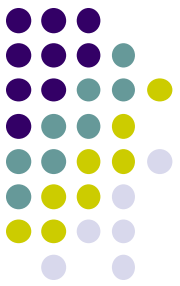
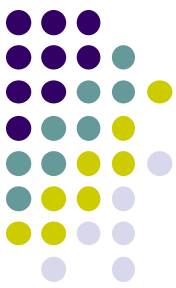


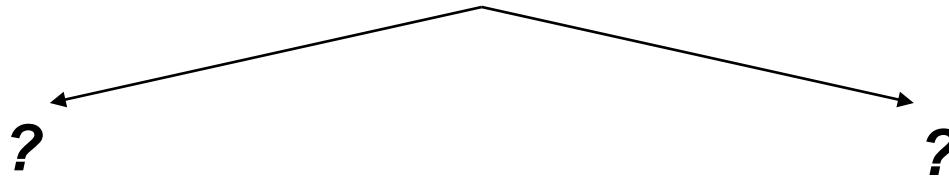
Typical Optic Neuritis



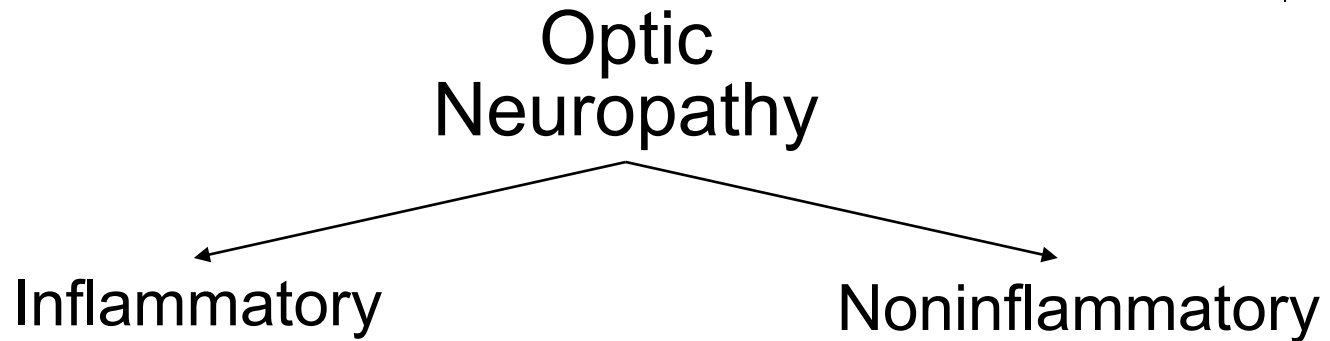
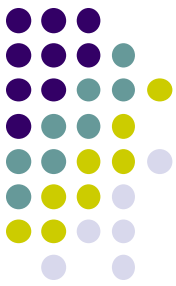
Before you begin: This is a big topic, and big topics beget big slide-sets. There's natural breaks in a couple of spots (@slides 152- and 355-ish); I placed *break time!* slides to mark them.



Optic Neuropathy



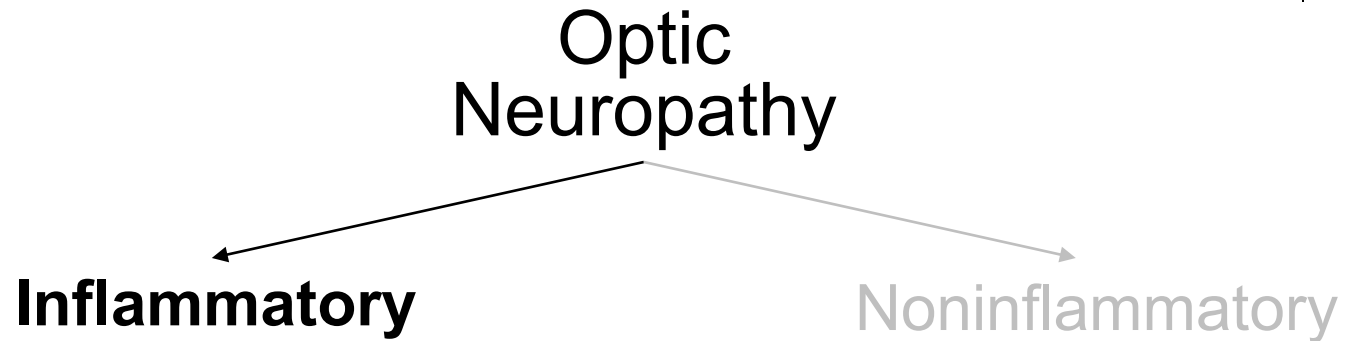
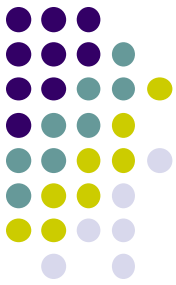
There's no single correct way to divide up the optic neuropathies. That said, there's a compelling argument that you should think of them in terms of these two subgroups. What are they?



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Typical Optic Neuritis

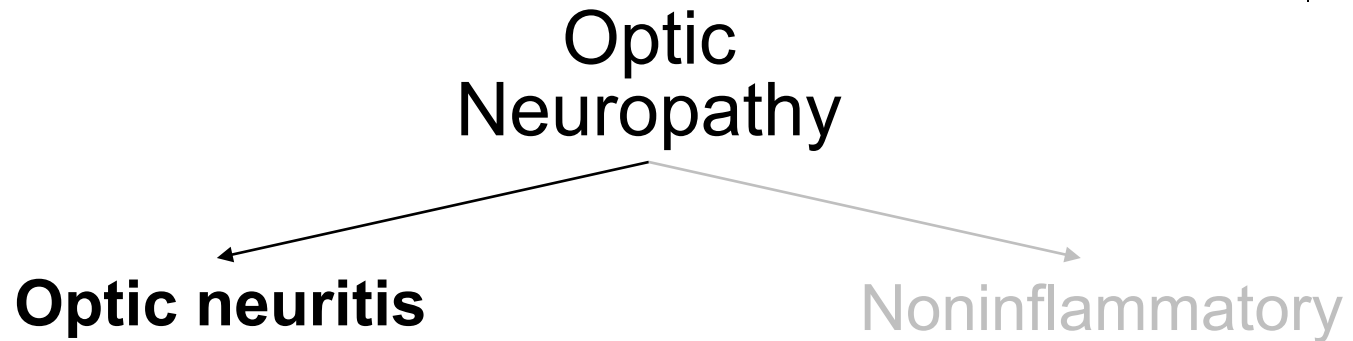
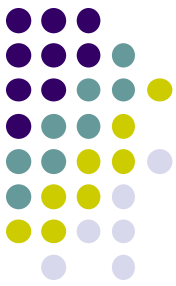
4



*What is the common name for an optic neuropathy
2ndry to an inflammatory process?*

Typical Optic Neuritis

5

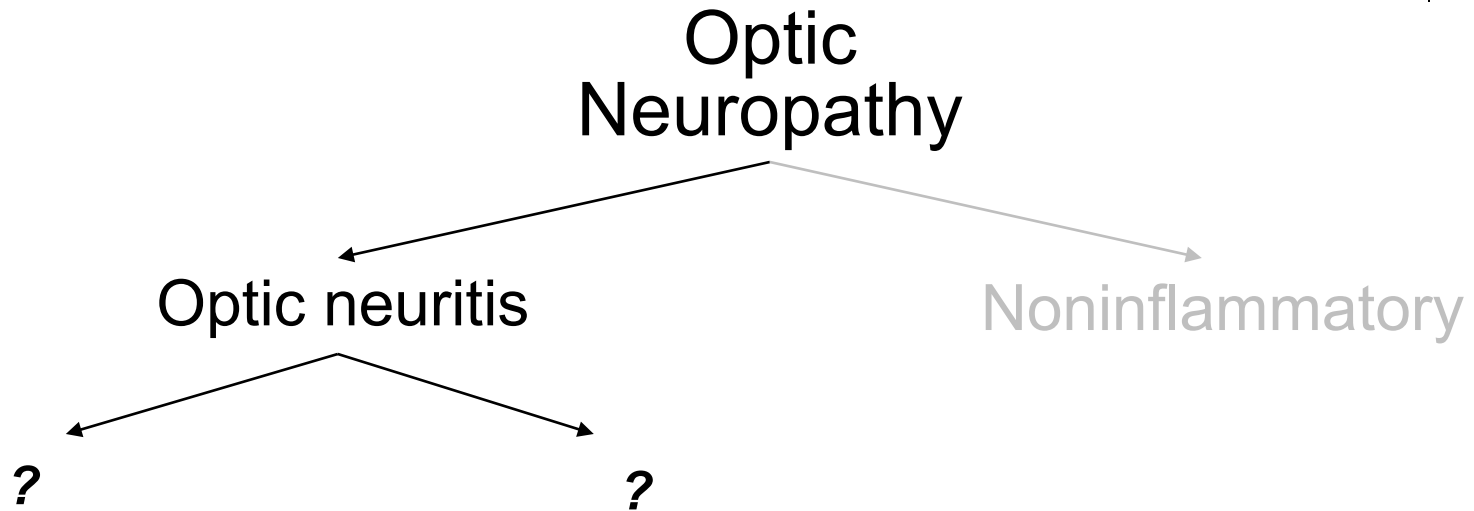
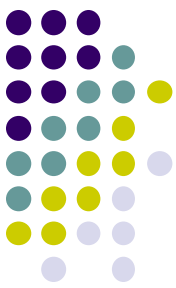


*What is the common name for an optic neuropathy
secondary to an inflammatory process?*

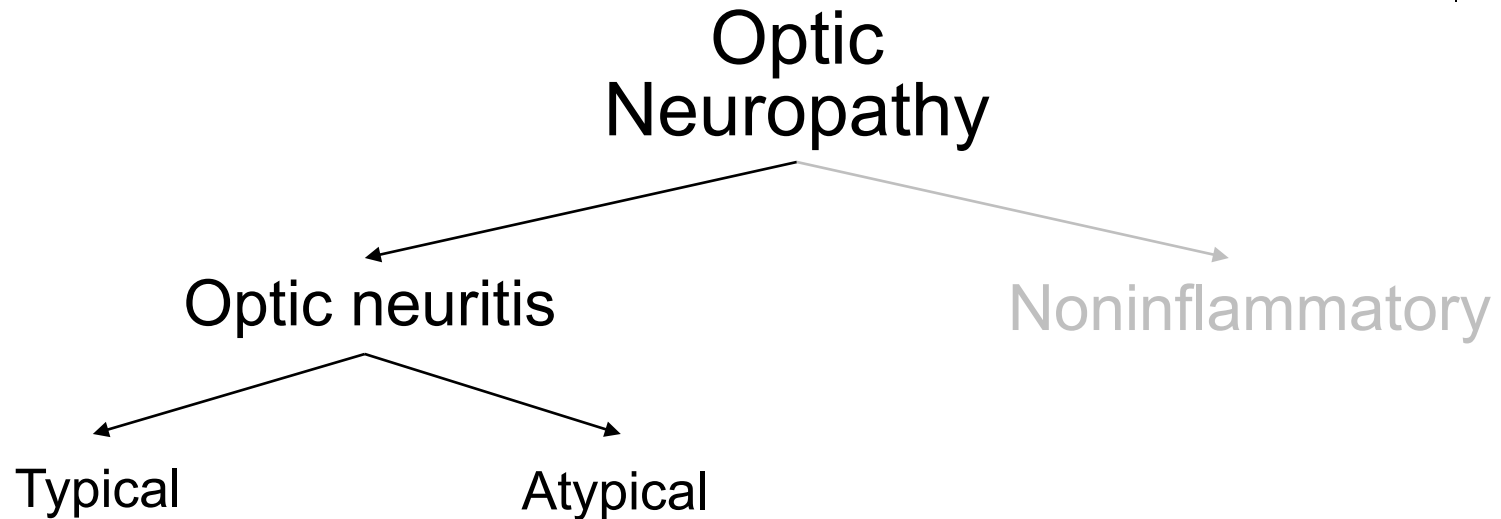
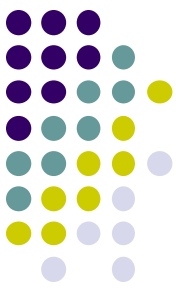
Optic neuritis

Typical Optic Neuritis

6

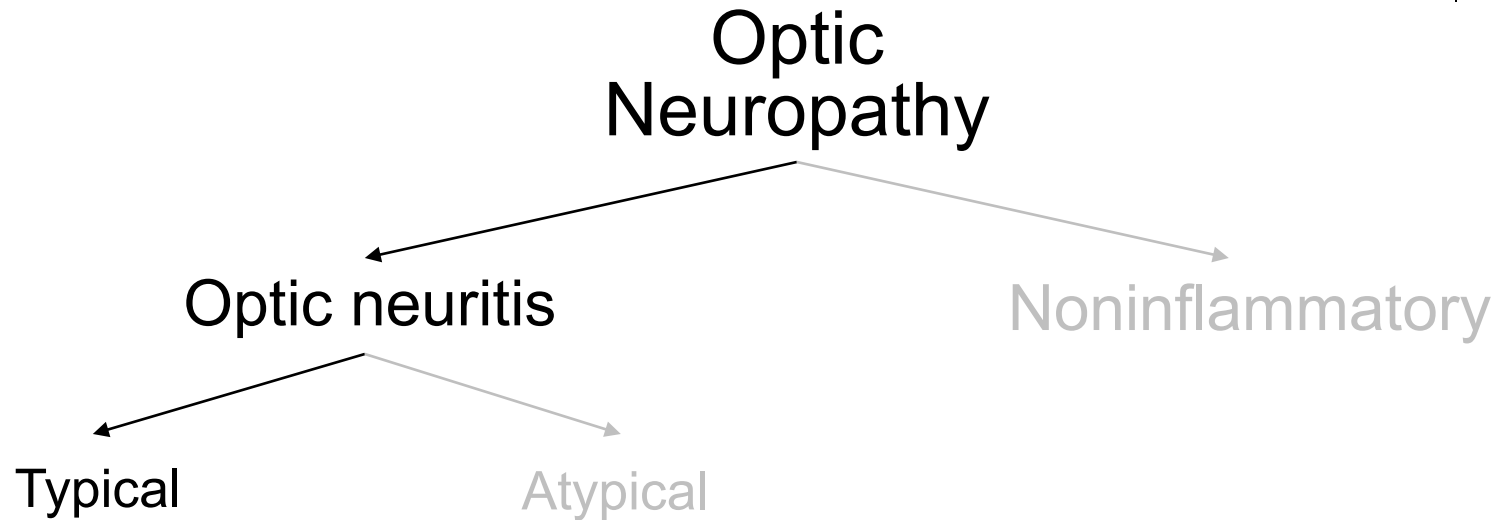
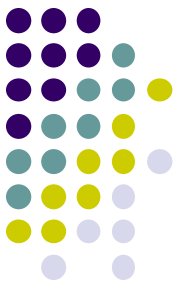


Again, no single correct answer (and several viable options). But there's a compelling argument that you should think of them as belonging to one of two subgroups. What are they?



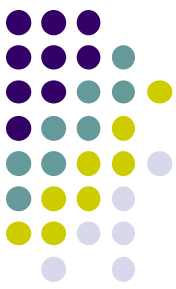
Again, no single correct answer (and several viable options). But there's a compelling argument that you should think of them as belonging to one of two subgroups. What are they?

Typical Optic Neuritis

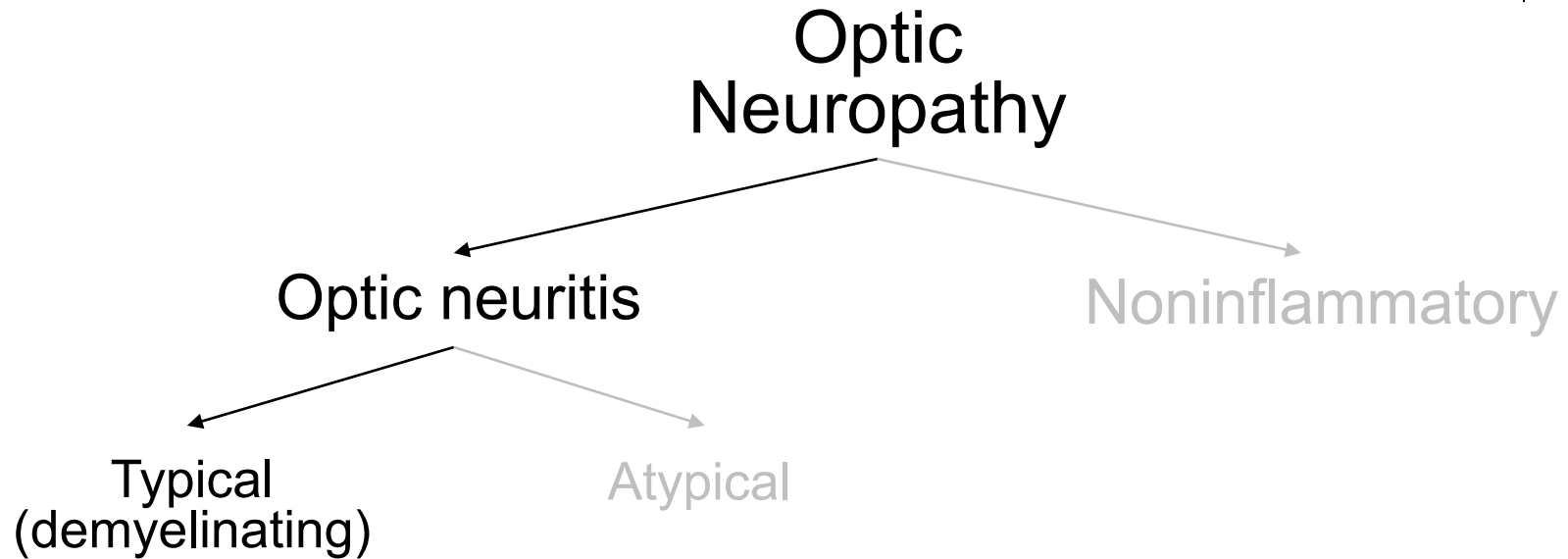


What does it mean to say an optic neuritis is typical?

