Before you begin: This is a big topic, and big topics beget big slide-sets. There’s a natural break near slide 205; a *Break time!* slide has been placed at that point to mark it.
Toxoplasmosis: Basics

What is the causative organism in ocular toxoplasmosis?
Uveitis: **Toxoplasmosis**

**Toxoplasmosis: Basics**

What is the causative organism in ocular toxoplasmosis?

*Toxoplasma gondii*
Toxoplasma gondii
Uveitis: *Toxoplasmosis*

Toxoplasmosis: Basics

What is the causative organism in ocular toxoplasmosis?
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*What are its basic properties, ie, what sort of organism is it in a microbiology sense?*
Uveitis: **Toxoplasmosis**

**Toxoplasmosis: Basics**

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

*What are its basic properties, ie, what sort of organism is it in a microbiology sense?*  
It is a protozoan, and an obligate intracellular parasite
Toxoplasma gondii intracellular

infected host cell containing tachyzoites
What is the causative organism in ocular toxoplasmosis?
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What are its basic properties, ie, what sort of organism is it in a microbiology sense?
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Where in the world can T gondii be found?
Toxoplasmosis: Basics

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The cat
A cat
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What animal is its definitive host? The cat.

A variety of animals can serve as intermediate hosts—which is of particular concern.
Toxoplasmosis: Basics

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Uveitis: *Toxoplasmosis*

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*What percent of the IgG-positive US population have signs of ocular involvement?*
Uveitis: **Toxoplasmosis**

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The cat.

A variety of animals can serve as intermediate hosts—which is of particular concern?
Us, ie, humans.

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What percent of the IgG-positive US population have signs of ocular involvement?
About 2.
Toxoplasmosis: Basics

*T gondii* has a complex life cycle, existing in **#** forms.
Uveitis: **Toxoplasmosis**

**Toxoplasmosis: Basics**

*T. gondii* has a complex life cycle, existing in three forms.
**Uveitis: Toxoplasmosis**

*Toxoplasmosis: Basics*

T. gondii has a complex life cycle, existing in **three forms**.

What are they?
T. gondii has a complex life cycle, existing in three forms. What are they?
**Uveitis: Toxoplasmosis**

**Toxoplasmosis: Basics**

*T. gondii* has a complex life cycle, existing in **three forms**

What are they?

![Diagram showing three forms of T. gondii: Oocyst, Tachyzoite, Tissue cyst](attachment:diagram.png)

Each form has a ‘nickname’ capturing its essence.

What is the nickname for this form?
Toxoplasmosis has a complex life cycle, existing in three forms. What are they?

- Oocyst
  - ‘Soil form’
- Tachyzoite
- Tissue cyst

Each form has a ‘nickname’ capturing its essence. What is the nickname for this form?
T. gondii has a complex life cycle, existing in **three forms**

What are they?

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  - ‘Soil form’

- **Tachyzoite**

- **Tissue cyst**

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What is the nickname for this form?
T. gondii has a complex life cycle, existing in **three forms**.

**What are they?**

- **Oocyst**
  --'Soil form'

- **Tachyzoite**
  --'Infectious form'

- **Tissue cyst**

Each form has a ‘nickname’ capturing its essence. **What is the nickname for this form?**
T. gondii has a complex life cycle, existing in three forms. What are they?

- Oocyst -- 'Soil form'
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Uveitis: *Toxoplasmosis*

Toxoplasmosis: Basics

*T gondii has a complex life cycle, existing in three forms.*

What are they?

- **Oocyst**
  - ‘Soil form’

- **Tachyzoite**
  - ‘Infectious form’

- **Tissue cyst**
  - ‘Latent form’

Each form has a ‘nickname’ capturing its essence.

What is the nickname for this form?
T gondii has a complex life cycle, existing in **three forms**

What are they?

- **Oocyst**
  - ‘Soil form’
  - Found in...

- **Tachyzoite**
  - ‘Infectious form’

- **Tissue cyst**
  - ‘Latent form’

Where does this form reside?
*Uveitis: Toxoplasmosis*

**Toxoplasmosis: Basics**

*T. gondii has a complex life cycle, existing in three forms.*

- **Oocyst**
  - ‘Soil form’
  - Found in GI tract of cat (shed in feces)

- **Tachyzoite**
  - ‘Infectious form’

- **Tissue cyst**
  - ‘Latent form’

---

Where does this form reside?

- Cat GI tract

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Uveitis: **Toxoplasmosis**

Toxoplasmosis: Basics

T. gondii has a complex life cycle, existing in **three forms**

What are they?

- **Oocyst**
  - ‘Soil form’
  - Found in GI tract of cat (shed in feces)

- **Tachyzoite**
  - ‘Infectious form’
  - Found in...

- **Tissue cyst**
  - ‘Latent form’

Where does this form reside?

Cat GI tract

?
Uveitis: Toxoplasmosis

Toxoplasmosis: Basics

T. gondii has a complex life cycle, existing in three forms.

What are they?

Oocyst
-- 'Soil form'
-- Found in GI tract of cat (shed in feces)

Tachyzoite
-- 'Infectious form'
-- Found in circulatory system

Tissue cyst
-- 'Latent form'

Where does this form reside?

Cat GI tract

Host circulatory system
**Uveitis: Toxoplasmosis**

*Toxoplasmosis: Basics*

T. gondii has a complex life cycle, existing in **three forms**.

**What are they?**

- **Oocyst**
  - ‘Soil form’
  - Found in GI tract of cat (shed in feces)

- **Tachyzoite**
  - ‘Infectious form’
  - Found in circulatory system

- **Tissue cyst**
  - ‘Latent form’
  - Found in…

**Cat GI tract**

**Host circulatory system**

**Where does this form reside?**
T. gondii has a complex life cycle, existing in **three forms**

What are they?

- **Oocyst**
  - ‘Soil form’
  - Found in GI tract of cat (shed in feces)

- **Tachyzoite**
  - ‘Infectious form’
  - Found in circulatory system

- **Tissue cyst**
  - ‘Latent form’
  - Found in host tissue

Where does this form reside?

---

**Uveitis: Toxoplasmosis**

**Toxoplasmosis: Basics**

Cat GI tract

Host circulatory system

Host tissue
**Uveitis: Toxoplasmosis**

Toxoplasmosis: Basics

*T. gondii* has a complex life cycle, existing in **three forms**

*What are they?*

- **Oocyst**
  - ‘Soil form’
  - Found in GI tract of cat (shed in feces)
- **Tachyzoite**
  - ‘Infectious form’
  - Found in circulatory system
- **Tissue cyst**
  - ‘Latent form’
  - Found in host tissue

*Infectious?*

*Is this form infectious?*
T. gondii has a complex life cycle, existing in **three forms**

**Oocyst**
- ‘Soil form’
- Found in GI tract of cat (shed in feces)
- **+infectious**

**Tachyzoite**
- ‘Infectious form’
- Found in circulatory system

**Tissue cyst**
- ‘Latent form’
- Found in host tissue

**Infectious?** Yes

**Is this form infectious?** Yes
**Toxoplasmosis: Basics**

* *T. gondii* has a complex life cycle, existing in **three forms**

- **Oocyst**
  - ‘Soil form’
  - Found in GI tract of cat (shed in feces)
  - **infectious**

- **Tachyzoite**
  - ‘Infectious form’
  - Found in circulatory system

- **Tissue cyst**
  - ‘Latent form’
  - Found in host tissue

**Infectious?**

- **Yes**
- **Tachyzoite**
  - Infectious?
    - Yes
  - Is this form infectious?

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**Uveitis: Toxoplasmosis**

*What are they?*
T. gondii has a complex life cycle, existing in **three forms**.

- **Oocyst**
  - ‘Soil form’
  - Found in GI tract of cat (shed in feces)
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- **Tachyzoite**
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  - +infectious

- **Tissue cyst**
  - ‘Latent form’
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**Infectious?** Yes

**Is this form infectious?** Yes
Toxoplasmosis: Basics

T. gondii has a complex life cycle, existing in three forms:

- **Oocyst**
  - ‘Soil form’
  - Found in GI tract of cat (shed in feces)
  - +infectious

- **Tachyzoite**
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  - Found in circulatory system
  - +infectious

- **Tissue cyst**
  - ‘Latent form’
  - Found in host tissue

Is this form infectious?

Infectious? Yes
Infectious? Yes
Infectious? Yes
T. gondii has a complex life cycle, existing in **three forms**

**Oocyst**
- ‘Soil form’
- Found in GI tract of cat (shed in feces)
- + infectious

**Tachyzoite**
- ‘Infectious form’
- Found in circulatory system
- + infectious

**Tissue cyst**
- ‘Latent form’
- Found in host tissue
- + infectious

**Infectious?** Yes

Is this form infectious? **Yes**
T. gondii has a complex life cycle, existing in three forms. What are they?

- **Oocyst**
  - 'Soil form'
  - Found in GI tract of cat (shed in feces)
  - +infectious

- **Tachyzoite**
  - 'Infectious form'
  - Found in circulatory system
  - +infectious

- **Tissue cyst**
  - 'Latent form'
  - Found in host tissue
  - +infectious

Infectious? Yes  Infectious? Yes  Infectious? Yes

All forms are infectious under the right circumstances! Don’t let the nickname of the tachyzoite form fool you into thinking it’s the only one.
T. gondii has a complex life cycle, existing in three forms.

**Oocyst**
- ‘Soil form’
- Found in GI tract of cat (shed in feces)
- + infectious via...

**Tachyzoite**
- ‘Infectious form’
- Found in circulatory system
- + infectious

**Tissue cyst**
- ‘Latent form’
- Found in host tissue
- + infectious

Infectious via...

How is infection transmitted for this form?
T. gondii has a complex life cycle, existing in three forms: Oocyst, Tachyzoite, and Tissue cyst.

**Oocyst**
- ‘Soil form’
- Found in GI tract of cat (shed in feces)
- Infectious via ingestion of contaminated soil

**Tachyzoite**
- ‘Infectious form’
- Found in circulatory system
- Infectious

**Tissue cyst**
- ‘Latent form’
- Found in host tissue
- Infectious

Infectious via:

How is infection transmitted for this form?
T. gondii has a complex life cycle, existing in three forms. What are they?

- **Oocyst**
  - ‘Soil form’
  - Found in GI tract of cat (shed in feces)
  - Infectious via…
  - Ingestion of contaminated soil

- **Tachyzoite**
  - ‘Infectious form’
  - Found in circulatory system
  - Infectious via…

- **Tissue cyst**
  - ‘Latent form’
  - Found in host tissue
  - Infectious via…

How is infection transmitted for this form?
T. gondii has a complex life cycle, existing in **three forms**

**Uveitis: Toxoplasmosis**

**Toxoplasmosis: Basics**

T. gondii has a complex life cycle, existing in **three forms**

**Oocyst**
- ‘Soil form’
- Found in GI tract of cat (shed in feces)
- Infectious via...
- Ingestion of contaminated soil

**Tachyzoite**
- ‘Infectious form’
- Found in circulatory system
- Infectious via...
- Blood-to-blood contact

**Tissue cyst**
- ‘Latent form’
- Found in host tissue
- Infectious

**How is infection transmitted for this form?**
T. gondii has a complex life cycle, existing in **three forms**

**What are they?**

**Oocyst**
- ‘Soil form’
- Found in GI tract of cat (shed in feces)
- Ingestion of contaminated soil

**Tachyzoite**
- ‘Infectious form’
- Found in circulatory system
- Blood-to-blood contact

**Tissue cyst**
- ‘Latent form’
- Found in host tissue

**How is infection transmitted for this form?**

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Infectious via…

---

Infectious via…

---

Infectious via…
T. gondii has a complex life cycle, existing in three forms.

