Uveitis: **Lyme**

**Basics**

What is the causative organism in Lyme dz?
Uveitis: **Lyme**

**Basics**

What is the causative organism in Lyme dz?

*Borrelia burgdorferi*
Uveitis: **Lyme**

### Basics

What is the causative organism in Lyme dz?

*Borrelia burgdorferi*

*What are its basic properties (ie, what sort of organism is it in a microbiology sense)?*
Uveitis: *Lyme*

**Basics**

What is the causative organism in Lyme dz?
*Borrelia burgdorferi*

*What are its basic properties (i.e., what sort of organism is it in a microbiology sense)?*

It is a spirochete
Uveitis: *Lyme*

*Borrelia burgdorferi*
Uveitis: **Lyme**

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What is the causative organism in Lyme dz?
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*How are humans infected?*
Via a bite from a tick of the *Ixodes* genus
Uveitis: *Lyme*

*Ixodes scapularis*: Adult female, adult male, nymph, larva

*Ixodes* tick

Yuck
Uveitis: **Lyme**

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*What animals serve as the reservoir for the disease?*
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--The Northeast, especially Connecticut  
--The Minnesota/Wisconsin region
Lyme dz: Distribution in the US

1 dot placed randomly within county of residence for each confirmed case
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*What age group(s) is/are most likely to be affected?*  
The age distribution is bimodal, with peaks at # to # years, and again at # to #
Uveitis: Lyme

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What regions of the US have the highest annual incidence of Lyme disease (LD)?
--The Northeast, especially Connecticut
--The Minnesota/Wisconsin region

What time of year is LD most likely to occur?
Summertime—May to August

What age group(s) is/are most likely to be affected?
The age distribution is bimodal, with peaks at 5-15 years, and again at 50-60
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--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
5. Treatment appropriate for the etiology is initiated
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they?*

--The **Local disease** stage

--The **Disseminated disease** stage

--The **Persistent disease** stage
Uveitis: **Lyme**

### Basics

*LD passes through three stages--what are they?*

--The **Local disease** stage:  

* What eye manifestations are associated with this stage?

--The **Disseminated disease** stage

--The **Persistent disease** stage
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they?*

--The **Local disease** stage: *Follicular conjunctivitis*

--The **Disseminated disease** stage

--The **Persistent disease** stage

*What eye manifestations are associated with this stage?*
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they?*

---The **Local disease** stage: *Follicular conjunctivitis*

---The **Disseminated disease** stage: *

---The **Persistent disease** stage

What eye manifestations are associated with this stage?
**Uveitis: Lyme**

**Basics**

LD passes through three stages—what are they?

--The **Local disease** stage: Follicular conjunctivitis

--The **Disseminated disease** stage: Intraocular inflammatory dz

--The **Persistent disease** stage

*What eye manifestations are associated with this stage?*
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they?*

--The **Local disease** stage: **Follicular conjunctivitis**

--The **Disseminated disease** stage: **Intraocular inflammatory dz**

--The **Persistent disease** stage: ?

What eye manifestations are associated with this stage?
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they?*

--The **Local disease** stage: **Follicular conjunctivitis**

--The **Disseminated disease** stage: **Intraocular inflammatory dz**

--The **Persistent disease** stage: **Usually little eye involvement (may be present)**

What eye manifestations are associated with this stage?
Uveitis: **Lyme**

**Basics**

LD passes through three stages--what are they?

--- The **Local disease** stage: Follicular conjunctivitis

--- The **Disseminated disease** stage: Intraocular inflammatory dz

--- The **Persistent disease** stage: Usually little eye involvement (keratitis may be present)

What eye manifestations are associated with this stage?
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they?*

*How much time typically passes between the bite and the onset of Local disease?*

--The **Local disease** stage

--The **Disseminated disease** stage

--The **Persistent disease** stage
Uveitis: Lyme

**Basics**

*LD passes through three stages—what are they?*  
(2-28 days post-inoculation)  
--- The **Local disease** stage