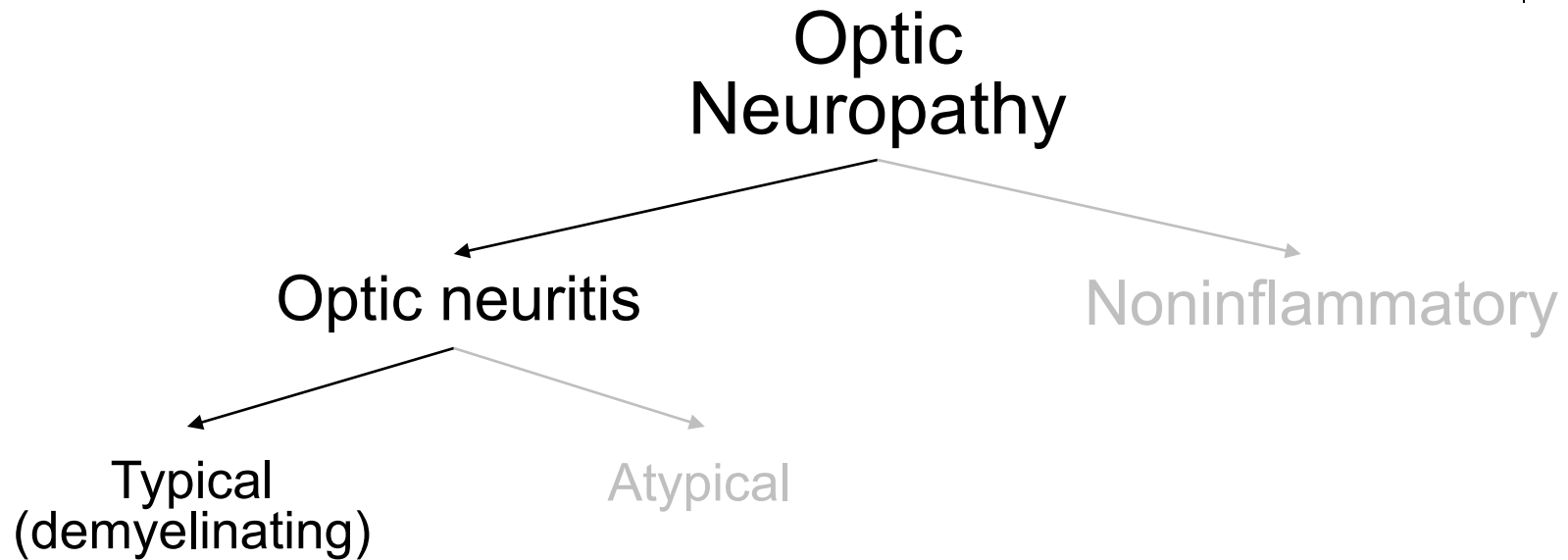
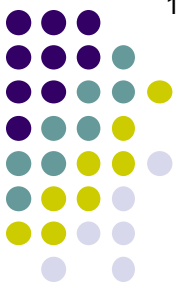
Typical Optic Neuritis



9



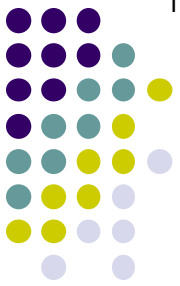
What does it mean to say an optic neuritis is typical?
It means the underlying dz process involves demyelination



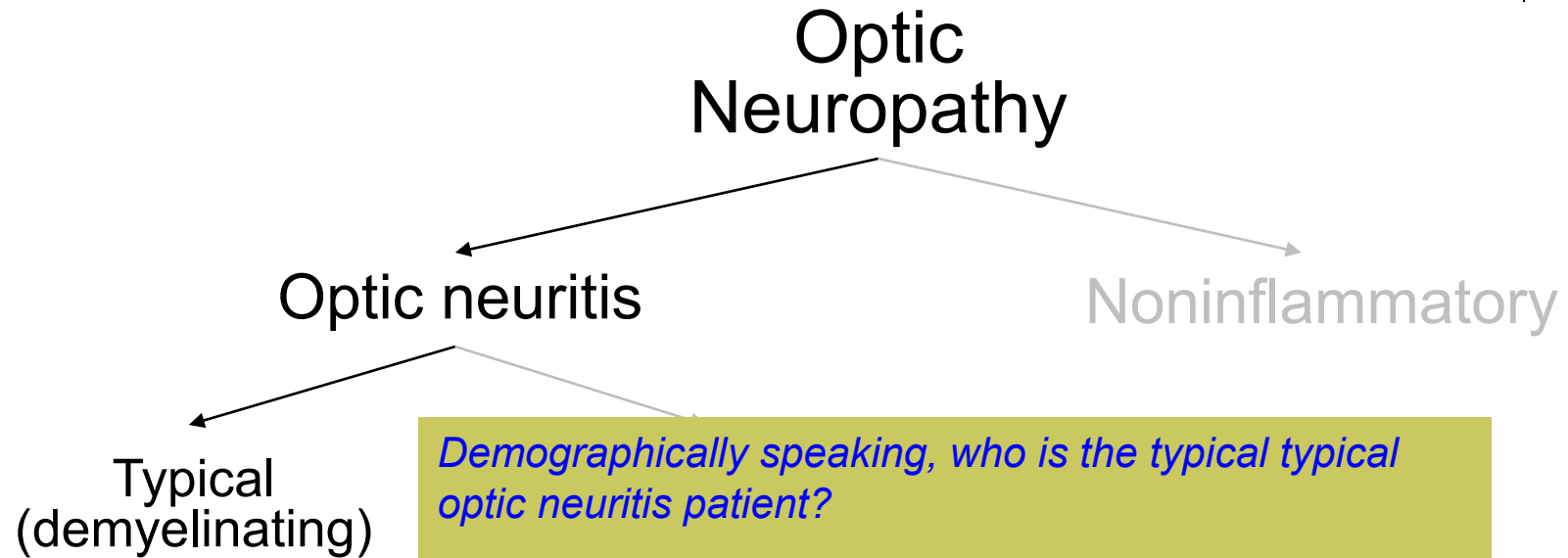
What does it mean to say an optic neuritis is typical?

It means the underlying dz process involves demyelination

Note: In common clinical parlance, the term *typical* is reserved for demyelination that is either idiopathic or related to MS

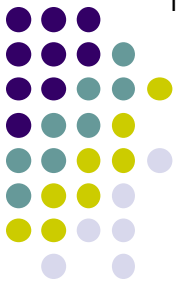


Typical Optic Neuritis



What does it mean to say an optic neuritis is typical?

It means the underlying dz process involves demyelination



Typical Optic Neuritis

Optic Neuropathy

Optic neuritis

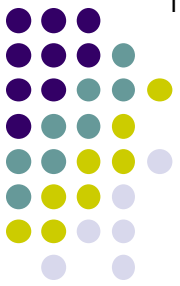
Noninflammatory

Typical
(demyelinating)

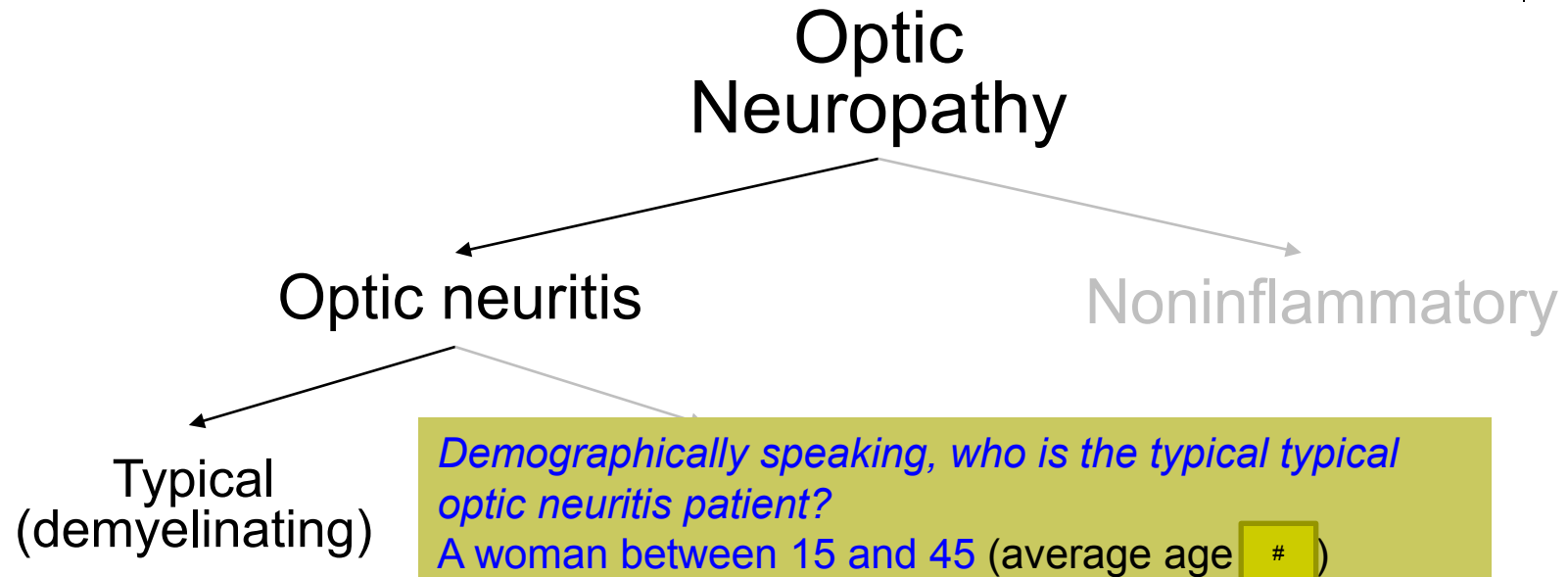
Demographically speaking, who is the typical typical optic neuritis patient?
A woman between 15 and 45

What does it mean to say an optic neuritis is typical?

It means the underlying dz process involves demyelination

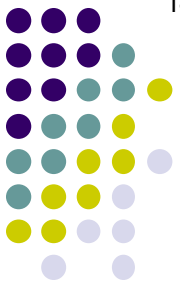


Typical Optic Neuritis

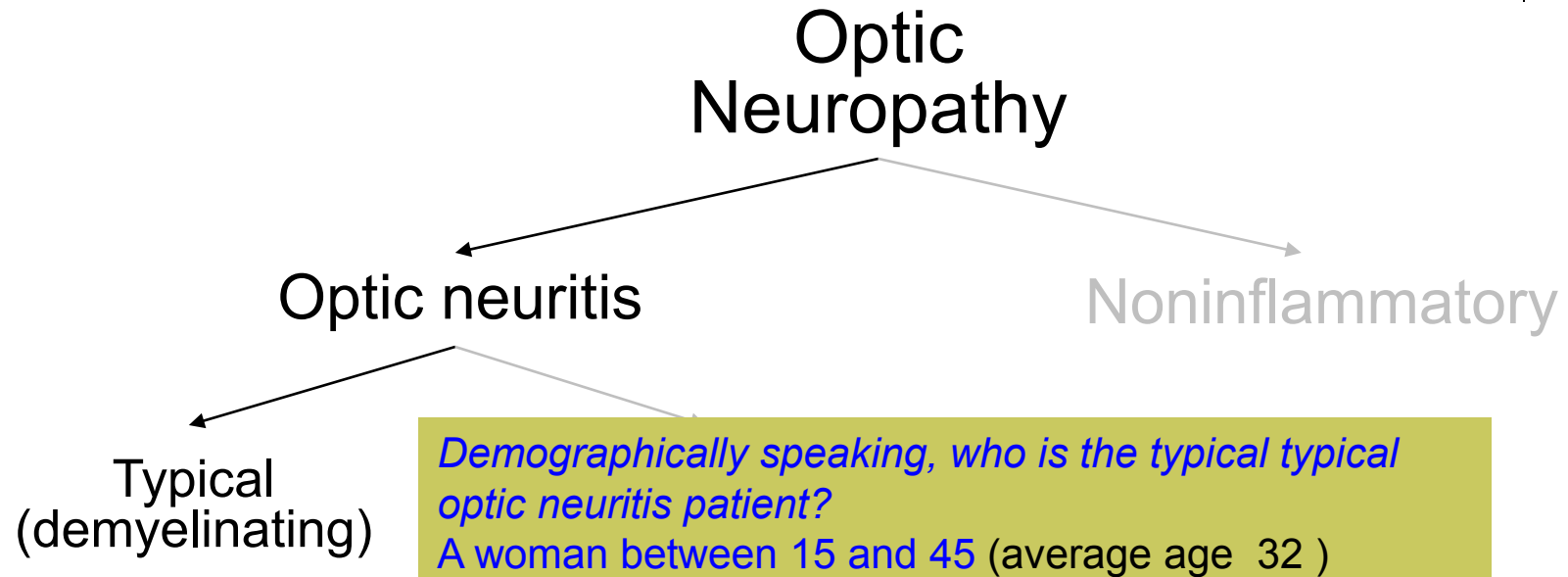


What does it mean to say an optic neuritis is typical?

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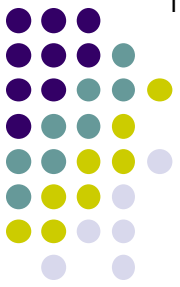


Typical Optic Neuritis



What does it mean to say an optic neuritis is typical?

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Typical Optic Neuritis

Optic Neuropathy

Optic neuritis

Noninflammatory

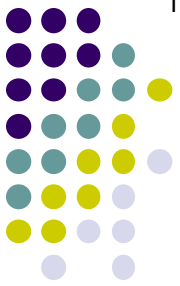
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A woman between 15 and 45 (average age 32)

What does it mean to say an optic neuritis is typical?
It means that it involves demyelination

What proportion of typical optic neuritis pts are women?



Typical Optic Neuritis

Optic Neuropathy

Optic neuritis

Noninflammatory

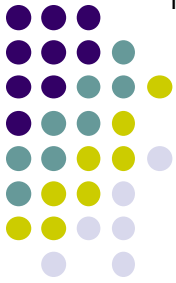
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It means that it involves demyelination

What proportion of typical optic neuritis pts are women?
Almost 80%!



Typical Optic Neuritis

As the title implies, we will have much more to say about typical optic neuritis later in the set

Optic Neuropathy

Optic neuritis

Noninflammatory

**Typical
(demyelinating)**

Demographically speaking, who is the typical typical optic neuritis patient?

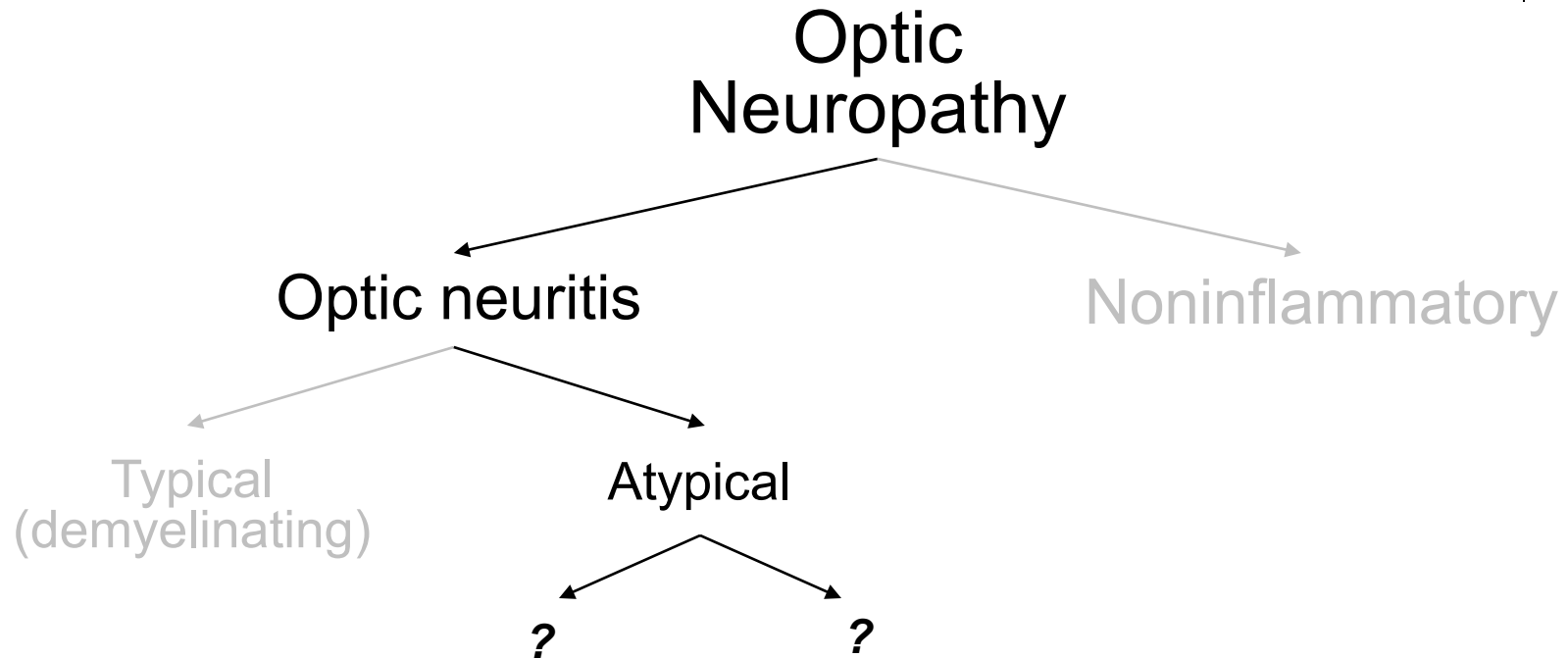
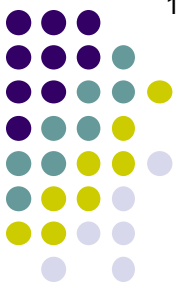
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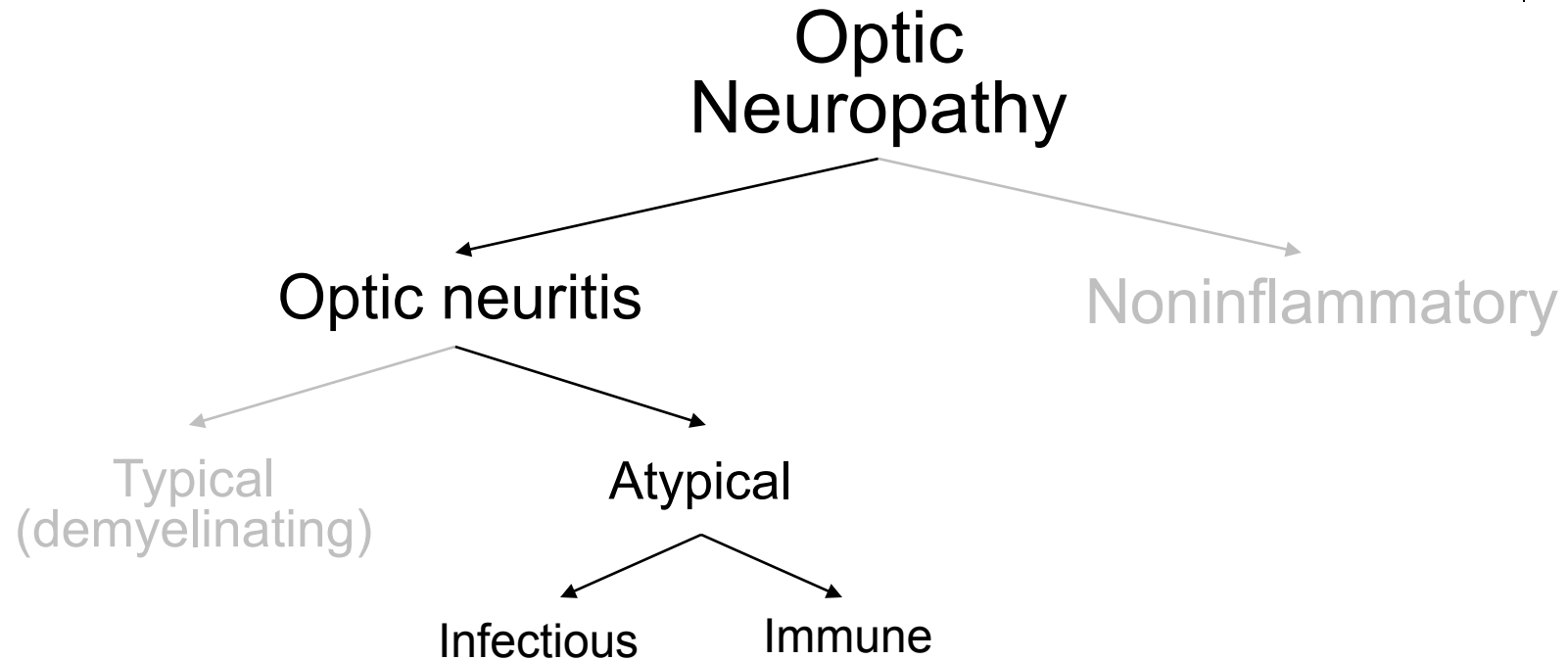
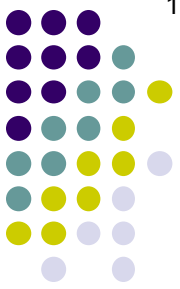
No question—proceed when ready

