Common Parasitic Pathogens

Parasitic pathogens

Three types of parasitic pathogen

?  ?  ?
Common Parasitic Pathogens

Parasitic pathogens

Three types of parasitic pathogen

Protozoa  Helminths  Arthropods
Broadly speaking, what are protozoa?
Broadly speaking, what are protozoa? They are unicellular eukaryotes capable of some form of motility. Protozoa feed on organic material, and many are parasites.
Broadly speaking, what are protozoa? They are unicellular eukaryotes capable of some form of motility. Protozoa feed on organic material, and many are parasites. The term protozoa is considered outdated by modern biologists, but it persists in the ophthalmic literature.
Broadly speaking, what are protozoa? They are unicellular eukaryotes capable of some form of motility. Protozoa feed on organic material, and many are parasites. The term protozoa is considered outdated by modern biologists, but it persists in the ophthalmic literature.

How do eukaryotes and prokaryotes differ?
Broadly speaking, what are protozoa? They are unicellular eukaryotes capable of some form of motility. Protozoa feed on organic material, and many are parasites. The term *protozoa* is considered outdated by modern biologists, but it persists in the ophthalmic literature.

How do eukaryotes and prokaryotes differ? Eukaryotic cells have a three words, whereas prokaryotic cells do not.
Broadly speaking, what are protozoa? They are unicellular eukaryotes capable of some form of motility. Protozoa feed on organic material, and many are parasites. The term protozoa is considered outdated by modern biologists, but it persists in the ophthalmic literature.

How do eukaryotes and prokaryotes differ? Eukaryotic cells have a membrane-bound nucleus, whereas prokaryotic cells do not.
Likewise, what are helminths?
Likewise, what are helminths?
Helminths are parasitic worms (or worm-like organisms).
By definition, they live inside the body of their host.
Common Parasitic Pathogens

Parasitic pathogens

Protozoa

Helminths

Arthropods

Finally—what are arthropods?
Finally—what are arthropods?
Arthropods are bugs—literally. They have an exoskeleton, a body, and appendages.
Common Parasitic Pathogens

Parasitic pathogens

Protozoa

Helminths

Arthropods

Four protozoa discussed in one or another BCSC book
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths

Arthropods

Four protozoa discussed in one or another BCSC book
Acanthamoeba is notorious for causing what sort of ocular infection?

- A devastating, sight-threatening keratitis

Acanthamoeba exist in two forms (ie, life-cycle stages). What are they?

- The motile trophozoite (infectious)
- The hard-to-kill cyst
Acanthamoeba is notorious for causing what sort of ocular infection? A devastating, sight-threatening keratitis.
Acanthamoeba is notorious for causing what sort of ocular infection? A devastating, sight-threatening keratitis.

Acanthamoeba exist in two forms (ie, life-cycle stages). What are they?

---
---
Acanthamoeba is notorious for causing what sort of ocular infection?
A devastating, sight-threatening keratitis

Acanthamoeba exist in two forms (ie, life-cycle stages). What are they?
-- The motile trophozoite
-- The hard-to-kill cyst
Common Parasitic Pathogens

Acanthamoeba

Trophozoite form

Cyst form
Acanthamoeba is notorious for causing what sort of ocular infection? A devastating, sight-threatening keratitis

Acanthamoeba exist in two forms (ie, life-cycle stages). Which are they?

Which form is infectious?
-- The motile trophozoite is infectious?
-- The hard-to-kill cyst is infectious?
Acanthamoeba is notorious for causing what sort of ocular infection? A devastating, sight-threatening keratitis.

Acanthamoeba exist in two forms (ie, life-cycle stages). What are they? Which form is infectious?
-- The motile trophozoite (is infectious!)
-- The hard-to-kill cyst
Acanthamoeba is notorious for causing what sort of ocular infection?
A devastating, sight-threatening keratitis

Acanthamoeba exist in two forms (i.e., life-cycle stages). What are they?
-- The motile trophozoite (is infectious!)
-- The hard-to-kill cyst

What medium is used when culturing for Acanthamoeba?

Non-nutrient agar with E. coli overlay

When placed on such a culture plate, the motile trophozoite form of the amoeba will respond by grazing its way around the plate, in the process leaving observable trails.
Acanthamoeba is notorious for causing what sort of ocular infection?
A devastating, sight-threatening keratitis

Acanthamoeba exist in two forms (ie, life-cycle stages). What are they?
--The motile trophozoite (is infectious!)
--The hard-to-kill cyst

What medium is used when culturing for Acanthamoeba?
Non-nutrient agar with E. coli overlay
Acanthamoeba is notorious for causing what sort of ocular infection? A devastating, sight-threatening keratitis.

Acanthamoeba exist in two forms. Which form is infectious?
--- The motile trophozoite (is infectious!)
--- The hard-to-kill cyst

What medium is used when culturing for Acanthamoeba?
Non-nutrient agar with E. coli overlay

What constitutes a positive ‘culture’?
Acanthamoeba is notorious for causing what sort of ocular infection?
A devastating, sight-threatening keratitis

Acanthamoeba exist in two forms (ie, life-cycle stages). What are they?

- The motile **trophozoite** (is infectious!)
- The hard-to-kill **cyst**

What medium is used when culturing for Acanthamoeba?
Non-nutrient agar with E. coli overlay

What constitutes a positive ‘culture’?
When placed on such a culture plate, the motile trophozoite form of the amoeba will respond by grazing its way around the plate, in the process leaving **observable trails** in the agar
Acanthamoeba: Feeding tracks on non-nutrient agar E coli plate
What is the most common misdiagnosis of early Acanthamoeba keratitis?

When culturing for Acanthamoeba?

What constitutes a positive ‘culture’?

Which form is infectious?

When placed on such a culture plate, the motile trophozoite will respond by grazing its way around the plate, in the process leaving observable trails in the agar.
What is the most common misdiagnosis of early Acanthamoeba keratitis? HSV keratitis

What medium is used when culturing for Acanthamoeba? Non-nutrient agar with E. coli overlay

What constitutes a positive ‘culture’? When placed on such a culture plate, the motile trophozoite respond by grazing its way around the plate, in the process leaving observable trails in the agar
Common Parasitic Pathogens

Parasitic pathogens

Protozoa

\textbf{Acanthamoeba}

- What is the most common misdiagnosis of early Acanthamoeba keratitis?
  - HSV keratitis

- Why HSV?
  - Because early Acanthamoeba keratitis is often dendritic in appearance at the slit lamp

Helminths

Arthropods

\textbf{Toxoplasma}

Microsporidia

Leishmania

\textbf{Acanthamoeba is notorious for causing what sort of ocular infection?}
- A devastating, sight-threatening keratitis

\textbf{Acanthamoeba exist in two forms (i.e., life-cycle stages). What are they?}
- The motile \textbf{trophozoite} (is infectious!)
- The hard-to-kill \textbf{cyst}

\textbf{What medium is used when culturing for Acanthamoeba?}
- Non-nutrient agar with E. coli overlay

\textbf{What constitutes a positive ‘culture’?}
- When placed on such a culture plate, the motile trophozoite respond by grazing its way around the plate, in the process leaving \textbf{observable trails} in the agar
Acanthamoeba is notorious for causing what sort of ocular infection?
- A devastating, sight-threatening keratitis

What is the most common misdiagnosis of early Acanthamoeba keratitis?
- HSV keratitis

Why HSV?
- Because early Acanthamoeba keratitis is often dendritic in appearance at the slit lamp

What medium is used when culturing for Acanthamoeba?
- Non-nutrient agar with E. coli overlay

What constitutes a positive ‘culture’?
- When placed on such a culture plate, the motile trophozoite respond by grazing its way around the plate, in the process leaving observable trails in the agar
Common Parasitic Pathogens

*Acanthamoeba*: (Pseudo)dendrites
Acanthamoeba is notorious for causing what sort of ocular infection?
- A devastating, sight-threatening keratitis

What constitutes a positive ‘culture’?
- When placed on such a culture plate, the motile trophozoite form of the amoeba will respond by grazing its way around the plate, in the process leaving observable trails in the agar.