--- The **Disseminated disease** stage

--- The **Persistent disease** stage
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they? How do they manifest? (2-28 days post-inoculation)*

--The **Local disease** stage is characterized by…

--The **Disseminated disease** stage

--The **Persistent disease** stage
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they? How do they manifest? (2-28 days post-inoculation)*

--The *Local disease* stage is characterized by...the appearance of **erythema chronicum migrans** at the bite site

--The *Disseminated disease* stage

--The *Persistent disease* stage
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they? How do they manifest? (2-28 days post-inoculation)*

--The **Local disease** stage is characterized by...the appearance of *erythema chronicum migrans* at the bite site

--The **Disseminated disease** stage

--The **Persistent disease** stage
Uveitis: **Lyme**

**Basics**

*LD passes through three stages*—what are they? How do they manifest? (2-28 days post-inoculation)

---The **Local disease** stage is characterized by…the appearance of **erythema chronicum migrans** at the bite site.

---The **Disseminated disease** stage

---The **Persistent disease** stage

---What is the classic appearance of the ECM rash? Macular
Uveitis: Lyme

Basics

*LD passes through three stages*--what are they? How do they manifest? (2-28 days post-inoculation)

--The **Local disease** stage is characterized by...the appearance of [**erythema chronicum migrans**](http://example.com) at the bite site

--The **Disseminated disease** stage

--The **Persistent disease** stage

*What is the classic appearance of the ECM rash? That of a ‘bull’s eye’*
Uveitis: *Lyme*

LD: Erythema chronicum migrans
Uveitis: *Lyme*

**Basics**

*LD passes through three stages*—what are they? How do they manifest?

(2-28 days post-inoculation)

--- The **Local disease** stage is characterized by...the appearance of **erythema chronicum migrans** at the bite site

--- The **Disseminated disease** stage

--- The **Persistent disease** stage

**What is the classic appearance of the ECM rash?**

That of a ‘bull’s eye’

*Is it macular, papular, or maculopapular?*
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they? How do they manifest?*  
(2-28 days post-inoculation)  
--The **Local disease** stage is characterized by...the appearance of *erythema chronicum migrans* at the bite site

--The **Disseminated disease** stage

--The **Persistent disease** stage

**What is the classic appearance of the ECM rash?**  
That of a ‘bull’s eye’

**Is it macular, papular, or maculopapular?**  
Macular
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they? How do they manifest?*

(2-28 days post-inoculation)

--The **Local disease** stage is characterized by…the appearance of *erythema chronicum migrans* at the bite site

In addition to the ECM rash, what other signs/symptoms characterize this stage?

--The **Disseminated disease** stage

--The **Persistent disease** stage
Uveitis: Lyme

Basics

Lyme disease passes through three stages—what are they? How do they manifest?

(2-28 days post-inoculation)

--The Local disease stage is characterized by...the appearance of erythema chronicum migrans at the bite site.

---In addition to the ECM rash, what other signs/symptoms characterize this stage? So-called ‘constitutional’ findings such as fever, fatigue, malaise and body aches.

--The Disseminated disease stage

--The Persistent disease stage
Uveitis: **Lyme**

**Basics**

*LD passes through three stages—what are they? How do they manifest?*  
(2-28 days post-inoculation)  
--The **Local disease** stage is characterized by…the appearance of *erythema chronicum migrans* at the bite site  

*How much time typically passes between the bite and the Disseminated disease stage?*  
--The **Disseminated disease** stage  

--The **Persistent disease** stage
Uveitis: *Lyme*

**Basics**

*LD passes through three stages--what are they? How do they manifest?*

**(2-28 days post-inoculation)**

--The **Local disease** stage is characterized by...the appearance of *erythema chronicum migrans* at the bite site

**(1-4 months post-inoculation)**

--The **Disseminated disease** stage

--The **Persistent disease** stage
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they? How do they manifest?*

(2-28 days post-inoculation)

--The **Local disease** stage is characterized by…the appearance of *erythema chronicum migrans* at the bite site

(1-4 months post-inoculation)

