



## Gabapentin for Dry Eye?

In response to “New Drug Highlights Inflammation’s Role in Dry Eye Disease” (Clinical Update, February), it is important to consider whether another mechanism of dry eye disease (DED) could be targeted. Although lifitegrast (Xiidra) targets a novel pathway, it is another drug that targets

inflammation, like its predecessor, cyclosporine (Restasis). Because DED is not fully understood, the ophthalmology community has struggled to adequately treat many cases of DED by targeting the inflammatory pathways alone. Edward J. Holland, MD, quoted in the article, astutely states, “Dry eye disease is complex because it varies in clinical presentation and can be caused by a variety of factors.” Many of these factors have not yet been discovered and, therefore, have not been targeted.

A recent article suggests that dry eye pain could be neuropathic in nature and that as-yet unrecognized mechanisms could be targeted to tackle this disease.<sup>1</sup> The purpose of this letter to the editor is to present some arguments for why topical gabapentin, the oral form of which is the standard treatment for neuropathic pain, might have utility in treating chronic dry eye.

Since its FDA approval in 1993, gabapentin has been approved to treat children suffering from epilepsy, as well as

neuropathic pain conditions.<sup>2</sup> In 2004, gabapentin was approved to treat postherpetic neuralgia and other neuropathic pain conditions.

While oral gabapentin has not gained a foothold in ophthalmology,<sup>3</sup> recent case reports and studies have shown its effectiveness in treating ocular pain. A case report published in 2008 discussed its effectiveness in treating a patient with neovascular glaucoma who was suffering from a blind painful eye.<sup>4</sup> A 2011 study focused on gabapentin in treating postoperative pain following photorefractive keratectomy. The prospective, randomized, double-blind, placebo-controlled trial found that those treated with gabapentin had significantly less pain during the first 72 hours after surgery, compared with the placebo group.<sup>5</sup>

Although gabapentin has been used orally for many diseases, ophthalmology focuses on treating diseases through local delivery to the eye, which works to enhance the drug distribution to the ocular tissues while also minimizing systemic exposure and potential side effects. In 2014, a patent was filed for topical gabapentin eyedrops.<sup>6</sup> The intense ocular pain many people experience from ophthalmic diseases such as herpes zoster, glaucoma, uveitis, optic neuritis, and dry eye could now have local relief. Unfortunately, although the patent was approved, the drops have not yet been synthesized for either commercial or investigational use.

Currently, there is no literature discussing the role of topical gabapentin in treating ocular diseases. Future research should look at the possibility of using gabapentin drops to treat ocular pain. Topical gabapentin could potentially have a greater effectiveness than the oral formulation in pain reduction without the side effect profile associated with systemic absorption, and the oral drug has already been shown to treat other forms of neuropathic pain.

While lifitegrast might be the first new medication in 13 years to be approved for patients with DED, it focuses on the inflammatory pathway much like its predecessor, Restasis. I present here a novel (and possibly more efficacious) approach to tackling DED. The ability to reformulate gabapentin, a drug already approved by the FDA, might provide a solution to this chronic problem.

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1 Galor A et al. *Eye (Lond)*. 2015;29(3):301-312.

2 Trevor A et al. *Katzung and Trevor's Pharmacology Examination and Board Review*. 9th ed. New York, N.Y.: Lange/McGraw-Hill; 2010:215-216.

3 Johnson R et al. *N Engl J Med*. 2014;371(16):1526-1533.

4 Kavalieratos CS et al. *Pain Med*. 2008;9(3):377-378.

5 Lichtinger A et al. *J Refract Surg*. 2011;27(8):613-617.

6 United States Patent #8,629,184. Wolicki et al. Jan. 14, 2014.