Uveitis: **Toxoplasmosis**

Toxoplasmosis: **Basics**

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

*What are its basic properties, ie, what sort of organism is it in a microbiology sense?*
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—an obligate intracellular parasite
Toxoplasma gondii intracellular
Uveitis: **Toxoplasmosis**

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

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*Where in the world can T gondii be found?*
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—an obligate intracellular parasite

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

**Toxoplasmosis: Basics**

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Uveitis: Toxoplasmosis

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What animal is its definitive host?
Uveitis: **Toxoplasmosis**

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**Toxoplasmosis: Basics**

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

*What animal is its definitive host?*  
The cat
A cat
Uveitis: **Toxoplasmosis**

**Toxoplasmosis: Basics**

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

What are its basic properties, i.e., what sort of organism is it in a microbiology sense? It is a protozoan—an obligate intracellular parasite.

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Yes—it’s likely that a billion people are infected worldwide.

*What animal is its definitive host?* The cat

*A variety of animals can serve as intermediate hosts—which is of particular concern?*
Uveitis: **Toxoplasmosis**

### Toxoplasmosis: Basics

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Us, ie, humans
Uveitis: Toxoplasmosis

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

What percent of people living in the US are IgG positive for toxoplasmosis?
Toxoplasmosis: Basics

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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? 
Us, ie, humans

What percent of people living in the US are IgG positive for toxoplasmosis? 
This is not answered consistently in the BCSC books. The *Uveitis* book gives two different answers: 22.5%, then 3%-10.8% a page later. The *Peds* book says positivity increases with age, from 5% at age 5 to 60% at age 80. *EyeWiki* gives a range of 22.5 to 70%. (The *Retina* book doesn't address the issue.) Caveat emptor.
Uveitis: **Toxoplasmosis**

### Toxoplasmosis: Basics

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

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

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

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*What percent of the IgG-positive US population have signs of ocular involvement?* About 2
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?

- 1) The uveitis is profiled
- 2) The profiled case is meshed
- 3) A differential diagnosis list is generated
- 4) Studies are obtained to identify the etiology
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Toxoplasmosis: Basics

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

What are they?

- Oocyst
- Tachyzoite
- Tissue cyst

1) The uveitis is profiled
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Toxoplasmosis: Basics

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

What are they?

- Oocyst
- 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?

- **Oocyst**
  - ‘Soil form’

- **Tachyzoite**

- **Tissue cyst**

Each form has a ‘nickname’ capturing its essence.

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**Toxoplasmosis: Basics**

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Uveitis: *Toxoplasmosis*

**Toxoplasmosis: Basics**

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**Toxoplasmosis: Basics**

What are they?

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**Oocyst**
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- ‘Infectious form’

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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'
- Tachyzoite: 'Infectious form'
- Tissue cyst: 'Latent form'

Each form has a 'nickname' capturing its essence. What is the nickname for this form?
Toxoplasmosis: Basics

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

- **Oocyst**
  -- 'Soil form'
  -- Found in...

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

- **Tissue cyst**
  -- 'Latent form'

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

**Toxoplasmosis: Basics**

1. Uveitis is profiled
2. The profiled case is meshed
3. A differential diagnosis list is generated
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---

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

**Tachyzoite**
- 'Infectious form'

**Tissue cyst**
- 'Latent form'

---

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

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  - Found in GI tract of cat (shed in feces)

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  - ‘Infectious form’
  - Found in…

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  - ‘Latent form’

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

1) The uveitis is profiled
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**Toxoplasmosis: Basics**

**T. gondii:** three forms

- **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 circulatory system

Where does this form reside?

**Cat GI tract**  **Host circulatory system**
T. gondii has a complex life cycle, existing in three forms. What are they?

- **Oocyst**
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  - Found in circulatory system

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

Where does this form reside?

**Toxoplasmosis: Basics**

- Cat GI tract
- Host circulatory system
- ?

**Uveitis: Toxoplasmosis**

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

What are they?