--The **Disseminated disease** stage is characterized by…

--The **Persistent disease** stage
Uveitis: **Lyme**

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*LD passes through three stages--what are they? How do they manifest?*

**Local disease** stage (2-28 days post-inoculation)

--The Local disease stage is characterized by...the appearance of *erythema chronicum migrans* at the bite site

**Disseminated disease** stage (1-4 months post-inoculation)

--The Disseminated disease stage is characterized by...*hematogenous spread* to different sites, including:

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**Persistent disease** stage
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they? How do they manifest?*

(2-28 days post-inoculation)

--The **Local disease** stage is characterized by…the appearance of *erythema chronicum migrans* at the bite site

(1-4 months post-inoculation)

--The **Disseminated disease** stage is characterized by…**hematogenous spread** to different sites, including:
--The skin
--The heart
--The CNS
--The joints
--The eye

--The **Persistent disease** stage
Uveitis: *Lyme*

**Basics**

*LD passes through three stages--what are they? How do they manifest? (2-28 days post-inoculation)*

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--The **Persistent disease** stage
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they? How do they manifest?*

- **Local disease** stage is characterized by the appearance of *erythema chronicum migrans* at the bite site
  (2-28 days post-inoculation)

- **Disseminated disease** stage is characterized by hematogenous spread to different sites, including:
  - The skin
  - The heart
  - The CNS
  - The joints
  - The eye
  (1-4 months post-inoculation)

- **Persistent disease** stage
  (5+ months post-inoculation)

**What skin finding is typical at this stage?**

The appearance of ECM rash at locations remote from the bite site
Uveitis: *Lyme*

LD: Multiple skin lesions
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they? How do they manifest?*

(2-28 days post-inoculation)

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  --The CNS
  --The joints
  --The eye

--The **Persistent disease** stage is characterized by one of three patterns:
  ----Benign tertiary syphilis
  ----Cardiovascular syphilis
  ----Neurosyphilis

*How does cardiac involvement manifest?*

*If the examinee suspects cardiac involvement, what is the correct response?*

Hospitalization on a telemetry unit (with appropriate consultations of course)
Uveitis: *Lyme*

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*LD passes through three stages--what are they? How do they manifest?*  
(2-28 days post-inoculation)  
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**How does cardiac involvement manifest?**  
As a conduction problem
Uveitis: **Lyme**

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*How does cardiac involvement manifest?*  
As a conduction problem  

*What should the OKAP/Boards examinee be on the lookout for?*
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How does cardiac involvement manifest?

As a conduction problem

*What should the OKAP/Boards examinee be on the lookout for?*

Signs/symptoms suggestive of conduction issues--syncope, irregular heartbeat, SOB

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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(5+ months post-inoculation)
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  ----Cardiovascular syphilis
  ----Neurosyphilis

---

**Is CNS involvement common?**
Yes; as many as 40% of LD pts will manifest neurologic findings

--Meningitis
--Encephalitis
--Cranial nerve palsies
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they? How do they manifest?*  
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Uveitis: Lyme

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Uveitis: Lyme

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----Cardiovascular syphilis

----Neurosyphilis

---Is CNS involvement common?

Yes; as many as 40% of LD pts will manifest neurologic findings

---What neurologic findings are typical at this stage?

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---
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they? How do they manifest?*
(2-28 days post-inoculation)
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--The Persistent disease stage is characterized by one of three patterns:
----Benign tertiary syphilis
----Cardiovascular syphilis
----Neurosyphilis

*Is CNS involvement common?*
Yes; as many as 40% of LD pts will manifest neurologic findings

*What neurologic findings are typical at this stage?*
--Meningitis
--Encephalitis
--Cranial nerve palsies
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they? How do they manifest?*

(2-28 days post-inoculation)

--The **Local disease** stage is characterized by…the appearance of *erythema chronicum migrans* at the bite site

(1-4 months post-inoculation)

--The **Disseminated disease** stage is characterized by…*hematogenous spread* to different sites, including:

--The skin
--The heart
--The CNS
--The joints
--The eye

--The **Persistent disease** stage is characterized by one of three patterns:

----Benign tertiary syphilis
----Cardiovascular syphilis
----Neurosyphilis

**Is joint involvement common?**

Yes; if left untreated, as many as 80% of LD pts will develop joint issues

**Does LD tend to affect large joints, or small?**

Large

**Does it tend to affect multiple joints, or only a few?**

Few; in fact, it is often a monoarthritis

**Which joint is its 'favorite'?**

The knee
Uveitis: Lyme

Basics

LD passes through three stages--what are they? How do they manifest?
(2-28 days post-inoculation)
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the bite site
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----Cardiovascular syphilis
----Neurosyphilis

Is joint involvement common?
Yes; if left untreated, as many as % of LD pts will develop joint issues

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: Lyme

Basics

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Which joint is its 'favorite'?
The knee
Uveitis: **Lyme**

**Basics**

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----**Cardiovascular syphilis**
----**Neurosyphilis**

Is joint involvement common?

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---
Uveitis: *Lyme*

**Basics**

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(1-4 months post-inoculation)
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--The CNS
--The **joints**
--The eye
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----Cardiovascular syphilis
----Neurosyphilis

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*Does LD tend to affect large joints, or small?*
Large

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4) Studies are obtained to identify the etiology
5) Treatment appropriate for the etiology is initiated
Uveitis: **Lyme**

**Basics**

*LD passes through three stages—what are they? How do they manifest?*

- **Local disease** stage (2-28 days post-inoculation): characterized by...the appearance of *erythema chronicum migrans* at the bite site.
- **Disseminated disease** stage (1-4 months post-inoculation): characterized by...*hematogenous spread* to different sites, including:
  - The skin
  - The heart
  - The CNS
  - The joints
  - The eye
- **Persistent disease** stage (5+ months post-inoculation): characterized by one of three patterns:
  - Benign tertiary syphilis
  - Cardiovascular syphilis
  - Neurosyphilis

**Is joint involvement common?**

Yes; if left untreated, as many as **80%** of LD pts will develop joint issues.

**Does LD tend to affect large joints, or small?**

Large

**Does it tend to affect multiple joints, or only a few?**
Uveitis: *Lyme*

**Basics**

*LD passes through three stages--what are they? How do they manifest?*

(2-28 days post-inoculation)
- The **Local disease** stage is characterized by...the appearance of *erythema chronicum migrans* at the bite site
(1-4 months post-inoculation)
- The **Disseminated disease** stage is characterized by...**hematogenous spread** to different sites, including:
  - The skin
  - The heart
  - The CNS
- **The joints**
  - The eye
- **The Persistent disease** stage is characterized by one of three patterns:
  - Benign tertiary syphilis
  - Cardiovascular syphilis
  - Neurosyphilis

*Is joint involvement common?*
- Yes; if left untreated, as many as 80% of LD pts will develop joint issues

*Does LD tend to affect large joints, or small?*
- Large

*Does it tend to affect multiple joints, or only a few?*
- Few; in fact, it is often a monoarthritis
**Uveitis: Lyme**

**Basics**

LD passes through three stages—what are they? How do they manifest?

(2-28 days post-inoculation)
--- The **Local disease** stage is characterized by... the appearance of *erythema chronicum migrans* at the bite site

(1-4 months post-inoculation)
--- The **Disseminated disease** stage is characterized by... **hematogenous spread** to different sites, including:
--- The skin
--- The heart
--- The CNS
--- **The joints**
--- The eye
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--- Neurosyphilis

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*Does LD tend to affect large joints, or small?*
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*Does it tend to affect multiple joints, or only a few?*
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*Which joint is its ‘favorite’?*
**Basics**

*LD passes through three stages—what are they? How do they manifest?*

(2-28 days post-inoculation)

--- The **Local disease** stage is characterized by the appearance of *erythema chronicum migrans* at the bite site

(1-4 months post-inoculation)