What medium is used when culturing for Acanthamoeba?
- Non-nutrient agar with E. coli overlay

What is the most common misdiagnosis of early Acanthamoeba keratitis?
- HSV keratitis

Why HSV?
- Because early Acanthamoeba keratitis is often dendritic in appearance at the slit lamp.

Dendritic in appearance??!! I thought Acanthamoeba was known for having a ring infiltrate. What’s the dealio?
- A ring-shaped infiltrate is indeed classic for Acanthamoeba; however, it is a relatively late finding in the disease.
Acanthamoeba is notorious for causing what sort of ocular infection?
A devastating, sight-threatening keratitis

Acanthamoeba exist in two forms (i.e., life-cycle stages). What are they?
- The motile trophozoite (is infectious!)
- The hard-to-kill cyst

What medium is used when culturing for Acanthamoeba?
Non-nutrient agar with E. coli overlay

What constitutes a positive ‘culture’?
When placed on such a culture plate, the motile trophozoite form of the amoeba will respond by grazing its way around the plate, in the process leaving observable trails in the agar.

What is the most common misdiagnosis of early Acanthamoeba keratitis?
HSV keratitis

Why HSV?
Because early Acanthamoeba keratitis is often dendritic in appearance at the slit lamp.

Dendritic in appearance??!! I thought Acanthamoeba was known for having a ‘ring infiltrate.’ What’s the dealio?
Acanthamoeba is notorious for causing what sort of ocular infection?
- A devastating, sight-threatening keratitis

Acanthamoeba exist in two forms (ie, life-cycle stages). What are they?
- The motile trophozoite (is infectious!)
- The hard-to-kill cyst

What medium is used when culturing for Acanthamoeba?
- Non-nutrient agar with E. coli overlay

What constitutes a positive ‘culture’?
- When placed on such a culture plate, the motile trophozoite respond by grazing its way around the plate, in the process leaving observable trails in the agar

A ring-shaped infiltrate is indeed classic for Acanthamoeba; however, it is a relatively late finding in the dz

What is the most common misdiagnosis of early Acanthamoeba keratitis?
- HSV keratitis

Why HSV?
- Because early Acanthamoeba keratitis is often dendritic in appearance at the slit lamp
Common Parasitic Pathogens

Acanthamoeba: Ring-shaped infiltrate
Acanthamoeba is notorious for causing what sort of ocular infection?
- A devastating, sight-threatening keratitis

Acanthamoeba exist in two forms (ie, life-cycle stages). What are they?
- The motile trophozoite (is infectious!)
- The hard-to-kill cyst

What medium is used when culturing for Acanthamoeba?
- Non-nutrient agar with E. coli overlay

What constitutes a positive 'culture'?
- When placed on such a culture plate, the motile trophozoite form of the amoeba will respond by grazing its way around the plate, in the process leaving observable trails

What is the most common misdiagnosis of early Acanthamoeba keratitis?
- HSV keratitis

Why HSV?
- Because early Acanthamoeba keratitis is often dendritic in appearance at the slit lamp

Dendritic in appearance??!! I thought Acanthamoeba was known for having a ‘ring infiltrate.’ What’s the dealio?
- A ring-shaped infiltrate is indeed classic for Acanthamoeba; however, it is a relatively late finding in the dz

In what key way do the dendrites of Acanthamoeba keratitis differ from those of HSV keratitis?
- HSV dendrites usually have terminal bulbs, whereas Acanthamoeba dendrites don’t. Be sure to evaluate all dendrites carefully for the presence of terminal bulbs!
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths

Arthropods

Acanthamoeba

What is the most common misdiagnosis of early Acanthamoeba keratitis?
- HSV keratitis

Why HSV?
- Because early Acanthamoeba keratitis is often dendritic in appearance

Dendritic in appearance??!! I thought Acanthamoeba had a ‘ring infiltrate.’ What’s the dealio?
- A ring-shaped infiltrate is indeed classic for Acanthamoeba; however, it is a relatively late finding in the dz

In what key way do the dendrites of Acanthamoeba keratitis differ from those of HSV keratitis?
- HSV dendrites usually have terminal bulbs, whereas Acanthamoeba dendrites don’t.

What constitutes a positive ‘culture’?
- When placed on such a culture plate, the motile trophozoite form of the amoeba will respond by grazing its way around the plate, in the process leaving observable trails in the agar.

What medium is used when culturing for Acanthamoeba?
- Non-nutrient agar with E. coli overlay
Common Parasitic Pathogens

Parasitic pathogens

Protozoa

- Acanthamoeba
- Toxoplasma

Helminths

Arthropods

Acanthamoeba

What is the most common misdiagnosis of early Acanthamoeba keratitis?
Acanthamoeba keratitis? HSV keratitis

Why HSV?
Because early Acanthamoeba keratitis is often dendritic in appearance.

In what key way do the dendrites of Acanthamoeba keratitis differ from those of HSV keratitis?
HSV dendrites usually have terminal bulbs, whereas Acanthamoeba dendrites don’t.

Protozoa

Acanthamoeba

Helminths

Arthropods
Common Parasitic Pathogens

HSV dendrites: Terminal bulbs (look carefully)
**Common Parasitic Pathogens**

**Parasitic pathogens**

- **Protozoa**
  - *Acanthamoeba*
  - *Toxoplasma*

- **Helminths**

- **Arthropods**

---

**Acanthamoeba**

- What is the most common misdiagnosis of early *Acanthamoeba* keratitis?
  - HSV keratitis

- Why HSV?
  - Because early *Acanthamoeba* keratitis often presents with a dendritic appearance.

- What is the most common misdiagnosis of early *Acanthamoeba* keratitis? (Rephrased)
  - HSV keratitis

- Why HSV? (Rephrased)
  - Because early *Acanthamoeba* keratitis often presents with a dendritic appearance.

- What constitutes a positive 'culture' when culturing for *Acanthamoeba*?
  - When placed on a culture plate, the motile trophozoite form of the amoeba will respond by grazing its way around the plate, in the process leaving observable trails in the agar.

- What medium is used when culturing for *Acanthamoeba*?
  - Non-nutrient agar with E. coli overlay

- In what key way do the dendrites of *Acanthamoeba* keratitis differ from those of HSV keratitis?
  - HSV dendrites usually have terminal bulbs, whereas *Acanthamoeba* dendrites don’t. Evaluate all dendrites carefully for the presence of terminal bulbs!

- A ring-shaped infiltrate is indeed classic for *Acanthamoeba*; however, it is a relatively late finding in the disease.
Common Parasitic Pathogens

Parasitic pathogens

Protozoa

Helminths

Arthropods

Acanthamoeba

Protozoa

Toxoplasma

Microsporidia

Leishmania

Acanthamoeba is notorious for causing what sort of ocular infection?

- A devastating, sight-threatening keratitis

What are the two forms (life-cycle stages) of Acanthamoeba?

- The motile trophozoite (is infectious!)
- The hard-to-kill cyst

What medium is used when culturing for Acanthamoeba?

- Non-nutrient agar with E. coli overlay

What constitutes a positive 'culture'?

- When placed on such a culture plate, the motile trophozoite form of the amoeba will respond by grazing its way around the plate, in the process leaving observable trails

What is the most common misdiagnosis of early Acanthamoeba keratitis?

- HSV keratitis

Why HSV?

- Because early Acanthamoeba keratitis is often dendritic in appearance at the slit lamp

In what key way do the dendrites of Acanthamoeba keratitis differ from those of HSV keratitis?

- HSV dendrites usually have terminal bulbs, whereas Acanthamoeba dendrites don’t. Evaluate all dendrites carefully for the presence of terminal bulbs!

In what key way might the presenting complaint of an Acanthamoeba keratitis patient differ from that of an HSV keratitis patient?

- The patient with Acanthamoeba keratitis will complain of pain that seems out of proportion to the clinical picture, while the HSV keratitis patient will have less pain than would be expected given the appearance of the cornea

Dendritic in appearance??!! I thought Acanthamoeba was known for having a ‘ring infiltrate.’ What’s the dealio?