Typical Optic Neuritis



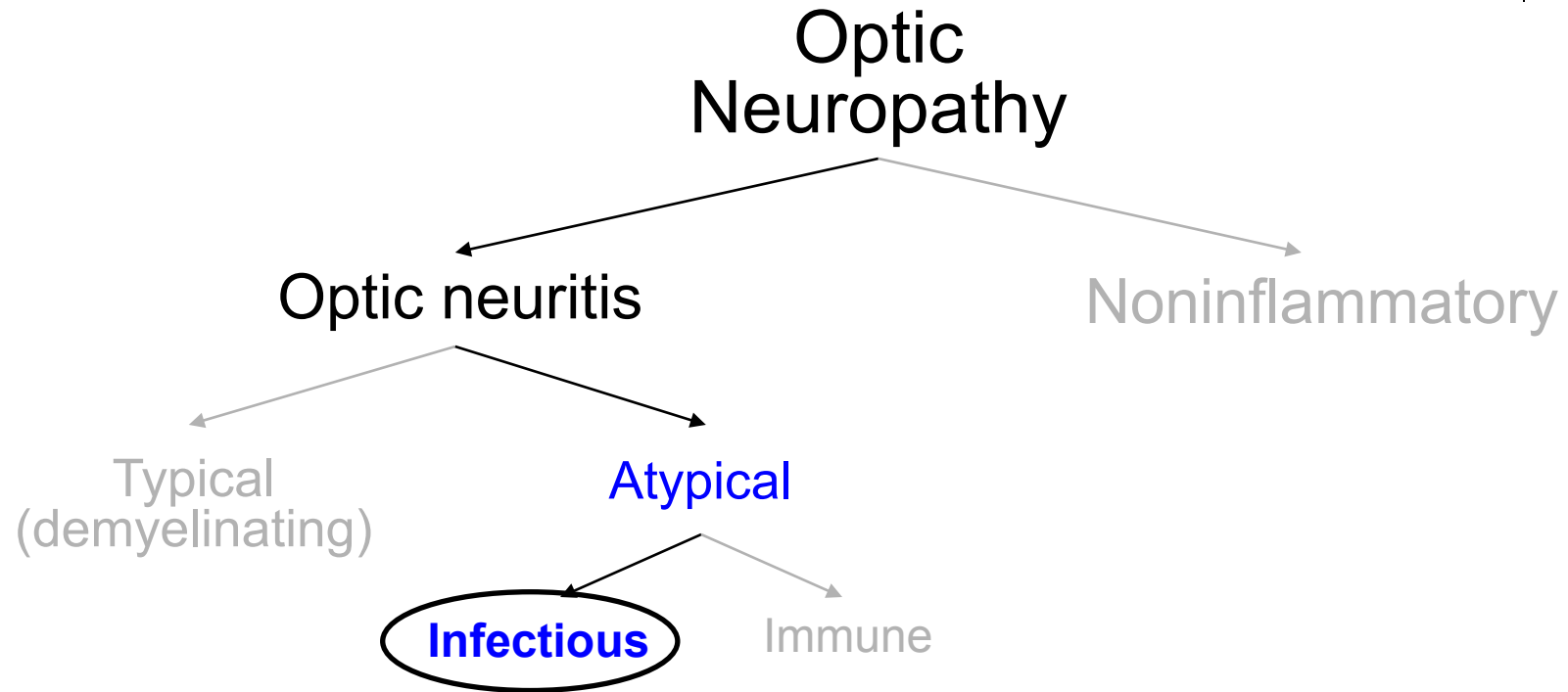
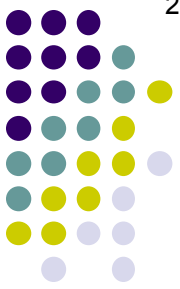
*No single correct answer, yada yada yada.
What are these two groups?*

Typical Optic Neuritis



*No single correct answer, yada yada yada.
What are these two groups?*

Typical Optic Neuritis



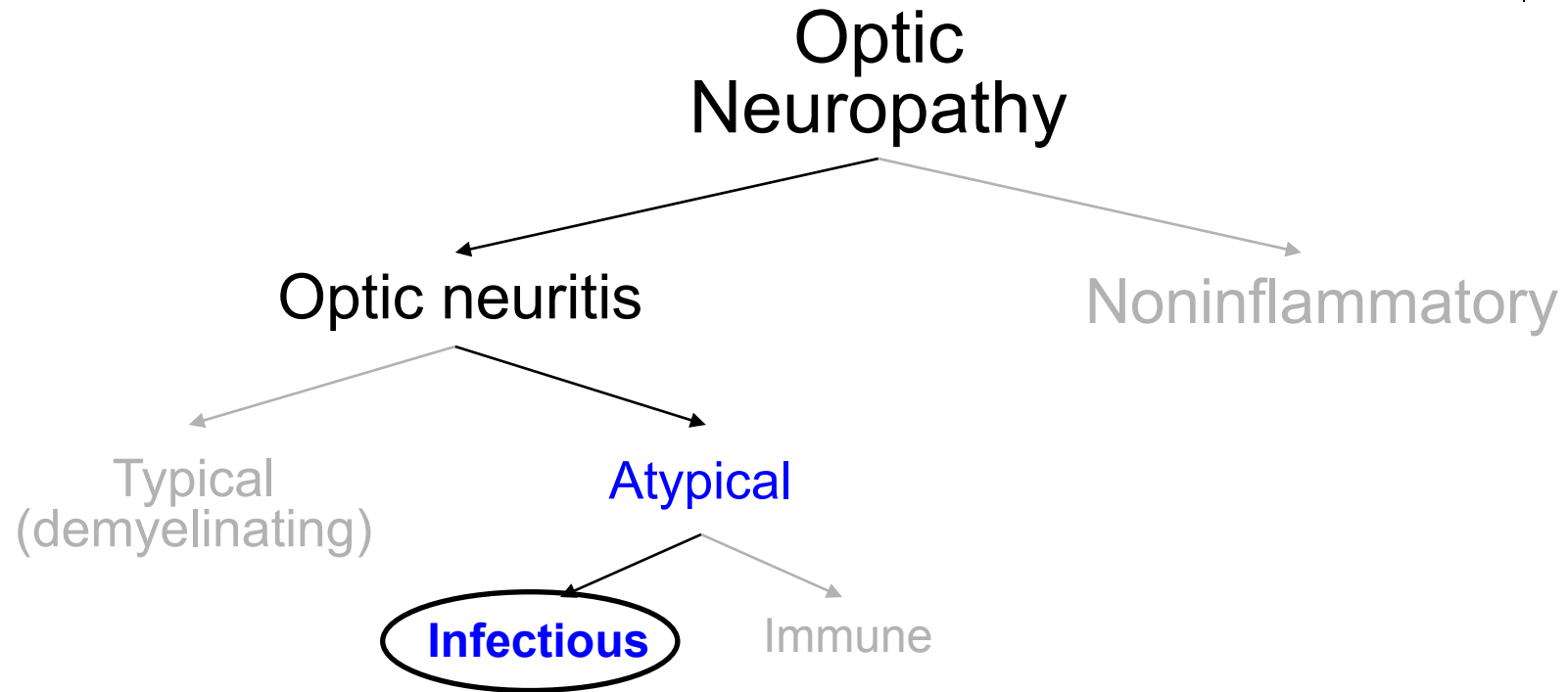
*Name 3 **infectious** causes of atypical ON:*

- 1)
- 2)
- 3)

(There are many others, of course)

Typical Optic Neuritis

21

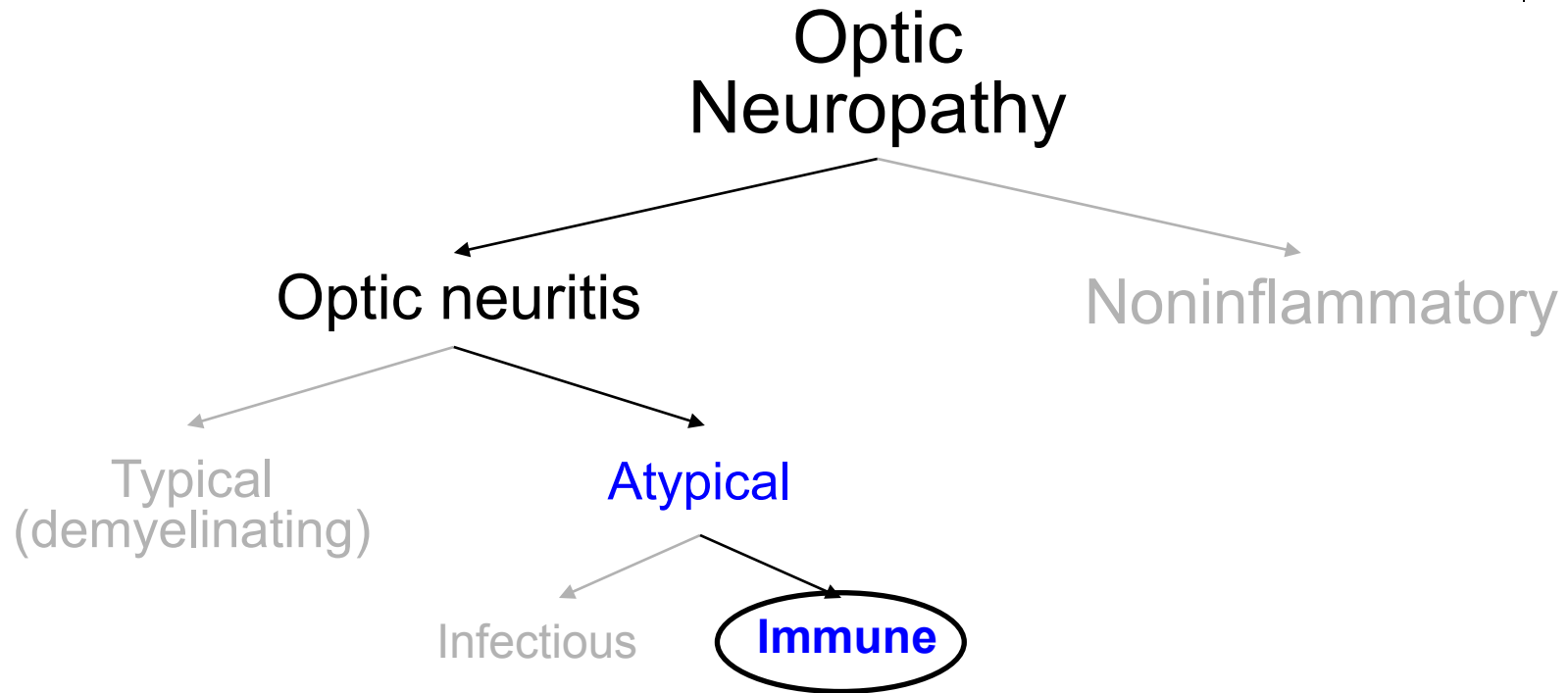
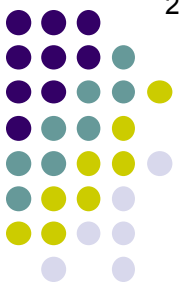


*Name 3 **infectious** causes of atypical ON:*

- 1) Syphilis
- 2) *Bartonella*
- 3) Lyme

(There are many others, of course)

Typical Optic Neuritis

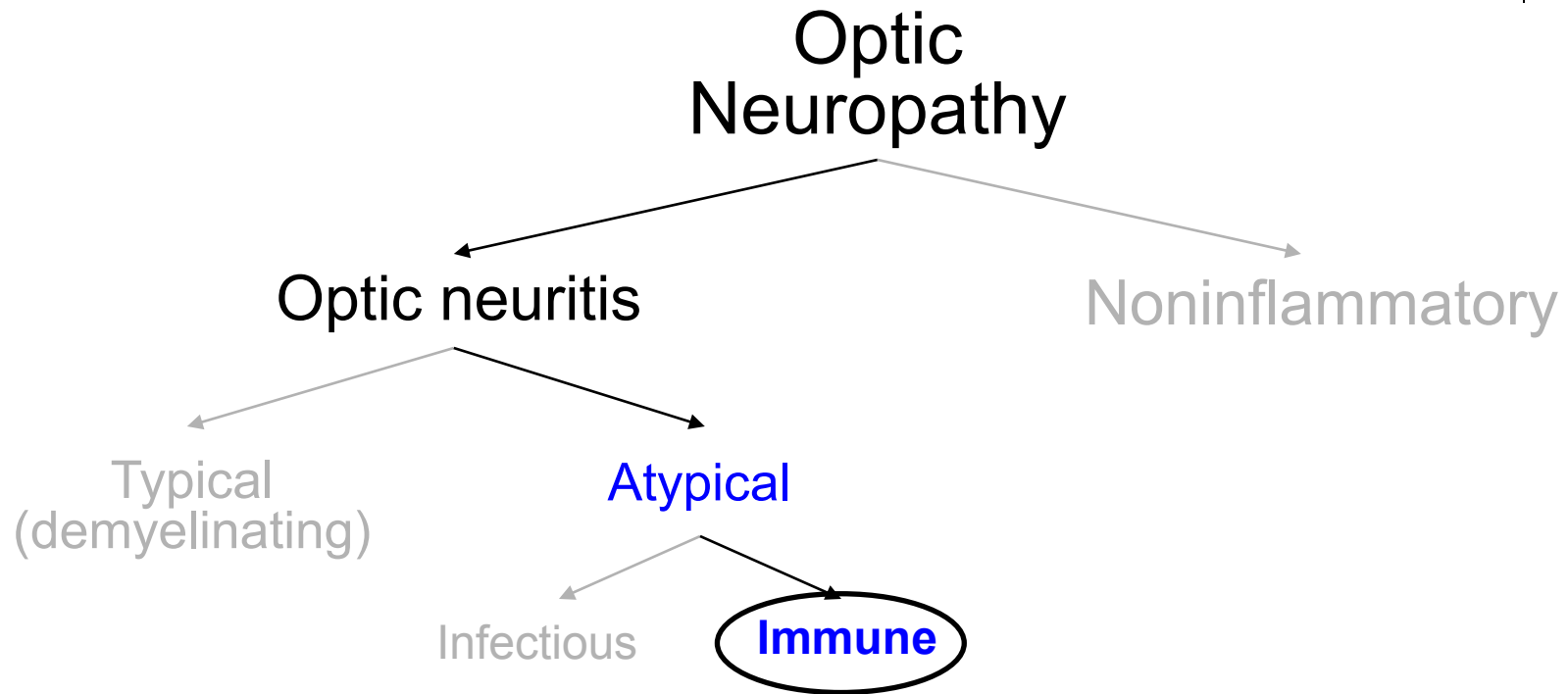
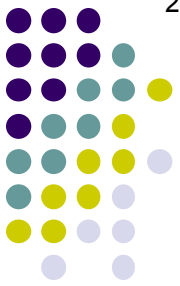


*Name 3 **immune-related** causes of atypical ON:*

- 1)
- 2)
- 3)

(There are many others, of course)