--- The **Disseminated disease** stage is characterized by hematogenous spread to different sites, including:

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--- The heart
--- The CNS
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--- The eye
--- The **Persistent disease** stage is characterized by one of three patterns:

--- Benign tertiary syphilis
--- Cardiovascular syphilis
--- Neurosyphilis

--- Is joint involvement common?
   Yes; if left untreated, as many as 80% of LD pts will develop joint issues

--- Does *LD* tend to affect large joints, or small?
   Large

--- Does it tend to affect multiple joints, or only a few?
   Few; in fact, it is often a monoarthritis

--- Which joint is its ‘favorite’?
   The knee
Uveitis: **Lyme**

**Basics**

*Lyme Disease* passes through three stages—what are they? How do they manifest?

1. **Local disease** stage (2-28 days post-inoculation)
   - Characterized by the appearance of *erythema chronicum migrans* at the bite site.

2. **Disseminated disease** stage (1-4 months post-inoculation)
   - Characterized by hematogenous spread to different sites, including:
     - Skin
     - Heart
     - CNS
     - Joints

3. **Persistent disease** stage

---

---The eye in *Lyme Disease* will be discussed in detail later in this slide-set!
Uveitis: Lyme

Basics

*LD passes through three stages--what are they? How do they manifest?*

(2-28 days post-inoculation)
--The **Local disease** stage is characterized by…the appearance of *erythema chronicum migrans* at the bite site

(1-4 months post-inoculation)
--The **Disseminated disease** stage is characterized by…*hematogenous spread* to different sites, including:
  --The skin
  --The heart
  --The CNS
  --The joints
  --The eye

*How much time typically passes between the bite and the Persistent disease stage?*
--The **Persistent disease** stage
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they? How do they manifest?*

(2-28 days post-inoculation)

--The **Local disease** stage is characterized by…the appearance of *erythema chronicum migrans* at the bite site

(1-4 months post-inoculation)

--The **Disseminated disease** stage is characterized by…*hematogenous spread* to different sites, including:

--The skin
--The heart
--The CNS
--The joints
--The eye

(5+ months post-inoculation)

--The **Persistent disease** stage
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they? How do they manifest?*

(2-28 days post-inoculation)

--The **Local disease** stage is characterized by…the appearance of *erythema chronicum migrans* at the bite site

(1-4 months post-inoculation)

--The **Disseminated disease** stage is characterized by…*hematogenous spread* to different sites, including:

--The skin
--The heart
--The CNS
--The joints
--The eye

(5+ months post-inoculation)

--The **Persistent disease** stage is characterized by…
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they? How do they manifest?*

(2-28 days post-inoculation)

--The **Local disease** stage is characterized by…the appearance of *erythema chronicum migrans* at the bite site

(1-4 months post-inoculation)

--The **Disseminated disease** stage is characterized by…*hematogenous spread* to different sites, including:
  --The skin
  --The heart
  --The CNS
  --The joints
  --The eye

(5+ months post-inoculation)

--The **Persistent disease** stage is characterized by…episodic or even chronic
Uveitis: **Lyme**

**Basics**

*LD passes through three stages--what are they? How do they manifest?*

*(2-28 days post-inoculation)*

--The **Local disease** stage is characterized by…the appearance of *erythema chronicum migrans* at the bite site

*(1-4 months post-inoculation)*

--The **Disseminated disease** stage is characterized by…*hematogenous spread* to different sites, including:
--The skin
--The heart
--The CNS
--The joints
--The eye

*(5+ months post-inoculation)*

--The **Persistent disease** stage is characterized by…episodic or even chronic arthritis
Deer tick bite

A few days to weeks later

1st: Local dz

Systemic: Target rash at bite site; constitutional symptoms

Eye: Follicular conjunctivitis
**Lyme dz stages: TLDR**

(No questions—review slide)

Deer tick bite

A few days to weeks later

1st: Local dz

- **Systemic**: Target rash at bite site; constitutional symptoms
- **Eye**: Follicular conjunctivitis