- A ring-shaped infiltrate is indeed classic for Acanthamoeba; however, it is a relatively late finding in the dz
**Acanthamoeba**

- **Protozoa**
- **Helminths**
- **Arthropods**

**Common Parasitic Pathogens**

**Toxoplasma**

**Parasitic pathogens**

- **Microsporidia**
- **Leishmania**

What is Acanthamoeba notorious for causing?
- A devastating, sight-threatening keratitis

What constitutes a positive 'culture' for Acanthamoeba?
- When placed on such a culture plate, the motile trophozoite form of the amoeba will respond by grazing its way around the plate, in the process leaving observable trails in the agar.

What medium is used when culturing for Acanthamoeba?
- Non-nutrient agar with E. coli overlay

What is the most common misdiagnosis of early Acanthamoeba keratitis?
- HSV keratitis

Why HSV?
- Because early Acanthamoeba keratitis is often dendritic in appearance at the slit lamp.

Dendritic in appearance??!! I thought Acanthamoeba was known for having a ‘ring infiltrate.’ What’s the dealio?
- A ring-shaped infiltrate is indeed classic for Acanthamoeba; however, it is a relatively late finding in the disease.

In what key way might the presenting complaint of an Acanthamoeba keratitis patient differ from that of an HSV keratitis patient?
- The patient with Acanthamoeba keratitis will complain of pain that seems out of proportion to the clinical picture, while the HSV keratitis patient will have less pain than would be expected given the appearance of the cornea.

In what key way do the dendrites of Acanthamoeba keratitis differ from those of HSV keratitis?
- HSV dendrites usually have terminal bulbs, whereas Acanthamoeba dendrites don’t.

Evaluate all dendrites carefully for the presence of terminal bulbs!
Common Parasitic Pathogens

Parasitic pathogens

Protozoa

- *Acanthamoeba*

Helminths

Arthropods

What is the most common misdiagnosis of early *Acanthamoeba* keratitis? *HSV keratitis*

Why HSV?

Because early *Acanthamoeba* keratitis is often dendritic in appearance at the slit lamp. Dendritic in appearance??!! I thought *Acanthamoeba* was known for having a 'ring infiltrate.' What's the dealio?

A ring-shaped infiltrate is indeed classic for *Acanthamoeba*; however, it is a relatively late finding in the disease.

In what key way might the presenting complaint of an *Acanthamoeba* keratitis patient differ from that of an *HSV* keratitis patient?

The patient with *Acanthamoeba* keratitis will complain of pain that seems out of proportion to the clinical picture, while the *HSV* keratitis patient will have less pain than would be expected given the appearance of the cornea.

Why is *Acanthamoeba* keratitis so painful?

Because the bug has a propensity for perineural invasion.

What constitutes a positive 'culture'?

When placed on such a culture plate, the motile trophozoite form of the amoeba will respond by grazing its way around the plate, in the process leaving observable trails in the agar.

What medium is used when culturing for *Acanthamoeba*?

Non-nutrient agar with *E. coli* overlay.

In what key way do the dendrites of *Acanthamoeba* keratitis differ from those of *HSV* keratitis?

*HSV* dendrites usually have terminal bulbs, whereas *Acanthamoeba* dendrites don't. Evaluate all dendrites carefully for the presence of terminal bulbs!

In what key way might the presenting complaint of an *Acanthamoeba* keratitis patient differ from that of an *HSV* keratitis patient?

The patient with *Acanthamoeba* keratitis will complain of pain that seems out of proportion to the clinical picture, while the *HSV* keratitis patient will have less pain than would be expected given the appearance of the cornea.

Why is *Acanthamoeba* keratitis so painful?

Because the bug has a propensity for perineural invasion.

What medium is used when culturing for *Acanthamoeba*?

Non-nutrient agar with *E. coli* overlay.

In what key way do the dendrites of *Acanthamoeba* keratitis differ from those of *HSV* keratitis?

*HSV* dendrites usually have terminal bulbs, whereas *Acanthamoeba* dendrites don't. Evaluate all dendrites carefully for the presence of terminal bulbs!

In what key way might the presenting complaint of an *Acanthamoeba* keratitis patient differ from that of an *HSV* keratitis patient?

The patient with *Acanthamoeba* keratitis will complain of pain that seems out of proportion to the clinical picture, while the *HSV* keratitis patient will have less pain than would be expected given the appearance of the cornea.

Why is *Acanthamoeba* keratitis so painful?

Because the bug has a propensity for perineural invasion.

What medium is used when culturing for *Acanthamoeba*?

Non-nutrient agar with *E. coli* overlay.

In what key way do the dendrites of *Acanthamoeba* keratitis differ from those of *HSV* keratitis?

*HSV* dendrites usually have terminal bulbs, whereas *Acanthamoeba* dendrites don't. Evaluate all dendrites carefully for the presence of terminal bulbs!

In what key way might the presenting complaint of an *Acanthamoeba* keratitis patient differ from that of an *HSV* keratitis patient?

The patient with *Acanthamoeba* keratitis will complain of pain that seems out of proportion to the clinical picture, while the *HSV* keratitis patient will have less pain than would be expected given the appearance of the cornea.

Why is *Acanthamoeba* keratitis so painful?

Because the bug has a propensity for perineural invasion.

What medium is used when culturing for *Acanthamoeba*?

Non-nutrient agar with *E. coli* overlay.

In what key way do the dendrites of *Acanthamoeba* keratitis differ from those of *HSV* keratitis?

*HSV* dendrites usually have terminal bulbs, whereas *Acanthamoeba* dendrites don't. Evaluate all dendrites carefully for the presence of terminal bulbs!

In what key way might the presenting complaint of an *Acanthamoeba* keratitis patient differ from that of an *HSV* keratitis patient?

The patient with *Acanthamoeba* keratitis will complain of pain that seems out of proportion to the clinical picture, while the *HSV* keratitis patient will have less pain than would be expected given the appearance of the cornea.

Why is *Acanthamoeba* keratitis so painful?

Because the bug has a propensity for perineural invasion.

What medium is used when culturing for *Acanthamoeba*?

Non-nutrient agar with *E. coli* overlay.

In what key way do the dendrites of *Acanthamoeba* keratitis differ from those of *HSV* keratitis?

*HSV* dendrites usually have terminal bulbs, whereas *Acanthamoeba* dendrites don't. Evaluate all dendrites carefully for the presence of terminal bulbs!

In what key way might the presenting complaint of an *Acanthamoeba* keratitis patient differ from that of an *HSV* keratitis patient?

The patient with *Acanthamoeba* keratitis will complain of pain that seems out of proportion to the clinical picture, while the *HSV* keratitis patient will have less pain than would be expected given the appearance of the cornea.

Why is *Acanthamoeba* keratitis so painful?

Because the bug has a propensity for perineural invasion.
Common Parasitic Pathogens

Protozoa

Helminths

Arthropods

Toxoplasma

Parasitic pathogens

Microsporidia

Leishmania

Acanthamoeba

What is the most common misdiagnosis of early Acanthamoeba keratitis?

HSV keratitis

Why HSV?

Because early Acanthamoeba keratitis is often dendritic in appearance at the slit lamp.

"Dendritic in appearance??!! Doesn’t Acanthamoeba have a ‘ring infiltrate.’? What’s the dealio?"

A ring-shaped infiltrate is indeed classic for Acanthamoeba; however, it is a relatively late finding in the diagnosis.

In what key way might the presenting complaint of an Acanthamoeba keratitis patient differ from that of an HSV keratitis patient?

The patient with Acanthamoeba keratitis will complain of pain that seems out of proportion to the clinical picture, while the HSV keratitis patient will have less pain than would be expected given the appearance of the cornea.

Why is Acanthamoeba keratitis so painful?

Because the bug has a propensity for perineural invasion.

What constitutes a positive ‘culture’?

When placed on such a culture plate, the motile trophozoite form of the amoeba will respond by grazing its way around the plate, in the process leaving observable trails in the agar.

What medium is used when culturing for Acanthamoeba?

Non-nutrient agar with E. coli overlay.

Which form is infectious?

- The motile trophozoite (is infectious!)
- The hard-to-kill cyst

Why HSV?

Because early Acanthamoeba keratitis is often dendritic in appearance at the slit lamp.

Why is Acanthamoeba keratitis so painful?

Because the bug has a propensity for perineural invasion.

