



### Attacking Ocular Allergies: Current and Future Trends

*Dr. Justin Schweitzer*

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### Welcome!



Host: Dr. Ariel Cerenzie

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Thank you to Ocular Therapeutics for supporting this event with an unrestricted educational grant.

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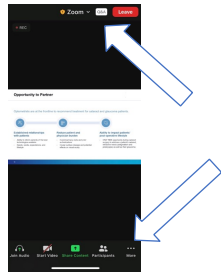
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Speaker Bio

Justin Schweitzer, OD was born and raised in Jamestown, North Dakota. He attended Jamestown College and graduated with degrees in Biology and Business Administration in 2002. He then attended the Pacific University College of Optometry where he graduated summa cum laude in 2006. After graduation, he and his wife Nissa moved to Sioux Falls, where Dr. Schweitzer enjoyed a great general practice. In July of 2013, he completed his fellowship training in advanced anterior segment surgery care and pathology here at Vance Thompson Vision.

Dr. Schweitzer is a member of the American Optometric Association, American Academy of Optometry, Scleral Lens Education Society, and the South Dakota Optometric Association and has had multiple articles published in scientific journals.



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Financial Disclosure – Justin Schweitzer, OD, FAAO

- Aerie – C/L
- Alcon – C/L
- Allergan – C/L
- Bausch + Lomb – C/L
- Ocular Therapeutix - C
- EyePoint – C
- Sight Sciences – C
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Attacking Ocular Allergies  
Current and Future Trends

Justin Schweitzer, OD, FAAO  
Vance Thompson Vision  
Residency Program Associate Director  
Externship Program Director

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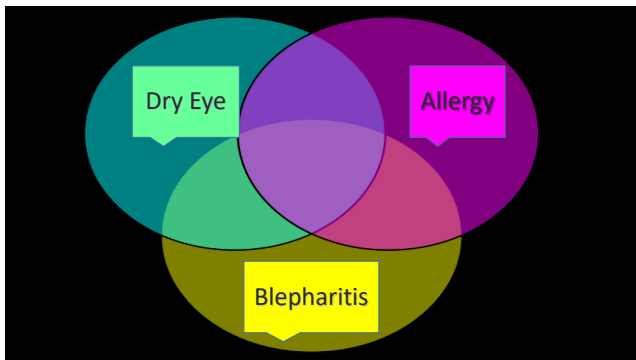
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## Ocular Allergies

55% - in the US test positive to 1 allergen  
 50 million Americans have allergic disease  
 6<sup>th</sup> - leading cause of chronic illness in the US



Allergy and the eye. Clin Exp Immunol. 2008 Sep; 153(Suppl 1): 17-21  
 Asthma & Allergy Foundation of America. Allergies Facts and Figures May 2022

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## Ocular Allergies

Common Causes – Indoor and Outdoor

- Tree pollen
- Grass pollen
- Weed pollen
- Mold spores
- Dust mites
- Cockroaches
- Cat and Dog Dander
- Rodent urine
- Cosmetics
- Smoke
- Perfume



Asthma & Allergy Foundation of America. Allergies Facts and Figures May 2022

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## Ocular Allergies

Common Signs & Symptoms

- Hyperemia/Redness
- Itching
- Burning
- Watery eyes
- Swollen eyelids
- Feeling of dirt or grit
- ...and many more



Asthma & Allergy Foundation of America. Allergies Facts and Figures May 2022

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### The Allergic Cascade

- Sensitization
- Early Phase
- Late Phase



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### The Allergic Cascade

**Sensitization**  
Person is exposed to an allergen (antigen) and IgE mediated antibodies join with associated mast cells which begin to become activated

The patient is not yet symptomatic

Additional exposure(s) start the degranulation process in which IgE specific mast cells release histamine and prostaglandin's

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### The Allergic Cascade

**Early Phase**  
The patient becomes symptomatic  
swelling, itching, pain, vasodilation, watery

The greater the exposure to the antigen the more the mast cells are stimulated = a greater allergic response leading into the late phase

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## The Allergic Cascade

### Late Phase

Characterized by epithelial infiltration of inflammatory cells like neutrophils, lymphocytes, basophils and eosinophils

Leads to continued inflammation, persistent symptoms and increased chances for tissue damage

Hypersecretion of tears increases drainage through the lacrimal ducts creating nasal passage issues