Typical Optic Neuritis

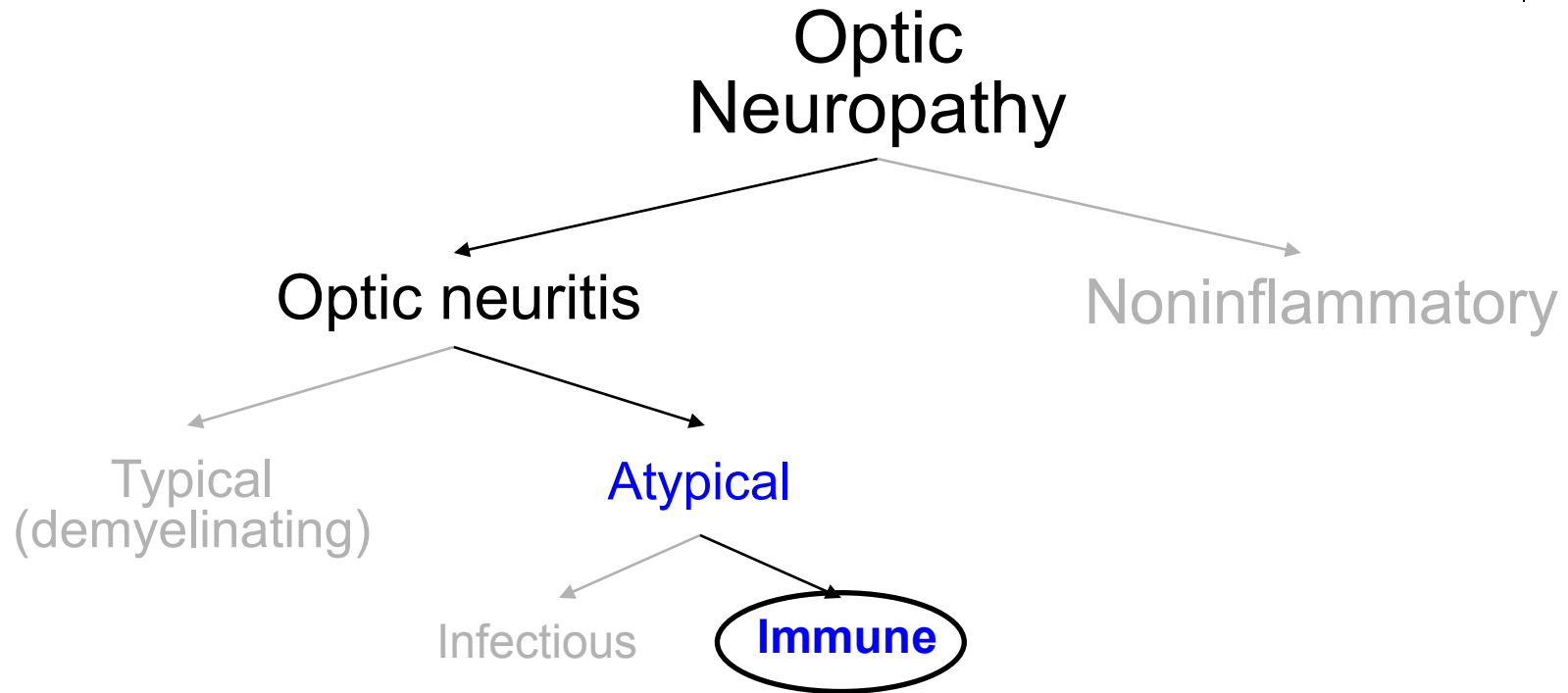
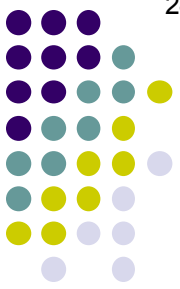


*Name 3 **immune-related** causes of atypical ON:*

- 1) Sarcoid
- 2) SLE or some other vasculitic process
- 3) Granulomatosis with polyangiitis

(There are many others, of course)

Typical Optic Neuritis

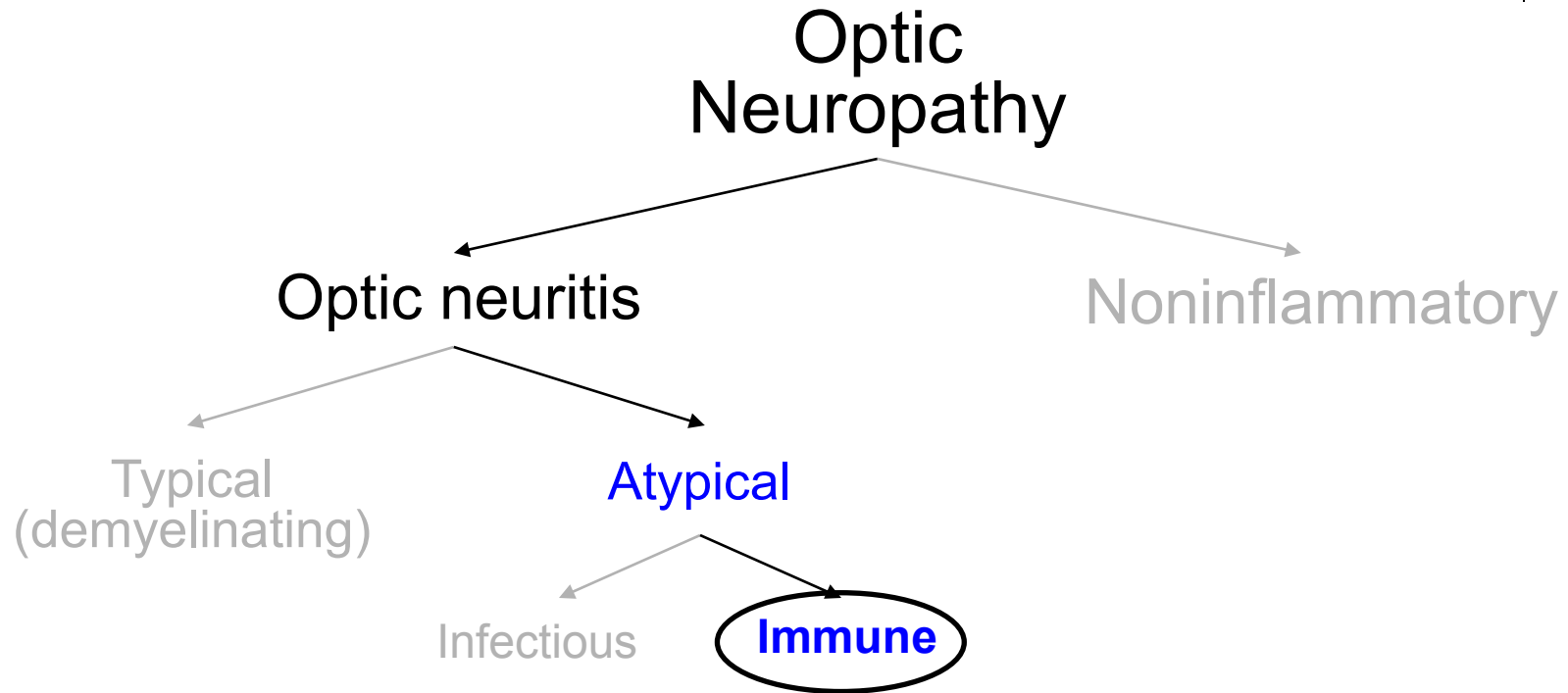
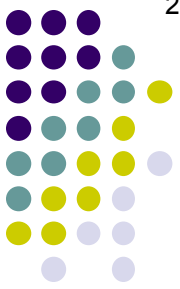


*Name 3 **immune-related** causes of atypical ON:*

- 1) Sarcoid
- 2) SLE or some other vasculitic process
- 3) Granulomatosis with polyangiitis (formerly known as)

(There are many others, of course)

Typical Optic Neuritis

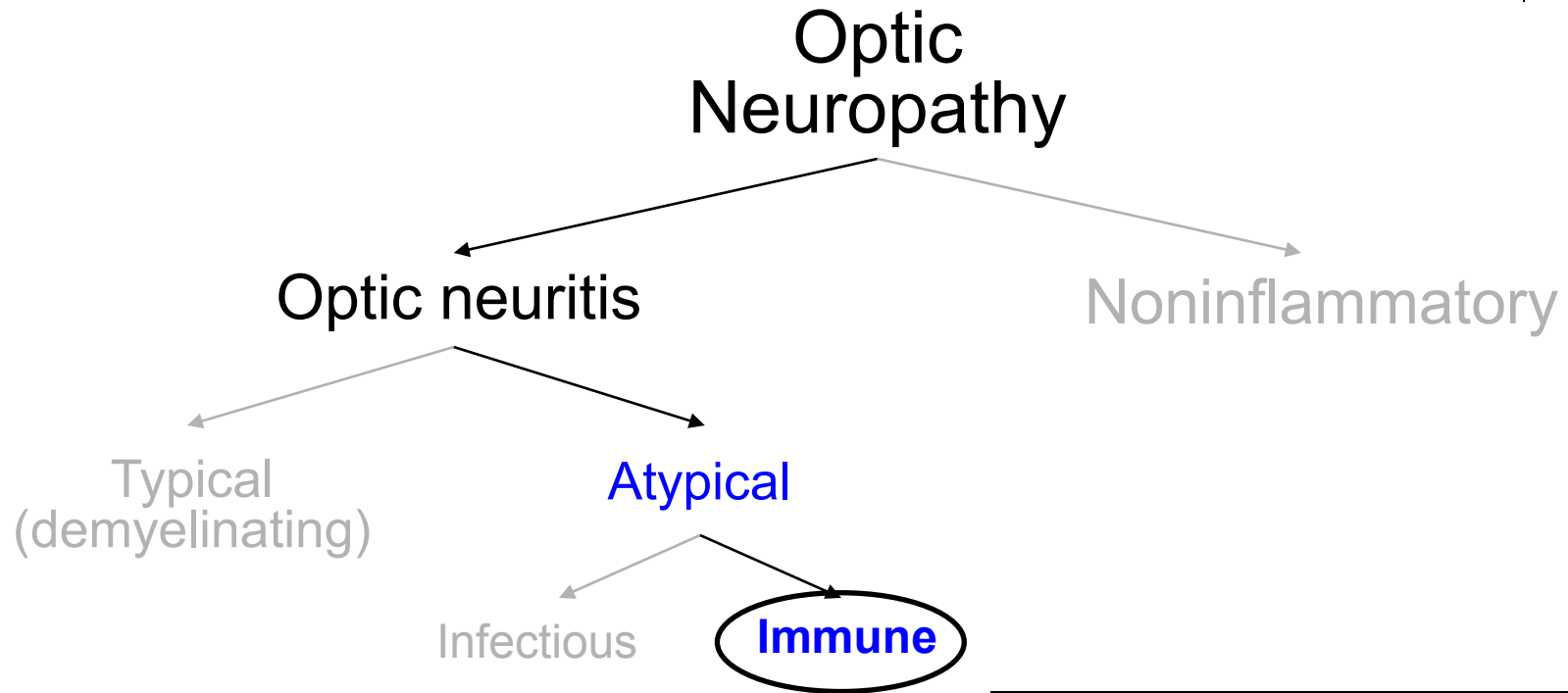


*Name 3 **immune-related** causes of atypical ON:*

- 1) Sarcoid
- 2) SLE or some other vasculitic process
- 3) Granulomatosis with polyangiitis (formerly known as Wegener's)

(There are many others, of course)

Typical Optic Neuritis



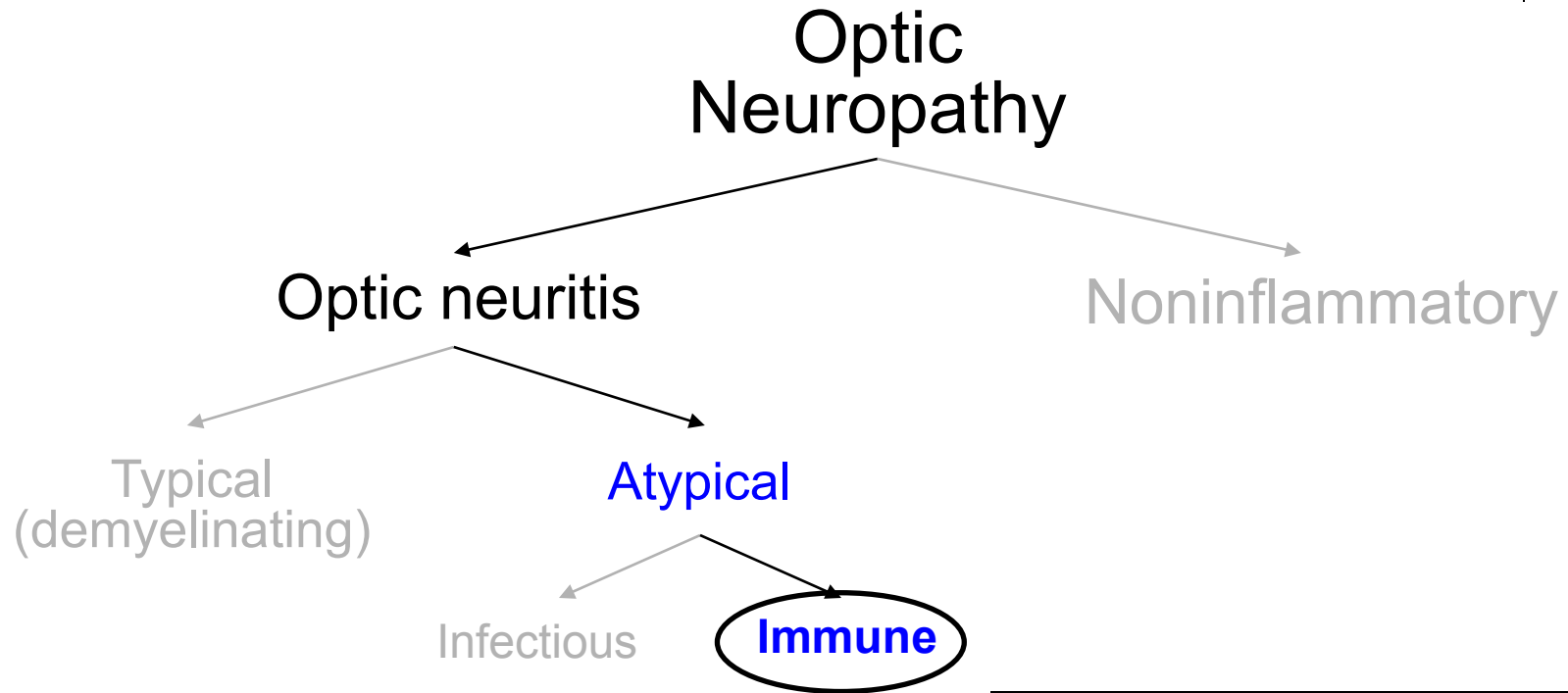
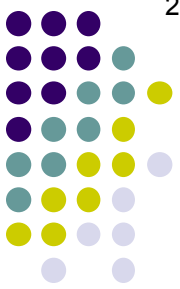
Why don't we call it Wegener's?

Name 3 *immune-related* causes

- 1) Sarcoid
- 2) SLE or some other vasculitic process
- 3) Granulomatosis with polyangiitis (formerly known as Wegener's)

(There are many others, of course)