- **Oocyst**
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  - Found in GI tract of cat (shed in feces)

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  - 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**
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**

- **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

**infectious**

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

**Uveitis: Toxoplasmosis**

**Toxoplasmosis: Basics**

1. The uveitis is profiled
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**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?** Yes

---

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

**Toxoplasmosis: Basics**

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

**Infectious?**
- Yes
- Yes
- Infectious?

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

**Uveitis: Toxoplasmosis**

**Toxoplasmosis: Basics**

1) The uveitis is profiled
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**Oocyst**
- ‘Soil form’
- Found in GI tract of cat (shed in feces)
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**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**.

**Uveitis:**

1. The uveitis is profiled
2. The profiled case is meshed
3. A differential diagnosis list is generated
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**Toxoplasmosis: Basics**

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

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!


\[ \text{Uveitis: } \textbf{Toxoplasmosis} \]

\[ \textit{Toxoplasmosis: Basics} \]

\( \text{T gondii has a complex life cycle, existing in three forms} \)

\( \text{What are they?} \)

\[ \begin{align*}
\text{Oocyst} & \quad \text{--'Soil form'} \\
& \quad \text{--Found in GI tract of cat (shed in feces)} \\
& \quad \text{--+infectious via…} \\
\text{Tachyzoite} & \quad \text{--'Infectious form'} \\
& \quad \text{--Found in circulatory system} \\
& \quad \text{--+infectious} \\
\text{Tissue cyst} & \quad \text{--'Latent form'} \\
& \quad \text{--Found in host tissue} \\
& \quad \text{--+infectious} \\
\end{align*} \]

\( \text{Infectious via…} \)

\( \text{How is infection transmitted for this form?} \)
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**.

1) The uveitis is profiled
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**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**.

**Uveitis: Toxoplasmosis**

**Toxoplasmosis: Basics**

1. The uveitis is profiled
2. The profiled case is meshed
3. A differential diagnosis list is generated
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5. Treatment appropriate for the etiology is initiated

---

**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...

**Infectious via...**

**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**
- ‘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

---

1) The uveitis is profiled
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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...

**Tachyzoite**
- 'Infectious form'
- Found in circulatory system
- Infectious via...

**Tissue cyst**
- 'Latent form'
- Found in host tissue
  - Infectious via...

**Uveitis: Toxoplasmosis**

1) The uveitis is profiled
2) The profiled case is meshed
3) A differential diagnosis list is generated
4) Studies are obtained to identify the etiology
5) Treatment appropriate for the etiology is initiated

**Toxoplasmosis: Basics**

- Ingestion of contaminated soil
- Blood-to-blood contact
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

---

1) The uveitis is profiled
2) The profiled case is meshed
3) A differential diagnosis list is generated
4) Studies are obtained to identify the etiology
5) Treatment appropriate for the etiology is initiated

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

**Uveitis: Toxoplasmosis**

1) The uveitis is profiled
2) The profiled case is meshed
3) A differential diagnosis list is generated
4) Studies are obtained to identify the etiology
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**Toxoplasmosis: Basics**

- 'Soil form'
  - Found in GI tract of cat (shed in feces)
  - Infectious via Ingestion of contaminated soil
- 'Infectious form'
  - Found in circulatory system
  - Infectious via Blood-to-blood contact
- 'Latent form'
  - Found in host tissue
  - Infectious via Consumption in foodstuffs

What very, very important means of dz transmission is not mentioned here?

How is infection transmitted for this form?
T. gondii has a complex life cycle, existing in \textit{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 disease 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**

***Uveitis: Toxoplasmosis***

**Toxoplasmosis: Basics**

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

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

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

3. **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)

---

1) The uveitis is profiled
2) The profiled case is meshed
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4) Studies are obtained to identify the etiology
5) Treatment appropriate for the etiology is initiated
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)
**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)
- Infectious via...
  - Ingestion of contaminated soil
- ‘Spores’

---

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

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**Tissue cyst**
- ‘Latent form’
- Found in host tissue
- Infectious via...
  - 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…
T. gondii has a complex life cycle, existing in **three forms**.

**What are they?**

- **Oocyst**
  - ‘Soil form’
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  - ‘Infectious form’
  - Found in circulatory system
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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**
T. gondii has a complex life cycle, existing in three forms.