What are they?

- **Oocyst**
  - ‘Soil form’
  - Found in GI tract of cat (shed in feces)
  - Infectious via...
    - Ingestion of contaminated soil

- **Tachyzoite**
  - ‘Infectious form’
  - Found in circulatory system
  - Infectious via...
    - Blood-to-blood contact

- **Tissue cyst**
  - ‘Latent form’
  - Found in host tissue
  - Infectious via...
    - Consumption in foodstuffs

How is infection transmitted for this form?
T. gondii has a complex life cycle, existing in three forms. What are they?

**Oocyst**
- ‘Soil form’
- Found in GI tract of cat (shed in feces)
- Infectious via:
  - Ingestion of contaminated soil

**Tachyzoite**
- ‘Infectious form’
- Found in circulatory system
- Infectious via:
  - Blood-to-blood contact

**Tissue cyst**
- ‘Latent form’
- Found in host tissue
- Infectious via:
  - Consumption in foodstuffs

Infection transmission and factors influencing disease spread are also important. What very, very important means of disease transmission is not mentioned here?

How is infection transmitted for this form?
T. gondii has a complex life cycle, existing in **three forms**.

**What are they?**

- **Oocyst**
  - 'Soil form'
  - Found in GI tract of cat (shed in feces)
  - Infectious via:
    - Ingestion of contaminated soil

- **Tachyzoite**
  - 'Infectious form'
  - Found in circulatory system
  - Infectious via:
    - Blood-to-blood contact

- **Tissue cyst**
  - 'Latent form'
  - Found in host tissue
  - Infectious via:
    - Consumption in foodstuffs

*What very, very important means of dz transmission is not mentioned here?* Transplacentally, resulting in congenital toxoplasmosis (we will have much to say about this later in the slide-set)

*How is infection transmitted for this form?*
T. gondii has a complex life cycle, existing in **three forms**.

What are they?

**Oocyst**
- ‘Soil form’
- Found in GI tract of cat (shed in feces)
- +infectious via...
  - Ingestion of contaminated soil
- ?

**Tachyzoite**
- ‘Infectious form’
- Found in circulatory system
- +infectious via...
  - Blood-to-blood contact

**Tissue cyst**
- ‘Latent form’
- Found in host tissue
- +infectious via...
  - Consumption in foodstuffs

---

**In a nutshell**...

**In a nutshell, how should we think of each form?**

--Oocysts...
T gondii has a complex life cycle, existing in **three forms**

What are they?

**Oocyst**
- ‘Soil form’
- Found in GI tract of cat (shed in feces)
- +infectious via… Ingestion of contaminated soil
- ‘Spores’

**Tachyzoite**
- ‘Infectious form’
- Found in circulatory system
- +infectious via… Blood-to-blood contact

**Tissue cyst**
- ‘Latent form’
- Found in host tissue
- +infectious via… Consumption in foodstuffs

*In a nutshell…*

*In a nutshell, how should we think of each form?*
--Oocysts…are toxo eggs or ‘spores’ (the bug is a *sporozoite* at this stage)
T. gondii has a complex life cycle, existing in **three forms**

**Oocyst**
- ‘Soil form’
- Found in GI tract of cat (shed in feces)
- +infectious via...
  - Ingestion of contaminated soil
  - ‘Spores’

**Tachyzoite**
- ‘Infectious form’
- Found in circulatory system
- +infectious via...
  - Blood-to-blood contact

**Tissue cyst**
- ‘Latent form’
- Found in host tissue
- +infectious via...
  - Consumption in foodstuffs

**In a nutshell…**

**In a nutshell, how should we think of each form?**
- Oocysts…are toxo eggs or ‘spores’ (the bug is a sporozoite at this stage)
T. gondii has a complex life cycle, existing in **three forms**.

**Oocyst**
- **‘Soil form’**
- Found in GI tract of cat (shed in feces)
- +infectious via...
  - Ingestion of contaminated soil
- **‘Spores’**

**Tachyzoite**
- **‘Infectious form’**
- Found in circulatory system
- +infectious via...
  - Blood-to-blood contact
- ?

**Tissue cyst**
- **‘Latent form’**
- Found in host tissue
- +infectious via...
  - Consumption in foodstuffs

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**In a nutshell, how should we think of each form?**
- Oocysts...are toxo eggs or ‘spores’ (the bug is a *sporozoite* at this stage)
- Tachyzoites...
Uveitis: *Toxoplasmosis*

**Toxoplasmosis: Basics**

*T. gondii* has a complex life cycle, existing in **three forms**

What are they?

- **Oocyst**
  - 'Soil form'
  - Found in GI tract of cat (shed in feces)
  - Ingestion of contaminated soil
  - 'Spores'

- **Tachyzoite**
  - 'Infectious form'
  - Found in circulatory system
  - Blood-to-blood contact
  - 'Active adult'

- **Tissue cyst**
  - 'Latent form'
  - Found in host tissue
  - Consumption in foodstuffs

*In a nutshell, how should we think of each form?*

- Oocysts...are toxo eggs or 'spores' (the bug is a *sporozoite* at this stage)
- Tachyzoites...are toxo 'adults' that are **active**
T. gondii has a complex life cycle, existing in **three forms**

**Oocyst**
- ‘Soil form’
- Found in GI tract of cat (shed in feces)
- +infectious via...
  - Ingestion of contaminated soil
- ‘Spores’

**In a nutshell…**

**Tachyzoite**
- ‘Infectious form’
- Found in circulatory system
- +infectious via...
  - Blood-to-blood contact
- ‘Active adult’

**In a nutshell…**

**Tissue cyst**
- ‘Latent form’
- Found in host tissue
- +infectious via...
  - Consumption in foodstuffs
- ?

**In a nutshell…**

---

**In a nutshell, how should we think of each form?**
- Oocysts…are toxo eggs or ‘spores’ (the bug is a *sporozoite* at this stage)
- Tachyzoites…are toxo ‘adults’ that are **active**
- The tissue cysts…
Toxoplasmosis: Basics

T. gondii has a complex life cycle, existing in **three forms**

**Oocyst**
- 'Soil form'
- Found in GI tract of cat (shed in feces)
- Infectious via...
  - Ingestion of contaminated soil
- 'Spores'

**Tachyzoite**
- 'Infectious form'
- Found in circulatory system
- Infectious via...
  - Blood-to-blood contact
- 'Active adult'

**Tissue cyst**
- 'Latent form'
- Found in host tissue
- Infectious via...
  - Consumption in foodstuffs
- 'Dormant adult'

**In a nutshell**...

**In a nutshell, how should we think of each form?**
- Oocysts...are toxo eggs or 'spores' (the bug is a *sporozoite* at this stage)
- Tachyzoites...are toxo 'adults' that are **active**
- The tissue cysts...contain toxo adults that are **dormant**
**Uveitis: Toxoplasmosis**

**Toxoplasmosis: Basics**

*T. gondii* has a complex life cycle, existing in **three forms**:

- **Oocyst**
  - "Soil form"
  - Found in GI tract of cat (shed in feces)
  - Infectious via ingestion of contaminated soil
  - "Spores"

- **Tachyzoite**
  - "Infectious form"
  - Found in circulatory system
  - Infectious via blood-to-blood contact
  - "Active adult"

- **Tissue cyst**
  - "Latent form"
  - Found in host tissue
  - Infectious via consumption in foodstuffs
  - "Dormant adult"

**In a nutshell…**

- Oocysts…are toxo eggs or "spores" (the bug is a sporozoite at this stage)
- Tachyzoites…are toxo "adults" that are active
- The tissue cysts…contain toxo adults that are dormant

**Question:** What is the name for the dormant adults in the tissue cysts?

**Answer:** Bradyzoites

**AKA…?**
T. gondii has a complex life cycle, existing in **three forms**

- **Oocyst**
  - ‘Soil form’
  - Found in GI tract of cat (shed in feces)
  - +infectious via...
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    - aka... Bradyzoite

**In a nutshell**, how should we think of each form?

- Oocysts... are toxo eggs or ‘spores’ (the bug is a sporozoite at this stage)
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- The tissue cysts... contain toxo adults that are dormant

**What is the name for the dormant adults in the tissue cysts?**

- Bradyzoites
**Uveitis: Toxoplasmosis**

**Toxoplasmosis: Basics**

*T. gondii* has a complex life cycle, existing in **three forms**

---

**Oocyst**
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- Found in host tissue
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  - Consumption in foodstuffs
- "Dormant adult"
  
    *aka... Bradyzoite*

---

**In a nutshell...**

**Oocyst**
- Infectious via...
  - Ingestion of contaminated soil

**Tachyzoite**
- Infectious via...
  - Blood-to-blood contact

**Tissue cyst**
- Infectious via...
  - Consumption in foodstuffs

---

It's not a coincidence that the *dormant* adults are identified as *brady* ('slow') –zoites...

---

**Bradyzoites**

---

What is the name for the dormant adults in the tissue cysts?

**Tissue cysts**
- Contain toxo adults that are **dormant**
T. gondii has a complex life cycle, existing in three forms.

**Oocyst**
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In a nutshell…
- Oocysts...are toxo eggs or ‘spores’ (the bug is a sporozoite at this stage)
- Tachyzoites...are toxo ‘adults’ that are active
- The tissue cysts...contain toxo adults that are dormant

It’s not a coincidence that the dormant adults are identified as brady (‘slow’) –zoites...whereas the active adults are tachy (‘fast’) –zoites.

Bradyzoites

Tachyzoites
Toxoplasmosis has a complex life cycle, existing in three forms. What are they?

- **Oocyst**
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In a nutshell...

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Summary slide—no question
Uveitis: Toxoplasmosis

Toxoplasmosis Basics

Toxoplasmosis Basics tl;dr
The person consumes either oocysts (wash your hands!) or tissue cysts (cook your meat!).

Oocyst
--‘Soil form’
--Found in GI tract of cat (shed in feces)
--+infectious via…
  Ingestion of contaminated soil
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--‘Latent form’
--Found in host tissue
--+infectious via…
  Consumption in foodstuffs
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(No question—review slide, proceed when ready)
**Toxoplasmosis Basics**

**Toxoplasmosis Basics tl;dr**

The person consumes either oocysts (wash your hands!) or tissue cysts (cook your meat!). The consumed bugs transform into tachyzoites, enter the bloodstream, then disseminate throughout the body.

**Oocyst**
- ‘Soil form’
- Found in GI tract of cat (shed in feces)
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*No question—review slide, proceed when ready*
**Uveitis: Toxoplasmosis**

---

**Toxoplasmosis: Basics**

---

**Toxoplasmosis Basics tl;dr**

The person consumes either oocysts (wash your hands!) or tissue cysts (cook your meat!). The consumed bugs transform into tachyzoites, enter the bloodstream, then disseminate throughout the body. The immune system quickly clears the circulating parasites, but not before some get encased in tissue cysts, which are impervious to the host’s immune system.

<table>
<thead>
<tr>
<th>Oocyst</th>
<th>Tachyzoite</th>
<th>Tissue cyst</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Soil form’</td>
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---

(No question—review slide, proceed when ready)
T. gondii has a complex life cycle, existing in three forms. What are they?