Typical Optic Neuritis



Name 3 *immune-related* causes

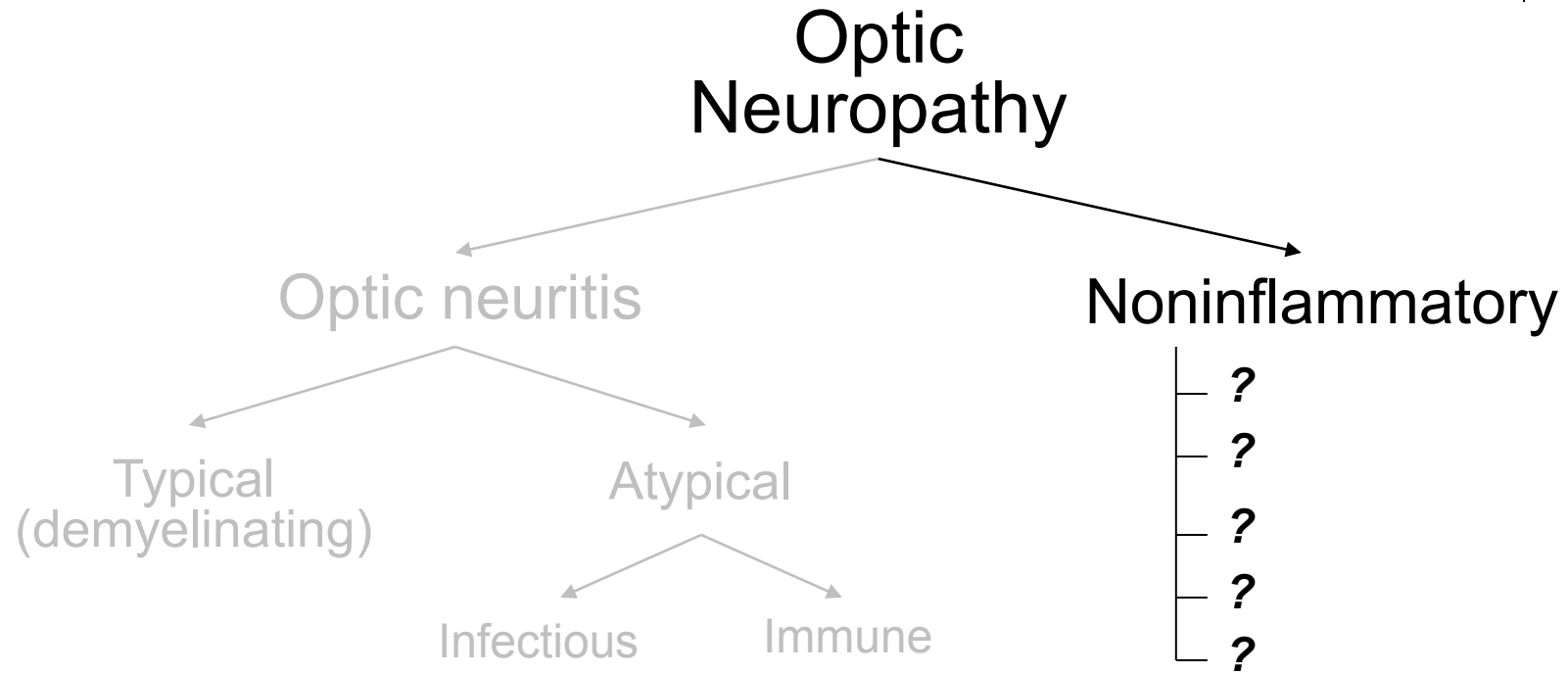
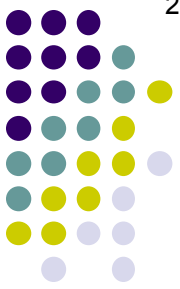
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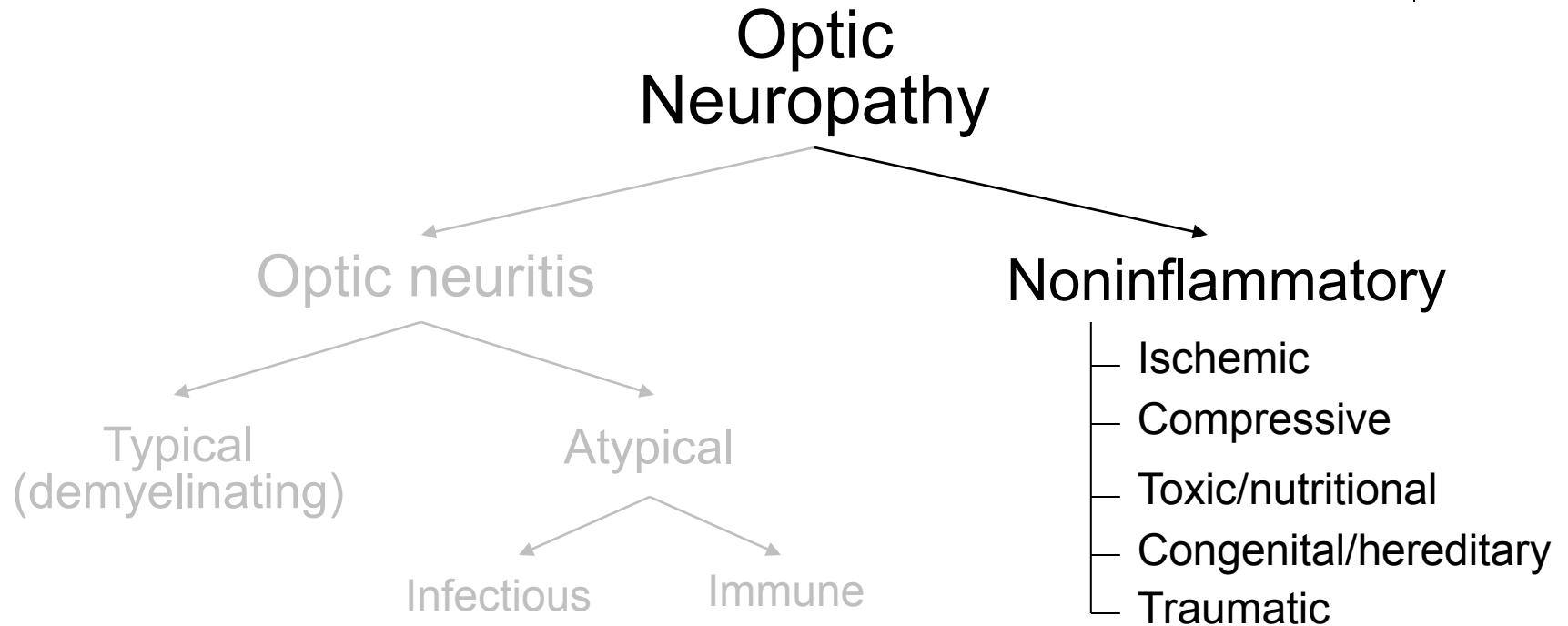
Why don't we call it Wegener's?

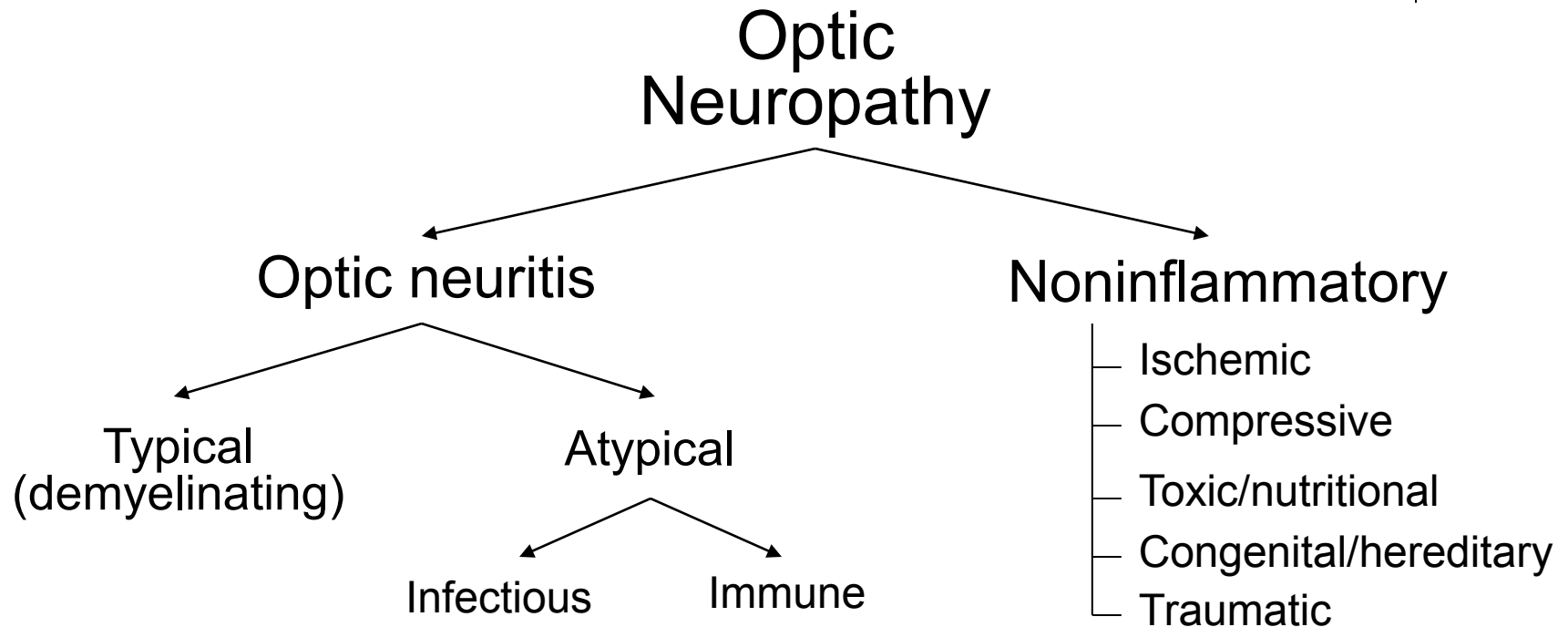
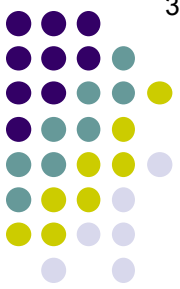
Because Dr Wegener was a Nazi, and is suspected to have committed war crimes

(formerly known as Wegener's)

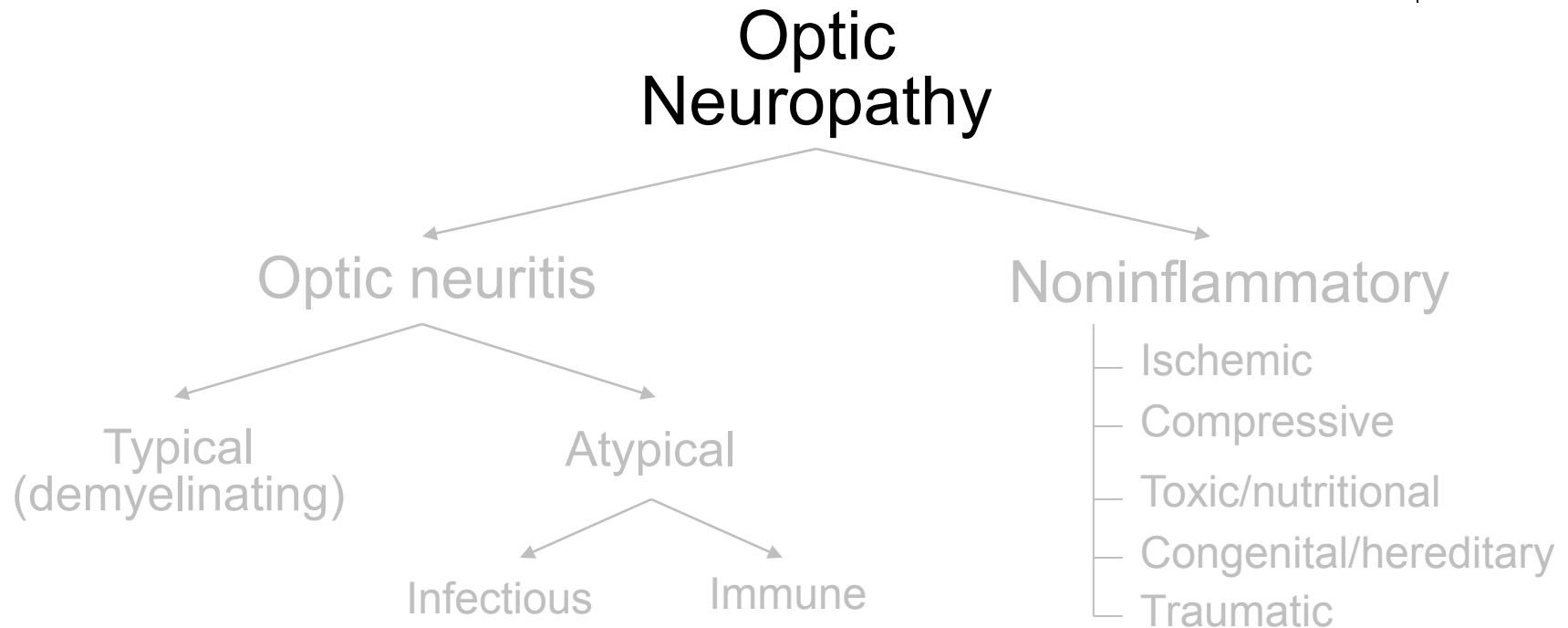
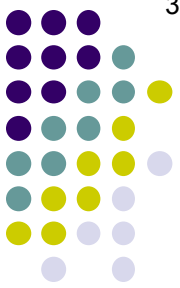
(There are many others, of course)



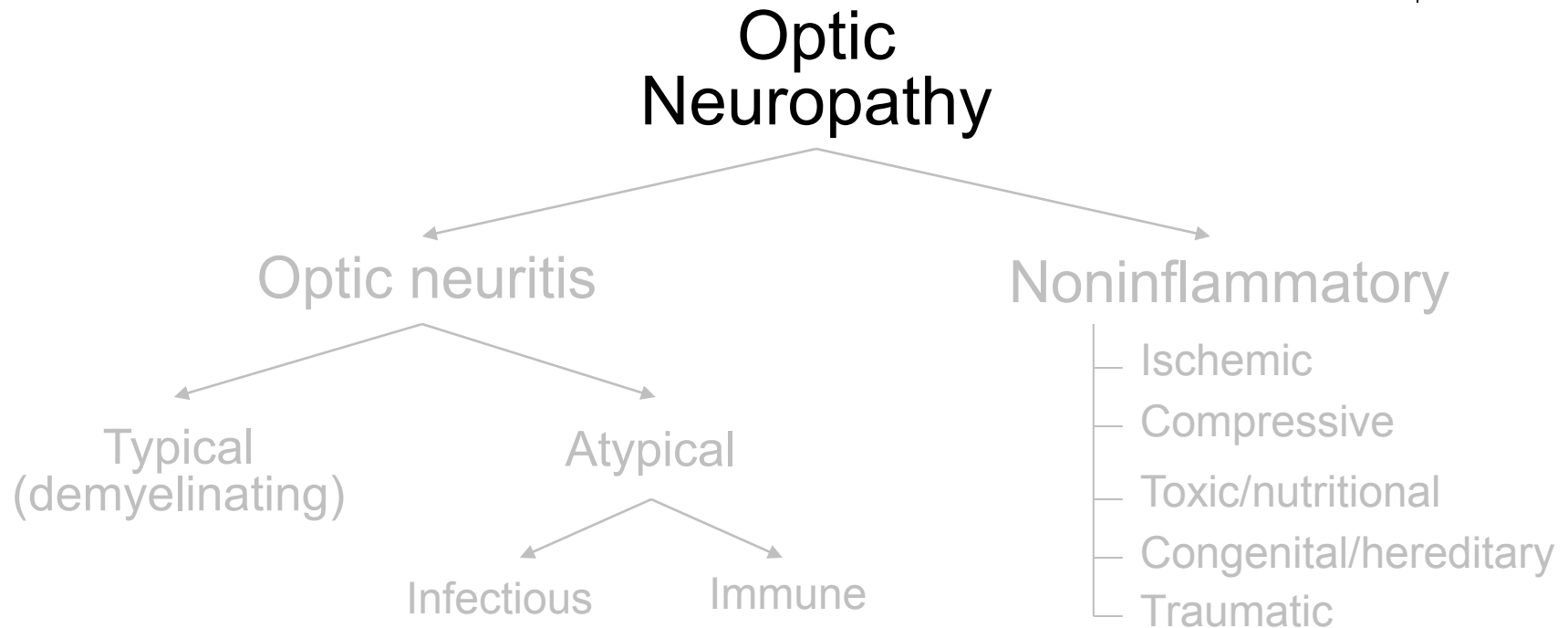
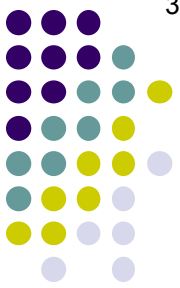




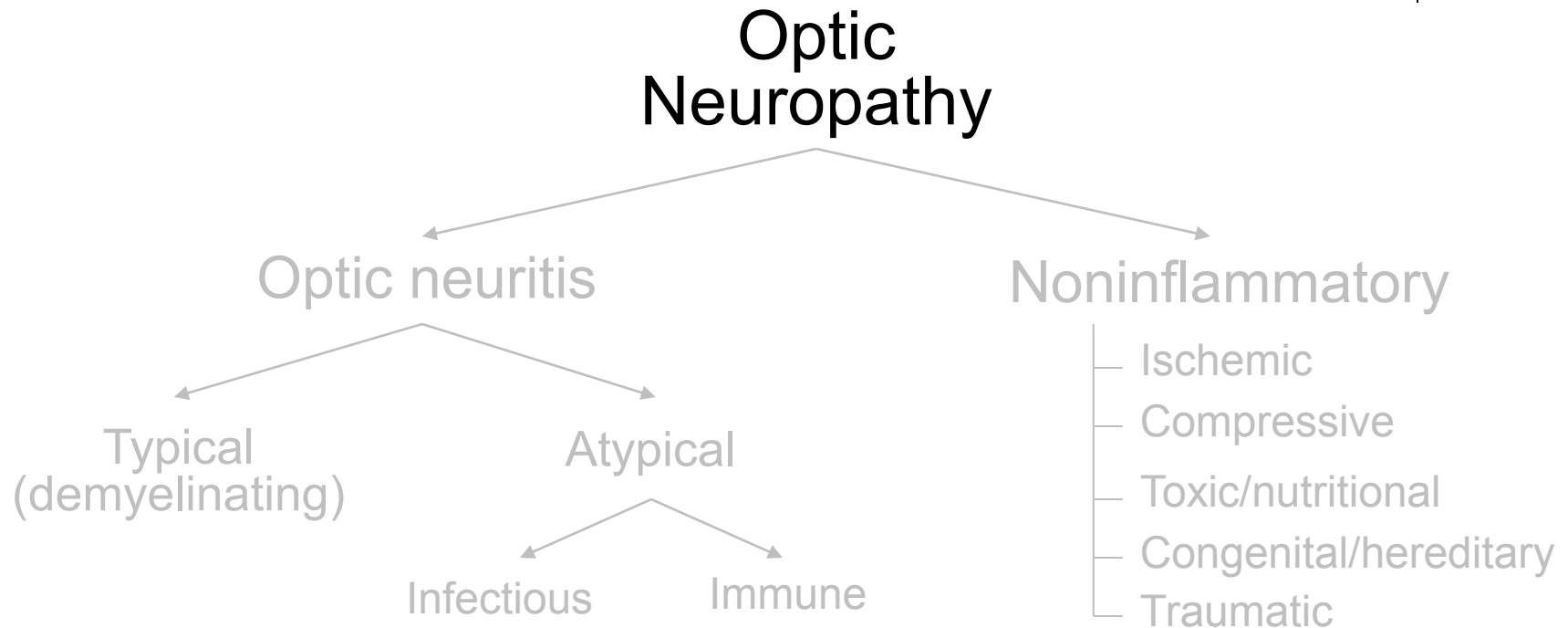
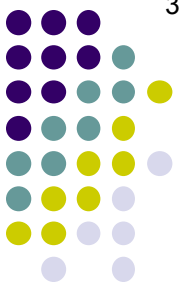
*What is far-and-away the most common type of optic neuropathy?
Hint...*