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*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)
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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**

Uveitis: **Toxoplasmosis**

**Toxoplasmosis: Basics**

1) The uveitis is profiled
2) The profiled case is meshed
3) A differential diagnosis list is generated
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5) Treatment appropriate for the etiology is initiated
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T. gondii has a complex life cycle, existing in three forms. What are they?

**Toxoplamosis: Basics**

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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...are toxo ‘adults’ that are active
- The tissue cysts...contain toxo adults that are dormant

What is the name for the dormant adults in the tissue cysts? Bradyzoites
T. gondii has a complex life cycle, existing in **three forms**

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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

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

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

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**Toxoplasmosis: Basics**

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**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, and 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.

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(No question—review slide, proceed when ready)
Uveitis: *Toxoplasmosis*

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?

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What foodstuffs are commonly involved?
Meat, especially pork

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

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

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**What foodstuffs are commonly involved?**
- Meat, especially pork
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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).
T. gondii has a complex life cycle, existing in three forms. What are they?

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*How does toxo get into the animals and/or onto the fruits and veggies?*
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*How is toxo able to get into humans from the animals…*
**Uveitis: Toxoplasmosis**

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How is toxo able to get into humans from the animals…
It gets into them when they eat meat that is

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

**Uveitis: Toxoplasmosis**

**Toxoplasmosis: Basics**

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- 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...fruits/veggies...

It gets into them when they eat meat that is undercooked... eat fruits/veggies that are
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
- 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...fruits/veggies...**

It gets into them when they eat meat that is undercooked...eat fruits/veggies that are unwashed...
T. gondii has a complex life cycle, existing in three forms. What are they?

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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 (ie, that contains oocysts).

**How is toxo able to get into humans from the animals…fruits/veggies…and 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...
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'`

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- `'Infectious form'`
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- `'Latent form'`
- Found in host tissue
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- `'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...fruits/veggies...and 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
Uveitis

1) The uveitis is profiled
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Anterior

Posterior

Intermediate

Panuveitis

Toxoplasmosis

Can toxoplasmosis present with anterior uveitis?
Uveitis

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Anterior

Toxoplasmosis

Can toxoplasmosis present with anterior uveitis? Yes

Panuveitis

Posterior

Intermediate

Toxoplasmosis
Uveitis: **Anterior**

First, let’s review the basic taxonomy of anterior uveitis…
First, let’s review the basic taxonomy of anterior uveitis…
Uveitis: Anterior

Granulomatous

Nongranulomatous

Key distinction

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Uveitis: **Anterior**

Granulomatous

Nongranulomatous

Acute

Key distinction

Chronic

Unilateral

Bilateral

Now that the taxonomy is laid out: 
*Where does toxoplasmosis reside?*
1) The uveitis is profiled
2) The profiled case is meshed
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Uveitis: Anterior

Granulomatous  Nongranulomatous

Granulomatous

Toxoplasmosis

Acute  Chronic

Acute  Bilateral

Unilateral  Bilateral

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

Among the granulomatous uveitides
Uveitis: **Anterior**

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---

**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: *Anterior*

1) The uveitis is profiled
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Granulomatous
- TB
- Sarcoid
- Syphilis
- HSV
- VKH
- Lyme
- Toxoplasmosis

What is the rest of the DDx for granulomatous uveitis?

Nongranulomatous

Acute
- Unilateral
- Bilateral

Chronic

Now that the taxonomy is laid out:
*What does toxoplasmosis reside?*
Among the granulomatous uveitides
Uveitis

1) The uveitis is profiled
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The BCSC Uveitis book does not list toxoplasmosis in the DDx for intermediate uveitis
1) The uveitis is profiled
2) The profiled case is meshed
3) A differential diagnosis list is generated
4) Studies are obtained to identify the etiology
5) Treatment appropriate for the etiology is initiated

OTOH, toxoplasmosis is a premiere cause of posterior uveitis!
Uveitis: *Toxoplasmosis*

**Posterior uveitis**

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

1. It is called:
   - ?
2. It is called:
   - ?
3. It is called:
   - ?

1) The uveitis is profiled
2) The profiled case is meshed
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Posterior uveitis

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

Inflammation location

It is called: ?

It is called: ?

