

### Question

A horse presents to you with a melting corneal ulcer. What does the fact that the ulcer is melting indicate?

- Trauma
- Descemetocoele
- Globe rupture
- Indolent ulcer
- Infection

**Explanation** - The correct answer is infection. When a corneal ulcer takes on a melting appearance, this indicates that the ulcer is deepening into the stroma of the cornea due to infection. A melting ulcer can exist without having a descemetocoele or globe rupture. If this is the case, you should consider swabbing the ulcer for cytology and culture to treat the ulcer most effectively. In horses, melting ulcers are most commonly due to infection with **Pseudomonas**.

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### Question

What breed of horse is predisposed to development of recurrent uveitis and equine night blindness?

- Quarterhorse
- Arabian
- Appaloosa
- Thoroughbred

**Explanation** - The correct answer is Appaloosa. Equine night blindness is a **congenital disease** that is **bilateral** and **nonprogressive**, wherein horses have variable degrees of decreased vision in the dark. Recurrent uveitis is a very important condition in the horse and is actually the most common cause of blindness in the horse. Appaloosas are overrepresented, but the disease can occur in any breed. It is thought to be related to certain pathogens including Leptospira, Onchocerca, Toxoplasma, Brucella, and other infections, but these relationships are poorly characterized. Affected horses have recurrent bouts of inflammation, and each episode causes progressively worsening intraocular damage. The condition is sometimes referred to as moon blindness.

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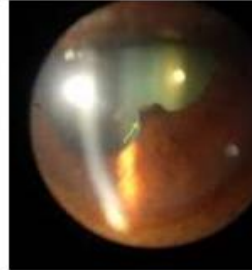
### Question

What is the most common cause of cataracts in horses?

- Uveitis
- Inherited cataracts
- Lens trauma
- Diabetes mellitus

**Explanation** - The correct answer is uveitis. Equine recurrent uveitis (also referred to as periodic ophthalmia, recurrent iridocyclitis, and moon blindness) is common in horses. There are many proposed causes for this condition, but it is thought to usually be from infection (*Onchocerca*, *Leptospira*, or *Borrelia*) or immune-mediated processes. Because recurrent bouts of uveitis can lead to serious problems including cataracts, lens luxation, and glaucoma, it should be treated aggressively with topical and systemic anti-inflammatory drugs and topical atropine to prevent synechiae and ciliary spasm. Systemic antibiotics are usually not indicated unless the horse is febrile or an infectious cause is identified.

A **synechia** is an eye condition where the iris adheres to either the cornea (i.e. anterior **synechia**) or lens (i.e. posterior **synechia**). **Synechiae** can be caused by ocular trauma, iritis or iridocyclitis and may lead to certain types of glaucoma.



NB: A cataract is a clouding of the eye's natural lens.

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### Question

What is the most common parasitic cause of uveitis in the horse?

- *Toxoplasma gondii*
- *Onchocerca cervicalis*
- *Thelazia lacrymalis*
- *Neospora caninum*