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*What foodstuffs are commonly involved?*
Uveitis: **Toxoplasmosis**

**Toxoplasmosis: Basics**

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**What are they?**

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**What foodstuffs are commonly involved?**

Meat, especially pork
T gondii has a complex life cycle, existing in three forms. What are they?

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Meat, especially pork and...
Toxoplasmosis: Basics

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Uveitis: **Toxoplasmosis**

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  - Found in host tissue
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---

**What foodstuffs are commonly involved?**

- Meat, especially pork
- Fruits and veggies
- Goat’s milk
- Baa...

**foodstuffs**
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*What foodstuffs are commonly involved?*
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*How does toxo get into the animals and/or onto the fruits and veggies?*
**Uveitis: Toxoplasmosis**

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---

**What foodstuffs are commonly involved?**
- Meat, especially pork
- Fruits and veggies
- Goat’s milk

---

**How does toxo get into the animals and/or onto the fruits and veggies?**

It gets into animals when they eat feed that has been pooped on by infected cats (i.e., that contains oocysts).
Uveitis: **Toxoplasmosis**

**Toxoplasmosis: Basics**

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**How does toxo get into the animals and/or onto the fruits and veggies?**

It gets into animals when they eat feed that has been pooped on by infected cats (ie, that contains oocysts)

---

**How is toxo able to get into humans from the animals?**
Toxoplasmosis: Basics

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What are they?

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What foodstuffs are commonly involved?
- Meat, especially pork
- Fruits and veggies
- Goat’s milk

How does toxo get into the animals and/or onto the fruits and veggies?
It gets into animals when they eat feed that has been pooped on by infected cats (ie, that contains oocysts)

How is toxo able to get into humans from the animals?
It gets into them when they eat meat that is
Toxoplasmosis: Basics

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**What foodstuffs are commonly involved?**
- Undercooked meat, especially pork
- Fruits and veggies
- Goat’s milk

**How does toxo get into the animals and/or onto the fruits and veggies?**
It gets into animals when they eat feed that has been pooped on by infected cats (ie, that contains oocysts)

**How is toxo able to get into humans from the animals?**
It gets into them when they eat meat that is undercooked…
Toxoplasmosis: Basics

T. gondii has a complex life cycle, existing in three forms.

What are they?

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What foodstuffs are commonly involved?

- Undercooked meat, especially pork
- Fruits and veggies
- Goat’s milk

How does toxo get into the animals and/or onto the fruits and veggies?

It gets into animals when they eat feed that has been pooped on by infected cats (ie, that contains oocysts).

How is toxo able to get into humans from the animals? From fruits/veggies?

It gets into them when they eat meat that is undercooked…eat fruits/veggies that are...
**Uveitis: Toxoplasmosis**

**Toxoplasmosis: Basics**

*T. gondii* has a complex life cycle, existing in **three forms**.

### Oocyst
- "Soil form"
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- "Latent form"
- Found in host tissue
- + infectious via...
- Consumption in foodstuffs
- "Dormant adult"

**What foodstuffs are commonly involved?**
- Undercooked meat, especially pork
- Unwashed fruits and veggies
- Goat’s milk

**How does toxo get into the animals and/or onto the fruits and veggies?**
It gets into animals when they eat feed that has been pooped on by infected cats (i.e., that contains oocysts).

**How is toxo able to get into humans from the animals? From fruits/veggies?**
It gets into them when they eat meat that is undercooked... eat fruits/veggies that are unwashed...
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  - ‘Soil form’
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What foodstuffs are commonly involved?

- Undercooked meat, especially pork
- Unwashed fruits and veggies
- Goat’s milk

How does toxo get into the animals and/or onto the fruits and veggies?
It gets into animals when they eat feed that has been pooped on by infected cats (ie, that contains oocysts)

How is toxo able to get into humans from the animals? From fruits/veggies? From goat’s milk?
It gets into them when they eat meat that is undercooked... eat fruits/veggies that are unwashed... or drink goat’s milk that is...
**Uveitis: Toxoplasmosis**

**Toxoplasmosis: Basics**

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- ‘Latent form’
- Found in host tissue
- + infectious via… Consumption in foodstuffs
- ‘Dormant adult’

*What foodstuffs are commonly involved?*

- Undercooked meat, especially pork
- Unwashed fruits and veggies
- Unpasteurized goat’s milk

*How does toxo get into the animals and/or onto the fruits and veggies?*

It gets into animals when they eat feed that has been pooped on by infected cats (ie, that contains oocysts)

*How is toxo able to get into humans from the animals? From fruits/veggies? From goat’s milk?*

It gets into them when they eat meat that is undercooked… eat fruits/veggies that are unwashed… or drink goat’s milk that is unpasteurized
What are the four basic anatomic locations for uveitis? (In general, ie, this is not a toxo-specific question.)
What are the four basic anatomic locations for uveitis?
(In general, ie, this is not a toxo-specific question.)
Can toxoplasmosis present with anterior uveitis?
Uveitis

- Anterior
- Intermediate
- Posterior
- Panuveitis

Toxoplasmosis

Can toxoplasmosis present with anterior uveitis? Yes
Can toxoplasmosis present with anterior uveitis? Yes

Let’s drill down on toxoplasmosis anterior uveitis

Toxoplasmosis
Uveitis: *Anterior*

*But first, let’s review the basic taxonomy of anterior uveitis*
Uveitis: *Anterior*

What is this first, fundamental way we divvy up anterior uveitis?

*But first, let’s review the basic taxonomy of anterior uveitis*
Uveitis: *Anterior*

Granulomatous → Key distinction → Nongranulomatous

What is this first, fundamental way we divvy up anterior uveitis?

*But first, let's review the basic taxonomy of anterior uveitis*
But first, let’s review the basic taxonomy of anterior uveitis
Uveitis: *Anterior*

- Granulomatous
- Nongranulomatous

**Key distinction**

- Acute
- Chronic

*Now this one…*

*But first, let’s review the basic taxonomy of anterior uveitis*
Uveitis: **Anterior**

- Granulomatous
- Nongranulomatous
  - Acute
  - Chronic

**Key distinction**

Finally...

*But first, let’s review the basic taxonomy of anterior uveitis*
But first, let’s review the basic taxonomy of anterior uveitis
Uveitis: *Anterior*

- Granulomatous
- Nongranulomatous
  - Acute
    - Unilateral
    - Bilateral
  - Chronic

Now that the taxonomy is laid out: *Where does toxoplasmosis reside?*
Uveitis: **Anterior**

Granulomatous

- Toxoplasmosis

Nongranulomatous

- Acute
  - Unilateral
- Chronic
  - Bilateral

Now that the taxonomy is laid out:

*Where does toxoplasmosis reside?*

Among the granulomatous uveitides
Uveitis: *Anterior*

**Granulomatous**

- ?
- ?
- ?
- ?
- ?
- ?
- Toxoplasmosis

**Nongranulomatous**

- Acute
  - Unilateral
  - Bilateral
- Chronic

*What is the rest of the DDx for granulomatous uveitis?*

Now that the taxonomy is laid out: 
*Where does toxoplasmosis reside?*

Among the granulomatous uveitides
Uveitis: \textit{Anterior}

\begin{itemize}
  \item Granulomatous
    \begin{itemize}
      \item TB
      \item Sarcoid
      \item Syphilis
      \item HSV
      \item VKH
      \item Lyme
      \item Toxoplasmosis
    \end{itemize}
  \item Nongranulomatous
    \begin{itemize}
      \item Acute
        \begin{itemize}
          \item Unilateral
          \item Bilateral
        \end{itemize}
      \item Chronic
    \end{itemize}
\end{itemize}

\textit{What is the rest of the DDx for granulomatous uveitis?}

Now that the taxonomy is laid out:
\textit{Where does toxoplasmosis reside?}
Among the granulomatous uveitides
The BCSC Uveitis book does not list toxoplasmosis in the DDx for intermediate uveitis.
OTOH, toxoplasmosis is a **premier** cause of posterior uveitis!
Posterior uveitis

...Is divided into three subtypes based on what attribute?
Uveitis: Toxoplasmosis

Posterior uveitis

...Is divided into three subtypes based on what attribute?

Inflammation

the attribute
Uveitis: *Toxoplasmosis*

Posterior uveitis

...Is divided into three subtypes based on what attribute?

*Inflammation location*
Uveitis: *Toxoplasmosis*

Posterior uveitis

What are the three ‘inflammation locations’ in posterior uveitis?
Posterior uveitis

Exclusively in the choroid

In both the choroid and the retina

Exclusively in the retina

What are the three ‘inflammation locations’ in posterior uveitis?
Uveitis: *Toxoplasmosis*

Posterior uveitis

- Exclusively in the choroid
- In both the choroid and the retina
- Exclusively in the retina

*What are the three ‘inflammation locations’ in posterior uveitis?*
Uveitis: **Toxoplasmosis**

**Posterior uveitis**

*If inflammation is located...*

- **Exclusively in the choroid**
  - *It is called:*
  - ?

- **In both the choroid and the retina**

- **Exclusively in the retina**
Uveitis: *Toxoplasmosis*

**Posterior uveitis**

*If inflammation is located…*

- Exclusively in the choroid
- In both the choroid *and* the retina
- Exclusively in the retina

*When inflammation is...*

- Exclusively in the choroid
  
  *It is called:*

  **Choroiditis**
**Uveitis:** *Toxoplasmosis*

**Posterior uveitis**

*If inflammation is located...*

- Exclusively in the choroid
  - *It is called:*
  - Choroiditis

- In both the choroid and the retina
  - *It is called:*

- Exclusively in the retina
  - *It is called:*
  - ?

*When inflammation is...*
Uveitis: *Toxplasmosis*

**Posterior uveitis**

*If inflammation is located...*

- Exclusively in the choroid
  - It is called:
  - Choroiditis

- In both the choroid *and* the retina

- Exclusively in the retina
  - It is called:
  - Retinitis

*When inflammation is...*
Uveitis: *Toxoplasmosis*

**Posterior uveitis**

*If inflammation is located…*

- **Exclusively in the choroid**
  - *It is called:* **Choroiditis**

- **In both the choroid and the retina**
  - *It is called:* **?**

- **Exclusively in the retina**
  - *It is called:* **Retinitis**

*When inflammation is...*
Uveitis: *Toxoplasmosis*

**Posterior uveitis**

*If inflammation is located…*

- Exclusively in the choroid
  - *It is called:* Choroiditis
- In both the choroid and the retina
  - *It is called:* Chorioretinitis or Retinochoroiditis
- Exclusively in the retina
  - *It is called:* Retinitis

*When inflammation is…*
Uveitis: **Toxoplasmosis**

**Posterior uveitis**

*If inflammation is located…*

- Exclusively in the choroid
  - *It is called:* Choroiditis

- In both the choroid *and* the retina
  - *It is called:* Chorioretinitis *or* Retinochoroiditis

- When inflammation is… in the retina *and*
  - *It is called:* Retinitis

Note: If you took exception to the suggestion that there are only 3 posterior uveitis locations by pointing out the existence of word, you’re not wrong.
Uveitis: *Toxoplasmosis*

**Posterior uveitis**

*If inflammation is located…*

- Exclusively in the choroid
  - *It is called:* Choroiditis

- In both the choroid and the retina
  - *It is called:* Chorioretinitis or Retinochoroiditis
  - *It is called:* Retinitis

*When inflammation is… in the retina and ONH*

- *It is called:* Neuroretinitis

Note: If you took exception to the suggestion that there are only 3 posterior uveitis locations by pointing out the existence of *neuroretinitis*, you’re not wrong.
Uveitis: **Toxoplasmosis**

Posterior uveitis

*If inflammation is located…*

- Exclusively in the choroid
  - *It is called:* Choroiditis?
- In both the choroid and the retina
  - *It is called:* Chorioretinitis? or Retinochoroiditis?
- Exclusively in the retina
  - *It is called:* Retinitis?