A few months later

2nd: Disseminated dz

- **Systemic**: Rash elsewhere; cardiac, CNS issues
- **Eye**: *All the uveitis stuff we’re fixing to discuss*
Lyme dz stages: TLDR
(No questions—review slide)

Deer tick bite

A few days to weeks later

1st: Local dz
Local: Target rash at bite site; constitutional symptoms
Eye: Follicular conjunctivitis

A few months later

2nd: Disseminated dz
Systemic: Rash elsewhere; cardiac, CNS issues
Eye: All the uveitis stuff we’re fixing to discuss

5+ months later

3rd: Persistent dz
Systemic: Arthritis, probably in the knee
Eye: Not much

(No questions—review slide)
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

LD uveitis can present in any form...
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

Anterior

Posterior

Intermediate

...including as an anterior uveitis.

Panuveitis

Lyme
Uveitis: **Anterior**

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: **Anterior**

- Granulomatous
- Nongranulomatous

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: *Anterior*

- Granulomatous
- Nongranulomatous

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: **Anterior**

- Granulomatous
- Nongranulomatous

  - Acute
  - Chronic

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: **Anterior**

- Granulomatous
- Nongranulomatous
  - Acute
  - Chronic

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: *Anterior*

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

- Granulomatous
  - Acute
    - Unilateral
  - Chronic
    - Bilateral

- Nongranulomatous
When LD presents as an anterior uveitis, in which form is it most likely to occur?
Uveitis: **Anterior**

### Granulomatous
- TB
- Syphilis
- Sarcoid
- HSV
- VKH
- Toxoplasmosis
- **Lyme**

### Nongranulomatous
- **Acute**
  - Unilateral
    - HLA-B27 dz
    - Posner-Schlossman
    - Sarcoid
    - Syphilis
    - HSV/VZV
    - TB
  - Bilateral
    - TINU
    - Behçet
    - Drug rxn
    - Leptospirosis
    - Sarcoid
    - Syphilis
    - IBD/PA
    - TB

- **Chronic**
  - JIA
  - FHI
  - IBD/PA
  - Sarcoid
  - Syphilis
  - TB

---

When LD presents as an anterior uveitis, in which form is it most likely to occur?  
As a **granulomatous uveitis**
Intermediate uveitis is a common presentation of LD, and this diagnosis should be given careful consideration in any pt presenting in this manner!
Uveitis: *Lyme*

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

LD is also well-known for presenting as a posterior uveitis.
Uveitis: *Posterior*

What are the four manifestations of posterior 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
What are the four manifestations of posterior uveitis?
Uveitis: Posterior

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

What is the classic posterior manifestation of LD?
Chorioretinitis or Retinochoroiditis

What is the classic posterior manifestation of LD?
A peripheral multifocal choroiditis
What is the classic posterior manifestation of LD?
A peripheral multifocal choroiditis

Are the lesions...
...large, or small?
What is the classic posterior manifestation of LD?
A peripheral multifocal choroiditis

Are the lesions...
...large, or small? Small
Uveitis: *Posterior*

Choroiditis

Chorioretinitis or Retinochoroiditis

Retinitis

Neuroretinitis

---

What is the classic posterior manifestation of LD?
A peripheral multifocal choroiditis

*Are the lesions…*

…large, or small? Small

…round, or irregular in shape?
Uveitis: **Posterior**

Chorioretinitis or Retinochoroiditis

Choroiditis

Retinitis

Neuroretinitis

What is the classic posterior manifestation of LD?
A peripheral multifocal choroiditis

Are the lesions…
…large, or small? Small
…round, or irregular in shape? Round
What is the classic posterior manifestation of LD?
A peripheral multifocal choroiditis

Are the lesions...
...large, or small? Small
...round, or irregular in shape? Round
...intact, or ‘punched out’ in appearance?
What is the classic posterior manifestation of LD?
A peripheral multifocal choroiditis

Are the lesions…
…large, or small? Small
…round, or irregular in shape? Round
…intact, or ‘punched out’ in appearance? Punched out
Uveitis: *Lyme*

