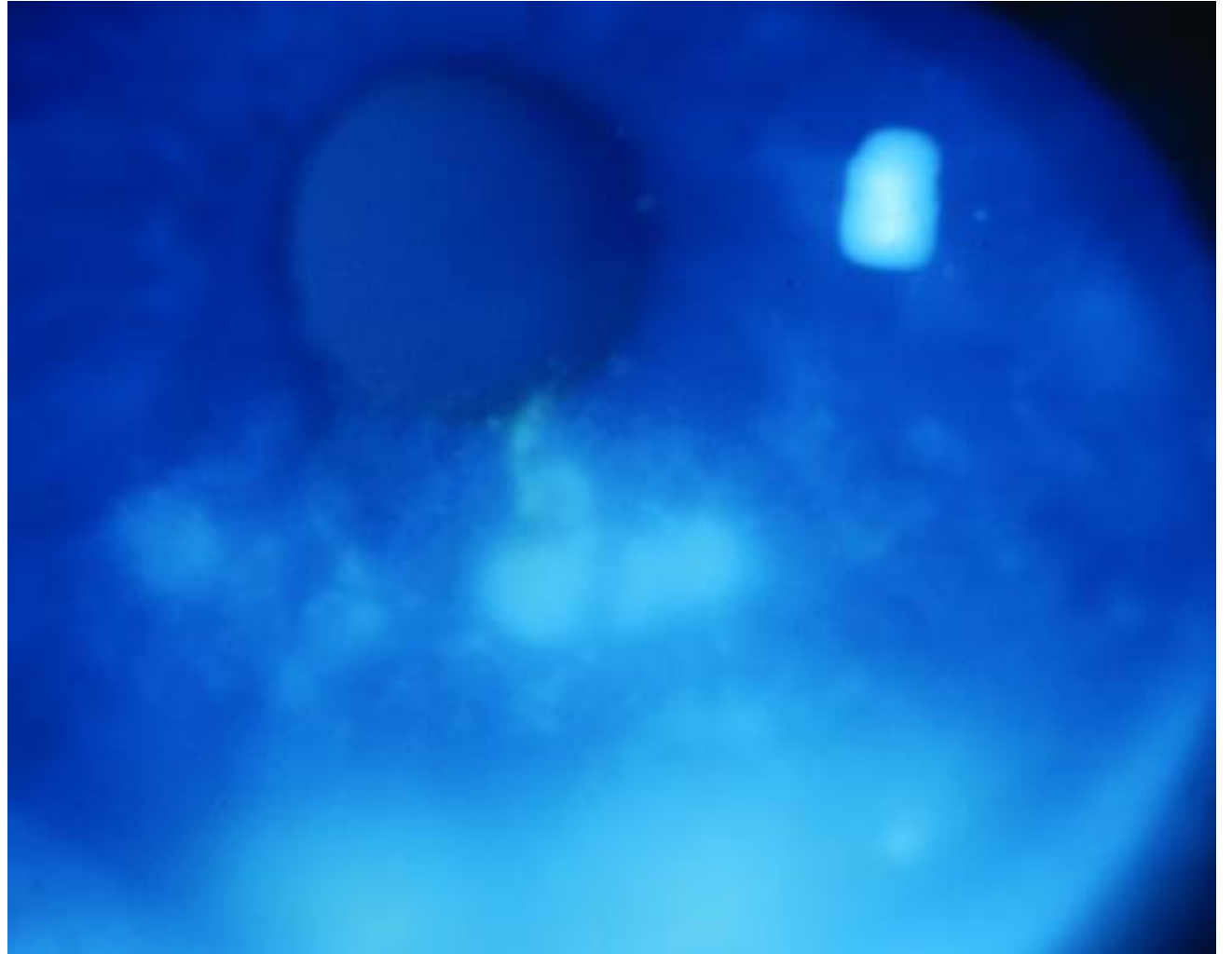
- Topical

- Preservatives in tears
- Topical antihistamines

Triggers of Dysfunctional Tear Syndrome



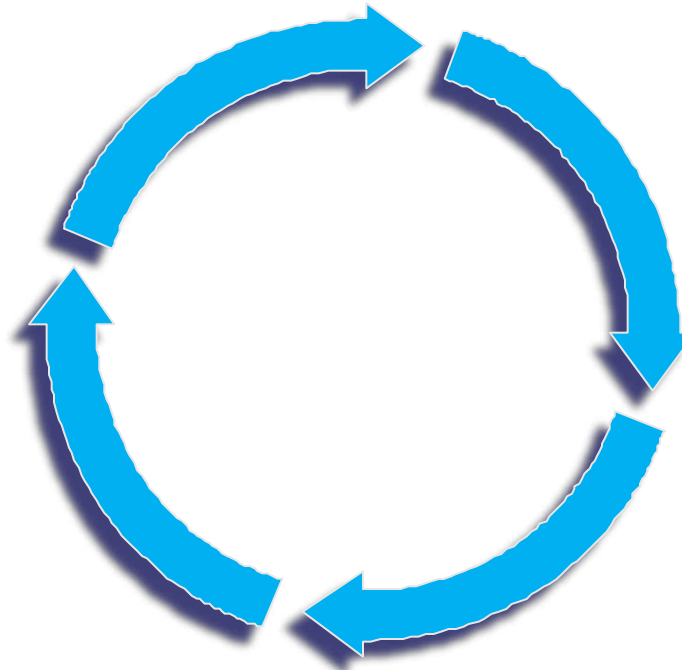
Treatments for Dysfunctional Tear Syndrome