In what key way do the dendrites of Acanthamoeba keratitis differ from those of HSV keratitis?

HSV dendrites usually have terminal bulbs, whereas Acanthamoeba dendrites don’t.

Evaluate all dendrites carefully for the presence of terminal bulbs!
Protozoa

- Acanthamoeba

Helminths

Arthropods

Common Parasitic Pathogens

Parasitic pathogens

What is the most common misdiagnosis of early Acanthamoeba keratitis?

HSV keratitis

Why HSV?

Because early Acanthamoeba keratitis is often dendritic in appearance at the slit lamp.

Dendritic in appearance??!! I thought Acanthamoeba was known for having a ‘ring infiltrate.’ What’s the dealio?

A ring-shaped infiltrate is indeed classic for Acanthamoeba; however, it is a relatively late finding in the disease.

Why is Acanthamoeba keratitis so painful?

Because the bug has a propensity for perineural invasion.

In what key way do the dendrites of Acanthamoeba keratitis differ from those of HSV keratitis?

HSV dendrites usually have terminal bulbs, whereas Acanthamoeba dendrites don’t. Evaluate all dendrites carefully for the presence of terminal bulbs!

In what key way might the presenting complaint of an Acanthamoeba keratitis patient differ from that of an HSV keratitis patient?

The patient with Acanthamoeba keratitis will complain of pain that seems out of proportion to the clinical picture, while the HSV keratitis patient will have less pain than would be expected given the appearance of the cornea.

What is the most common misdiagnosis of early Acanthamoeba keratitis?

HSV keratitis

Why HSV?

Because early Acanthamoeba keratitis is often dendritic in appearance at the slit lamp.
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia

Helminths

Arthropods

What is the full name of the causative organism in ocular toxoplasmosis?

Toxoplasma gondii

Where in the world can T gondii be found? Is it a common human pathogen?

Everywhere—it has a worldwide distribution
Yes—it's likely that a billion people are infected worldwide

What animal is its definitive host?
The cat
Common Parasitic Pathogens

Parasitic pathogens

Protozoa

Helminths

Arthropods

- Acanthamoeba
- Microsporidia
- Toxoplasma

What is the full name of the causative organism in ocular toxoplasmosis?
Toxoplasma gondii

Where in the world can T. gondii be found? Is it a common human pathogen?
Everywhere—it has a worldwide distribution
Yes—it’s likely that a billion people are infected worldwide

What animal is its definitive host?
The cat
Common Parasitic Pathogens

Toxoplasma gondii
What is the full name of the causative organism in ocular toxoplasmosis? 
*Toxoplasma gondii*

*Where in the world can T gondii be found?*
What is the full name of the causative organism in ocular toxoplasmosis?
Toxoplasma gondii

Where in the world can T gondii be found?
Everywhere—it has a worldwide distribution
Common Parasitic Pathogens

Parasitic pathogens

- Protozoa
  - Acanthamoeba
  - Toxoplasma
  - Microsporidia
- Helminths
- Arthropods

What is the full name of the causative organism in ocular toxoplasmosis? 
*Toxoplasma gondii*

*Where in the world can T gondii be found? Is it a common human pathogen?*
Everywhere—it has a worldwide distribution
What is the full name of the causative organism in ocular toxoplasmosis? *Toxoplasma gondii*

*Where in the world can* T gondii *be found? Is it a common human pathogen?*
- Everywhere—it has a worldwide distribution
- Yes—it’s likely that a billion people are infected worldwide
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
  - Acanthamoeba
  - Toxoplasma
  - Microsporidia

Helminths

Arthropods

What is the full name of the causative organism in ocular toxoplasmosis? *Toxoplasma gondii*

Where in the world can *T. gondii* be found? Is it a common human pathogen?
Everywhere—it has a worldwide distribution
Yes—it’s likely that a billion people are infected worldwide

What animal is its definitive host?
What is the full name of the causative organism in ocular toxoplasmosis?
*Toxoplasma gondii*

*Where in the world can T gondii be found? Is it a common human pathogen?*  
Everywhere—it has a worldwide distribution  
Yes—it’s likely that a billion people are infected worldwide

*What animal is its definitive host?*  
The cat
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- *Toxoplasma*
- Microsporidia

Helminths

Arthropods

What is the full name of the causative organism in ocular toxoplasmosis?

*Toxoplasma gondii*

Where in the world can *T. gondii* be found? Is it a common human pathogen?

Everywhere—it has a worldwide distribution
Yes—it’s likely that a billion people are infected worldwide

What animal is its definitive host?

The cat

Which ocular structures are most commonly involved in *Toxoplasma* infection?

The retina and choroid

Is toxoplasmosis a common form of infectious posterior uveitis?

It is indeed—in fact, it is the most common
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia

Helminths

Arthropods

What is the full name of the causative organism in ocular toxoplasmosis?
Toxoplasma gondii

Where in the world can T. gondii be found? Is it a common human pathogen?
Everywhere—it has a worldwide distribution
Yes—it's likely that a billion people are infected worldwide

What animal is its definitive host?
The cat

Which ocular structures are most commonly involved in Toxoplasma infection?
The retina and choroid

Is toxoplasmosis a common form of infectious posterior uveitis?
It is indeed—in fact, it is the most common
Classic presentation of *Toxoplasma* retinochoroiditis:
An active retinal lesion next to an old inactive scar
Common Parasitic Pathogens

Parasitic pathogens

Protozoa

Toxoplasma

Protozoa

Helminths

Arthropods

What is the full name of the causative organism in ocular toxoplasmosis?
*Toxoplasma gondii*

Where in the world can *T. gondii* be found? Is it a common human pathogen?
Everywhere—it has a worldwide distribution
Yes—it’s likely that a billion people are infected worldwide

What animal is its definitive host?
The cat

Which ocular structures are most commonly involved in Toxoplasma infection?
The retina and choroid

Is toxoplasmosis a common form of infectious posterior uveitis?

What animal is its definitive host?
The cat
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
  - Toxoplasma
  - Microsporidia

Helminths

Arthropods

What is the full name of the causative organism in ocular toxoplasmosis? *Toxoplasma gondii*

Where in the world can *T. gondii* be found? Is it a common human pathogen? Yes—it's likely that a billion people are infected worldwide

What animal is its definitive host? The cat

Which ocular structures are most commonly involved in *Toxoplasma* infection? The retina and choroid

Is toxoplasmosis a common form of infectious posterior uveitis? It is indeed—in fact, it is the most common
Common Parasitic Pathogens

Parasitic pathogens

Protozoa

Helminths

Arthropods

Acanthamoeba

Toxoplasma

Microsporidia

Protozoa

What is the full name of the causative organism in ocular toxoplasmosis? Toxoplasma gondii

Where in the world can T gondii be found? Is it a common human pathogen? Everywhere—it has a worldwide distribution. Yes—it's likely that a billion people are infected worldwide

What animal is its definitive host? The cat

Which ocular structures are most commonly involved in Toxoplasma infection? The retina and choroid

Is toxoplasmosis a common form of infectious posterior uveitis? It is indeed—in fact, it is the most common

What are the three common means of catching the toxo bug?

--- Ingestion of undercooked meat (#1 type: pork) that harbors toxo cysts

--- Ingestion of cysts directly from cat feces (well, not directly)

---
Common Parasitic Pathogens

Parasitic pathogens

Protozoa

- Acanthamoeba
- Toxoplasma
- Microsporidia

Helminths

Arthropods

What is the full name of the causative organism in ocular toxoplasmosis?

Toxoplasma gondii

Where in the world can T gondii be found? Is it a common human pathogen?

Everywhere—it has a worldwide distribution
Yes—it's likely that a billion people are infected worldwide

What animal is its definitive host?

The cat

Which ocular structures are most commonly involved in Toxoplasma infection?

The retina and choroid

Is toxoplasmosis a common form of infectious posterior uveitis?

It is indeed—in fact, it is the most common

What are the three common means of catching the toxo bug?