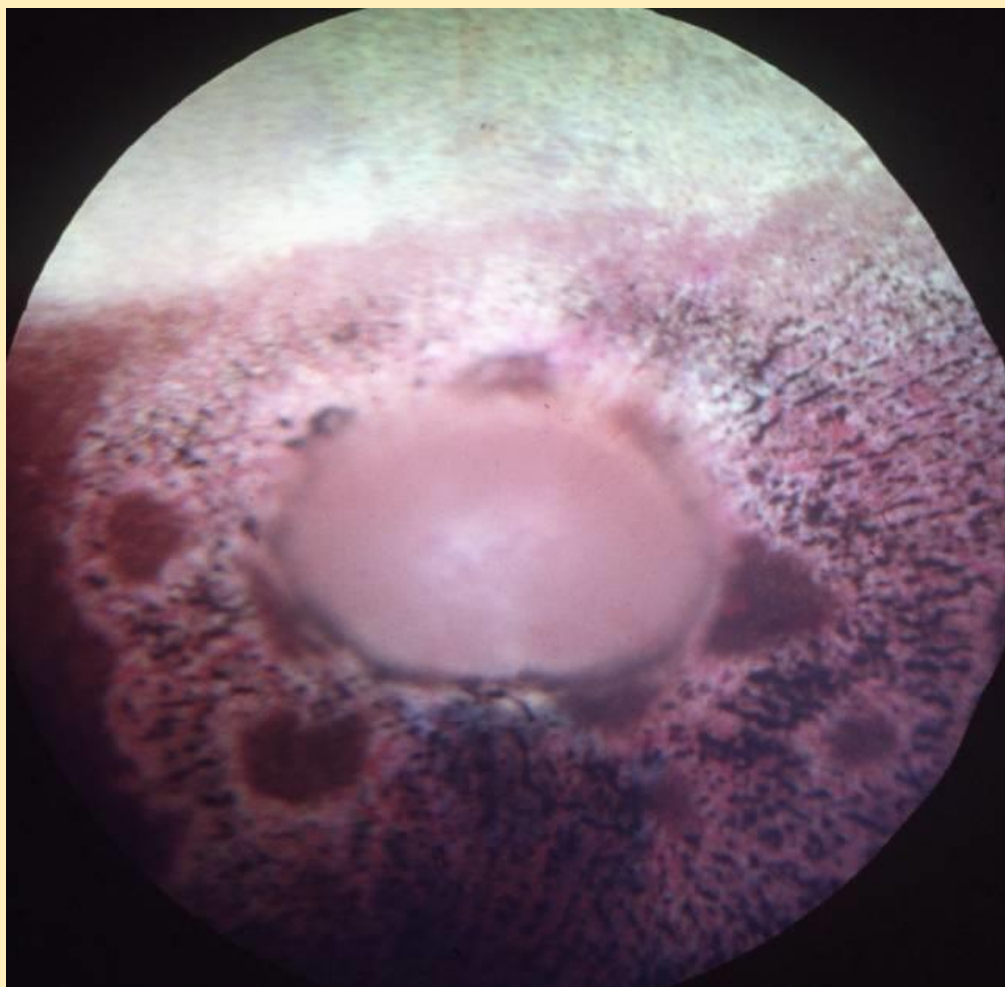
**Explanation** - The correct answer is ***Onchocerca cervicalis***. Uveitis is caused by aberrant migration of the microfilariae; when they die, an inflammatory response is generated.

*Thelazia lacrymalis* does cause ocular disease in the horse but mainly causes conjunctivitis rather than uveitis. *Neospora* and *Toxoplasma* can cause uveitis in dogs and cats but this is not frequently recognized in horses.

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### Question

When performing a fundic exam on a horse with uveitis, you notice multiple dark dots on the tapetum as shown here. What do these dots most likely indicate?



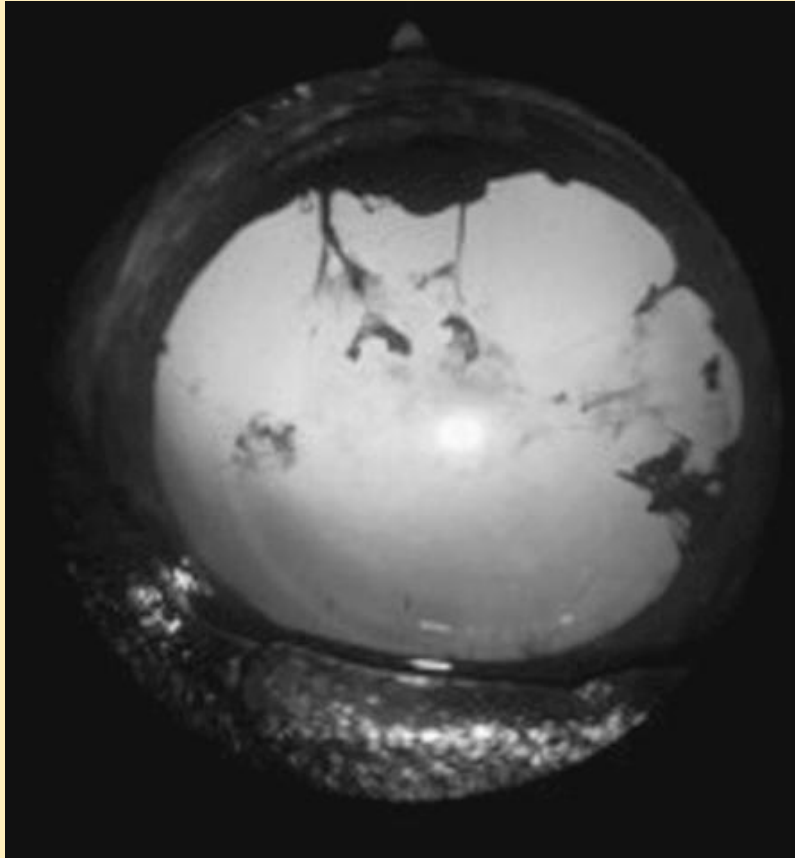
- Hypertension
- A normal finding
- Active chorioretinitis
- Previous chorioretinitis
- Fungal infection