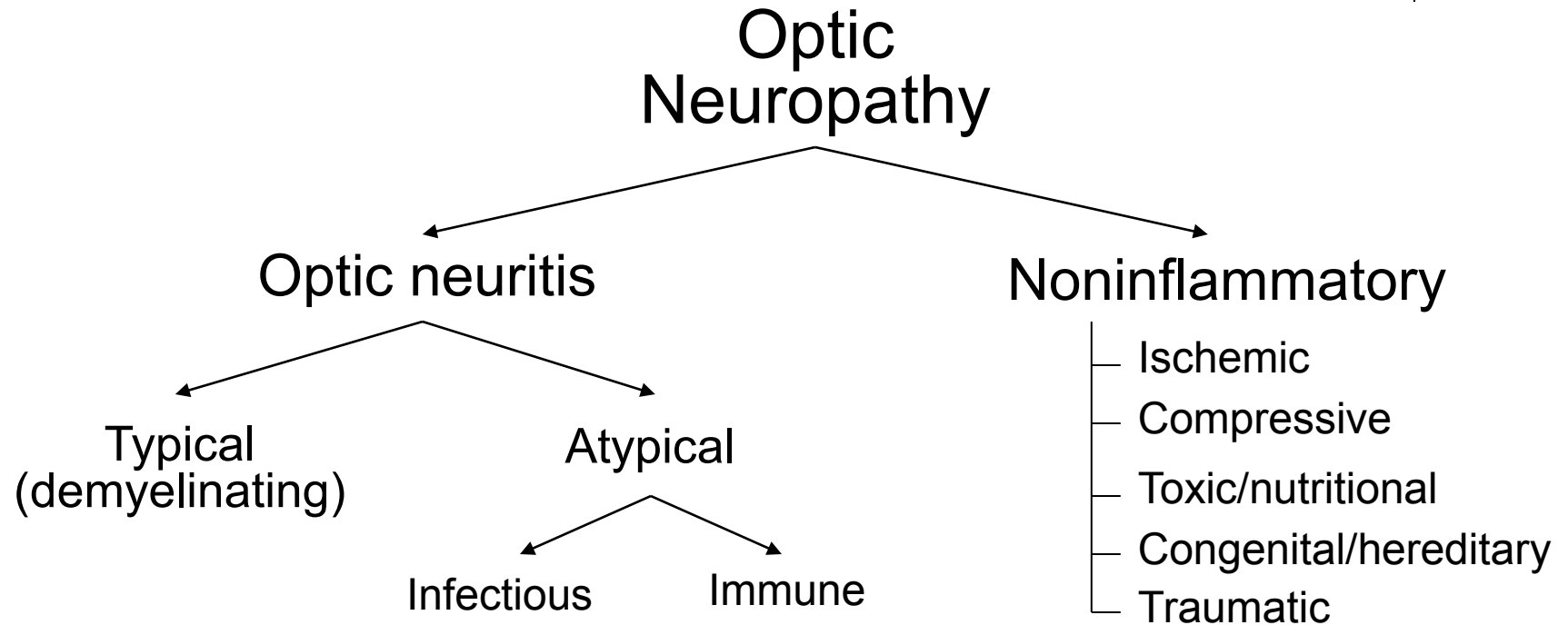
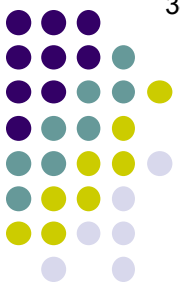
*What is far-and-away the most common type of optic neuropathy?
Hint...It's not listed on this slide!
Hint...*



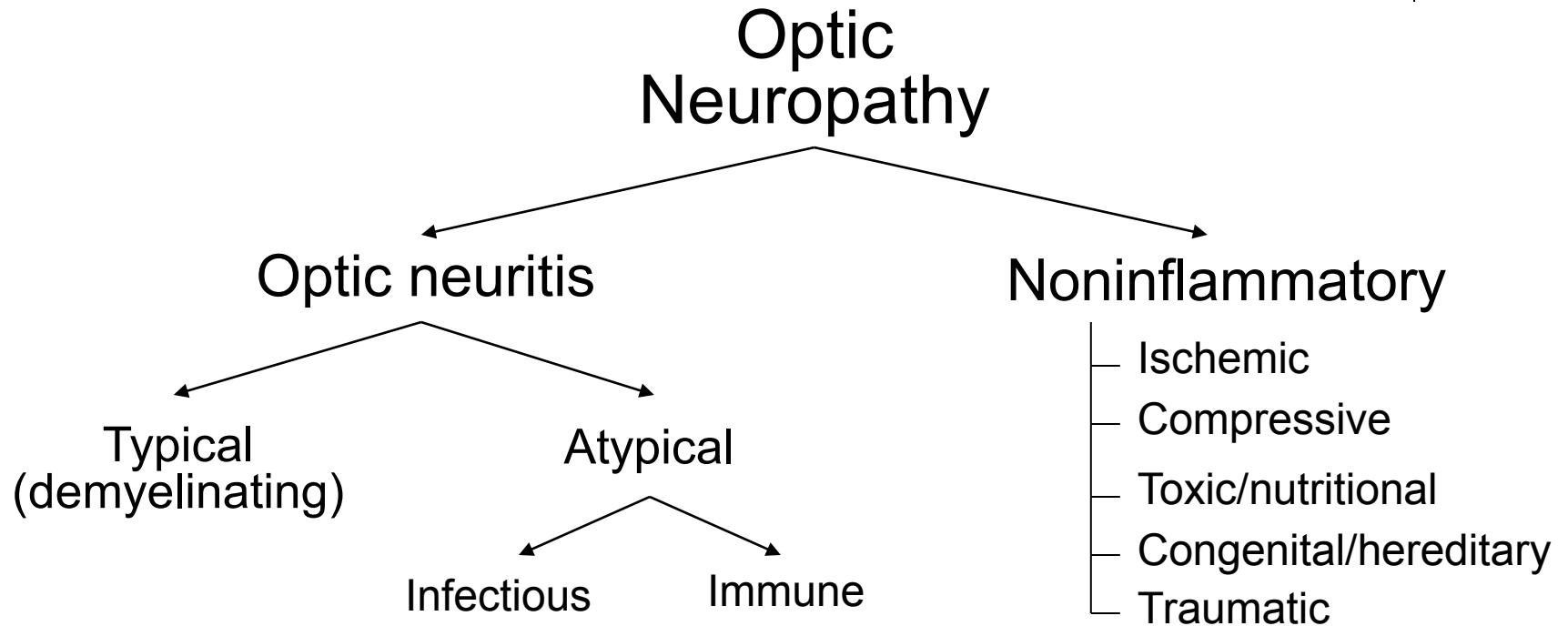
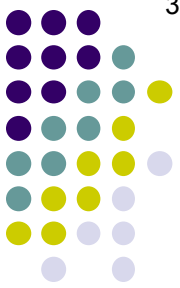
What is far-and-away the most common type of optic neuropathy?
Hint...It's not listed on this slide!
Hint...It's so common, it gets its own ophthalmic subspecialty!
It's...



What is far-and-away the most common type of optic neuropathy?
Hint...It's not listed on this slide!
Hint...It's so common, it gets its own ophthalmic subspecialty!
*It's...**Glaucoma** (don't forget—glaucoma is an optic neuropathy!)*

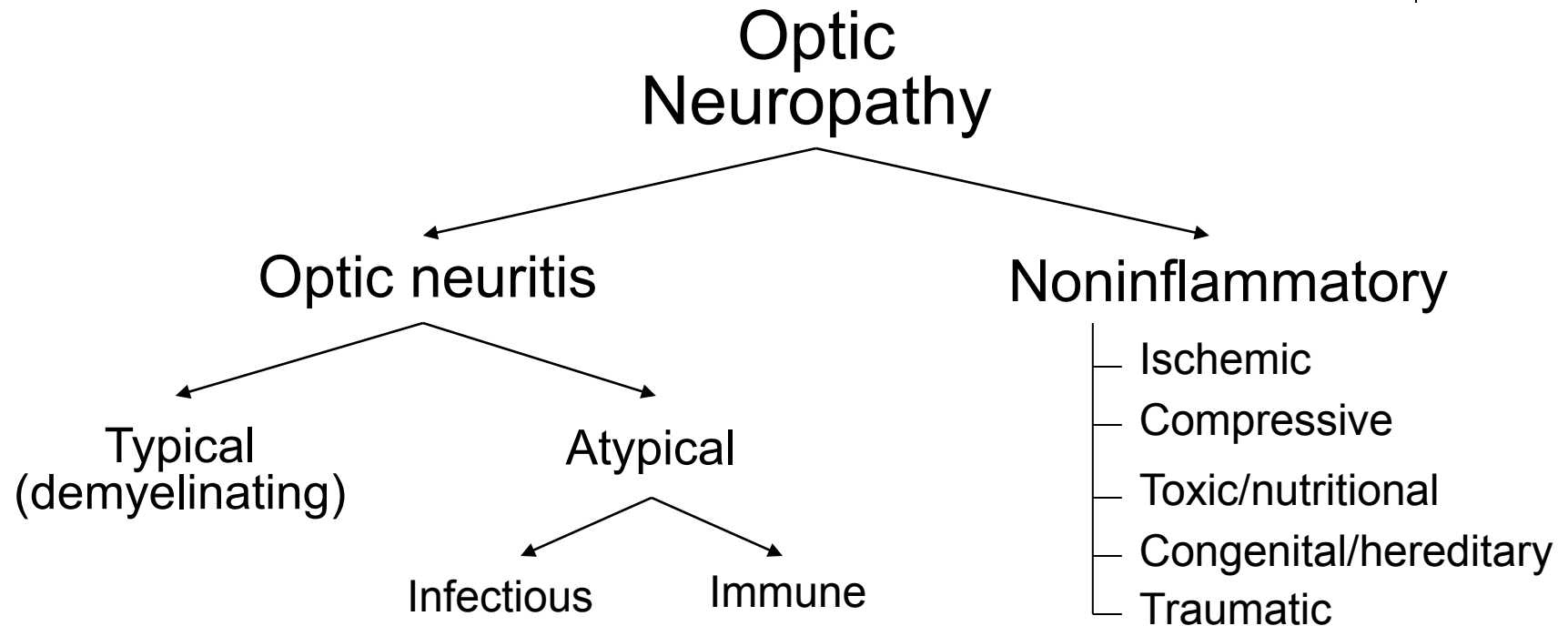
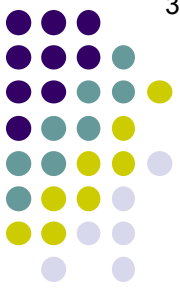


What exam finding is the sine qua non of unilateral or asymmetric bilateral optic neuropathy?



What exam finding is the sine qua non of unilateral or asymmetric bilateral optic neuropathy?
A relative afferent pupillary defect (RAPD)

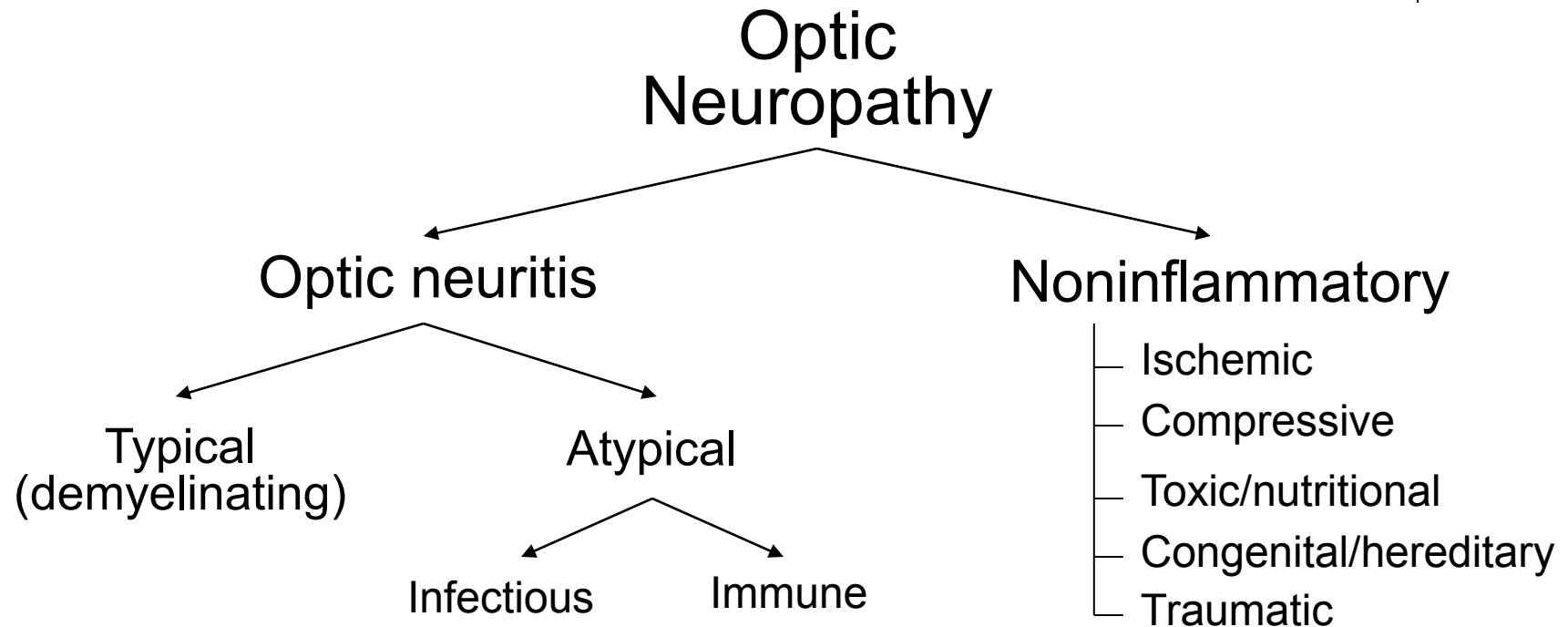
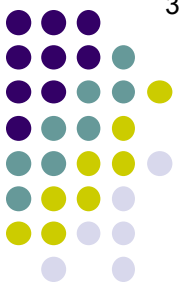
Typical Optic Neuritis



What exam finding is the sine qua non of unilateral or asymmetric bilateral optic neuropathy?

A relative afferent pupillary defect (RAPD)

What should you do if a presumptive unilateral/asymmetric bilateral ON pt doesn't have an RAPD?

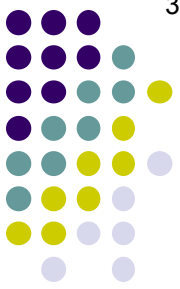


What exam finding is the sine qua non of unilateral or asymmetric bilateral optic neuropathy?

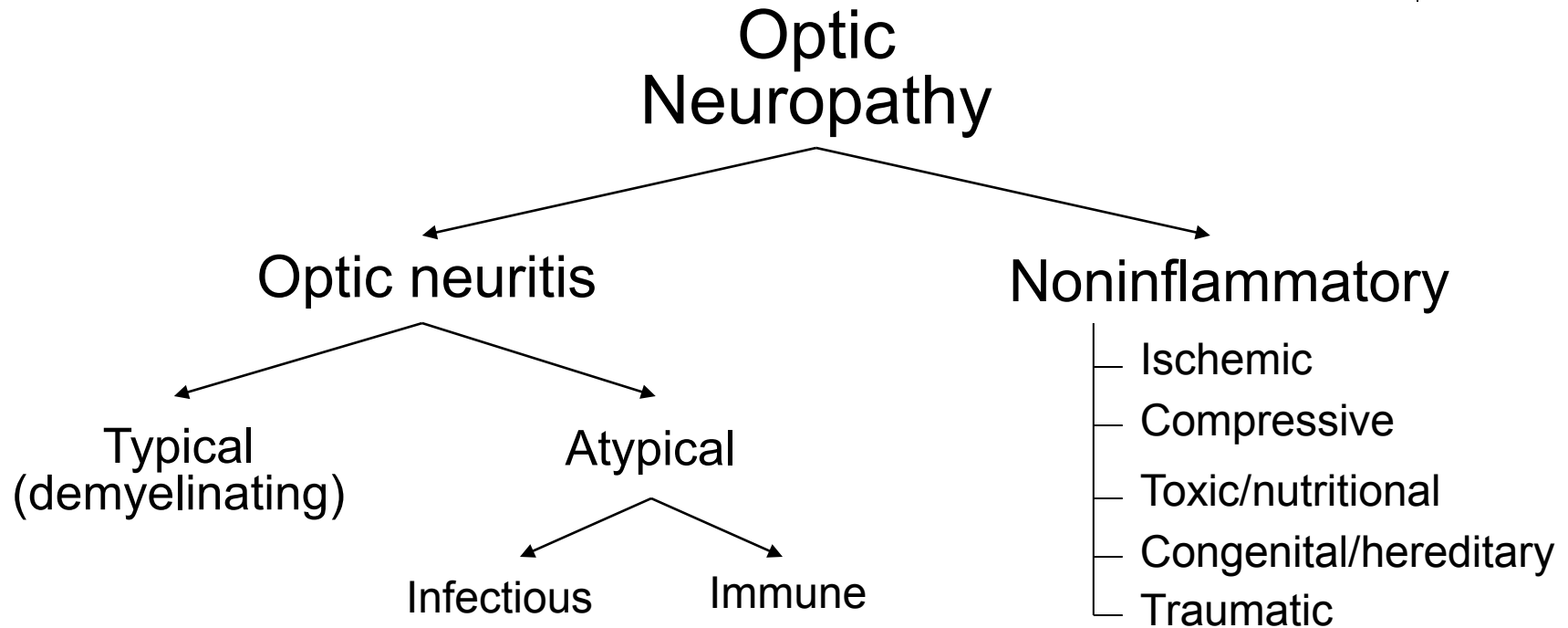
A relative afferent pupillary defect (RAPD)

What should you do if a presumptive unilateral/asymmetric bilateral ON pt doesn't have an RAPD?