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Diagnosis	Typical Causes	Secondary Causes
Seasonal allergic conjunctivitis (SAC)	Aeroallergens: Spring: trees, pollen Summer: grass/weeds, some trees Fall: weeds, some trees	
Perennial allergic conjunctivitis (PAC)	Animal dander, dust mites, feathers	Molds, yeast
Vernal keratoconjunctivitis (VKC)	Multifactorial (IgE and Th2 [T helper 2] mediated with nonspecific triggers such as sun, dust, and wind); genetic	
Atopic keratoconjunctivitis (AKC)	Multifactorial with stimulants such as stress, bacteria, aeroallergens, and food allergies	
Giant papillary conjunctivitis (GPC)	Trauma from sutures, glue, scleral buckles, prosthetic devices, and contact lenses (CTLs)	CTL use Mechanical irritation Not IgE mediated

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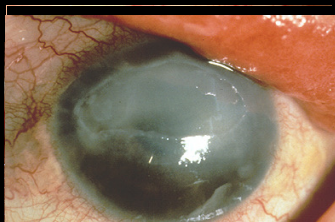
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## Vernal keratoconjunctivitis (VKC)

Seasonal, relatively rare and reoccurring

8-12 YO Males

IgE and T cell - mediated



Leonard A. Management of VKC. Ophthalmol Ther. 2013 Dec;2(2): 73-88

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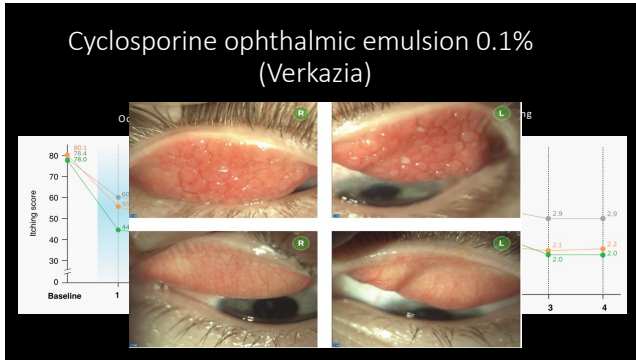
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### Atopic Keratoconjunctivitis (AKC)

Chronic, perennial bilateral conjunctivitis  
 <1-8% of the adult population

Associated with  
 Atopic Dermatitis in 95%  
 Asthma in 87%

Signs and Symptoms  
 Itching, eczema, symblepharon, and pannus

Bielory B and Bielory L. Atopic dermatitis and keratoconjunctivitis. Immunology and Allergy Clinics of North America 2020; 30(3): 323-336.  
 Guilleminetti S, Delfino J and Calder F. Atopic keratoconjunctivitis and atopic dermatitis. Current Oculcular Allergy and Clinical Immunology 2010; 10: 478-485.

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### Allergy Antigen Testing

Who Should Be Tested?

- Recurrent or chronic URD, i.e., rhinitis, sinusitis, allergic-rhinitis
- Unseasonal allergy-like symptoms
- Seasonal or perennial allergy-like symptoms
- Recurrent otitis media
- Exogenous asthma and other conditions in which IgE mediation is suspected

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### Allergy Antigen Testing

#### Blood Test

New Gold Standard in 2010  
Not as sensitive as Skin Testing  
More costly than Skin Testing  
Delayed results



#### Cutaneous Skin Prick Test

Must stop anti-histamine Rx  
Dermatitis or eczema may preclude testing  
Risk of severe specific allergic reaction  
Less suitable for infants and children



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### Serum and Skin Prick Test Comparison

Key Allergy Test Differences	Blood Test	Skin Prick
Ordered in PCP or ECP office	Yes	Yes
OK to stay on allergy medication	Yes	No
Only one needle stick	Yes (blood draw)	No (60)
No risk of severe allergic reaction	Yes	No
OK with skin rash present	Yes	No
Children as young as 3 months	Yes	No
Same day results in the office	No	Yes

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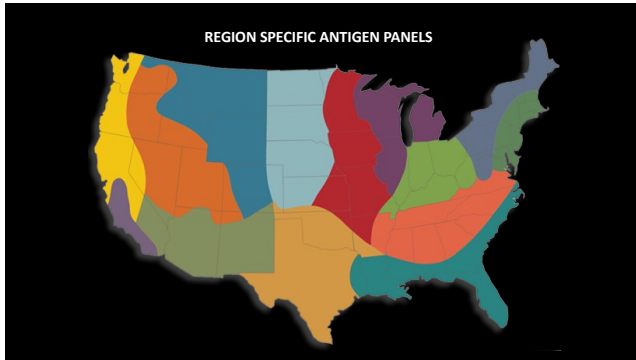
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### Goals for Treatment