It is called: ?
Posterior uveitis

If inflammation is located…

What are the three ‘inflammation locations’?

- It is called:
  - ?
  - ?
  - ?
Uveitis: Toxoplasmosis

Posterior uveitis

*If inflammation is located…*

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

**What are the three ‘inflammation locations’?**

- It is called: ?
- It is called: ?
- It is called: ?

1) The uveitis is profiled
2) The profiled case is meshed
3) A differential diagnosis list is generated
4) Studies are obtained to identify the etiology
5) Treatment appropriate for the etiology is initiated
The onset, duration and course of the uveitis

-- Onset: Sudden vs insidious
-- Duration: Limited vs persistent
-- Course: Acute vs recurrent vs chronic

The severity of the uveitis

-- AC cell grade
-- AC flare grade
-- Vitreous haze score

**Uveitis: Toxoplasmosis**

If inflammation is located...

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Posterior uveitis

*If inflammation is located...*

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

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

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

---

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3) A differential diagnosis list is generated
4) Studies are obtained to identify the etiology
5) Treatment appropriate for the etiology is initiated
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:*
  - ?

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**Uveitis: Toxoplasmosis**

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2) The profiled case is meshed  
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4) Studies are obtained to identify the etiology  
5) Treatment appropriate for the etiology is initiated

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**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
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

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- AC cell grade
- AC flare grade
- Vitreous haze score

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

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Uveitis: **Toxoplasmosis**

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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 and ONH
  - It is called: Retinitis

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Uveitis: *Toxoplasmosis*

**Posterior uveitis**

If inflammation is located...

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  - It is called: Choroiditis

- In both the choroid and the retina
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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?
The onset, duration and course of the uveitis

-- Onset: Sudden vs insidious
-- Duration: Limited vs persistent
-- Course: Acute vs recurrent vs chronic

The severity of the uveitis

-- AC cell grade
-- AC flare grade
-- Vitreous haze score

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?
Uveitis: **Toxoplasmosis**

*Toxoplasmosis: Retinochoroiditis*

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 white lesion adjacent to a scar, with overlying vitreous cell
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?*
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?
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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
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**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?*
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 not 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
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’
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**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 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?
*‘Headlight in the fog’*

_In terms of the Headlight in the fog appearance…*

_The headlight = the white toxo lesion_
_The fog =_

---

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Uveitis: **Toxoplasmosis**

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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 vitritis
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?*
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 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
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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.
Diagnosis

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

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

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What about suspected congenital toxo—is serology helpful in these cases?
How is the diagnosis of ocular toxoplasmosis made?
In most cases, clinically

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What about suspected congenital toxo—is serology helpful in these cases?
Again, it can be. Maternal IgG antibodies will cross the placenta, so there presence in a newborn is noncontributory.
How is the diagnosis of ocular toxoplasmosis made?
In most cases, clinically

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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?
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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 [ ] or threatening the [ ]
--Lesions associated with decreased [ ]
--[ ] or [ ] lesions
--A lesion that remains active for [ ]
--Lesions associated with significant [ ]

Uveitis: Toxoplasmosis

Treatment

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--Lesions in the fovea or threatening the ONH
--Lesions associated with decreased VA
--Large or multifocal lesions
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And most physicians consider the following clinical scenarios **absolute** indications to tx:

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Uveitis: **Toxoplasmosis**

**Treatment**

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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
**Uveitis: Toxoplasmosis**

### Treatment

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

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How is ocular toxo treated?
Multiple regimens have been developed:
--So-called ‘triple therapy’ consists of pyrimethamine + sulfadiazine + steroids
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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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- Leucovorin

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Uveitis: **Toxoplasmosis**

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**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.
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
--A lesion that remains active for >1 month
--Lesions associated with significant vitreous inflammation
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

*In terms of route, are steroids given…*
--Systemically?
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Uveitis: Toxoplasmosis

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--Topically? Sure, especially if anterior segment inflammation is present
--Periocular-depot?
Uveitis: **Toxoplasmosis**

**Treatment**

1) The uveitis is profiled
2) The profiled case is meshed
3) A differential diagnosis list is generated
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5) Treatment appropriate for the etiology is initiated