**Explanation** - The correct answer is normal finding. The equine tapetum is penetrated by small choroidal vessels that appear as dark dots. These are sometimes affectionately referred to as the stars of Winslow.

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### Question

The image shows the dilated eye of a 9-year old gelding that has had periodic bouts of ocular **redness**, **tearing**, **photophobia**, and **cloudy cornea** (owner calls it blue eye) over a period of years. You are now doing a prepurchase exam for the potential buyer and new owner. Based on the history and visible findings, what condition does this horse have?



- Ocular neoplasia
- Ocular onchocerciasis
- Recurrent uveitis
- Equine pinkeye
- Bullous pemphigoid

**Explanation** - Also known as moon blindness or periodic ophthalmia, this condition is characterized by recurring bouts of **immune-mediated inflammation**. Repeated episodes damage the cornea, lens, vitreous, retina and optic nerve, leading to loss of vision. The image shows pigmented remnants of iris on the lens capsule.

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### Question

What is the most common cause of blindness in horses?

- Fungal ulcerative keratitis
- Cataract(s)
- Trauma

- Equine recurrent uveitis
- Bacterial ulcerative keratitis

**Explanation** - Although all of the listed answers could potentially result in blindness (directly or as a result of enucleation), the most common cause of blindness in horses is **equine recurrent uveitis (ERU)**. This disease is also known as moon blindness or periodic ophthalmia. Recurrent episodes may result from dysregulated immune responses within the eye; typical clinical signs include **blepharospasm, photophobia, lacrimation, miosis** and **aqueous flare**.

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### Question

A horse presents to you with a corneal ulcer. You are concerned because it appears to be infected, as shown in this image. You perform cytology and find gram negative rods. What is the most likely organism infecting the corneal ulcer in this horse?



- *Pasteurella multocida*
- *Pseudomonas*
- *E. coli*
- *Staphylococcus* spp.

**Explanation** - The correct answer is Pseudomonas. Pseudomonas is the most common agent causing **bacterial keratitis** in the horse. The gram negative cytology provides further evidence that it is the likely culprit. Staphylococcus can cause keratitis in horses but is gram positive. E. coli and Pasteurella are not agents that are commonly involved with keratitis in the horse.

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### Question

You are doing a summer externship in South America and performing physical exams on a variety of animals. You are performing a fundic exam on the eye of a horse and note what appears to be a worm migrating through the conjunctiva (see image). Because of the location and appearance of this parasite, you suspect this is which of the following?



- Oxyuris
- Dirofilaria
- Thelazia
- Toxocara

**Explanation** - Thelazia is a genus of nematode worms (eyeworms) which are found in the ocular tissues. Adults are usually found in the eyelids, tear glands, tear ducts, or the nictitating membrane. They may be found in the eyeball itself under the conjunctiva or in the vitreous. Thelazia are transmitted by Diptera (flies) which do not bite but feed on tears.

Toxocara, which causes ocular larval migrans, usually causes granulomas which may be seen in the retina and appear more circular.