- Transplacentally
- Ingestion of undercooked meat (#1 type: pork) that harbors toxo cysts
- Ingestion of cysts directly from cat feces (well, not directly directly)
Common Parasitic Pathogens

Parasitic pathogens

Protozoa

Helminths

Arthropods

Protozoa

Acanthamoeba

Toxoplasma

Microsporidia

Helminths

Arthropods

Protozoa

Helminths

Arthropods

What is the full name of the causative organism in ocular toxoplasmosis? Toxoplasma gondii

Where in the world can T gondii be found? Is it a common human pathogen? Everywhere—it has a worldwide distribution Yes—it’s likely that a billion people are infected worldwide

What animal is its definitive host? The cat

Which ocular structures are most commonly involved in Toxoplasma infection? The retina and choroid

Is toxoplasmosis a common form of infectious posterior uveitis? It is indeed—in fact, it is the most common

What are the three common means of catching the toxo bug?--Transplacentally--Ingestion of undercooked meat (#1 type: pork) that harbors toxo cysts--Ingestion of cysts directly from cat feces (well, not directly directly)
Parasitic pathogens

Common Parasitic Pathogens

Toxoplasmosis has its own slide-set (U7); see it for more detail re this very important bug!

What is the full name of the causative organism in ocular toxoplasmosis? Toxoplasma gondii

Where in the world can T gondii be found? Is it a common human pathogen? Everywhere—it has a worldwide distribution. Yes—it's likely that a billion people are infected worldwide.

What animal is its definitive host? The cat

Which ocular structures are most commonly involved in Toxoplasma infection? The retina and choroid

Is toxoplasmosis a common form of infectious posterior uveitis? It is indeed—in fact, it is the most common.

What are the three common means of catching the toxo bug? --Transplacentally --Ingestion of undercooked meat (#1 type: pork) that harbors toxo cysts --Ingestion of cysts directly from cat feces (well, not directly directly)

Toxoplasmosis has its own slide-set (U7); see it for more detail re this very important bug!
Note: The *Cornea* book mentions that there is evidence suggesting *Microsporidia* might actually be a fungus, but for now it is still classified (by the book) as a protozoan.
Parasitic pathogens

Protozoa

Acanthamoeba
Toxoplasma
Microsporidia
Leishmania

What sort of ocular infection is caused by Microsporidia?

Common Parasitic Pathogens

Parasitic pathogens

Protozoa

Acanthamoeba
Toxoplasma
Microsporidia
Leishmania

What sort of ocular infection is caused by Microsporidia?
What sort of ocular infection is caused by Microsporidia?
Keratitis

Who (ie, what pt population) gets Microsporidia keratitis?
AIDS patients

How is Microsporidia keratitis diagnosed?
Electron microscopy of corneal scrapings

What is the treatment for Microsporidia keratitis?
Topical fumagillin
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- \textbf{Microsporidia}
- Leishmania

\textit{What sort of ocular infection is caused by Microsporidia?}
Keratitis

\textit{Who (ie, what pt population) gets Microsporidia keratitis?}
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
  - **Microsporidia**
- Leishmania

**What sort of ocular infection is caused by Microsporidia?**
Keratitis

**Who (ie, what pt population) gets Microsporidia keratitis?**
AIDS patients
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- *Microsporidia*
- Leishmania

What sort of ocular infection is caused by *Microsporidia*? Keratitis

Who (ie, what pt population) gets *Microsporidia* keratitis? AIDS patients

How is *Microsporidia* keratitis diagnosed?
What sort of ocular infection is caused by Microsporidia?
Keratitis

Who (ie, what pt population) gets Microsporidia keratitis?
AIDS patients

How is Microsporidia keratitis diagnosed?
Electron microscopy of corneal scrapings
What sort of ocular infection is caused by Microsporidia?
Keratitis

Who (ie, what pt population) gets Microsporidia keratitis?
AIDS patients

How is Microsporidia keratitis diagnosed?
Electron microscopy of corneal scrapings

What is the treatment for Microsporidia keratitis?
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- **Microsporidia**
- Leishmania

What sort of ocular infection is caused by Microsporidia?
Keratitis

Who (ie, what pt population) gets Microsporidia keratitis?
AIDS patients

How is Microsporidia keratitis diagnosed?
Electron microscopy of corneal scrapings

What is the treatment for Microsporidia keratitis?
Topical fumagillin
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths

Arthropods

What ophthalmic condition is associated with Leishmania?
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths

Arthropods

What ophthalmic condition is associated with Leishmania?
An eyelid ulcer as a manifestation of cutaneous leishmaniasis (the general term for the condition caused by this protozoan)
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths

Arthropods

What ophthalmic condition is associated with Leishmania?
An eyelid ulcer as a manifestation of cutaneous leishmaniasis (the general term for the condition caused by this protozoan)

What is the mechanism by which humans become infected?
Common Parasitic Pathogens

Parasitic pathogens

Protozoa

- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths

Arthropods

What ophthalmic condition is associated with Leishmania?
An eyelid ulcer as a manifestation of cutaneous leishmaniasis
(the general term for the condition caused by this protozoan)

What is the mechanism by which humans become infected?
Via a bite by the (female) sandfly
Common Parasitic Pathogens

Parasitic pathogens

- Protozoa
  - Acanthamoeba
  - Toxoplasma
  - Microsporidia
  - Leishmania

- Helminths

- Arthropods

Three worms addressed in the BCSC
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods

*Three worms addressed in the BCSC*
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods

Re helminthic ocular conditions...
Which causes a condition known as river blindness?
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods

Re helminthic ocular conditions…
Which causes a condition known as river blindness? Onchocerca
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Re helminthic ocular conditions…
Which causes a condition known as *river blindness*? *Onchocerca*
Which is transmitted via the bite of the blackfly?
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods

Re helminthic ocular conditions...
Which causes a condition known as river blindness? Onchocerca
Which is transmitted via the bite of the blackfly? Onchocerca
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia

Helminths
- Toxocara
- Onchocerca (transmitted by the blackfly)
- Loa Loa
- Leishmania (transmitted by the sandfly)

Arthropods

Re helminthic ocular conditions...

Take note! Don’t get them confused!
Common Parasitic Pathogens

Parasitic pathogens

- Protozoa
  - Acanthamoeba
  - Toxoplasma
  - Microsporidia
  - Leishmania

- Helminths
  - Toxocara
  - Onchocerca
  - Loa Loa

- Arthropods

Re helminthic ocular conditions...
Which causes a condition known as *river blindness*? *Onchocerca*
Which is transmitted via the bite of the blackfly? *Onchocerca*
Which can be observed moving beneath the conjunctiva?
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- **Toxocara**
- **Onchocerca**
- **Loa Loa**

Arthropods

Re helminthic ocular conditions...
Which causes a condition known as *river blindness*? **Onchocerca**
Which is transmitted via the bite of the blackfly? **Onchocerca**
Which can be observed moving beneath the conjunctiva? **Loa Loa**
Common Parasitic Pathogens

Loa Loa. Yikes
Parasitic pathogens

Common Parasitic Pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods

Re helminthic ocular conditions...
Which causes a condition known as river blindness? Onchocerca
Which is transmitted via the bite of the blackfly? Onchocerca
Which can be observed moving beneath the conjunctiva? Loa Loa
Which can be observed swimming in the AC?
Re helminthic ocular conditions…
Which causes a condition known as *river blindness*? *Onchocerca*
Which is transmitted via the bite of the blackfly? *Onchocerca*
Which can be observed moving beneath the conjunctiva? *Loa Loa*
Which can be observed swimming in the AC? *Onchocerca*
**Common Parasitic Pathogens**

**Parasitic pathogens**

- **Protozoa**
  - Acanthamoeba
  - Toxoplasma
  - Microsporidia
  - Leishmania

- **Helminths**
  - **Toxocara**
  - **Onchocerca**
    - **Loa Loa**

- **Arthropods**

**Re helminthic ocular conditions…**
- Which causes a condition known as *river blindness*? *Onchocerca*
- Which is transmitted via the bite of the blackfly? *Onchocerca*
- Which can be observed moving beneath the conjunctiva? *Loa Loa*
- Which can be observed swimming in the AC? *Onchocerca*
- Which is a resident parasite in dogs? *Onchocerca*
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods

Re helminthic ocular conditions...
Which causes a condition known as river blindness? Onchocerca
Which is transmitted via the bite of the blackfly? Onchocerca
Which can be observed moving beneath the conjunctiva? Loa Loa
Which can be observed swimming in the AC? Onchocerca
Which is a resident parasite in dogs? Toxocara
Is onchocerciasis a serious condition?

Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca

Arthropods

Is onchocerciasis a serious condition? Indeed it is (it ain't called river blindness for nothing!)

Is it common? Yep—it's among the most common causes of infectious visual morbidity.

Where in the world is it found? While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it's sometimes called African river blindness.

Onchocerca Which is transmitted via the bite of the blackfly?

Onchocerca Which can be observed moving beneath the conjunctiva?

Loa Loa Which can be observed swimming in the AC?

Onchocerca Which is a resident parasite in dogs?
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca

Arthropods

Is onchocerciasis a serious condition? Indeed it is (it ain’t called river blindness for nothing!)
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca

Arthropods

Is onchocerciasis a serious condition?
Indeed it is (it ain’t called river blindness for nothing!)

Is it common?
Is onchocerciasis a serious condition? Indeed it is (it ain’t called river blindness for nothing!)

Is it common? Yep—it’s the second most common cause of infectious visual morbidity
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca

Arthropods

Is onchocerciasis a serious condition?
Indeed it is (it ain’t called river blindness for nothing!)

Is it common?
Yep—it's the second most common cause of infectious visual morbidity

What’s the most common cause of infectious visual morbidity?
(You know this one!)

Common Parasitic Pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca

Arthropods

Is onchocerciasis a serious condition?
Indeed it is (it ain’t called river blindness for nothing!)

Is it common?
Yep—it's the second most common cause of infectious visual morbidity

What’s the most common cause of infectious visual morbidity?
(You know this one!)
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara

Arthropods

Is onchocerciasis a serious condition? Indeed it is (it ain’t called river blindness for nothing!)

Is it common? Yep—it’s the second most common cause of infectious visual morbidity

What’s the most common cause of infectious visual morbidity? (You know this one!) Trachoma (told ya!)
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods

Common Parasitic Pathogens

Is onchocerciasis a serious condition? Indeed it is (it ain’t called river blindness for nothing!)

OK, fair, I get the ‘blindness’ part of the name now. But why is it called river blindness?

Is visual morbidity really visual? Onchocerca

Where is it found? While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it’s sometimes called African river blindness.

Why is it called river blindness? The blackfly lives only near fast-flowing rivers, so cases tend to cluster around them.
Parasitic pathogens

Common Parasitic Pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca

Arthropods

Is onchocerciasis a serious condition? Indeed it is (it ain’t called river blindness for nothing!)

OK fair, I get the ‘blindness’ part of the name now. But why is it called river blindness? The blackfly lives only near fast-flowing rivers, so cases tend to cluster around them.

Is onchocerciasis a serious condition? Indeed it is (it ain’t called river blindness for nothing!)

Is it common? Yep—it’s among the most common causes of infectious visual morbidity.

Where in the world is it found? While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it’s sometimes called African river blindness.

OK fair, I get the ‘blindness’ part of the name now. But why is it called river blindness? The blackfly lives only near fast-flowing rivers, so cases tend to cluster around them.
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca

Arthropods

*Is onchocerciasis a serious condition?*
Indeed it is (it ain’t called river blindness for nothing!)

*Is it common?*
Yep—it’s the second most common cause of infectious visual morbidity

*Where in the world does it occur?*
Is onchocerciasis a serious condition?
Indeed it is (it ain’t called river blindness for nothing!)

Is it common?
Yep—it’s the second most common cause of infectious visual morbidity

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is...
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Onchocerca
- Toxocara

Arthropods

Is onchocerciasis a serious condition?
Indeed it is (it ain’t called river blindness for nothing!)

Is it common?
Yep—it’s the second most common cause of infectious visual morbidity

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods

Is onchocerciasis a serious condition?
Indeed it is (it ain’t called river blindness for nothing!)

Is it common?
Yep—it’s the second most common cause of infectious visual morbidity

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa.

What proportion of cases are in Africa?
99%

sub-Saharan Africa
**Parasitic pathogens**

- **Protozoa**
  - Acanthamoeba
  - Toxoplasma
  - Toxocara

- **Helminths**
  - Onchocerca (Loa Loa)

- **Arthropods**

---

**Common Parasitic Pathogens**

**Is onchocerciasis a serious condition?**
Indeed it is (it ain’t called river blindness for nothing!)

**Is it common?**
Yep—it’s the second most common cause of infectious visual morbidity

**Where in the world does it occur?**
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa.

**What proportion of cases are in Africa?**
99%

**Is it the most common cause of infectious visual morbidity?**
Onchocerca

**Is it sometimes called African river blindness?**
Onchocerca

---

**Loa Loa**
Which can be observed swimming in the AC?

**Onchocerca**
Which is transmitted via the bite of the blackfly?

**Toxocara**
Which can be observed moving beneath the conjunctiva?

---

**Acanthamoeba**

**Toxoplasma**

---

**Onchocerca**
Which is a resident parasite in dogs?
Onchocerciasis distribution
Is onchocerciasis a serious condition?
Indeed it is (it ain’t called river blindness for nothing!)

Is it common?
Yep—it’s the second most common cause of infectious visual morbidity

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it’s sometimes called African river blindness.
Parasitic pathogens

Protozoa
- *Acanthamoeba*
- *Toxoplasma*

Helminths
- *Toxocara*
- *Onchocerca*
- *Loa Loa*

Arthropods

Is Onchocerciasis a serious condition? Indeed it is (it ain't called river blindness for nothing!)

Is it common? Yep—it's among the most common causes of infectious visual morbidity.

Where in the world does it occur? While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it's sometimes called *African river blindness.*

How do humans acquire the worm? They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host? They form the subcutaneous nodules that are classic for the condition. Over the course of the next year they grow into the adult form of the worm. The adults then start cranking out microfilariae by the millions, which disseminate throughout the body, including the eye.
**Common Parasitic Pathogens**

Parasitic pathogens

- Protozoa
  - Acanthamoeba
  - Toxoplasma

- Helminths
  - Toxocara
  - Onchocerca

- Arthropods

---

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

Is onchocerciasis a serious condition?
Indeed it is (it ain't called river blindness for nothing!)

Is it common?
Yep—it's among the most common causes of infectious visual morbidity.

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it's sometimes called African river blindness.

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.
Parasitic pathogens

- **Protozoa**
  - *Acanthamoeba*
  - *Toxoplasma*

- **Helminths**
  - *Toxocara*
  - *Onchocerca*

- **Arthropods**

- **How do humans acquire the worm?**
  - They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Toxocara

Helminths
- Onchocerca
- Loa Loa

Arthropods

---

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year they grow into the adult form of the worm. The adults then start cranking out microfilariae by the millions, which disseminate throughout the body, including the eye.
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca

Arthropods

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year they grow into the adult form of the worm.

Is onchocerciasis a serious condition?
Indeed it is (it ain’t called river blindness for nothing!)

Is it common?
Yep—it’s among the most common causes of infectious visual morbidity.

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it’s sometimes called African river blindness.

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year they grow into the adult form of the worm.

Is it common?
Yep—it’s among the most common causes of infectious visual morbidity.

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it’s sometimes called African river blindness.

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year they grow into the adult form of the worm.

Is it common?
Yep—it’s among the most common causes of infectious visual morbidity.

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it’s sometimes called African river blindness.

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year they grow into the adult form of the worm.

Is it common?
Yep—it’s among the most common causes of infectious visual morbidity.

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it’s sometimes called African river blindness.

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year they grow into the adult form of the worm.

Is it common?
Yep—it’s among the most common causes of infectious visual morbidity.

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it’s sometimes called African river blindness.

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year they grow into the adult form of the worm.

Is it common?
Yep—it’s among the most common causes of infectious visual morbidity.

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it’s sometimes called African river blindness.

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year they grow into the adult form of the worm.

Is it common?
Yep—it’s among the most common causes of infectious visual morbidity.

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it’s sometimes called African river blindness.

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year they grow into the adult form of the worm.

Is it common?
Yep—it’s among the most common causes of infectious visual morbidity.

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it’s sometimes called African river blindness.