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*In terms of route, are steroids given…*

--**Systemically?** Yes, so long as anti-microbial tx is on-board
--**Topically?** Sure, especially if anterior segment inflammation is present
--**Periocular-depot?** **No!** This route can lead to uncontrollable inflammation and loss of the eye
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What is the dreaded potential side effect of clinda?
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What is the dreaded potential side effect of clinda? Pseudomembranous colitis
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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.
A woman with a hx of toxoplasmosis becomes pregnant. What is the risk of fetal infection?
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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.
Uveitis: **Toxoplasmosis**

**Toxoplasmosis: Congenital**

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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. **The only way to transmit the dz transplacentally is if momma has tachyzoites in her bloodstream, and this occurs only during initial infection.**
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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? --Don’t consume or --Don’t handle litter boxes (or cats, especially kittens)
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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

How should a pregnant woman go about minimizing her risk of becoming infected?
--Don’t consume undercooked meat or unpasteurized goat’s milk
--Don’t handle litter boxes (or cats, especially kittens)
Uveitis: *Toxoplasmosis*

**Toxoplasmosis: Congenital**

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

**Toxoplasmosis: Congenital**

*What is the classic ocular manifestation of congenital toxoplasmosis?*
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*Where in the retina are congenital lesions usually found?*
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Does congenital toxo present unilaterally, or bilaterally?
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The macula

*Does congenital toxo present unilaterally, or bilaterally?*
Bilaterally in the majority of cases
What is the classic ocular manifestation of congenital toxoplasmosis? The same as in the acquired version—a retinochoroiditis (either active, or a scar)

Are the manifestations of congenital toxoplasmosis limited to retinochoroiditis?
Uveitis: *Toxoplasmosis*

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No, unfortunately—they can be systemic, and devastating
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*What are the systemic manifestations?*
They are protean, but include intracranial calcifications, hydrocephalus, and developmental issues
Congenital toxoplasmosis

Hydrocephalus

Intracranial calcifications

Congenital toxoplasmosis
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*Is there a relationship between gestational age at the time of maternal infection and dz severity?*
Mos def. If mom is infected very early, there’s a significant chance of fetal demise; if very late, the infant may appear completely normal. Acquisition between these extremes will result in a ‘sliding scale’ of dz severity.
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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.
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**What impact does this have on dz management?**

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1) The uveitis is profiled  
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What impact does this have on dz management?
All infants with congenital toxo must receive anti-toxo tx for the first year of life.
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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 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.
What is the classic ocular manifestation of congenital toxoplasmosis?
The same as in the acquired version—a retinochoroiditis (either active, or a scar)

Are the manifestations of congenital toxoplasmosis limited to retinochoroiditis?
No, unfortunately—they can be systemic, and devastating

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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?
1) The uveitis is profiled
2) The profiled case is meshed
3) A differential diagnosis list is generated
4) Studies are obtained to identify the etiology
5) Treatment appropriate for the etiology is initiated

Uveitis: **Toxoplasmosis**

**Toxoplasmosis: Congenital**

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--O
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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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**What is the well-known mnemonic for the infectious agents?**

*What does each letter stand for?*

--- Toxoplasmosis
--- Other
--- Rubella
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--- Herpesviruses, including
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The Peds book uses the mnemonic **TORCH**:--TOxoplasmosis
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Uveitis: *Toxoplasmosis*  

*In HIV+ pts*

Is toxoplasmosis a common opportunistic infection in HIV/AIDS pts?
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Toxoplasmosis in AIDS. Note 1) multifocality, and 2) the absence of old scars
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Because unlike in immunocompetent pts, dz in HIV/AIDS pts does **not** resolve spontaneously—instead, it is relentlessly progressive
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Not particularly, no.

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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 50% of toxo retinitis pts will be found to have CNS involvement

What is the classic neuroimaging finding?

'ReRing-enhancing lesions'
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CNS toxo: Ring-enhancing lesions
The following slides were part of an earlier version of the toxo review slide-set. There’s no new info in them, but as they take a different approach to the subject, it might be worth your time to go through them.
Where does toxoplasmosis rank as a cause of posterior segment infection?
Where does toxoplasmosis rank as a cause of posterior segment infection? #1
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?