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### Question

A horse presents to you with a corneal ulcer. You are concerned because it appears to be infected. You perform cytology and find gram negative rods. What is the most appropriate treatment for this infection?

- Topical tobramycin
- Topical cefazolin

- Systemic penicillin
- Topical natamycin

**Explanation** - The correct answer is **topical tobramycin**. Tobramycin is an aminoglycoside and would be effective against most gram negative organisms, including Pseudomonas, which are the most common cause of bacterial keratitis. **Cefazolin would be useful topically for a gram + infection**. Systemic antibiotics would not penetrate to the site at levels that would be effective. Natamycin is an antifungal drug and would not be useful in this case of bacterial keratitis.

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### Question

You examine a one-week old female foal for eye problems. She has blepharospasm and epiphora. On ocular exam, you note that the lower eyelid margin is inverted inward. What is your diagnosis?

- Fungal keratitis
- Ocular onchocerciasis
- Chelazion
- Ectropion
- Entropion

**Explanation** - The correct answer is **entropion**. This is a common condition in foals where the lower eyelid is inverted and can cause conjunctivitis or keratitis. The condition will **usually correct spontaneously** but **sometimes will require treatment to evert the lid**. One method for this is to use a local anesthetic, mechanically evert the lid, and staple it. Alternatively, surgical correction can be performed but is rarely indicated. Ectropion is the opposite condition where the eyelid everts out and can lead to exposure keratitis, but this is uncommon in horses. Ocular onchocerciasis is caused by microfilariae and is seen in about 50% of horses with cutaneous onchocerciasis.

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### Question

A 6-year old Morgan horse presents for an ocular evaluation. The owner is concerned that the horse has a corneal ulcer. You notice that the horse has marked blepharospasm. Which of the following best describes the effects of an auriculopalpebral nerve block in this horse?

- Disrupts motor innervation to the orbicularis oculi
- Disrupts motor innervation to the levator palpebrae superioris
- Blocks sensory innervation of the cornea
- Disrupts motor and sensory innervation to the eyelids
- Blocks sensory innervation of the upper two-thirds of the eyelids

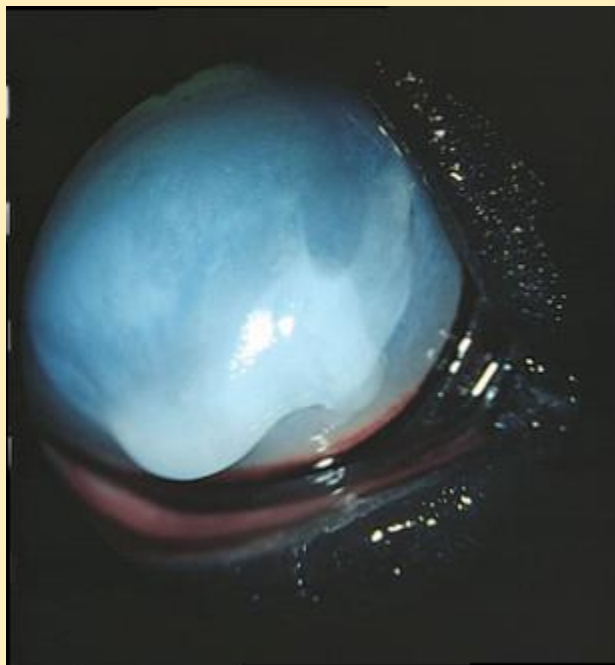
**Explanation** - The auriculopalpebral nerve is a branch of the facial nerve and is therefore **motor only**. The auriculopalpebral block is useful in providing eyelid akinesis **by blocking motor innervation primarily to the orbicularis oculi**, thereby allowing manipulation of the eyelids without putting pressure on an already painful eye. This block is motor only and does not provide any desensitization.

The supraorbital/frontal nerve block can be used to block a branch of the ophthalmic division of the trigeminal nerve, desensitizing the middle two-thirds of the upper eyelid and forehead skin. It may also provide some motor block of the levator palpebrae superioris due to a branch of the oculomotor nerve which runs adjacent.