LD: Peripheral multifocal choroiditis
What is the classic posterior manifestation of LD?
A peripheral multifocal choroiditis

Are the lesions...
...large, or small? Small
...round, or irregular in shape? Round
...intact, or ‘punched out’ in appearance? Punched out

In addition to choroiditis, in what other manner does LD posterior uveitis often manifest?
What is the classic posterior manifestation of LD?
A peripheral multifocal choroiditis

Are the lesions...
...large, or small? Small
...round, or irregular in shape? Round
...intact, or 'punched out' in appearance? Punched out

In addition to choroiditis, in what other manner does LD posterior uveitis often manifest?
As a retinal vasculitis
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

And of course, LD can present as a panuveitis.
Uveitis: **Lyme**

**Neuro-Ophthalmic Manifestations**

What neuro-ophthalmic condition is LD notorious for (it was alluded to an earlier)?
Uveitis: *Lyme*

**Neuro-Ophthalmic Manifestations**

*What neuro-ophthalmic condition is LD notorious for (it was alluded to earlier)?*

Cranial nerve (CN) palsies
Uveitis: *Lyme*

**Neuro-Ophthalmic Manifestations**

What neuro-ophthalmic condition is LD notorious for (it was alluded to an earlier)? Cranial nerve (CN) palsies

Of the CNs affecting the eye (ie, II - VII), which can be involved?
Uveitis: **Lyme**

**Neuro-Ophthalmic Manifestations**

*What neuro-ophthalmic condition is LD notorious for (it was alluded to an earlier)?*  
Cranial nerve (CN) palsies

*Of the CNs affecting the eye (ie, II - VII), which can be involved?*  
Any/all of them
Uveitis: **Lyme**

**Neuro-Ophthalmic Manifestations**

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*Of the CNs affecting the eye (ie, II - VII), which can be involved?*  
Any/all of them

*Of CNs II - VII, which is most likely to be affected?*
Uveitis: **Lyme**

**Neuro-Ophthalmic Manifestations**

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Any/all of them

*Of CNs II - VII, which is most likely to be affected?*
CN VII
Uveitis: Lyme

Neuro-Ophthalmic Manifestations

What neuro-ophthalmic condition is LD notorious for (it was alluded to an earlier)?
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Of the CNs affecting the eye (ie, II - VII), which can be involved?
Any/all of them

Of CNs II - VII, which is most likely to be affected?
CN VII. It is estimated that in areas endemic for LD, as many as % of new Bell’s palsies are due to LD!
Uveitis: **Lyme**

**Neuro-Ophthalmic Manifestations**

What neuro-ophthalmic condition is LD notorious for (it was alluded to an earlier)?
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Of the CNs affecting the eye (ie, II - VII), which can be involved?
Any/all of them

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Uveitis: **Lyme**

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Does LD Bell’s palsy present unilaterally, or bilaterally?
Uveitis: **Lyme**

**Neuro-Ophthalmic Manifestations**

*What neuro-ophthalmic condition is LD notorious for (it was alluded to an earlier)?*  
Cranial nerve (CN) palsies

*Of the CNs affecting the eye (ie, II - VII), which can be involved?*  
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CN VII. *It is estimated that in areas endemic for LD, as many as 25% of new Bell's palsies are due to LD!*

*Does LD Bell's palsy present unilaterally, or bilaterally?*  
It can present either way
Uveitis: **Lyme**

**Neuro-Ophthalmic Manifestations**

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Does LD Bell’s palsy present unilaterally, or bilaterally? It can present either way

In what ways can the optic nerve be affected?

--

--
Uveitis: Lyme

Neuro-Ophthalmic Manifestations

What neuro-ophthalmic condition is LD notorious for (it was alluded to an earlier)? Cranial nerve (CN) palsies

Of the CNs affecting the eye (ie, II - VII), which can be involved? Any/all of them

Of CNs II - VII, which is most likely to be affected? CN VII. It is estimated that in areas endemic for LD, as many as 25% of new Bell’s palsies are due to LD!