You should question the diagnosis



Typical Optic Neuritis

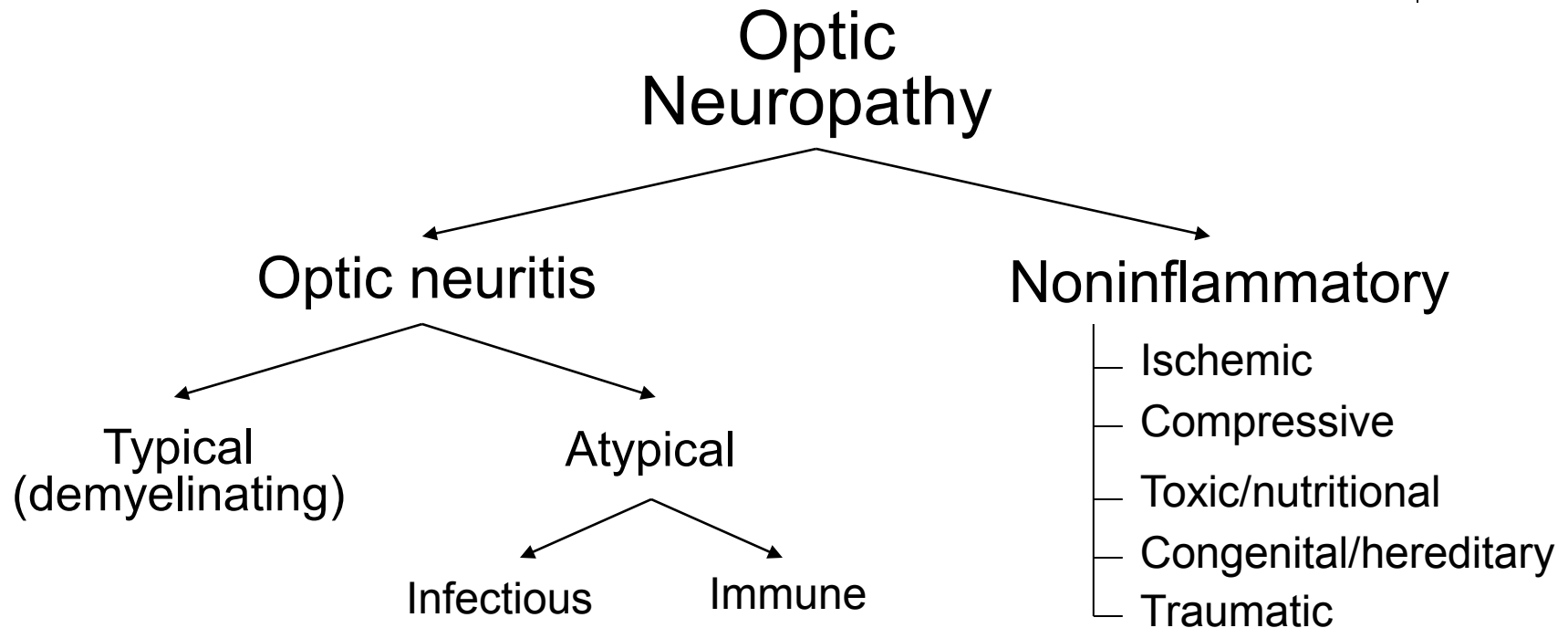
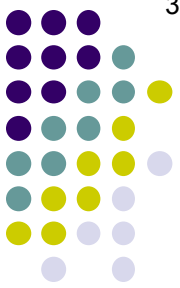


What functional abnormalities are likely to be found in a pt with an optic neuropathy?

--Decreased two words

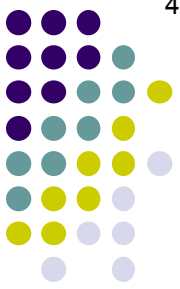
--Abnormal two diff words

--Impaired two diff diff words



What functional abnormalities are likely to be found in a pt with an optic neuropathy?

- Decreased central acuity
- Abnormal visual fields
- Impaired color vision



Typical Optic Neuritis

Optic Neuropathy

○ *What is the typical pattern of vision loss in typical optic neuritis?*

Typical

(demyelination)

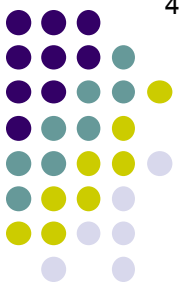
itory

What functional abnormalities are likely to be found in a pt with an optic neuropathy?

--Decreased central acuity

--Abnormal visual fields

--Impaired color vision



Typical Optic Neuritis

Optic Neuropathy

○ What is the typical pattern of vision loss in typical optic neuritis?

uni- vs bilateral

vision loss which develops and nadirs over

amount of time

Typical

(demyelination)

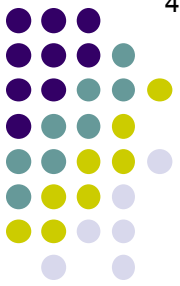
itory

What functional abnormalities are likely to be found in a pt with an optic neuropathy?

-- **Decreased central acuity**

--Abnormal visual fields

--Impaired color vision



Typical Optic Neuritis

Optic Neuropathy

○ What is the typical pattern of vision loss in typical optic neuritis?
Unilateral vision loss which develops and nadirs over a few days

Typical

(demyelination)

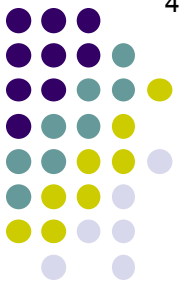
itory

What functional abnormalities are likely to be found in a pt with an optic neuropathy?

--**Decreased central acuity**

--Abnormal visual fields

--Impaired color vision



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 with spontaneous recovery beginning a day?
week?
month? or two later

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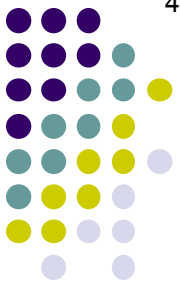
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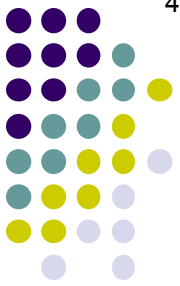
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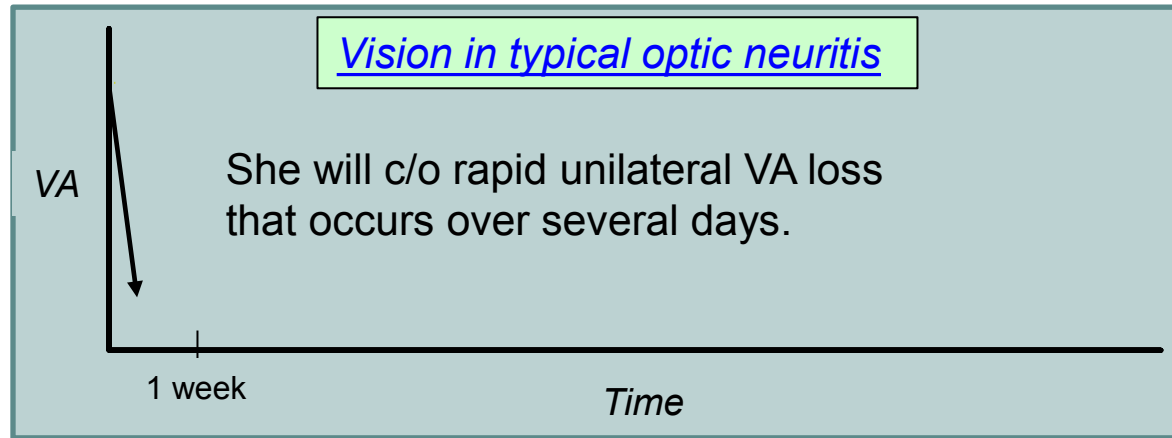
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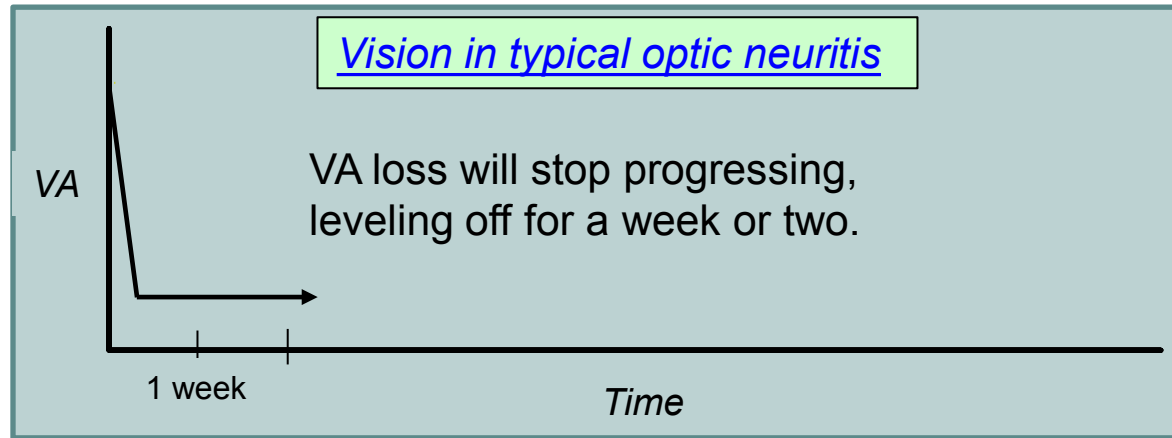
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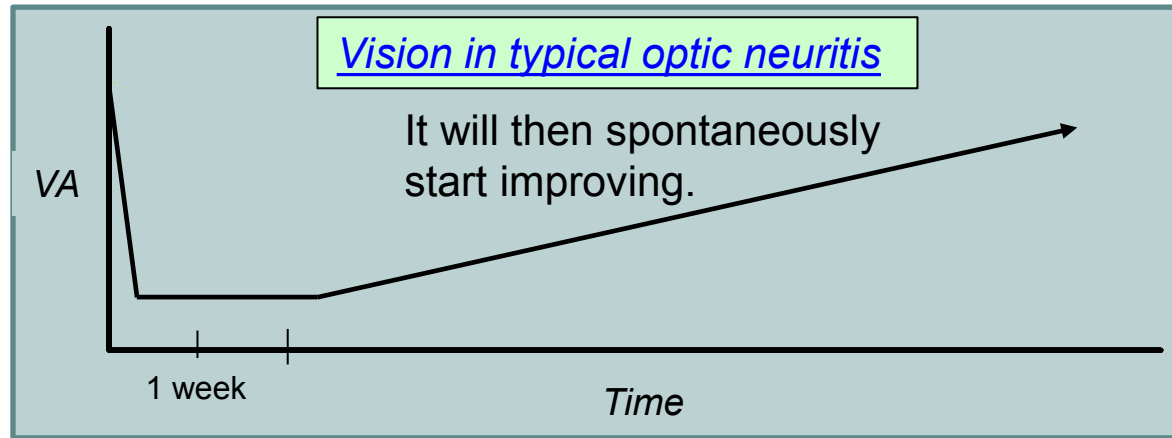
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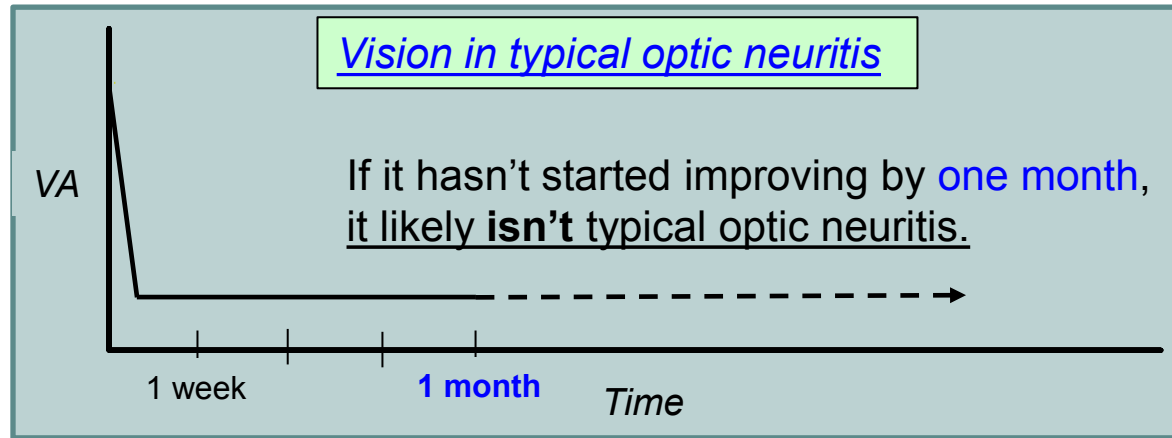
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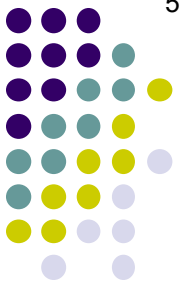
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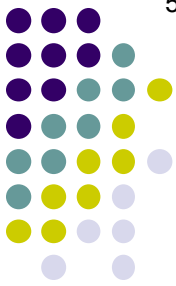
How profound is the vision loss?

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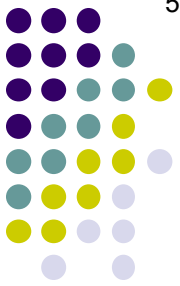
VA can be anywhere from 20/20 to NLP; however, most cases are in the Snellen to Snellen range

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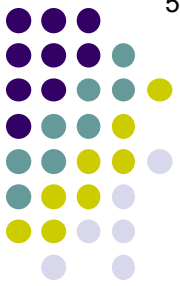
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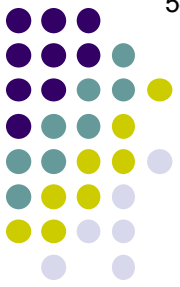
What is the long-term VA prognosis?

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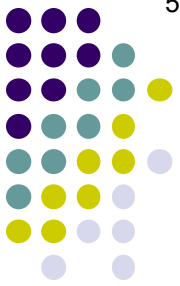
Very good—about % will be 20/40 or better at one year

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Very good—about 90% will be 20/40 or better at one year

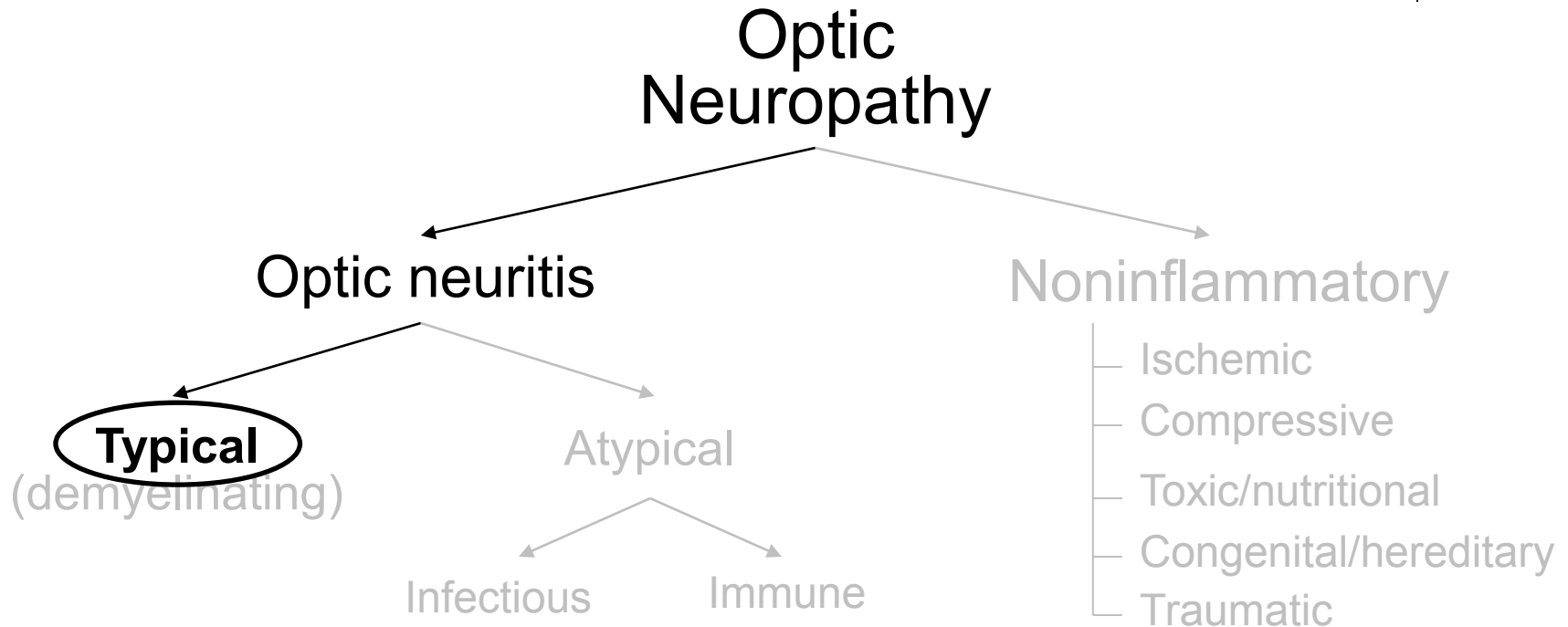
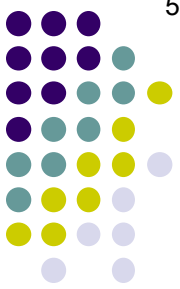
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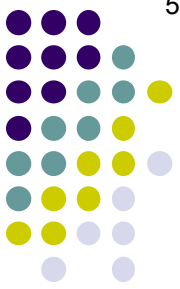
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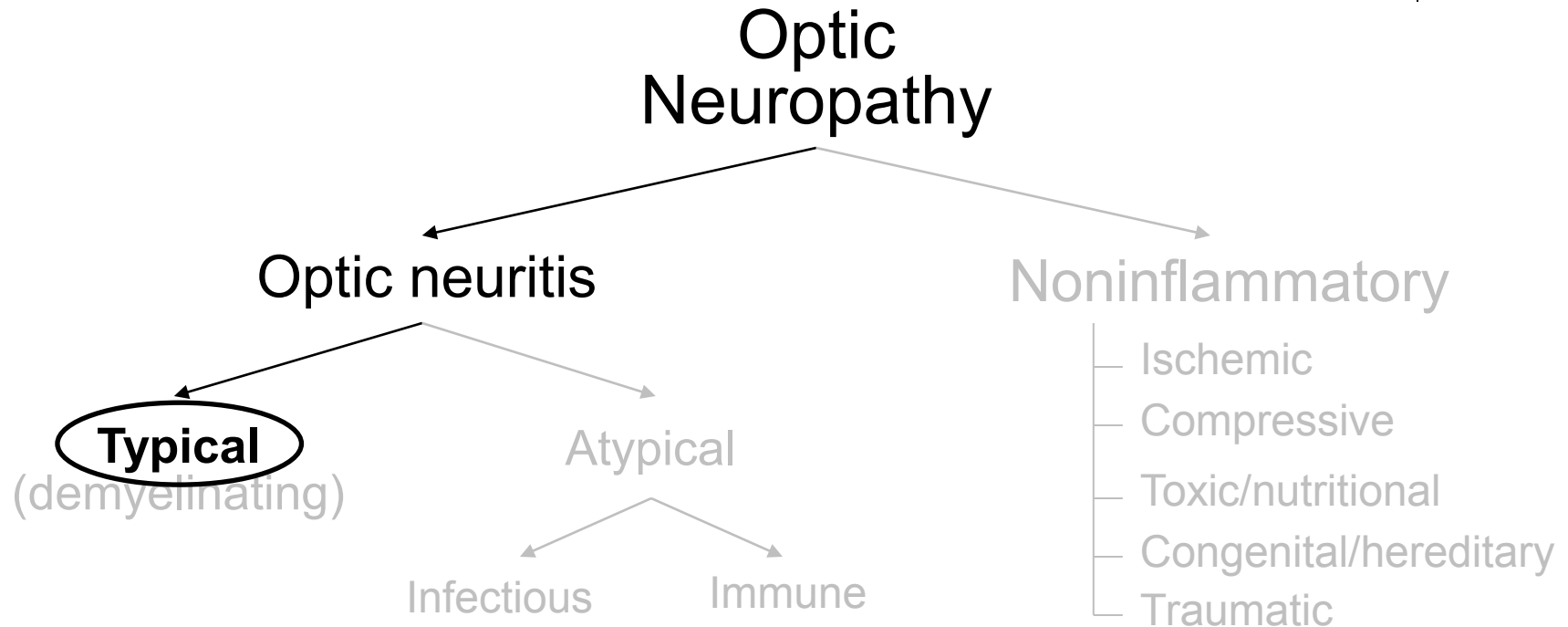
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What pattern(s) of VF loss occur in typical optic neuritis?