*What is the classic posterior manifestation of toxoplasmosis?*
Uveitis: *Toxoplasmosis*

Posterior uveitis

*If inflammation is located…*

- Exclusively in the choroid
  - *It is called:*
    - Choroiditis
- In both the choroid and the retina
  - *It is called:*
    - Chorioretinitis or Retinochoroiditis
- Exclusively in the retina
  - *It is called:*
    - Retinitis

*What is the classic posterior manifestation of toxoplasmosis?*

Retinochoroiditis
What is the classic appearance of an inactive toxoplasmosis lesion?
What is the classic appearance of an *inactive* toxoplasmosis lesion?
A pigmented chorioretinal scar
Toxoplasmosis: Inactive scar
What is the classic appearance of an inactive toxoplasmosis lesion?
A pigmented chorioretinal scar

What is the classic appearance of an active toxoplasmosis lesion?
Uveitis: **Toxoplasmosis**

*Toxoplasmosis: Retinochoroiditis*

*What is the classic appearance of an inactive toxoplasmosis lesion?*
A pigmented chorioretinal scar

*What is the classic appearance of an active toxoplasmosis lesion?*
A **color** lesion
What is the classic appearance of an inactive toxoplasmosis lesion?
A pigmented chorioretinal scar

What is the classic appearance of an active toxoplasmosis lesion?
A white lesion
What is the classic appearance of an inactive toxoplasmosis lesion?
A pigmented chorioretinal scar

What is the classic appearance of an active toxoplasmosis lesion?
A white lesion adjacent to a structure
What is the classic appearance of an inactive toxoplasmosis lesion?
A pigmented chorioretinal scar

What is the classic appearance of an active toxoplasmosis lesion?
A white lesion adjacent to a scar
Uveitis: *Toxoplasmosis*

*Toxoplasmosis: Retinochoroiditis*

*What is the classic appearance of an inactive toxoplasmosis lesion?*
A pigmented chorioretinal scar

*What is the classic appearance of an active toxoplasmosis lesion?*
A white lesion adjacent to a scar, with overlying two words
What is the classic appearance of an inactive toxoplasmosis lesion?
A pigmented chorioretinal scar

What is the classic appearance of an active toxoplasmosis lesion?
A white lesion adjacent to a scar, with overlying vitreous cell
Uveitis: *Toxoplasmosis*

Recurrent ocular toxoplasmosis. Note the active retinal lesion associated with an old inactive scar.
Uveitis: **Toxoplasmosis**

**Toxoplasmosis: Retinochoroiditis**

What is the classic appearance of an inactive toxoplasmosis lesion?
A pigmented chorioretinal scar

What is the classic appearance of an **active** toxoplasmosis lesion?
A white lesion **adjacent to a scar**, with overlying vitreous cell

*The fact that active lesions are usually adjacent to an old scar indicates what about their origin?*
What is the classic appearance of an inactive toxoplasmosis lesion? A pigmented chorioretinal scar

What is the classic appearance of an active toxoplasmosis lesion? A white lesion adjacent to a scar, with overlying vitreous cell

The fact that active lesions are usually adjacent to an old scar indicates what about their origin? It indicates they represent reactivation of a previously dormant infection
Uveitis: \textit{Toxoplasmosis}

\textit{Toxoplasmosis: Retinochoroiditis}

What is the classic appearance of an inactive toxoplasmosis lesion? A pigmented chorioretinal scar

What is the classic appearance of an active toxoplasmosis lesion? A white lesion \textit{not} adjacent to a scar, with overlying vitreous cell

\textit{The fact that active lesions are usually adjacent to an old scar indicates what about their origin?}
It indicates they represent reactivation of a previously dormant infection

\textit{What is indicated if an active is not adjacent to a scar?}
Uveitis: **Toxoplasmosis**

**Toxoplasmosis: Retinochoroiditis**

*What is the classic appearance of an inactive toxoplasmosis lesion?*
A pigmented chorioretinal scar

*What is the classic appearance of an active toxoplasmosis lesion?*
A white lesion adjacent to a scar, with overlying vitreous cell

*The fact that active lesions are usually adjacent to an old scar indicates what about their origin?*
It indicates they represent reactivation of a previously dormant infection

*What is indicated if an active is not adjacent to a scar?*
It indicates the dz is newly acquired
Uveitis: *Toxoplasmososis*

Newly acquired toxo retinitis (note the absence of an adjacent scar)
Toxoplasmosis: Retinochoroiditis

What is the classic appearance of an inactive toxoplasmosis lesion?
A pigmented chorioretinal scar

What is the classic appearance of an active toxoplasmosis lesion?
A white lesion adjacent to a scar, with overlying vitreous cell

What is the classic description of the appearance of an active lesion?
Uveitis: **Toxoplasmosis**

*Toxoplasmosis: Retinochoroiditis*

*What is the classic appearance of an inactive toxoplasmosis lesion?*
A pigmented chorioretinal scar

*What is the classic appearance of an active toxoplasmosis lesion?*
A white lesion adjacent to a scar, with overlying vitreous cell

*What is the classic description of the appearance of an active lesion?*
‘Headlight in the fog’
Uveitis: *Toxoplasmosis*

Active toxoplasmosis: Headlight in the fog
Uveitis: **Toxoplasmosis**

---

**Toxoplasmosis: Retinochoroiditis**

What is the classic appearance of an inactive toxoplasmosis lesion? A pigmented chorioretinal scar.

What is the classic appearance of an **active** toxoplasmosis lesion? A white lesion adjacent to a scar, with overlying vitreous cell.

What is the classic description of the appearance of an active lesion? 'Headlight in the fog'

*In terms of the Headlight in the fog appearance…*

The **headlight** = ?

The **fog** = 

---
What is the classic appearance of an inactive toxoplasmosis lesion? A pigmented chorioretinal scar

What is the classic appearance of an active toxoplasmosis lesion? A white lesion adjacent to a scar, with overlying vitreous cell

What is the classic description of the appearance of an active lesion? ‘Headlight in the fog’

In terms of the Headlight in the fog appearance…

The headlight = the white toxo lesion

The fog =
Uveitis: Toxoplasmosis

Toxoplasmosis: Retinochoroiditis

What is the classic appearance of an inactive toxoplasmosis lesion?
A pigmented chorioretinal scar

What is the classic appearance of an active toxoplasmosis lesion?
A white lesion adjacent to a scar, with overlying vitreous cell

What is the classic description of the appearance of an active lesion?

*In terms of the Headlight in the fog appearance…*

The *headlight* = the *white toxo lesion*
The *fog* = ?
Uveitis: **Toxoplasmosis**

*Toxoplasmosis: Retinochoroiditis*

What is the classic appearance of an inactive toxoplasmosis lesion?
A pigmented chorioretinal scar

What is the classic appearance of an **active** toxoplasmosis lesion?
A white lesion adjacent to a scar, with overlying vitreous cell

What is the classic description of the appearance of an active lesion?
*In terms of the Headlight in the fog appearance…*

_The headlight = the white toxo lesion_
_The fog = the dense overlying vitreous_
**Uveitis: Toxoplasmosis**

**Toxoplasmosis: Retinochoroiditis**

*What is the classic appearance of an inactive toxoplasmosis lesion?*
A pigmented chorioretinal scar

*What is the classic appearance of an active toxoplasmosis lesion?*
A white lesion adjacent to a scar, with overlying vitreous cell

*What is the classic description of the appearance of an active lesion?*
‘Headlight in the fog’

*What is the natural history of active toxo retinochoroiditis in immunocompetent pts?*
What is the classic appearance of an inactive toxoplasmosis lesion?
A pigmented chorioretinal scar

What is the classic appearance of an **active** toxoplasmosis lesion?
A white lesion adjacent to a scar, with overlying vitreous cell

What is the classic description of the appearance of an active lesion?
‘Headlight in the fog’

What is the natural history of active toxo retinochoroiditis in immunocompetent pts?
The news in this regard is mixed. In one sense it is a self-limited condition in that active lesions resolve spontaneously over a couple of months.
What is the classic appearance of an inactive toxoplasmosis lesion?
A pigmented chorioretinal scar

What is the classic appearance of an active toxoplasmosis lesion?
A white lesion adjacent to a scar, with overlying vitreous cell

What is the classic description of the appearance of an active lesion?
‘Headlight in the fog’

What is the natural history of active toxo retinochoroiditis in immunocompetent pts?
The news in this regard is mixed. In one sense it is a self-limited condition in that active lesions resolve spontaneously over a couple of months. However, it is also a chronic and progressive condition in that new lesions appear periodically adjacent or near to old scars.
Uveitis: *Toxoplasmosis*

**Diagnosis**

*How is the diagnosis of ocular toxoplasmosis made?*
How is the diagnosis of ocular toxoplasmosis made?
In most cases, clinically
Uveitis: **Toxoplasmosis**

**Diagnosis**

*How is the diagnosis of ocular toxoplasmosis made?*
In most cases, clinically

*Is serology testing helpful?*
Uveitis: Toxoplasmosis

Diagnosis

How is the diagnosis of ocular toxoplasmosis made?
In most cases, clinically

Is serology testing helpful?
It can be. As with most infectious conditions, toxo acquisition produces a transient (<1 yr) IgM response, and a lifelong IgG response. Thus, a positive IgM result confirms a recent infection.
How is the diagnosis of ocular toxoplasmosis made?
In most cases, clinically

Is serology testing helpful?
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In most cases, clinically

Is serology testing helpful?
It can be. As with most infectious conditions, toxo acquisition produces a transient (<1 yr) IgM response, and a lifelong IgG response. Thus, a positive IgM result confirms a recent infection. Because of the high prevalence of toxo exposure in the population at large, IgG positivity cannot be considered confirmatory vis a vis a pt who presents with retinochoroiditis. However, if the pt’s toxo serology is IgG(-), this result removes toxo from the DDx.
**Diagnosis**

*How is the diagnosis of ocular toxoplasmosis made?*
In most cases, clinically

*Is serology testing helpful?*
It can be. As with most infectious conditions, toxo acquisition produces a transient (<1 yr) IgM response, and a lifelong IgG response. Thus, a positive IgM result confirms a recent infection. Because of the high prevalence of toxo exposure in the population at large, IgG positivity cannot be considered confirmatory vis a vis a pt who presents with retinochoroiditis. However, if the pt's toxo serology is IgG(-), this result removes toxo from the DDx.

*What about suspected congenital toxo—is serology helpful in these cases?*
**Diagnosis**

*How is the diagnosis of ocular toxoplasmosis made?*

In most cases, clinically

*Is serology testing helpful?*

It can be. As with most infectious conditions, toxo acquisition produces a transient (<1 yr) IgM response, and a lifelong IgG response. Thus, a positive IgM result confirms a recent infection. Because of the high prevalence of toxo exposure in the population at large, IgG positivity cannot be considered confirmatory vis a vis a pt who presents with retinochoroiditis. However, if the pt's toxo serology is IgG(-), this result removes toxo from the DDx.