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### Question

A 3-year-old Standardbred gelding presents with epiphora, blepharospasm, and severe pain of the right eye (see image). There are numerous treatment options. Which medication would be contraindicated for this case?



- EDTA
- Tropicamide
- Tobramycin
- Banamine
- Serum
- Neomycin and polymyxin B and dexamethasone (Neo-Poly-Dex)

**Explanation** - The correct answer is Neo-Poly-Dex. This is an illustration of a melting ulcer. Any corneal ulcer, whether it is superficial or deep, can be perpetuated by steroid use. Steroids increase the protease activity causing the "melting"; therefore, one of the primary goals in managing corneal ulcers is to **decrease protease**



activity by using EDTA and serum. Further, aggressive topical antibiotic use is essential. Tobramycin, gentamicin, neomycin-polymyxin B-bacitracin, among others are appropriate. Intravenous banamine is the drug of choice for ocular pain and inflammation in horses.

**Tropicamide** is used for its mydriatic and cycloplegic effect because all animals with corneal ulcers have uveitis. Atropine is an alternative to tropicamide. It is important to note that, even though atropine has a longer duration of action than tropicamide, atropine must be used with extreme caution in horses as it may potentiate colic.

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### Question

You have diagnosed fungal keratitis in a valuable 5-year old stallion. He has turned out to be difficult to administer the topical ocular medication you are using (itraconazole drops) every 2 hours. What should you now do regarding treatment?

- Switch to metronidazole by injection
- Administer the itraconazole systemically by injection
- Forget the antifungal drug and use NSAIDS and atropine by injection
- Place a subpalpebral lavage system
- Switch to oral chloramphenicol

**Explanation** - The system allows for a continuous drip of the topical meds without having to handle the horse frequently, and the reservoir can be filled without touching the horse. Treatment of fungal keratitis is optimal via direct ophthalmic administration, so you do not want to change your route of administration.



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### Question

Which of these is not indicated in the treatment and care for an eyelid laceration in a horse?

- Tetanus toxoid immunization
- Lavage with saline
- Phenylbutazone administration
- Topical atropine

- 2 or more layer closure

**Explanation** - The correct answer is topical atropine. Saline lavage is useful to clean the wound. Minimal wound debridement should be performed to prevent distorting the eyelid. At least a 2 layer closure should be used to oppose the wound edges closely. Phenylbutazone is given as an anti-inflammatory to prevent swelling in the area. Tetanus immunization is useful because the horse has sustained an open wound and would be at risk for tetanus. Topical atropine would play no useful role in treating an eyelid laceration.

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### Question

You examine a one-week old female foal for eye problems. She has mild blepharospasm and epiphora. On ocular exam, you note that the lower eyelid margin is inverted inward. What is the usual treatment for this condition?

- Enucleation
- No treatment is necessary
- Place a patch over the eye
- Surgical correction of the defect

**Explanation** - The correct answer is no treatment is necessary. Entropion in foals is **fairly common and will usually resolve spontaneously**. Surgical correction is reserved for cases that do not resolve, because over correction in a young animal could result in further eyelid defects as the foal grows. If clinical signs are severe enough, a procedure where local anesthetic is infused and the eyelid is everted and stapled can be performed as a temporary fix until the problem resolves. Enucleation or patching of the eye are not indicated

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### Question

Which of these nerve blocks is used to examine the eyes of a horse?

- Corneal nerve block
- Trigeminal nerve block
- Oculomotor nerve block
- Auriculopalpebral nerve block

**Explanation** - The correct answer is **auriculopalpebral nerve block**. Blocking this branch of cranial nerve VII (**facial nerve**) disrupts the motor innervation to the orbicularis oculi, which is the **muscle that closes the eye**. In the horse, this muscle is very strong and can prevent a thorough ocular exam. To perform this block, lidocaine is injected subcutaneously at the caudal aspect of the zygomatic arch where the nerve is palpable. Because this is a motor nerve, the eye will not be able to close as well, but there is no anesthesia of the tissue.

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