1. Stop the Inflammatory Cascade
2. Provide Relief to the Patient

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### Stepwise Treatment Strategies

Primary/Mild	Avoidance, cold compresses, PF tears, OTC Medications Topical antihistamines/mast cell stabilizer Oral antihistamines (see future slide)
Secondary/Moderate	Mast cell stabilizers (treat the allergy before mediator is released) Combination antihistamine/mast cell stabilizers Topical corticosteroids
Tertiary/Severe	Topical corticosteroid (short course or pulse use) Topical immunomodulating agents (tacrolimus, cyclosporine) Oral steroids

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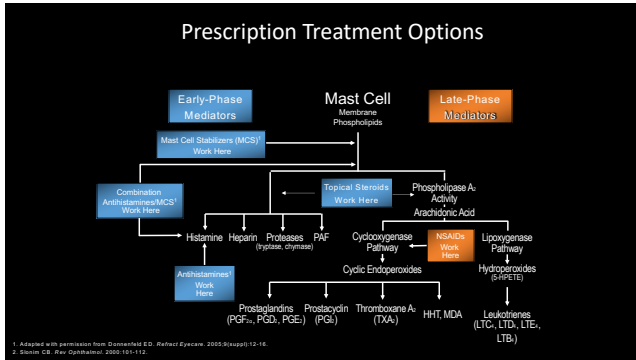
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## Antihistamines

Bind to H1 histamine receptors on nerve endings, blocking the effects of histamine, and controlling itch

Fast onset of action – 3-15 minutes

Oral and topical options are available

**Mast Cell Membrane Phospholipids**  
Histamine, Heparin, Proteases (tryptase, chymase), PAF  
Phospholipase A<sub>2</sub> Activity, Arachidonic Acid

**Antihistamines Work Here**

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## Topical Antihistamines

Active Ingredient(s)	Dosing	Manufacturer	Generic	Rx or OTC
cetirizine	BID	Eyevance		Rx
alcaftadine	QD	Allergan		Rx
bepotastine	BID	Bausch Health		Rx
epinastine	BID	Allergan	Yes	Rx
zelastine	BID	Mylan	Yes	Rx
ketotifen	BID	Alcon/Novartis	Yes	OTC
ketotifen	BID	Bausch Health	Yes	OTC

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## Dual-Activity Agents

Compared to standalone (either antihistamines or mast cell stabilizers)  
 Topical dual-activity agents are typically clinically superior due to both symptom/sign relief and tolerability

Prophylactic benefit = mast cell stabilizers  
 Immediate relief = antihistamines

**Mast Cell**  
 Membrane Phospholipids

Phospholipase A<sub>2</sub> Activity  
 Arachidonic Acid

Dupuis P., Prokopiuk C., Hayes A. et al. A contemporary look at allergic conjunctivitis. Allergy Asthma Clin Immunol. 2020; 16:5  
 Leonard A., Mielogus R., Satani E. Allergy and Dry Eye Disease. Ocul Immunol Inflamm. Feb 3 2022;1-9.

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## Topical Combination Antihistamine/Mast Cell Stabilizer

Active Ingredient(s)	Dosing	Manufacturer	Generic	Rx or OTC
olopatadine 0.7 mg	QD	Alcon	Yes	Rx/OTC
olopatadine 0.2 mg	QD	Alcon	Yes	Rx/OTC
olopatadine 0.1 mg	BID	Alcon	Yes	Rx/OTC

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## NSAIDS

Controls pain and reducing inflammation causing same side effects seen with steroids

Not as powerful as steroids

Does not help with itching

**Mast Cell**  
 Membrane Phospholipids

Phospholipase A<sub>2</sub> Activity  
 Arachidonic Acid

Cyclooxygenase Pathway  
 NSAIDs Work Here

Lipoxygenase Pathway

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## Topical NSAIDs

Active Ingredient(s)	Dosing	Manufacturer	Generic	Rx or OTC
Ketorolac tromethamine	QID/BID	Allergan	Yes	Rx

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## Topical Corticosteroids

Excellent option to decrease allergic inflammation

Underutilized in eyecare for allergic conjunctivitis  
10% use corticosteroids as first-line therapy

Lisa M. Nijm, MD, JD, P. Dee G. Stephenson, MD, Michael H. Manning, MD, et al. Presented at ASCRS Annual Meeting, July 23-27, 2021, Las Vegas NV