*What about suspected congenital toxo—is serology helpful in these cases?*

Again, it can be. Maternal Ig? antibodies will cross the placenta, so their presence in a newborn is noncontributory.
How is the diagnosis of ocular toxoplasmosis made?
In most cases, clinically

Is serology testing helpful?
It can be. As with most infectious conditions, toxo acquisition produces a transient (<1 yr) IgM response, and a lifelong IgG response. Thus, a positive IgM result confirms a recent infection. Because of the high prevalence of toxo exposure in the population at large, IgG positivity cannot be considered confirmatory vis a vis a pt who presents with retinochoroiditis. However, if the pt’s toxo serology is IgG(-), this result removes toxo from the DDx.

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Again, it can be. Maternal IgG antibodies will cross the placenta, so their presence in a newborn is noncontributory.
How is the diagnosis of ocular toxoplasmosis made?
In most cases, clinically

Is serology testing helpful?
It can be. As with most infectious conditions, toxo acquisition produces a transient (<1 yr) IgM response, and a lifelong IgG response. Thus, a positive IgM result confirms a recent infection. Because of the high prevalence of toxo exposure in the population at large, IgG positivity cannot be considered confirmatory vis a vis a pt who presents with retinochoroiditis. However, if the pt’s toxo serology is IgG(-), this result removes toxo from the DDx.

What about suspected congenital toxo—is serology helpful in these cases?
Again, it can be. Maternal IgG antibodies will cross the placenta, so their presence in a newborn is noncontributory. In contrast, IgM does not cross the placenta, so if a newborn is IgM(+), it is confirmatory of congenital infection.
What are the indications for treating active ocular toxoplasmosis?
What are the indications for treating active ocular toxoplasmosis?
This is controversial. Some physicians tx all lesions, whereas other elect to watch small peripheral ones. That said, the following clinical scenarios are considered relative indications to tx:

--?
--?
--?
--?
--?
What are the indications for treating active ocular toxoplasmosis?
This is controversial. Some physicians tx all lesions, whereas other elect to watch small peripheral ones. That said, the following clinical scenarios are considered relative indications to tx:
--Lesions in the [location] or threatening the [different location]
What are the indications for treating active ocular toxoplasmosis?
This is controversial. Some physicians tx all lesions, whereas other elect to watch small peripheral ones. That said, the following clinical scenarios are considered relative indications to tx:
--Lesions in the fovea or threatening the ONH
--?
What are the indications for treating active ocular toxoplasmosis?
This is controversial. Some physicians tx all lesions, whereas other elect to watch small peripheral ones. That said, the following clinical scenarios are considered relative indications to tx:
--Lesions in the fovea or threatening the ONH
--Lesions associated with decreased exam finding
What are the indications for treating active ocular toxoplasmosis?
This is controversial. Some physicians tx all lesions, whereas other elect to watch small peripheral ones. That said, the following clinical scenarios are considered relative indications to tx:
--Lesions in the fovea or threatening the ONH
--Lesions associated with decreased VA
--?
--?
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What are the indications for treating active ocular toxoplasmosis? This is controversial. Some physicians tx all lesions, whereas other elect to watch small peripheral ones. That said, the following clinical scenarios are considered relative indications to tx:

---Lesions in the fovea or threatening the ONH
---Lesions associated with decreased VA
---adj. or diff adj. lesions
---?
---?
What are the indications for treating active ocular toxoplasmosis?
This is controversial. Some physicians tx all lesions, whereas other elect to watch small peripheral ones.
That said, the following clinical scenarios are considered relative indications to tx:
--Lesions in the fovea or threatening the ONH
--Lesions associated with decreased VA
--Large or multifocal lesions
--?
Uveitis: **Toxoplasmosis**

**Treatment**

*What are the indications for treating active ocular toxoplasmosis?*

This is controversial. Some physicians tx all lesions, whereas other elect to watch small peripheral ones. That said, the following clinical scenarios are considered relative indications to tx:

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--Large or multifocal lesions
--A lesion that remains active for an amount of time

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--Large or multifocal lesions
--A lesion that remains active for >1 month
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--Large or multifocal lesions
--A lesion that remains active for >1 month
--Lesions associated with significant exam finding (two words)
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--Large or multifocal lesions
--A lesion that remains active for >1 month
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--If the pt is general medical condition

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And most physicians consider the following clinical scenarios **absolute** indications to tx:

-- If the pt is immunocompromised

--
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--If the pt is in a specific health state, and has newly-acquired dz
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How is ocular toxo treated?
Multiple regimens have been developed:
--So-called ‘triple therapy’ consists of pyrimethamine + sulfadiazine + steroids
Uveitis: *Toxoplasmosis*

**Treatment**

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Uveitis: Toxoplasmosis

Treatment

Pyrimethamine and sulfadiazine inhibit the metabolism of what vitamin?

Folate

What critical hematopoietic issues can arise if folate metabolism is inhibited?
Leukopenia and thrombocytopenia

In order to prevent pyrimethamine/sulfadiazine-induced leukopenia and thrombocytopenia, what med is given along with triple therapy?
Folinic acid (aka leucovorin).

In addition, pts treated with triple therapy should have their blood count checked weekly.
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What are the indications for treating active ocular toxoplasmosis? This is controversial. Some physicians tx all lesions, whereas others elect to watch small peripheral ones. That said, the following clinical scenarios are considered relative indications to tx:

- Lesions in the fovea or threatening the ONH
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And most physicians consider the following clinical scenarios absolute indications to tx:

- If the pt is immunocompromised
- If the pt is pregnant, and has newly-acquired dz

How is ocular toxo treated? Multiple regimens have been developed:

- So-called ‘triple therapy’ consists of **pyrimethamine + sulfadiazine + steroids**

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**Uveitis: Toxoplasmosis**

**Treatment**

Pyrimethamine and sulfadiazine inhibit the metabolism of what vitamin? Folate

What critical hematopoietic issues can arise if folate metabolism is inhibited? Leukopenia and thrombocytopenia

In order to prevent pyrimethamine/sulfadiazine-induced leukopenia and thrombocytopenia, what med is given along with triple therapy? Folinic acid (aka *leucovorin*). In addition, pts treated with triple therapy should have their blood count checked how often.

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**How is ocular toxo treated?**

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Uveitis: *Toxoplasmosis*

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--Abb. – abb. + is preferred by many for its simplicity, availability and low price
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Uveitis: *Toxoplasmosis*

**Treatment**

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Which is the most effective tx regimen for ocular toxoplasmosis?
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Which is the most effective tx regimen for ocular toxoplasmosis?
None of the above. That is, while all are employed, none has been shown via clinical trial to be definitively the best.
(This is a good point in the set to take a break)
A woman with a hx of toxoplasmosis becomes pregnant. What is the risk of fetal infection?
A woman with a hx of toxoplasmosis becomes pregnant. What is the risk of fetal infection? Zero, zilch, nada. Transplacental transmission occurs only if/when a pregnant woman is infected.
Toxoplasmosis: Congenital

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What is the risk if she has a recurrence during her pregnancy?
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OK, but what if she’s harboring tissue cysts—what’s the risk then?
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OK, but what if she’s harboring tissue cysts—what's the risk then? Well, if she has a hx of toxoplasmosis, there’s no ‘what if’—she’s **definitely** harboring tissue cysts. That said, the risk of fetal transmission is still zero.
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*How might a pregnant woman become primarily infected?* By any of the pathways described earlier—by consuming foodstuffs containing viable tissue cysts, consuming oocysts, or (very rarely) by blood-to-blood transmission of tachyzoites.
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How should a pregnant woman go about minimizing her risk of becoming infected? 1) Don’t consume undercooked meat or unpasteurized goat’s milk 2) Don’t handle litter boxes
A woman with a hx of toxoplasmosis becomes pregnant. What is the risk of fetal infection?
Zero, zilch, nada. Transplacental transmission occurs only if/when a pregnant woman is infected.

What is the risk if she has a recurrence during her pregnancy?
Zero, zilch, nada again. As stated above, transplacental transmission occurs only if/when a pregnant woman is infected.

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How should a pregnant woman go about minimizing her risk of becoming infected?
1) Don’t consume undercooked meat or unpasteurized goat’s milk
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Toxoplasmosis: Congenital

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Uveitis: **Toxoplasmosis**

**Toxoplasmosis: Congenital**

What is the classic ocular manifestation of congenital toxoplasmosis?
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The same as in the acquired version—a retinochoroiditis (either active, or a scar)
What is the classic ocular manifestation of *congenital toxoplasmosis*?
The same as in the acquired version—a retinochoroiditis (either active, or a scar)

*Where in the retina are congenital lesions usually found?*
Uveitis: **Toxoplasmosis**

**Toxoplasmosis: Congenital**

*What is the classic ocular manifestation of congenital toxoplasmosis?*

The same as in the acquired version—a retinochoroiditis (either active, or a scar)

*Where in the retina are congenital lesions usually found?*

The macula
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Where in the retina are congenital lesions usually found?
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Does congenital toxo present unilaterally, or bilaterally?
Uveitis: **Toxoplasmosis**

**Toxoplasmosis: Congenital**

What is the classic ocular manifestation of **congenital toxoplasmosis**?
The same as in the acquired version—a retinochoroiditis (either active, or a scar)

*Where in the retina are congenital lesions usually found?*
The macula

*Does congenital toxo present unilaterally, or bilaterally?*
in the majority of cases
Uveitis: **Toxoplasmosis**

**Toxoplasmosis: Congenital**

What is the classic ocular manifestation of {congenital toxoplasmosis}? The same as in the acquired version—a retinochoroiditis (either active, or a scar)

*Where in the retina are congenital lesions usually found?*
The macula

*Does congenital toxo present unilaterally, or bilaterally?*
Bilaterally in the majority of cases
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Are the manifestations of congenital toxoplasmosis limited to retinochoroiditis?
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Are the manifestations of congenital toxoplasmosis limited to retinochoroiditis?
No, unfortunately—they can be systemic, and devastating
Uveitis: *Toxoplasmosis*

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*What are the systemic manifestations?*
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What are the systemic manifestations? 
They are protean, but include intracranial calcifications, hydrocephalus, and developmental issues
Uveitis: **Toxoplasmosis**

Hydrocephalus

Intracranial calcifications

Congenital toxoplasmosis
Uveitis: **Toxoplasmosis**

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Are such infants in the clear?
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Are such infants in the clear? Unfortunately not. Almost all of these ‘unaffected’ infants will experience a retinochoroiditis event in one or both eyes at some point in childhood, and up to 25% will be blinded by it.
**Uveitis: Toxoplasmosis**

**Toxoplasmosis: Congenital**

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**What impact does this have on dz management?**
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What impact does this have on dz management?
All infants with congenital toxo must receive anti-toxo tx for an amount of time.
Uveitis: **Toxoplasmosis**

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*What impact does this have on dz management?*
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*Are such infants in the clear?*
Unfortunately not. **Almost all of these ‘unaffected’ infants will experience a retinochoroiditis event** in one or both eyes at some point in their first year of life, and up to 25% will be blinded by it.

