



## Neurotrophic Keratitis Prior Authorization with Quantity Limit Program Summary

### FDA APPROVED INDICATIONS AND DOSAGE<sup>1</sup>

Agent(s)	Indication(s)	Dosage
<b>Oxervate™</b> (cenegermin-bkbj) 0.002%  Ophthalmic solution	Treatment of neurotrophic keratitis	One drop in the affected eye(s) 6 times daily at 2-hour intervals for 8 weeks.  If more than one topical ophthalmic product is being used, administer the eye drops at least 15 min apart.

### CLINICAL RATIONALE Neurotrophic Keratitis<sup>2,3</sup>

Neurotrophic keratitis (NK) is a degenerative disease that is characterized by a reduction or absence of corneal sensitivity, due to impaired innervation by the trigeminal nerve. The lack of innervation leads to corneal epithelial breakdown, impairment of healing, and development of corneal ulceration, melting, and perforation. There are numerous underlying ocular and systemic conditions associated with NK, with the most common causes including infection (e.g., herpes simplex, herpes zoster, leprosy), trigeminal nerve palsy (e.g., surgery, neoplasia, aneurysms, facial trauma), toxicity (e.g., topical ocular anesthetics, timolol, betaxolol, sulfacetamide, diclofenac sodium, chemical burns), and systemic disease (e.g., diabetes, vitamin A deficiency, multiple sclerosis).

Diagnosing NK requires clinical history and ocular examination. The presence of persistent epithelial defects (PED), ulceration, and decreased corneal sensitivity are hallmarks of disease. Corneal sensitivity testing is recommended using a cotton swab, the Cochet-Bonnet contact esthesiometer, or the CRCERT-Belmonte non-contact esthesiometer. If sensitivity testing indicates reduced sensitivity, corneal staining, Schirmer testing, microbiology exams, lid evaluation, nerve imaging, and limbal evaluation are recommended to determine disease staging and determine underlying etiology.

The clinical classification of NK is broken down into three stages. Stage 1 is characterized by corneal epithelial changes with dry and cloudy epithelium, the presence of superficial punctate keratopathy, and corneal edema. Stage 2 is characterized by recurrent and/or PED with an oval or circular shape, mostly localized at the superior half of the cornea. Stage 3 is characterized by corneal ulcer with stromal involvement that may be complicated by stromal melting and progression to corneal perforation.

Management of NK requires any topical preservative containing medication to be discontinued if possible. All ocular surface-associated diseases (e.g., keratitis, dry eye, blepharitis, limbal stem cell deficiency) should be treated. Topical NSAIDs should be avoided in NK as they inhibit the healing process. Treatment options are determined based on staging. Stage 1 is treated with preservative-free artificial tears and lubricant ointments. Treatment soft contact lenses, punctal plugs, and autologous serum could also be options in some cases. Oxervate can be considered in patients that fail to respond to these therapies.

Stage 2 treatment includes continuing preservative-free artificial tears and lubricant ointments with prophylactic antibiotic drops. Additional treatment options for stage 2 are therapeutic soft contact lenses, topical autologous serum application, amniotic membrane grafting, conjunctival flap, tarsorrhaphy or botulinum induced ptosis, and topical nerve growth factor application. Treatment for stage 3 includes all of the treatments for stage 2 with the addition of N-acetylcysteine, oral tetracycline, and medroxyprogesterone. Surgical treatments are typically reserved for refractory cases.

Corneal perforations require immediate treatment with either cyanoacrylate glue and soft bandage contact lenses, or amniotic membrane grafting. Tectonic perforating or lamellar keratoplasty can be performed for larger perforations.

### **Efficacy<sup>1,4</sup>**

Cenegermin ophthalmic solution contains cenegermin, a recombinant form of human nerve growth factor produced in *Escherichia coli*. Nerve growth factor is an endogenous protein involved in the differentiation and maintenance of neurons, which acts through specific high-affinity (i.e., TrkA) and low-affinity (i.e., p75NTR) nerve growth factor receptors in the anterior segment of the eye to support corneal innervation and integrity. Efficacy and safety of Oxervate (cenegermin 20 mcg/mL) for treatment of patients with NK (N=151) was evaluated in two Phase 2, 8-week, randomized, multi-center, double-masked, vehicle-controlled studies (Study NGF0212 and Study NGF0214). In both studies, cenegermin was dosed 6 times daily in the affected eye(s) for 8 weeks. Results for the primary endpoint, "complete corneal healing" (i.e., absence of corneal lesion staining and no persistent staining in the rest of the cornea after 8 weeks of treatment) were as follows:

- Study NGF0214- cenegermin 20 mcg/mL (65.2%); vehicle (16.7%) [treatment difference: 48.6%; 95% CI: 24%, 73.1%; p-value < 0.01]
- Study NGF0212- cenegermin 20 mcg/mL (72.0%); vehicle (33.3%) [treatment difference: 38.7%; 95% CI: 20.7%, 56.6%; p-value < 0.01]

In patients healed after 8 weeks of Oxervate (cenegermin 20 mcg/mL) therapy, recurrences occurred in about 20% of patients in Study NGF0212 and 14% of patients in Study NGF0214. Least square mean changes (improvement) from baseline in corneal sensitivity inside the lesion after 8 weeks of treatment were not clinically significant in either study:

- Study NGF0214- cenegermin 20 mcg/mL (1.6); vehicle (0.7) [treatment difference: 0.9; 95% CI: 0.2, 1.7]
- Study NGF0212- cenegermin 20 mcg/mL (1.1); vehicle (0.8) [treatment difference: 0.3; 95% CI: -0.4, 0.9]

Inclusion criteria required patients to be 18 years of age with Stage 2 (persistent epithelial defect [PED]) or Stage 3 (corneal ulcer) NK (involving one eye for NGF0212 and involving both eyes for NGF0214); PED or corneal ulceration of >2 weeks duration refractory to > 1 conventional non-surgical treatments for NK (e.g., preservative-free artificial tears, gels or ointments; discontinuation of preserved topical drops and medications that can decrease corneal sensitivity; therapeutic contact lenses); evidence of decreased corneal sensitivity ( $\leq$  4 cm on Cochet-Bonnet aesthesiometer) within area of the PED or corneal ulcer and outside of the area of the defect in > 1 corneal quadrant; best corrected distance visual acuity (BCDVA) score  $\leq$  75 Early Treatment Diabetic Retinopathy Study (ETDRS) letters, ( $\geq$  +0.2 log MAR,  $\leq$  20/32 Snellen or  $\leq$  0.625 decimal fraction) in the affected eye; and no objective clinical evidence of improvement in PED or corneal ulceration within the 2 weeks prior to study enrollment.

Exclusion criteria included any active ocular infection or active ocular inflammation not related to NK in the affected eye; any other ocular disease requiring topical ocular treatment in the affected eye during study treatment period; severe vision loss in the affected eye with no potential for visual improvement; Schirmer's test without anesthesia  $\leq$  3 mm/ 5 minutes in the affected eye; severe blepharitis and/or severe meibomian gland disease in the affected eye; history of any ocular surgery in affected eye within 3 months before study enrollment (allowed if the ocular surgery was the cause of Stage 2 or 3 NK); prior surgical procedure(s) for treatment of NK (e.g., complete tarsorrhaphy, conjunctival flap, etc.) in affected eye; previous Botox treatment; botulinum injections used to induce pharmacologic blepharoptosis eligible only if last injection was > 90 days prior to enrollment; use of contact lenses during study treatment periods in the eye with NK; anticipated need for punctal occlusion during study treatment period (patients with punctal occlusion or punctal plugs inserted prior to study were eligible for enrollment if the punctal occlusion was maintained during the study); evidence of corneal ulceration involving posterior third of the corneal stroma, corneal melting or perforation in the affected eye; presence/history of any ocular or systemic disorder or condition that might have hindered efficacy of the study treatment or its evaluation; need for or anticipated change in dose of systemic medications known to impair function of the trigeminal nerve (e.g., neuroleptics, antipsychotic and antihistamine drugs [these treatments were allowed during the study if initiated prior to 30 days before study enrollment provided they remained stable throughout the course of the study treatment periods]); known hypersensitivity to study or procedural medications (e.g., fluorescein); history of drug, medication or alcohol abuse or addiction; use of any investigational agent within 4 weeks of baseline visit; and participation in another clinical study at the same time as the present study.

### **Safety<sup>1</sup>**

Oxervate does not have any FDA labeled contraindications for use.