Goals of Therapeutic Intervention

Decrease Lacrimal Gland Inflammation
- Improve Gland Function

**Restore Normal
Neural Feedback
to Lacrimal Gland**



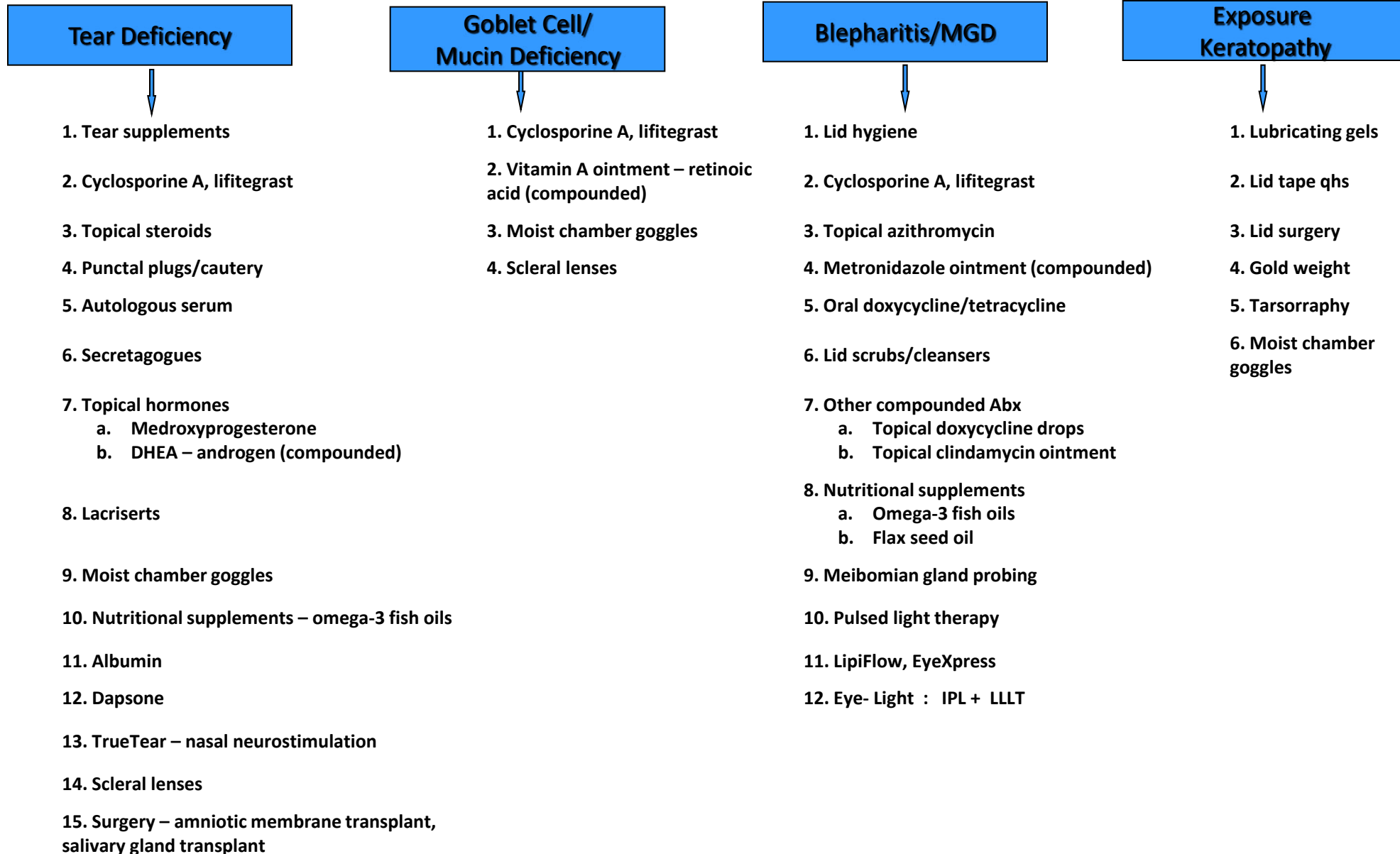
**Normalize
Tear Film**

Decrease Ocular Surface Inflammation
- Stimulate Epithelial Healing

“Dry Eye” – Aqueous Deficiency Treatment Options

- ▶ Replenish tears - lubrication
 - ▶ Artificial tears
 - ▶ Ointments
 - ▶ Ocular inserts - enough tears to melt rods?
- ▶ Preserve tears - tear conservation
 - ▶ Punctal plugs - work well, but may exacerbate inflammation
 - ▶ Surgery
 - ▶ Goggles
- ▶ Anti-inflammatory
 - ▶ Steroids, cyclosporine A, lifitegrast
- ▶ Treat lid margin disease
 - ▶ Eye-Light (IPL + LLLT) / Lipiflow/ IPL

CEDARS Dysfunctional Tear Syndrome Algorithm: Diagnostic-Based Approach



DTS Treatment Regimen