*What impact does this have on dz management?*
**All infants with congenital toxo must receive anti-toxo tx for the first year of life**

Note: This is per the *Uveitis* book; the *Peds* book states “Ocular toxo does not require treatment unless it threatens vision.” Caveat emptor.
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Toxoplasmosis is not the only infectious agent that presents in this manner when acquired in utero. What is the well-known mnemonic for the infectious agents?
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--O
--R
--C
--H
--E
--S
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Toxoplasmosis is not the only infectious agent that presents in this manner when acquired in utero.
What is the well-known mnemonic for the infectious agents? What does each letter stand for?
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--Toxoplasmosis (duh)
--Other
--Rubella
--CMV
--Herpesviruses, including
--EBV
--Syphilis
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The Peds book uses the mnemonic TORCH:
--TOxoplasmosis--Rubella--CMV--Herpesviruses
Uveitis: *Toxoplasmosis*

*In HIV+ pts*

*Is toxoplasmosis a common opportunistic infection in HIV/AIDS pts?*
Uveitis: \textit{Toxoplasmosis} \hfill In HIV+ pts

\textit{Is toxoplasmosis a common opportunistic infection in HIV/AIDS pts?}
Not particularly, no
Uveitis: *Toxoplasmosis*

In HIV+ pts

Is toxoplasmosis a common opportunistic infection in HIV/AIDS pts?
Not particularly, no

In what key way might the presentation of toxo retinitis in an HIV+ pt deviate from the classic *headlight in the fog* description?
Is toxoplasmosis a common opportunistic infection in HIV/AIDS pts?
Not particularly, no

In what key way might the presentation of toxo retinitis in an HIV+ pt deviate from the classic "headlight in the fog" description?
By the absence or attenuation of the ‘fog’ aspect—a pt who is profoundly immunocompromised might not be able to generate a significant vitritis
Toxoplasmosis in AIDS. Note how clear the pic is, ie, there’s no ‘fog.’ This is due to an absence of the normal vitritis.
Is toxoplasmosis a common opportunistic infection in HIV/AIDS pts?
Not particularly, no

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**Toxo retinochoroiditis presentation in HIV/AIDS pts differs in several other respects as well. What are they?**
--?
--?
--?
Uveitis: *Toxoplasmosis*

*In HIV+ pts*

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*Toxo retinochoroiditis presentation in HIV/AIDS pts differs in several other respects as well. What are they?*
--The dz may be multifocal (ie, >1 active lesion present)
--The lesion(s) tend to be s/w larger than in immunocompetent pts
--The lesion is much more likely to be de novo, ie, to not be associated with an old CR scar
Uveitis: *Toxoplasmosis*

Same pic of toxoplasmosis in AIDS. This time, note 1) the multifocality, and 2) the absence of a CR scar.
Is toxoplasmosis a common opportunistic infection in HIV/AIDS pts?
Not particularly, no

In what key way might the presentation of toxo retinitis in an HIV+ pt deviate from the classic "headlight in the fog" description?
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In what ways does the management of toxo retinitis differ in the immunocompromised population?
--Whereas in immunocompetent pts, toxo retinitis needs treatment only if the lesion is threatening the macula, ONH or a major vessel, or in cases of severe vitritis, in immunocompromised pts, lesions are treated regardless of location, or severity of vitritis
**Uveitis: Toxoplasmosis**

*In HIV+ pts*

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Not particularly, no

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*Why must all toxo retinochoroiditis be treated in HIV/AIDS pts?*
Uveitis: **Toxoplasmosis**

*In HIV+ pts*

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*Why must all toxo retinochoroiditis be treated in HIV/AIDS pts?*
Because unlike in immunocompetent pts, dz in HIV/AIDS pts does **not** resolve spontaneously—instead, it is relentlessly progressive
Uveitis: **Toxoplasmosis**

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Why do immunocompromised pts with toxo retinitis need brain imaging?
To assess for CNS involvement

Is there a strong correlation between ocular and CNS toxo in HIV+ pts?
Yes—up to 5-0% of toxo retinitis pts will be found to have CNS involvement

What is the classic neuroimaging finding?
'Ring-enhancing lesions'
**Uveitis: Toxoplasmosis**

*In HIV+ pts*

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Not particularly, no

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MR imaging of the brain

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In what ways does the management of toxo retinitis differ in the immunocompromised population?
--Whereas in immunocompetent pts, toxo retinitis needs treatment only if the lesion is threatening the macula, ONH or a major vessel, or in cases of severe vitritis, in immunocompromised pts, lesions are treated regardless of location, severity or timing
--In immunocompetent pts, toxo retinitis does not prompt imaging; whereas in immunocompromised pts, a finding of toxo retinitis should prompt MR imaging of the brain

Why do immunocompromised pts with toxo retinitis need brain imaging?
To assess for CNS involvement

Is there a strong correlation between ocular and CNS toxo in HIV+ pts?
Yes—up to 50% of toxo retinitis pts will be found to have CNS involvement

Classic neuroimaging finding:
'Ring-enhancing lesions'
**Uveitis: Toxoplasmosis**

*In HIV+ pts*

*Is toxoplasmosis a common opportunistic infection in HIV/AIDS pts?*  
Not particularly, no

*In what key way might the presentation of toxo retinitis in an HIV+ pt deviate from the classic __headlight in the fog__ description?*  
By the absence or attenuation of the ‘fog’ aspect—a pt who is profoundly immunocompromised might not be able to generate a significant vitritis

*Toxo retinochoroiditis presentation in HIV/AIDS pts differs in several other respects as well. What are they?*  
--The dz may be multifocal (ie, >1 active lesion present)  
--The lesion(s) tend to be s/w larger than in immunocompetent pts  
--The lesion is much more likely to be de novo, ie, to not be associated with an old CR scar

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What is the classic neuroimaging finding?
MR imaging of the brain
Uveitis: *Toxoplasmosis*

*In HIV+ pts*

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To assess for CNS involvement.

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*What is the classic neuroimaging finding?*

‘Ring-enhancing lesions’

MR imaging of the brain
Uveitis: *Toxoplasmosis*

CNS toxo: Ring-enhancing lesions
The following slides comprised a previous version of the toxo review slide-set. This previous version is, frankly, not as good as the one you just completed, and there’s no new info of significance in it. That being said, it might be worth your time to go through it. (Or not—your call.)
Where does toxoplasmosis rank as a cause of posterior segment infection?
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In the US, what is the prevalence for toxoplasmosis infection?
Where does toxoplasmosis rank as a cause of posterior segment infection? 

*In the US, what is the prevalence for toxoplasmosis infection?*  
20-25%
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

In the US, what is the prevalence for toxoplasmosis infection?
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Of Americans who are infected, what percent have ocular dz?
Where does toxoplasmosis rank as a cause of posterior segment infection?

In the US, what is the prevalence for toxoplasmosis infection? 20-25%

Of Americans who are infected, what percent have ocular dz? Only 2
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

In the US, what is the prevalence for toxoplasmosis infection? 20-25%

Of Americans who are infected, what percent have ocular dz? Only 2

What country has the highest toxoplasmosis prevalence rate?
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

In the US, what is the prevalence for toxoplasmosis infection?  
20-25%

Of Americans who are infected, what percent have ocular dz?  
Only 2

What country has the highest toxoplasmosis prevalence rate?  
Brazil, at about 85% (France is really high as well)
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

In the US, what is the prevalence for toxoplasmosis infection?
20-25%

Of Americans who are infected, what percent have ocular dz?
Only 2

What country has the highest toxoplasmosis prevalence rate?
Brazil, at about 85% (France is really high as well)

What percentage of infected Brazilians have ocular dz?
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

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20-25%

Of Americans who are infected, what percent have ocular dz?
Only 2

What country has the highest toxoplasmosis prevalence rate?
Brazil, at about 85% (France is really high as well)

What percentage of infected Brazilians have ocular dz?
About 20
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Is ocular toxoplasmosis known to present with anterior segment signs?
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Is ocular toxoplasmosis known to present with anterior segment signs?
Yes
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Is ocular toxoplasmosis known to present with anterior segment signs?
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When the anterior segment is involved, what appearance is typical for the KP?
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Is ocular toxoplasmosis known to present with anterior segment signs? Yes

When the anterior segment is involved, what appearance is typical for the KP? They are typically granulomatous in appearance. However, toxoplasmosis is known to produce 'stellate' KP as well.
Where does toxoplasmosis rank as a cause of **posterior segment infection**? #1

Is ocular toxoplasmosis known to present with anterior segment signs?
Yes

*When the anterior segment is involved, what appearance is typical for the KP?*
They are typically granulomatous in appearance. However, toxoplasmosis is known to produce ‘stellate’ KP as well.
Where does toxoplasmosis rank as a cause of posterior segment infection?

Is ocular toxoplasmosis known to present with anterior segment signs? Yes

When the anterior segment is involved, what appearance is typical for the KP?
They are typically granulomatous in appearance. However, toxoplasmosis is known to produce ‘stellate’ KP as well.

Which four uveitides are associated with stellate KP?
--?
--?
--?
--
--Toxoplasmosis
Is ocular toxoplasmosis known to present with anterior segment signs? Yes

When the anterior segment is involved, what appearance is typical for the KP? They are typically granulomatous in appearance. However, toxoplasmosis is known to produce ‘stellate’ KP as well.

*Which four uveitides are associated with stellate KP?*
--FHI
--HSV
--VZV
--Toxoplasmosis
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis:

four words
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

In terms of the Headlight in the fog appearance…
The headlight =
The fog =
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

In terms of the Headlight in the fog appearance…
The headlight = the white toxo lesion
The fog = the dense overlying vitritis
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate vs facultative
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular

bug-host relationship
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular parasitic class of bug
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular parasitic protozoan
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular parasitic protozoan

What is the full name of the organism?
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular parasitic protozoan

What is the full name of the organism? *Toxoplasma gondii*
Where does toxoplasmosis rank as a cause of posterior segment infection?

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular parasitic protozoan

What is the full name of the organism? 
*Toxoplasma gondii*

Are humans the so-called ‘definitive host’ for toxoplasma?
Where does toxoplasmosis rank as a cause of posterior segment infection?

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular parasitic protozoan

What is the full name of the organism?
Toxoplasma gondii

Are humans the so-called ‘definitive host’ for toxoplasma?
No; humans are an intermediate host
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular parasitic protozoan

What is the full name of the organism?
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Are humans the so-called ‘definitive host’ for toxoplasma?
No; humans are an intermediate host

What animal is the definitive host?
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular parasitic protozoan

What is the full name of the organism? 
Toxoplasma gondii

Are humans the so-called ‘definitive host’ for toxoplasma? 
No; humans are an intermediate host

What animal is the definitive host? 
The cat
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular parasitic protozoan

Can represent re-activation of disease, or newly-acquired infection
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular parasitic protozoan

Can represent re-activation of congenital disease, or newly-acquired infection
Toxoplasmosis

- Where does toxoplasmosis rank as a cause of posterior segment infection? #1
- Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’
- The toxo organism is an obligate intracellular parasitic protozoan
- Can represent re-activation of congenital disease, or newly-acquired infection

It had long been thought that virtually all cases of ocular toxo represented reactivation of congenital disease. However, recent research indicates a sizeable proportion of cases are acquired post-natally, with many experts now convinced that the majority of cases are acquired in this fashion.
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classical description of the posterior pole exam in toxoplasmosis: 'Headlight in the fog'

The toxo organism is an obligate intracellular parasitic protozoan

Can represent re-activation of congenital disease, or newly-acquired infection

What is the typical DFE finding in congenital toxoplasmosis?
Toxoplasmosis

- Where does toxoplasmosis rank as a cause of posterior segment infection?

- Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

- The toxo organism is an obligate intracellular parasitic protozoan

- Can represent re-activation of congenital disease, or newly-acquired infection

What is the typical DFE finding in congenital toxoplasmosis? A chorioretinal scar
Where does toxoplasmosis rank as a cause of posterior segment infection?

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular parasitic protozoan.

Can represent reactivation of congenital disease, or newly-acquired infection.

What is the typical DFE finding in congenital toxoplasmosis?
A chorioretinal scar

Where in the retina is the C-R scar usually found?
● Where does toxoplasmosis rank as a cause of posterior segment infection?