About 20
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

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

Brazil, at about 85% (France is really high as well)

About 20% of infected Brazilians have ocular disease.
Where does toxoplasmosis rank as a cause of posterior segment infection? #1

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Which four uveitides are associated with stellate KP?
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--FHI
--HSV
--VZV
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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?

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?

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

The toxo organism is an obligate

Intra- vs extracellular
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’

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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
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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.
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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

They are bilateral in the majority of cases
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Are the lesion usually unilateral, or bilateral?
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What is the principal means by which newly-acquired toxoplasmosis is transmitted? Via ingestion of the infectious cysts in:

-- 
-- 
-- ; or in
-- ; or in
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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
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Of AIDS patients with ocular toxo will have lesions
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Treatment of ocular toxoplasmosis:
- Treat active infection if threatening the...

<table>
<thead>
<tr>
<th>Structure/Area</th>
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<tr>
<td>1</td>
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</table>
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
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- 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
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
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- ...or in cases of severe vitritis
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Give a then until resolved (usually takes time)

Side effect: Bone-marrow suppression
Treatment of ocular toxoplasmosis:
- Treat active infection if threatening the...
  - macula
  - ONH
  - major retinal vessels
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Give a loading dose, then qd until resolved (usually takes 4-6 weeks)
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- Treat active infection if threatening the...
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  Side effect: serious, systemic

  (administration schedule)
  
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Side effect: Bone-marrow suppression; to prevent, give...

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  3) Folinic acid

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  3) Prednisone

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Side effect: Bone-marrow suppression

(administration schedule)
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:

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  3) Folinic acid
  3) Prednisone

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

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

(amount of drug and administration schedule)

Are alternative therapies available?
- Trimethoprim-sulfamethoxazole
- Azithromycin
- Clindamycin

Do HIV/AIDS pts require long-term suppressive therapy?
Yes
Treatment of ocular toxoplasmosis:
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Are alternative therapies available?
Yes, the following have been found to be efficacious alternatives:
--
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(Administration schedule)

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

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2) Pyrimethamine
3) Folinic acid
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(Administration schedule)

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Treatment of ocular toxoplasmosis:

- Treat active infection if threatening the macula, ONH, or 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
   - Administration schedule: Give a loading dose, then qd until resolved (usually takes 4-6 weeks)

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

(administration schedule)

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**Treat with**

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3) Folinic acid
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(Administration schedule)

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**Treat with**

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**(administration schedule)**

Given

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3) **Folinic acid**
3) **Prednisone**

(Administration schedule)

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---

**Treat with**

1) **Sulfadiazine**

Side effect: Bone-marrow suppression; to prevent,

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

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**Does treatment prevent recurrences?**
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**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!
**Toxoplasmosis**

Does treatment eradicate the infection?  
No

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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**
   - Side effect: Bone-marrow suppression
   - Administration schedule: qd

2) **Pyrimethamine**
   - Side effect: Bone-marrow suppression
   - Administration schedule: qd

3) **Folinic acid**

3) **Prednisone**
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Yes
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**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**

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
**Toxoplasmosis**

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**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

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**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.

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2) **Pyrimethamine**
   - Side effect: Bone-marrow suppression

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What is the most common manifestation of congenital toxoplasmosis? Retinochoroiditis

What mnemonic covers the differential for a congenital presentation such as this? TORCHES

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 does TORCHES stand for?
- Toxoplasmosis
- Retinochoroiditis
- Other (often rubella, herpes, cytomegalovirus, syphilis, enterovirus)
- Congenital
- Herpes Simplex
- Encephalitis

What is the most common cause of toxoplasmosis? Toxoplasmosis

What mnemonic covers the differential for a congenital presentation such as this? TORCHES
Toxoplasmosis

- Where does toxoplasmosis rank as a cause of posterior segment infection? #1
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What does TORCHES stand for?
- Toxoplasmosis
- Other agents
- Rubella
- CMV
- Herpes, including EBV
- Syphilis

What is the most common manifestation of congenital toxoplasmosis?
- Retinochoroiditis

What mnemonic covers the differential for a congenital presentation such as this?
- TORCHES