

# The cosmetic impact

By Amy Gallant Sullivan

EYE CARE PRACTITIONERS are well aware that medications for patients with ocular surface disease need to be proven safe through clinical trials. They probably also assume, like their patients, that basic beauty and anti-aging products are tested to be safe and not toxic to the ocular surface. This is not always the case.

Unbeknownst to most, the cosmetic products and skincare practices used by patients in and around their eyes are not required to meet the same type of regulatory standards as pharmaceuticals and are often governed by outdated laws.

With this in mind, eye care practitioners need to be aware that the daily skincare, aesthetic and cosmetic routines of their patients may not be safe. There are a multitude of chemicals in everyday cosmetic products and treatments that may negatively impact the eye's health and contribute to ocular surface disease.

For example, the European Union authorises the use of benzylalkonium chloride (BAK) in cosmetic products at a level 20,000 fold higher than the amount that is toxic to human corneal, conjunctival and meibomian gland epithelial cells<sup>1</sup>. Other preservatives widely used in cosmetic products

are formaldehyde-releasing compounds<sup>2</sup>. Their approved limit in cosmetics is 740-2000 fold higher than the concentration shown by researchers at Harvard Medical School to be toxic to these same human cells<sup>3</sup>.

Cosmetics and aesthetic treatments used on and around the eyelids are believed to impact the ocular surface in many ways, such as:

- Obstructing the meibomian glands and interfering with their function
- Limiting meibum delivery to the lid margin and subsequent delivery onto the tear film
- Providing an entry point to the vicious circle of dry eye disease
- Promoting ocular surface inflammation, secondary to evaporative stress
- Disrupting the tear film and desiccating the ocular surface
- Creating an environment conducive to bacterial overgrowth and *Demodex* infestation

A recently published review of the current scientific literature by Dr Michael Wang and A/Prof Jennifer Craig from the University of Auckland showed the application of eye makeup can contribute to symptoms of dry eye, corneal nerve irritation, dendritic cell activation, hyperosmolarity of

the tear film, meibomian gland dysfunction and tear film instability<sup>4</sup>.

More education is needed for eye care specialists and consumers. According to Dry Eye Diva research, almost 90% of women have not spoken with their eye doctor about their use of cosmetics, including eye makeup, skincare and anti-aging products<sup>5</sup>.

From face wash to eye makeup remover and anti-wrinkle creams, medical-aesthetic products and procedures used by both women and men deserve better attention, as understanding how lifestyle and beauty routines can impact the ocular surface may help in achieving optimal eye health. Products and procedures that may be worthy of discussion with patients include:

- Anti-aging or acne creams containing Retin-A
- Argireline, or acetyl hexapeptide-3, in eye creams (aka Botox-in-a-jar)
- Botulinum fillers for crow's feet
- Cosmetic use in combination with contact lens wear
- Eyelash perms, extensions and tinting
- Eyelid tattooing
- Eyeshadow glitter



Beauty products can contribute to ocular surface disease

- Over-the-counter eyelash growth serums
- Waterproof eye makeup

For more visit <http://www.eyenoptics.com.au/articles/archive/cosmetics-and-the-tear-film/> or [www.dryeyediva.com](http://www.dryeyediva.com)

## References

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2. O'Dell LE, Sullivan AG, Brennan LM. Beauty does not have to hurt. *Advanced Ocular Care*. 2018;Feb; August:42-47.
3. Wang M, Craig JP. Investigating the effect of eye cosmetics on the tear film: current thoughts. *Clin Ophthalmol*. 2015;1:39-40.



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## DNase for severe dry eye?

RESEARCHERS AT THE University of Illinois at Chicago have released promising results from a phase I/II clinical trial for a new enzyme-based treatment for severe dry eye.



Professor Sandeep Jain

The trial compared eye drops containing a biosynthetic form of the DNase enzyme with eye drops without the enzyme.

"In dry eye disease, several things happen," said principal investigator Professor Sandeep Jain. "There is an increase in the number of white blood cells called neutrophils that gather on the surface of the eye. Neutrophils release DNA which forms webs on the cornea called neutrophil extracellular traps, which cause inflammation of the ocular surface and attract additional neutrophils in a vicious cycle."

Normally, enzymes present in tears chop up and clear DNA and other debris on the cornea, but in patients with dry eye disease, there is not enough DNase to clear the material, he explained.

Published in *Translational Vision Science and Technology*, the randomised, placebo-controlled trial, included 47 participants with severe dry eye disease, about half with Sjögren's syndrome and 17% with graft-versus-host disease, both

associated with significant deficits in tear production. Participants were given eye drops containing either DNase or a placebo and instructed to administer one drop of the solution to each eye four times per day for eight weeks. The researchers evaluated patients' symptoms through questionnaires and measured the degree of corneal damage and amount of DNA webs and other pro-inflammatory material on the surface of the eye before and throughout the study.

Results revealed participants in the DNase group had a statistically significant and clinically meaningful reduction in corneal damage at eight weeks, significant improvement in symptoms and reduced amounts of corneal DNA webs and other material on the ocular surface compared with the placebo group.

"The data from this early clinical trial suggests DNase eye drops may be safe and effective for treating severe dry eye and we look forward to conducting larger, randomised trials to definitively prove its efficacy," said Prof Jain.