### **References**

1. Oxervate prescribing information. Dompé farmaceutici S.p.A. October 2019.
2. Rabiolo, A., Rama, P., Ferrari, G., & Woodward, M., MD. (2017, July 09). Neurotrophic Keratitis. Last updated December 2020. Retrieved April 2021, from [http://eyewiki.aao.org/Neurotrophic\\_Keratitis](http://eyewiki.aao.org/Neurotrophic_Keratitis).
3. Sacchetti M, Lambiase A. Diagnosis and management of neurotrophic keratitis. *Clin Ophthalmol*. 2014;8:571-9. Published 2014 Mar 19. doi:10.2147/OPHT.S45921.
4. Bonini S, Lambiase A, Rama P, et al. Phase II randomized, double-masked, vehicle-controlled trial of recombinant human nerve growth factor for neurotrophic keratitis. *Ophthalmology* 2018; 125:1332-1343.

## Neurotrophic Keratitis Prior Authorization with Quantity Limit Criteria

### TARGET AGENT(S)

**Oxervate™** (cenegermin-bkbj)

Brand (generic)	GPI	Multisource Code	Quantity Limit (per day or as listed)
<b>Oxervate (cenegermin-bkbj) ophthalmic solution</b>			
20 mcg/mL vials	86770020202020	M, N, O, or Y	56 vials/8 weeks

### PRIOR AUTHORIZATION CRITERIA FOR APPROVAL

#### Evaluation

**Target Agent(s)** will be approved when ALL of the following are met:

1. The patient has a diagnosis of neurotrophic keratitis (NK)
  - AND**
  - 2. The patient has stage 2 (persistent epithelial defect [PED]) or stage 3 (corneal ulcer) NK
    - AND**
    - 3. ONE of the following:
      - a. The patient has NOT been previously treated with the requested agent in the affected eye(s) AND ALL of the following:
        - i. The patient's PED and/or corneal ulcer have been present for at least 2 weeks
          - AND**
          - ii. ONE of the following:
            1. The patient's NK has been refractory to at least ONE conventional non-surgical treatment (i.e., preservative-free lubricant eye drops or ointment, discontinuation of preserved topical agents that can decrease corneal sensitivity, therapeutic soft contact lenses, topical autologous serum application, botulinum A toxin treatment)
              - OR**
              - 2. The patient has an intolerance or hypersensitivity to at least ONE conventional non-surgical treatment for NK
                - OR**
                - 3. The patient has an FDA labeled contraindication to ALL conventional non-surgical treatments for NK
                  - AND**
                  - iii. The patient has decreased corneal sensitivity within the area of the PED or ulcer and outside the area of defect in at least one corneal quadrant
                    - OR**
                    - b. The patient has been previously treated with the requested agent in the affected eye(s) AND BOTH of the following:
                      - i. The patient had complete corneal healing in the previously treated eye(s)
                        - AND**
                        - ii. The patient has a recurrence of neurotrophic keratitis (NK) that requires another treatment course
                          - AND**
                          - 4. ONE of the following:

- a. The patient does NOT have ocular surface disease(s) associated with or in conjunction with NK  
**OR**
  - b. BOTH of the following:
    - i. The patient has ocular surface disease(s) associated with or in conjunction with NK  
**AND**
    - ii. The ocular surface disease(s) has been properly treated
- AND**
- 5. The patient will NOT be using the requested agent in combination with a topical ophthalmic NSAID  
**AND**
  - 6. The patient does NOT have any of the following:
    - a. Active ocular infection or active ocular inflammation not related to NK in the affected eye  
**OR**
    - b. Schirmer test without anesthesia  $\leq 3$  mm/5 min in the affected eye  
**OR**
    - c. Severe blepharitis and/or severe Meibomian gland disease in the affected eye  
**OR**
    - d. History of any ocular surgery in the affected eye within the past 90 days that has not been determined to be the cause of NK  
**OR**
    - e. Corneal perforation, ulceration involving the posterior third of the corneal stroma, or corneal melting
- AND**
- 7. The prescriber is a specialist in the area of the patient's diagnosis (e.g., optometrist, ophthalmologist) or the prescriber has consulted with a specialist in the area of the patient's diagnosis  
**AND**
  - 8. The patient does NOT have any FDA labeled contraindications to the requested agent  
**AND**
  - 9. ONE of the following:
    - a. The requested quantity (dose) does NOT exceed the program quantity limit  
**OR**
    - b. BOTH of the following:
      - i. The patient has bilateral NK  
**AND**
      - ii. The requested quantity (dose) does NOT exceed TWICE the program quantity limit

**Length of Approval:** 8 weeks