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year they grow into the adult form of the worm.

Is it common?
Yep—it’s among the most common causes of infectious visual morbidity.

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it’s sometimes called African river blindness.
Common Parasitic Pathogens

Onchocerciasis: Skin nodules
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca

Arthropods

---

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year they grow into the adult form of the worm. The adults then start cranking out microfiliariae by the millions, which disseminate throughout the body, including the eye.
Common Parasitic Pathogens

Uterus of an adult female worm chock-full of microfilariae
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca

Arthropods
- Loa Loa

Is onchocerciasis a serious condition? Indeed it is (it ain’t called river blindness for nothing!)

Is it common? Yep—it’s among the most common causes of infectious visual morbidity

Where in the world does it occur? While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it’s sometimes called African river blindness.

How do humans acquire the worm? They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host? They form the subcutaneous nodules that are classic for the condition. Over the course of the next year they grow into the adult form of the worm. The adults then start cranking out microfilariae by the millions, which disseminate throughout the body, including the eye.

How big is the microfilariae form of the worm? About a third of a millimeter
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods

Common Parasitic Pathogens

Protozoa

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already)

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year they grow into the adult form of the worm. The adults then start cranking out microfilariae by the millions, which disseminate throughout the body, including the eye

Helminths

How big is the microfilariae form of the worm?
About a third of a millimeter

Arthropods

Is onchocerciasis a serious condition?
Indeed it is (it ain’t called river blindness for nothing!)

Is it common?
Yep—it’s among the most common causes of infectious visual morbidity

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it’s sometimes called African river blindness.

How do humans acquire the worm?
They are bitten by a blackfly carrying the microfilariae form of the worm, which is transmitted by the bite

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year they grow into the adult form of the worm. The adults then start cranking out microfilariae by the millions, which disseminate throughout the body, including the eye
Common Parasitic Pathogens

Onchocerca: Microfilariae
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods

Common Parasitic Pathogens

How do humans acquire the worm? They are bitten by a blackfly (you knew that already).

What do the microfilariae do upon entering a host? They form the subcutaneous nodules that are classic for the condition. Over the course of the next year, the microfilariae by the millions, which disseminate throughout the body, including the eye.

How big is the microfilariae form of the worm? About a third of a millimeter.

How big is the adult form of the worm? About a meter.

Is onchocerciasis a serious condition? Indeed it is (it ain't called river blindness for nothing!)

Is it common? Yep—it's among the most common causes of infectious visual morbidity.

Where in the world does it occur? While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it's sometimes called African river blindness.

How do you get rid of the worm? With ivermectin.
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods

Is onchocerciasis a serious condition? Indeed it is (it ain’t called river blindness for nothing!)

Is it common? Yep—it’s among the most common causes of infectious visual morbidity

Where in the world does it occur? While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it’s sometimes called African river blindness.

How do humans acquire the worm? They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host? They form the subcutaneous nodules that are classic for the condition. Over the course of the next year, they grow into the adult form of the worm. The adults then start cranking out microfilariae by the millions, which disseminate throughout the body, including the eye.

How big is the microfilariae form of the worm? About a third of a millimeter

How big is the adult form of the worm? Up to a meter
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods

Common Parasitic Pathogens

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which are transmitted by the bite.

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year, they grow into the adult form of the worm. The adults then start cranking out microfilariae by the millions, which disseminate throughout the body, including the eye.

How big is the microfilariae form of the worm?
About a third of a millimeter.

How big is the adult form of the worm?
Up to a meter.

No, seriously—how big is it?
I'm not even kidding—the adult female can be up to a meter long.

Is onchocerciasis a serious condition?
Indeed it is (it ain't called river blindness for nothing!)

Is it common?
Yep—it's among the most common causes of infectious visual morbidity.

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it's sometimes called African river blindness.

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year, they grow into the adult form of the worm. The adults then start cranking out microfilariae by the millions, which disseminate throughout the body, including the eye.

How big is the microfilariae form of the worm?
About a third of a millimeter.

How big is the adult form of the worm?
Up to a meter.

No, seriously—how big is it?
I'm not even kidding—the adult female can be up to a meter long.

Is onchocerciasis a serious condition?
Indeed it is (it ain't called river blindness for nothing!)

Is it common?
Yep—it's among the most common causes of infectious visual morbidity.

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it's sometimes called African river blindness.

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year, they grow into the adult form of the worm. The adults then start cranking out microfilariae by the millions, which disseminate throughout the body, including the eye.

How big is the microfilariae form of the worm?
About a third of a millimeter.

How big is the adult form of the worm?
Up to a meter.

No, seriously—how big is it?
I'm not even kidding—the adult female can be up to a meter long.

Is onchocerciasis a serious condition?
Indeed it is (it ain't called river blindness for nothing!)

Is it common?
Yep—it's among the most common causes of infectious visual morbidity.

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it's sometimes called African river blindness.

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year, they grow into the adult form of the worm. The adults then start cranking out microfilariae by the millions, which disseminate throughout the body, including the eye.

How big is the microfilariae form of the worm?
About a third of a millimeter.

How big is the adult form of the worm?
Up to a meter.

No, seriously—how big is it?
I'm not even kidding—the adult female can be up to a meter long.

Is onchocerciasis a serious condition?
Indeed it is (it ain't called river blindness for nothing!)

Is it common?
Yep—it's among the most common causes of infectious visual morbidity.

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it's sometimes called African river blindness.

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year, they grow into the adult form of the worm. The adults then start cranking out microfilariae by the millions, which disseminate throughout the body, including the eye.

How big is the microfilariae form of the worm?
About a third of a millimeter.

How big is the adult form of the worm?
Up to a meter.

No, seriously—how big is it?
I'm not even kidding—the adult female can be up to a meter long.

Is onchocerciasis a serious condition?
Indeed it is (it ain't called river blindness for nothing!)

Is it common?
Yep—it's among the most common causes of infectious visual morbidity.

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it's sometimes called African river blindness.

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year, they grow into the adult form of the worm. The adults then start cranking out microfilariae by the millions, which disseminate throughout the body, including the eye.

How big is the microfilariae form of the worm?
About a third of a millimeter.

How big is the adult form of the worm?
Up to a meter.

No, seriously—how big is it?
I'm not even kidding—the adult female can be up to a meter long.

Is onchocerciasis a serious condition?
Indeed it is (it ain't called river blindness for nothing!)

Is it common?
Yep—it's among the most common causes of infectious visual morbidity.

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it's sometimes called African river blindness.

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year, they grow into the adult form of the worm. The adults then start cranking out microfilariae by the millions, which disseminate throughout the body, including the eye.

How big is the microfilariae form of the worm?
About a third of a millimeter.
Parasitic pathogens

Protozoa
  - Acanthamoeba
  - Toxoplasma

Helminths
  - Toxocara
  - Onchocerca
  - Loa Loa

Arthropods

Common Parasitic Pathogens

How do humans acquire the worm? They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host? They form the subcutaneous nodules that are classic for the condition. Over the course of the next year they grow into the adult form of the worm. The adults then start cranking out microfilariae by the millions, which disseminate throughout the body, including the eye.

How big is the microfilariae form of the worm? About a third of a millimeter.

How big is the adult form of the worm? Up to a meter.

No, seriously—how big is it? I'm not even kidding—the adult female can be up to a meter long.

Is onchocerciasis a serious condition? Indeed it is (it ain't called river blindness for nothing!)

Is it common? Yep—it's among the most common causes of infectious visual morbidity.

Where in the world does it occur? While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it's sometimes called African river blindness.

How do humans acquire the worm? They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host? They form the subcutaneous nodules that are classic for the condition. Over the course of the next year they grow into the adult form of the worm. The adults then start cranking out microfilariae by the millions, which disseminate throughout the body, including the eye.

How big is the microfilariae form of the worm? About a third of a millimeter.

How big is the adult form of the worm? Up to a meter.

No, seriously—how big is it? I'm not even kidding—the adult female can be up to a meter long.
Onchocerca: Three adult males, and a female
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted by the bite.

What do the microfilariae do upon entering a host?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year, they grow into the adult form of the worm. The adult worm then starts cranking out microfilariae by the millions, which disseminate throughout the body, including the eye.