Classic description of the posterior pole exam in toxoplasmosis: 'Headlight in the fog'

The toxoplasmosis organism is an obligate intracellular parasitic protozoan.

Can represent re-activation of congenital disease, or newly-acquired infection.

What is the typical DFE finding in congenital toxoplasmosis?
- A chorioretinal scar

Where in the retina is the C-R scar usually found?
- The macula

congenital
Where does toxoplasmosis rank as a cause of posterior segment infection?

Classic description of the posterior pole exam in toxoplasmosis: 'Headlight in the fog'

The toxo organism is an obligate intracellular parasitic protozoan

Can represent re-activation of congenital disease, or newly-acquired infection

What is the typical DFE finding in congenital toxoplasmosis? A chorioretinal scar

Where in the retina is the C-R scar usually found? The macula

Are the lesion usually unilateral, or bilateral?
Where does toxoplasmosis rank as a cause of posterior segment infection?

Classical description of the posterior pole exam in toxoplasmosis: 'Headlight in the fog'

The toxo organism is an obligate intracellular parasitic protozoan.

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What is the typical DFE finding in congenital toxoplasmosis?
A chorioretinal scar

Where in the retina is the C-R scar usually found?
The macula

Are the lesion usually unilateral, or bilateral?
They are bilateral in the majority of cases.
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular parasitic protozoan

Can represent re-activation of congenital disease, or newly-acquired infection

What is the principal means by which newly-acquired toxoplasmosis is transmitted?
Where does toxoplasmosis rank as a cause of posterior segment infection?

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular parasitic protozoan

Can represent re-activation of congenital disease, or newly-acquired infection

Q/A

What is the principal means by which newly-acquired toxoplasmosis is transmitted?
Via ingestion of the infectious cysts in:
-- two words ; or in
-- three words ; or in
-- three words
Where does toxoplasmosis rank as a cause of posterior segment infection?

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular parasitic protozoan

Can represent re-activation of congenital disease, or newly-acquired infection

What is the principal means by which newly-acquired toxoplasmosis is transmitted?

Via ingestion of the infectious cysts in:
--Undercooked meat; or in
--contaminated fruits/veggies; or in
--unpasteurized milk
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular parasitic protozoan

Can represent re-activation of congenital disease, or newly-acquired infection

What is the principal means by which newly-acquired toxoplasmosis is transmitted?
Via ingestion of the infectious cysts in:
--Undercooked meat; or in
--contaminated fruits/veggies; or in
--unpasteurized goat’s milk
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular parasitic protozoan

Can represent re-activation of congenital disease, or newly-acquired infection

of AIDS patients with ocular toxo will have lesions
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular parasitic protozoan

Can represent re-activation of congenital disease, or newly-acquired infection

1/2 of AIDS patients with ocular toxo will have CNS lesions
Where does toxoplasmosis rank as a cause of posterior segment infection? 

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular parasitic protozoan

Can represent re-activation of congenital disease, or newly-acquired infection

1/2 of AIDS patients with ocular toxo will have CNS lesions--they must undergo MRI (classic finding—ring-enhancing lesions)
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

Classic description of the posterior pole exam in toxoplasmosis: ‘Headlight in the fog’

The toxo organism is an obligate intracellular parasitic protozoan

Can represent re-activation of congenital disease, or newly-acquired infection

1/2 of AIDS patients with ocular toxo will have CNS lesions--they must undergo MRI (classic finding—ring-enhancing lesions)
Treatment of ocular toxoplasmosis:
- Treat active infection if threatening the...
Treatment of ocular toxoplasmosis:

- Treat active infection if threatening the...
  - macula
  - ONH
  - major retinal vessels
Treatment of ocular toxoplasmosis:

- Treat active infection if threatening the...
  - macula
  - ONH
  - major retinal vessels

- ...or in cases of severe [__]
Treatment of ocular toxoplasmosis:
- Treat active infection if threatening the...
  - macula
  - ONH
  - major retinal vessels
- ...or in cases of severe vitritis
Treatment of ocular toxoplasmosis:
- Treat active infection if threatening the...
  - macula
  - ONH
  - major retinal vessels
- ...or in cases of severe vitritis

What is the natural course of untreated ocular toxoplasmosis?
Treatment of ocular toxoplasmosis:

- Treat active infection if threatening the...
  - macula
  - ONH
  - major retinal vessels
- ...or in cases of severe vitritis

What is the natural course of untreated ocular toxoplasmosis? It is a self-limited disease in the immunocompetent--lesions will begin healing within a month or two.
Treatment of ocular toxoplasmosis:

- Treat active infection if threatening the:
  - macula
  - ONH
  - major retinal vessels

  ...or in cases of severe vitritis

- Treat with
  1) antibiotic
  2) anti-malarial, actually
  3)
Treatment of ocular toxoplasmosis:
- Treat active infection if threatening the...
  - macula
  - ONH
  - major retinal vessels
- …or in cases of severe vitritis
- Treat with
  1) Sulfadiazine
  2) Pyrimethamine

3)
Treatment of ocular toxoplasmosis:

- Treat active infection if threatening the...
  - macula
  - ONH
  - major retinal vessels
- ...or in cases of severe vitritis
- Treat with
  1) Sulfadiazine
  2) Pyrimethamine

Give a loading dose, then qd until resolved (usually takes 4-6 weeks)
Treatment of ocular toxoplasmosis:
- Treat active infection if threatening the...
  - macula
  - ONH
  - major retinal vessels
- ...or in cases of severe vitritis
- Treat with
  1) Sulfadiazine
  2) Pyrimethamine
    (administration schedule)
    Give a loading dose, then qd until resolved (usually takes 4-6 weeks)
Treatment of ocular toxoplasmosis:
- Treat active infection if threatening the...
  - macula
  - ONH
  - major retinal vessels
- ...or in cases of severe vitritis
- Treat with
  1) Sulfadiazine
  2) Pyrimethamine

Side effect: serious, systemic

(administration schedule)
Give a loading dose, then qd until resolved (usually takes 4-6 weeks)
Treatment of ocular toxoplasmosis:

- Treat active infection if threatening the...
  - macula
  - ONH
  - major retinal vessels
- …or in cases of severe vitritis
- Treat with
  1) Sulfadiazine
     (administration schedule)
    Give a loading dose, then qd until resolved (usually takes 4-6 weeks)
  2) Pyrimethamine
     Side effect: Bone-marrow suppression
  3)
Treatment of ocular toxoplasmosis:
- Treat active infection if threatening the...
  - macula
  - ONH
  - major retinal vessels
- …or in cases of severe vitritis
- Treat with
  1) Sulfadiazine
  2) Pyrimethamine
  
  (administration schedule)
  Give a loading dose, then qd until resolved (usually takes 4-6 weeks)
  Side effect: Bone-marrow suppression; to prevent, give…
  3) two words
Treatment of ocular toxoplasmosis:

- Treat active infection if threatening the...
  - macula
  - ONH
  - major retinal vessels

...or in cases of severe vitritis

Treat with

1) Sulfadiazine
2) Pyrimethamine
   - Side effect: Bone-marrow suppression; to prevent, give...
3) Folinic acid

Give a loading dose, then qd until resolved (usually takes 4-6 weeks)
Treatment of ocular toxoplasmosis:

- Treat active infection if threatening the...
  - macula
  - ONH
  - major retinal vessels
- …or in cases of severe vitritis
- Treat with
  1) Sulfadiazine
  2) Pyrimethamine
  3) Folinic acid

Side effect: Bone-marrow suppression; to prevent, give...

Producer: [Toxoplasmosis](https://www.toxoplasmosis.org)
Treatment of ocular toxoplasmosis:
- Treat active infection if threatening the:
  - macula
  - ONH
  - major retinal vessels
- ...or in cases of severe vitritis
- Treat with
  1) Sulfadiazine
  2) Pyrimethamine
  3) Folinic acid
  Not a typo!

Side effect: Bone-marrow suppression; to prevent, give...

Give a loading dose, then qd until resolved (usually takes 4-6 weeks)
Treatment of ocular toxoplasmosis:

- Treat active infection if threatening the...
  - macula
  - ONH
  - major retinal vessels
- ...or in cases of severe vitritis
- Treat with
  1) Sulfadiazine
  2) Pyrimethamine
  Side effect: Bone-marrow suppression
  - To prevent, give Folinic acid
  3) Prednisone

Give a loading dose, then qd until resolved (usually takes 4-6 weeks)

With respect to treating ocular toxoplasmosis, this combo of meds is known as the classic...what?
Treatment of ocular toxoplasmosis:
- Treat active infection if threatening the...
  - macula
  - ONH
  - major retinal vessels
- ...or in cases of severe vitritis
- Treat with
  1) Sulfadiazine
  2) Pyrimethamine
    Side effect: Bone-marrow suppression
  3) Folinic acid
  3) Prednisone

With respect to treating ocular toxoplasmosis, this combo of meds is known as the classic…what? ‘Triple therapy'
Treatment of ocular toxoplasmosis:
- Treat active infection if threatening the...
  - macula
  - ONH
  - major retinal vessels
- …or in cases of severe vitritis
- Treat with
  1) Sulfadiazine
  2) Pyrimethamine
  3) Folinic acid
  4) Prednisone

Side effect: Bone-marrow suppression; to prevent, give:
- 3) Folinic acid
- 3) Prednisone

(Administration schedule)

Are alternative therapies available?

Yes, the following have been found to be efficacious alternatives:
- Trimethoprim-sulfamethoxazole
- Azithromycin
- Clindamycin

Do HIV/AIDS pts require long-term suppressive therapy?
Yes
Treatment of ocular toxoplasmosis:

- Treat active infection if threatening the...
  - macula
  - ONH
  - major retinal vessels
- ...or in cases of severe vitritis
- Treat with
  1) Sulfadiazine
  2) Pyrimethamine
  3) Folinic acid
  3) Prednisone

Side effect: Bone-marrow suppression; to prevent, give...

Are alternative therapies available?
Yes, the following have been found to be efficacious alternatives:

- Trimethoprim-sulfamethoxazole
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Do HIV/AIDS pts require long-term suppressive therapy?
Yes
Treatment of ocular toxoplasmosis:

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  - major retinal vessels
- …or in cases of severe vitritis
- Treat with
  1) Sulfadiazine
  2) Pyrimethamine
  3) Folinic acid
  3) Prednisone

Side effect: Bone marrow suppression

Are alternative therapies available?
Yes, the following have been found to be efficacious alternatives:
- Trimethoprim-sulfamethoxazole
- Azithromycin
- Clindamycin

Give a loading dose, then qd until resolved (usually takes 4-6 weeks)
Treatment of ocular toxoplasmosis:

- Treat active infection if threatening the...
  - macula
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  - major retinal vessels
- ...or in cases of severe vititis

Treat with
1) Sulfadiazine
2) Pyrimethamine
   - Side effect: Bone-marrow suppression
3) Folinic acid
3) Prednisone

Are alternative therapies available?
Yes, the following have been found to be efficacious alternatives:
-- Trimethoprim-sulfamethoxazole
-- Azithromycin
-- Clindamycin

Do HIV/AIDS pts require long-term suppressive therapy?
Treatment of ocular toxoplasmosis:
- Treat active infection if threatening the...
  - macula
  - ONH
  - major retinal vessels
- ...or in cases of severe vitritis
- Treat with
  1) Sulfadiazine
  2) Pyrimethamine
  3) Folinic acid
  4) Prednisone

Side effect: Bone-marrow suppression; to prevent, give Folinic acid.