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## Topical Corticosteroids

Active Ingredient(s)	Dosing	Manufacturer	Generic	Rx or OTC
Loteprednol etabonate 0.2%	QID	Bausch Health		RX
Loteprednol etabonate 0.5%	QID	Bausch Health		RX
Fluorometholone acetate	QID	Eyevance		Rx
Prednisolone acetate 0.125%	QID	Allergan, Alcon		RX
Fluorometholone	QID	Allergan		RX
Loteprednol etabonate 0.25%	QID	Kala		RX

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### Allergy Beyond the Eye

Rhinitis  
Post-nasal Drip  
Asthma

fexofenadine (Allegra), cetirizine (Zyrtec)  
Loratadine (Claritin), montelukast (Singulair)

fluticasone propionate (Flonase)

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### Dexamethasone ophthalmic insert 0.4 mg for intracanalicular use

- A corticosteroid indicated for:
  - The treatment of ocular inflammation and pain following ophthalmic surgery
  - The treatment of ocular itching associated with allergic conjunctivitis
- Sustained release of dexamethasone 0.4 mg for up to 30 days

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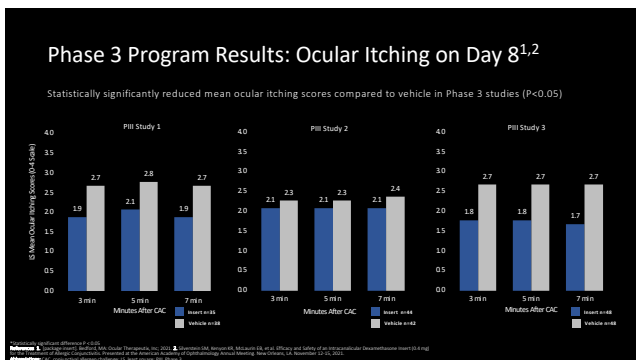
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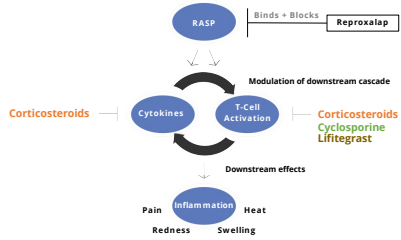
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### RASP Are Believed to Work at the Top of the Inflammatory Cascade



Sources: Lee S et al. NF-κB-induced I-κB expression is regulated by NF-κB/IKK and Sm3/328 MAPK pathways via IκB receptor in murine macrophages. *Cardiovasc Res*. 2010;88(2):382-9. Chiraguetta L et al. Role of a hydroxy-3,6-dienone in the pathogenesis of fibrosis. *Biochim Biophys Acta*. 2005;1743(4):229-36. Natarajan K et al. The advanced lipoxidation and product precursor malondialdehyde induces IL-17 expression and alters lymphocytes to the Th17 subset. *Cell Mol Biol Int*. 2012;20(10):147-53. Hughes J et al. Experimental allergy: effects of malondialdehyde on lymphocytes. *J Invest Allerg Clin Immunol*. 2012;20(10):147-53. Saito T et al. Immunomodulatory effects of advanced lipoxidation and products in murine cells. *Immunol*. 2004;112(5):679-88.

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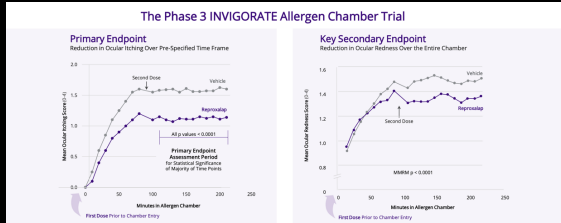
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## ReproXalap



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## Antihistamine-Releasing Contact Lens

Etafilcon A drug-eluting contact lens with ketotifen

Lens contains 19 mcg ketotifen

Daily disposable contact lens indicated for prevention of ocular itch due to allergic conjunctivitis



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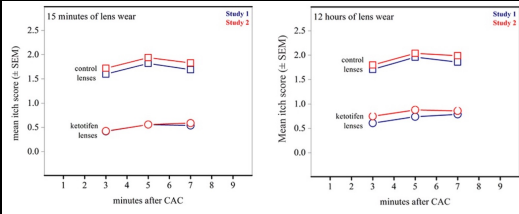
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### Antihistamine-Releasing Contact Lens



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### In Conclusion...

Dry Eye, blepharitis, and allergic conjunctivitis often overlap

Key for Treatment is STOP the inflammatory cascade

Embrace new technology on the market and as it comes to the market

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Date: May 22, 2022  
Time: 8:00 AM - 12:00 PM Pacific Time  
Speakers: Bruce E. Onofrey, OD, RPh  
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Topic: What To Know About Oral Pharmaceuticals  
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