Does LD Bell’s palsy present unilaterally, or bilaterally? It can present either way

In what ways can the optic nerve be affected? --An optic neuritis can occur --If ICP increases because of a meningitic/encephalitic process, papilledema may be present
Uveitis: **Lyme**

LD: Optic neuritis
Uveitis: *Lyme*

LD: Papilledema
Uveitis: *Lyme*

**Diagnosis**

How is the diagnosis of LD made?

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 the diagnosis of LD made?
The diagnosis can be made clinically (eg, the presence of ECM is considered diagnostic in the proper clinical setting). The diagnosis can also be made serologically, but this can be challenging, as there is a lack of consensus concerning what lab values should be considered positive.
Uveitis: *Lyme*

**Diagnosis**

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Uveitis: *Lyme*

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**Treatment**

*How is LD treated?*
Uveitis: Lyme

**Diagnosis**

*How is the diagnosis of LD made?*

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**Treatment**

*How is LD treated?*

Treatment depends upon the stage of disease, and what organ-systems are involved.
Uveitis: Lyme

**Diagnosis**

How is the diagnosis of LD made?
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**Treatment**

How is LD treated?
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OK, how should LD uveitis be treated?
Uveitis: **Lyme**

**Diagnosis**

*How is the diagnosis of LD made?*

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**Treatment**

*How is LD treated?*

Treatment depends upon the stage of disease, and what organ-systems are involved

*OK, how should LD uveitis be treated?*

As with syphilitic uveitis, the presence of intraocular inflammation in the context of LD should be considered presumptive evidence of CNS involvement, and thus LD uveitis should be managed as suspected CNS LD...
Uveitis: **Lyme**

**Diagnosis**

*How is the diagnosis of LD made?*
The diagnosis can be made clinically (eg, the presence of ECM is considered diagnostic in the proper clinical setting). The diagnosis can also be made serologically, but this can be challenging, as there is a lack of consensus concerning what lab values should be considered positive. The CDC recommends ELISA testing for Ig levels, followed by Western blot testing.

**Treatment**

*How is LD treated?*
Treatment depends upon the stage of disease, and what organ-systems are involved

*OK, how should LD uveitis be treated?*
As with syphilitic uveitis, the presence of intraocular inflammation in the context of LD should be considered presumptive evidence of CNS involvement, and thus LD uveitis should be managed as suspected CNS LD

*How is suspected CNS LD managed?*
Uveitis: Lyme

**Diagnosis**

*How is the diagnosis of LD made?*

The diagnosis can be made clinically (eg, the presence of ECM is considered diagnostic in the proper clinical setting). The diagnosis can also be made serologically, but this can be challenging, as there is a lack of consensus concerning what lab values should be considered positive. The CDC recommends ELISA testing for Ig levels, followed by Western blot testing.

**Treatment**

*How is LD treated?*

Treatment depends upon the stage of disease, and what organ-systems are involved

*OK, how should LD uveitis be treated?*

As with syphilitic uveitis, the presence of intraocular inflammation in the context of LD should be considered presumptive evidence of CNS involvement, and thus LD uveitis should be managed as suspected CNS LD

*How is suspected CNS LD managed?*

LP with CSF studies should be performed to confirm the diagnosis. If CNS involvement is confirmed, IV ceftriaxone should be administered per protocol
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In this case, treatment of LD uveitis is a function of the severity of the dz. Less-severe uveitis can be managed with PO antibiotics (first line: doxycycline; if pediatric or pregnant/lactating, amoxicillin or cefuroxime).
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**What if CSF analysis fails to confirm the presence of CNS LD?**
In this case, treatment of LD uveitis is a function of the severity of the dz. Less-severe uveitis can be managed with PO antibiotics (first line: doxycycline; if pediatric or pregnant/lactating, amoxicillin or cefuroxime). **On the other hand, severe posterior-segment LD uveitis should be treated with IV antibiotics regardless of the outcome of CSF studies.**