Are alternative therapies available?
Yes, the following have been found to be efficacious alternatives:
- Trimethoprim-sulfamethoxazole
- Azithromycin
- Clindamycin

Do HIV/AIDS pts require long-term suppressive therapy?
Yes
Treatment of ocular toxoplasmosis:

- Treat active infection if threatening the macula, ONH, or major retinal vessels.

- Treat with:
  1. Sulfadiazine
  2. Pyrimethamine (Side effect: Bone-marrow suppression; to prevent, give Folinic acid)
  3. Prednisone

(administration schedule)

Are alternative therapies available?
Yes, the following have been found to be efficacious alternatives:
- Trimethoprim-sulfamethoxazole
- Azithromycin
- Clindamycin

Do HIV/AIDS pts require long-term suppressive therapy?
Yes

Does treatment eradicate the infection?
No

Why not? Is the toxo bug not susceptible?
The active bug (the tachyzoite) is quite susceptible. However, the bradyzoite form (aka tissue cyst) is impervious to the anti-infectives; thus, the infection is incurable.

Does treatment prevent recurrences?
No

What is the purpose of anti-infective treatment, then?
Practically speaking, the purpose of treatment is to allow for the administration of steroids (to reduce inflammation) without fear of exacerbating the infection itself.
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Treatment of ocular toxoplasmosis:
- Treat active infection if threatening the macula, ONH, or major retinal vessels
- Treat with:
  1) Sulfadiazine
  2) Pyrimethamine
     - Side effect: Bone-marrow suppression; to prevent, give folic acid
  3) Folinic acid
  4) Prednisone
     - Give a loading dose, then qd until resolved (usually takes 4-6 weeks)

Are alternative therapies available?
Yes, the following have been found to be efficacious alternatives:
- Trimethoprim-sulfamethoxazole
- Azithromycin
- Clindamycin

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Toxoplasmosis
### Treatment of ocular toxoplasmosis:

- Treat active infection if threatening the macula, ONH, major retinal vessels, or in cases of severe vitritis.

  1. **Sulfadiazine**
  2. **Pyrimethamine**
  3. **Folinic acid**
  4. **Prednisone**

  **Side effect:** Bone-marrow suppression

  **(administration schedule)**

  - Give a loading dose, then qd until resolved (usually takes 4-6 weeks).

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**Are alternative therapies available?**

Yes, the following have been found to be efficacious alternatives:

- Trimethoprim-sulfamethoxazole
- Azithromycin
- Clindamycin

**Do HIV/AIDS pts require long-term suppressive therapy?**

Yes

**Why not? Is the toxo bug not susceptible?**

The active bug (the *tachyzoite*) is quite susceptible. However, the bradyzoite form (aka *tissue cyst*) is impervious to the anti-infectives; thus, the infection is incurable.

**Does treatment prevent recurrences?**

No

**Does treatment eradicate the infection?**

No
Treatment of ocular toxoplasmosis:

- Treat active infection if threatening the macula, ONH, major retinal vessels, or in cases of severe vitritis.

Treat with:

1) Sulfadiazine
2) Pyrimethamine
3) Folinic acid
4) Prednisone

Side effect: Bone-marrow suppression; to prevent, give:
3) Folinic acid

Are alternative therapies available?
Yes, the following have been found to be efficacious alternatives:
-- Trimethoprim-sulfamethoxazole
-- Azithromycin
-- Clindamycin

Do HIV/AIDS pts require long-term suppressive therapy?
Yes

Does treatment eradicate the infection?
No

Why not? Is the toxo bug not susceptible?
The active bug (the tachyzoite) is quite susceptible. However, the bradyzoite form (aka tissue cyst) is impervious to the anti-infectives; thus, the infection is incurable.

Practically speaking, the purpose of treatment is to allow for the administration of steroids (to reduce inflammation) without fear of exacerbating the infection itself.
**Toxoplasmosis**

*Does treatment eradicate the infection?*
No

*Why not? Is the toxo bug not susceptible?*
The active bug (the *tachyzoite*) is quite susceptible. However, the bradyzoite form (aka *tissue cyst*) is impervious to the anti-infectives; thus, the infection is incurable.

*Does treatment prevent recurrences?*

---

**Treat with**

1) **Sulfadiazine**
2) **Pyrimethamine**
   - Side effect: Bone-marrow suppression
3) **Folinic acid**
4) **Prednisone**

(Administration schedule)

---

*Are alternative therapies available?*
Yes, the following have been found to be efficacious alternatives:

- Trimethoprim-sulfamethoxazole
- Azithromycin
- Clindamycin

*Do HIV/AIDS pts require long-term suppressive therapy?*
Yes
Treatment of ocular toxoplasmosis:

Treat active infection if threatening the macula, ONH, major retinal vessels, or in cases of severe vitritis

Treat with
1) Sulfadiazine
2) Pyrimethamine
3) Folinic acid
3) Prednisone

Side effect: Bone-marrow suppression; to prevent, give Folinic acid

Give a loading dose, then qd until resolved (usually takes 4-6 weeks)

Are alternative therapies available?
Yes, the following have been found to be efficacious alternatives:
--Trimethoprim-sulfamethoxazole
--Azithromycin
--Clindamycin

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Does treatment prevent recurrences?
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Does treatment prevent recurrences?

Toxoplasmosis
**Toxoplasmosis**

Does treatment eradicate the infection?
No

Why not? Is the toxo bug not susceptible?
The active bug (the *tachyzoite*) is quite susceptible. However, the bradyzoite form (aka *tissue cyst*) is impervious to the anti-infectives; thus, the infection is incurable.

Does treatment prevent recurrences?
No

What is the purpose of anti-infective treatment, then?

**Treat with**

1) **Sulfadiazine**
2) **Pyrimethamine**
   - Side effect: Bone-marrow suppression
3) **Folinic acid**
4) **Prednisone**

*(administration schedule)*

Are alternative therapies available?
Yes, the following have been found to be efficacious alternatives:
--Trimethoprim-sulfamethoxazole
--Azithromycin
--Clindamycin

Do HIV/AIDS pts require long-term suppressive therapy?
Yes
Treatment of ocular toxoplasmosis:

- Treat active infection if threatening the macula, ONH, major retinal vessels, or in cases of severe vitritis.

- Treat with:
  1) Sulfadiazine
  2) Pyrimethamine
  3) Folinic acid
  4) Prednisone

  Side effect: Bone-marrow suppression; to prevent, give Folinic acid.

- Administration schedule:
  - Give a loading dose, then qd until resolved (usually takes 4-6 weeks).

Are alternative therapies available? Yes, the following have been found to be efficacious alternatives:
- Trimethoprim-sulfamethoxazole
- Azithromycin
- Clindamycin

Do HIV/AIDS pts require long-term suppressive therapy? Yes
Does treatment eradicate the infection?
No

Why not? Is the toxo bug not susceptible?
The active bug (the *tachyzoite*) is quite susceptible. However, the bradyzoite form (aka *tissue cyst*) is impervious to the anti-infectives; thus, the infection is incurable.

Does treatment prevent recurrences?
No

What is the purpose of anti-infective treatment, then?
Practically speaking, *the purpose of treatment is to allow for the administration of steroids (to reduce inflammation) without fear of exacerbating the infection itself*.

---

*Treat with*

1) **Sulfadiazine**
2) **Pyrimethamine**
3) **Folinic acid**
3) **Prednisone**

Side effect: Bone-marrow suppression

(Provide the administration schedule)

Are alternative therapies available?
Yes, the following have been found to be efficacious alternatives:
--Trimethoprim-sulfamethoxazole
--Azithromycin
--Clindamycin

Do HIV/AIDS pts require long-term suppressive therapy?
Yes

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The triple therapy includes prednisone. Is it appropriate to use peri- or intraocular steroids instead?

---

The active bug (the *tachyzoite*) is quite susceptible. However, the bradyzoite form (aka *tissue cyst*) is impervious to the anti-infectives; thus, the infection is incurable.
Does treatment eradicate the infection?
No

Why not? Is the toxo bug not susceptible?
The active bug (the tachyzoite) is quite susceptible. However, the bradyzoite form (aka tissue cyst) is impervious to the anti-infectives; thus, the infection is incurable.

Does treatment prevent recurrences?
No

What is the purpose of anti-infective treatment, then?
Practically speaking, **the purpose of treatment is to allow for the administration of steroids (to reduce inflammation) without fear of exacerbating the infection itself**

Treat with

1) Sulfadiazine
2) Pyrimethamine
3) Folinic acid
3) Prednisone

Side effect: Bone-marrow suppression

(Administration schedule)
Give a loading dose, then qd until resolved (usually takes 4-6 weeks)

Are alternative therapies available?
Yes, the following have been found to be efficacious alternatives:
-- Trimethoprim-sulfamethoxazole
-- Azithromycin
-- Clindamycin

Do HIV/AIDS pts require long-term suppressive therapy?
Yes

The triple therapy includes prednisone. **Is it appropriate to use peri- or intraocular steroids instead?**
No! Peri/intraocular steroids can result in inflammation so severe as to cause loss of the eye!

The active bug (the tachyzoite) is quite susceptible. However, the bradyzoite form (aka tissue cyst) is impervious to the anti-infectives; thus, the infection is incurable.
Toxoplasmosis

**Does treatment eradicate the infection?**
No

**Why not? Is the toxo bug not susceptible?**
The active bug (the *tachyzoite*) is quite susceptible. However, the bradyzoite form (aka *tissue cyst*) is impervious to the anti-infectives; thus, the infection is incurable.

**Does treatment prevent recurrences?**
No

*When recurrence occurs, what relationship usually holds between the new lesion and the original one?*

Practically speaking, the purpose of treatment is to allow for the administration of steroids (to reduce inflammation) without fear of exacerbating the infection itself.

**Treat with**

1) **Sulfadiazine**
   - Side effect: Bone-marrow suppression
   - Give a loading dose, then qd until resolved (usually takes 4-6 weeks)

2) **Pyrimethamine**
   - Side effect: Bone-marrow suppression
   - To prevent, give folic acid (aka *folinic acid*)

3) **Prednisone**
   - Administration schedule

4) **Trimethoprim-sulfamethoxazole**
5) **Azithromycin**
6) **Clindamycin**

**Are alternative therapies available?**
Yes, the following have been found to be efficacious alternatives:
   - Trimethoprim-sulfamethoxazole
   - Azithromycin
   - Clindamycin

**Do HIV/AIDS pts require long-term suppressive therapy?**
Yes
Toxoplasmosis

Does treatment eradicate the infection? No

Why not? Is the toxo bug not susceptible?
The active bug (the tachyzoite) is quite susceptible. However, the bradyzoite form (aka tissue cyst) is impervious to the anti-infectives; thus, the infection is incurable.

Does treatment prevent recurrences? No

When recurrence occurs, what relationship usually holds between the new lesion and the original one? The recurrence will occur at the border of the original lesion (which is now a scar).

Practically speaking, the purpose of treatment is to allow for the administration of steroids (to reduce inflammation) without fear of exacerbating the infection itself.

Treat with

1) Sulfadiazine
2) Pyrimethamine
3) Folinic acid
3) Prednisone (administration schedule)

Are alternative therapies available? Yes, the following have been found to be efficacious alternatives:
--Trimethoprim-sulfamethoxazole
--Azithromycin
--Clindamycin

Do HIV/AIDS pts require long-term suppressive therapy? Yes