Which ophthalmic structures can be affected by the worm?
Any of them, from the lids to the retina.

In what specific ways can onchocerciasis cause blindness?
- Sclerosing keratitis
- Glaucoma
- Uveitis
- Cataracts
- Chorioretinitis with late optic atrophy
Parasitic pathogens

Protozoa
  - Acanthamoeba
  - Toxoplasma

Helminths
  - Toxocara
  - Onchocerca
  - Loa Loa

Arthropods

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which burrows into the skin.

What do the microfilariae do?
They form the subcutaneous nodules that are classic for the condition. Over the course of a year, they grow into the adult form of the worm. The adults then start cranking out microfilariae by the millions, which disseminate throughout the body, including the eye.

Which ophthalmic structures can be affected by the worm?
Any of them, from the lids to the retina.
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods

How do humans acquire the worm?
They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which has been injected into the skin.

What do the microfilariae do?
They form the subcutaneous nodules that are classic for the condition. Over the course of the next year, the microfilariae grow into the adult form of the worm. The adults then start cranking out microfilariae by the millions, which disseminate throughout the body, including the eye.

Which ophthalmic structures can be affected by the worm?
Any of them, from the lids to the retina

In what specific ways can onchocerciasis cause blindness?
- --
- --
- --
- --

Is onchocerciasis a serious condition?
Indeed it is (it ain't called river blindness for nothing!)

Is it common?
Yep—it's among the most common causes of infectious visual morbidity

Where in the world does it occur?
While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it's sometimes called African river blindness.
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca

Arthropods
- Loa Loa

Is onchocerciasis a serious condition? Indeed it is (it ain’t called river blindness for nothing!)

Is it common? Yep—it’s among the most common causes of infectious visual morbidity

Where in the world does it occur? While it can be found in both Latin America and the Middle East, the locale where it is really a problem is sub-Saharan Africa. In fact, it’s sometimes called African river blindness.

How do humans acquire the worm? They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm, which is transmitted via the bite.

What do the microfilariae do upon entering a host? They form the subcutaneous nodules that are classic for the condition. Over the course of the year, they grow into the adult form of the worm. The adult worms then begin to produce microfilariae by the millions, which disseminate throughout the body, including the eye.

Which ophthalmic structures can be affected by the worm? Any of them, from the lids to the retina

In what specific ways can onchocerciasis cause blindness?
- Sclerosing keratitis
- Glaucoma
- Uveitis
- Cataracts
- Chorioretinitis with late optic atrophy
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods

How do humans acquire the worm? They are bitten by a blackfly (you knew that already) carrying the microfilariae form of the worm.

What do the microfilariae do? They form the subcutaneous condition. Over the course of the next year they grow into the adult form of the worm. The adult worm can microfilariae by the millions, including the eye.

Which ophthalmic structures can be affected by the worm? Any of them, from the lids to the retina, including the eye.

In what specific ways can onchocerciasis cause blindness?
- Sclerosing keratitis
- Glaucoma
- Uveitis
- Cataracts
- Chorioretinitis with late optic atrophy

All this being said, onchocerciasis appears in only two BCSC books: Cornea and Uveitis, and gets more love in the Cornea book. Thus, if you remember nothing else about it, remember that it causes a sclerosing keratitis!
Onchocerciasis: Sclerosing keratitis
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca

Arthropods
- Re helminthic ocular conditions...
  - Which causes a condition known as *river blindness*? *Onchocerca*
  - Which is transmitted via the bite of the blackfly? *Onchocerca*
  - Which can be observed moving beneath the conjunctiva? *Loa Loa*
  - Which can be observed swimming in the AC? *Onchocerca*
  - Which is a resident parasite in dogs? *Toxocara*
Parasitic pathogens

Re helminthic ocular conditions...
Which causes a condition known as river blindness? *Onchocerca*
Which is transmitted via the bite of the blackfly? *Onchocerca*
Which can be observed moving beneath the conjunctiva? *Loa Loa*
Which can be observed swimming in the AC? *Onchocerca*
Which is a resident parasite in dogs? *Toxocara*

Note also that helminths implicated in diffuse unilateral subacute neuroretinitis (DUSN) are covered in slide-set R15

Common Parasitic Pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods

Two bugs addressed in the BCSC
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods
- Phthirus
- Demodex

Two bugs addressed in the BCSC
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca

Arthropods
- Phthirus
- Demodex

What is the common name of Phthirus pubis?

The crab louse

If it takes hold in the lashes, blepharoconjunctivitis will result.
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca

Arthropods
- Phthirus
- Demodex

What is the common name of Phthirus pubis?
The crab louse—’crabs’ for short
Common Parasitic Pathogens

Phthirus pubis
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca

Arthropods
- Phthirus
- Demodex

What is the common name of Phthirus pubis?
The crab louse—’crabs’ for short

What ophthalmic condition does it cause?
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca

Arthropods
- Phthirus
- Demodex

What is the common name of Phthirus pubis?
The crab louse—‘crabs’ for short

What ophthalmic condition does it cause?
If it takes hold in the lashes, blepharoconjunctivitis will result
Common Parasitic Pathogens

*Phthirus pubis* on the eyelid
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca

Arthropods
- Phthirus
- Demodex

What is the common name of Phthirus pubis?
The crab louse—‘crabs’ for short

If it takes hold in the lashes
Blepharoconjunctivitis will result

How is Phthirus infestation of the lashes and eyebrows acquired?
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca

Arthropods
- Phthirus
- Demodex

What is the common name of Phthirus pubis?
The crab louse—‘crabs’ for short.

What ophthalmic condition does it cause?
If it takes hold in the lashes, blepharoconjunctivitis will result.

How is Phthirus infestation of the lashes and eyebrows acquired?
It's a venereal disease. Use your imagination.
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods
- Phthirus
- Demodex

Awkward. How about Demodex—is it acquired in like manner?
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods
- Phthirius
- Demodex

Awkward. How about Demodex—is it acquired in like manner? No, it's part of the normal fauna of the lashes and adnexa.
Common Parasitic Pathogens

Demodex
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods
- Phthirus
- Demodex

How common is Demodex infestation?

Awkward. How about Demodex—is it acquired in like manner?
No, it’s part of the normal fauna of the lashes and adnexa
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods
- Phthirus
- Demodex

Awkward. How about Demodex—is it acquired in like manner? No, it’s part of the normal fauna of the lashes and adnexa.

How common is Demodex infestation? Very; it approaches 100% in the elderly.
Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods
- Phthirus
- Demodex

Awkward. How about Demodex—is it acquired in like manner? No, it’s part of the normal fauna of the lashes and adnexa

How does Demodex infestation manifest clinically?
Parasitic pathogens

**Protozoa**
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

**Helminths**
- Toxocara
- Onchocerca
- Loa Loa

**Arthropods**
- Phthirus
- **Demodex**

---

**Awkward. How about Demodex—is it acquired in like manner?**
No, it’s part of the normal fauna of the lashes and adnexa

**How does Demodex infestation manifest clinically?**
As waxy sleeves on the proximal lashes
Common Parasitic Pathogens

Demodex: Eyelash sleeves
These are *Demodex* mites next to an eyelash within the follicle opening. Note their size.

Take-home point: *Demodex* are NOT visible at the slit lamp. The only slit-lamp sign of *Demodex* is sleeving of the lash base.
Common Parasitic Pathogens

Parasitic pathogens

Protozoa
- Acanthamoeba
- Toxoplasma
- Microsporidia
- Leishmania

Helminths
- Toxocara
- Onchocerca
- Loa Loa

Arthropods
- Phthirus
- Demodex

Awkward. How about Demodex—is it acquired in like manner?
No, it’s part of the normal fauna of the lashes and adnexa

How does Demodex infestation manifest clinically?
As waxy sleeves on the proximal lashes

What ophthalmic condition does it cause?
Awkward. How about Demodex—is it acquired in like manner?
No, it’s part of the normal fauna of the lashes and adnexa

How does Demodex infestation manifest clinically?
As waxy sleeves on the proximal lashes

What ophthalmic condition does it cause?
Blepharoconjunctivitis