Typical Optic Neuritis



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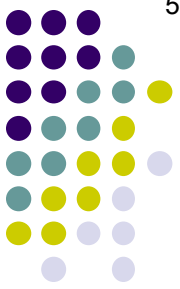
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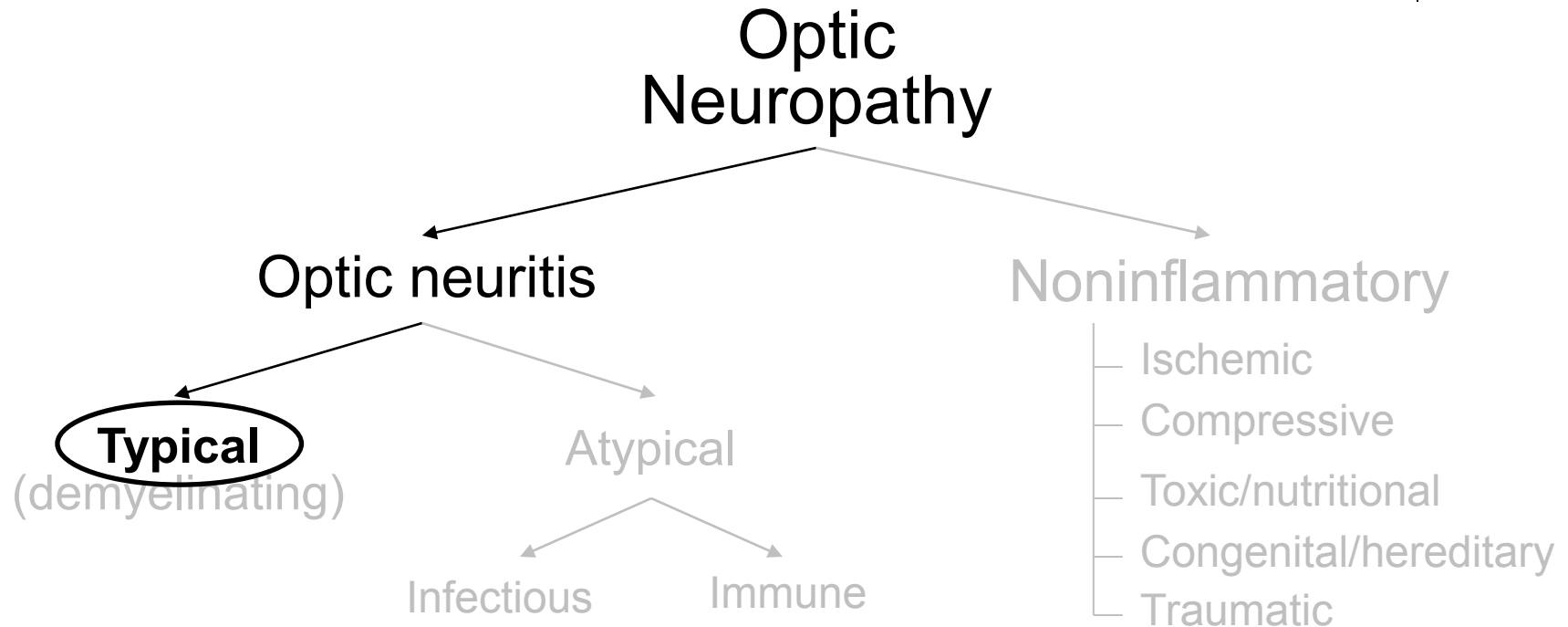
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It can be anything, but is most commonly a

two words



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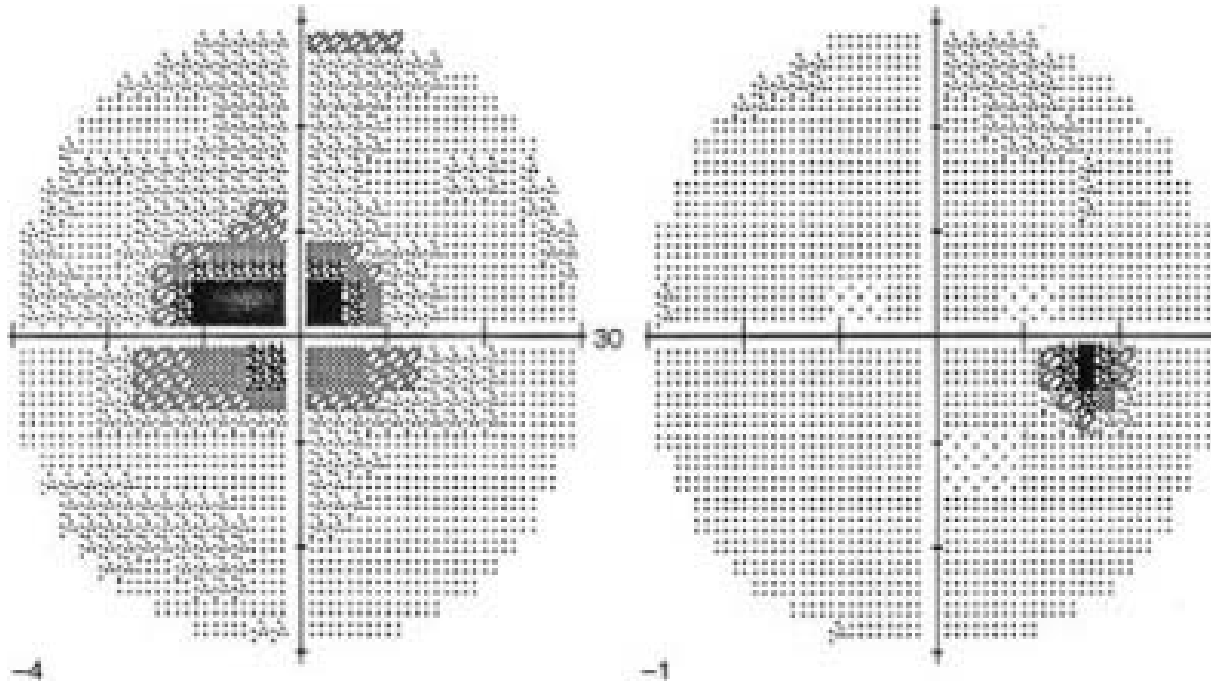
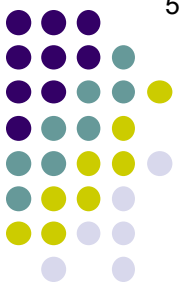
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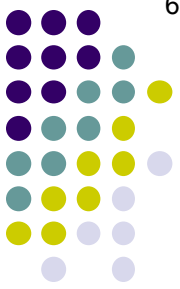
What pattern(s) of VF loss occur in typical optic neuritis?

It can be anything, but is most commonly a central scotoma

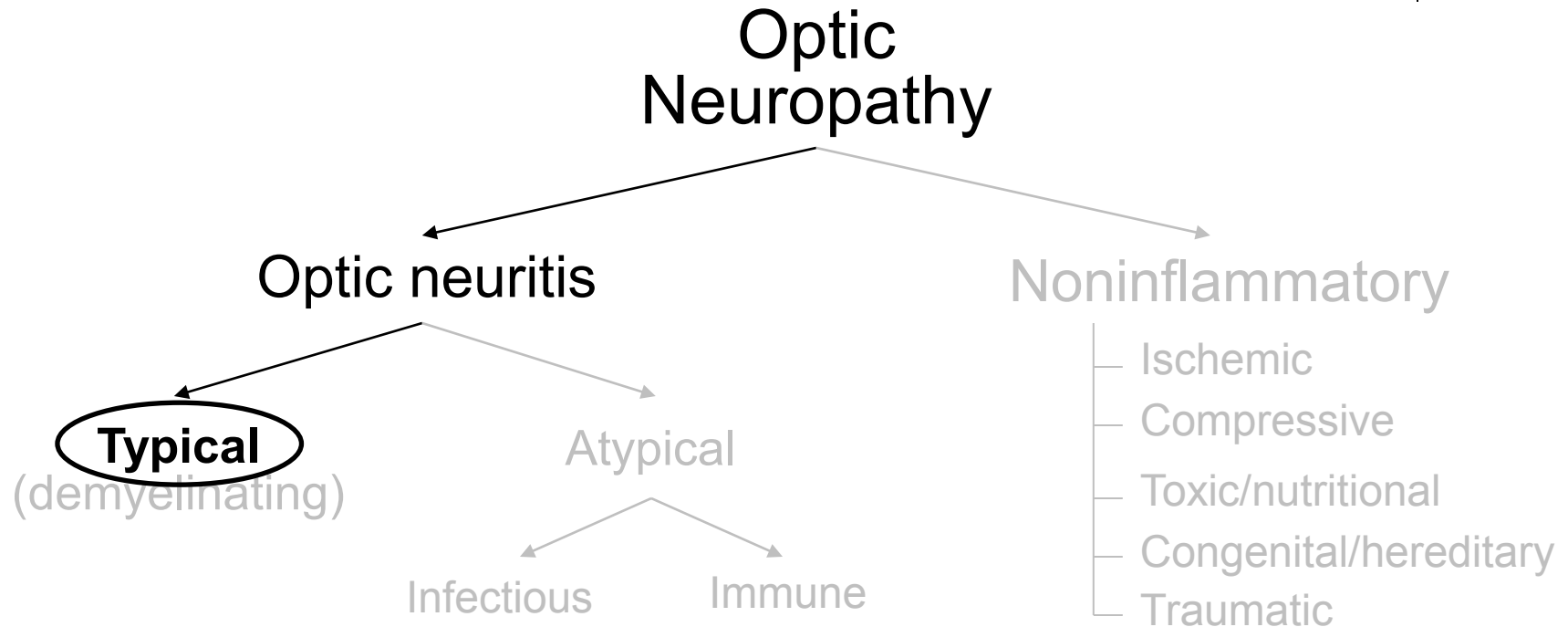
Typical Optic Neuritis



Central scotoma in typical optic neuritis



Typical Optic Neuritis



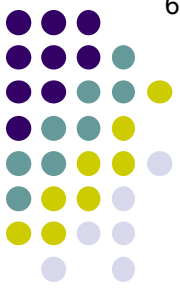
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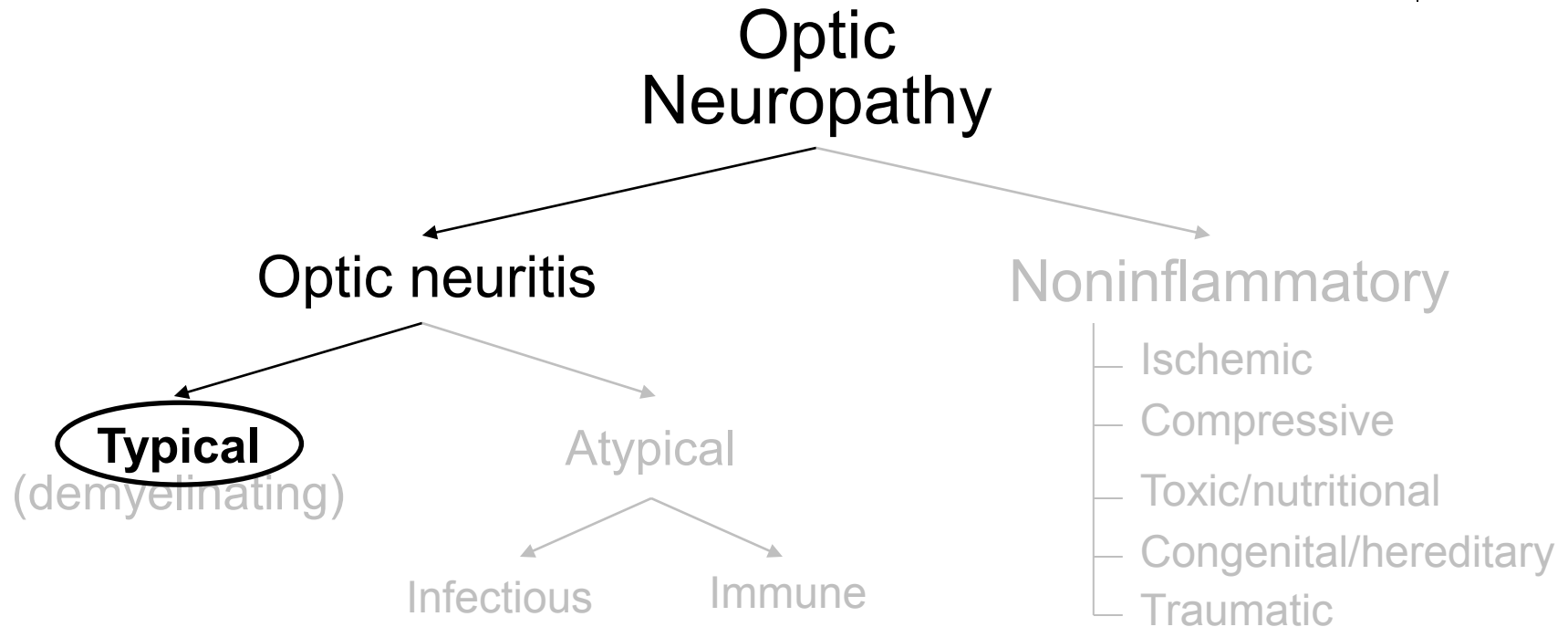
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*Dyschromatopsia in typical optic neuritis: Is it **red-green**, or **blue-yellow**?*



Typical Optic Neuritis



What functional abnormal

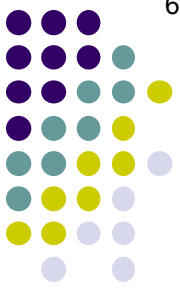
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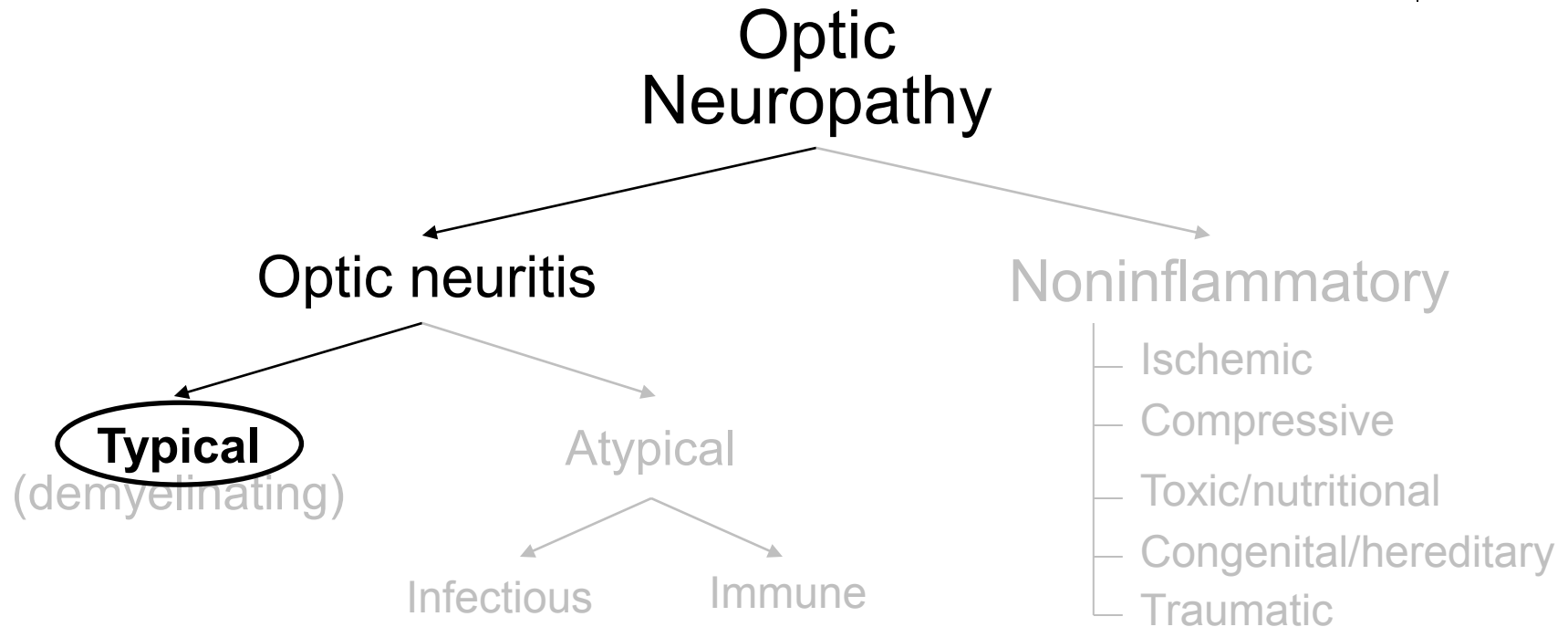
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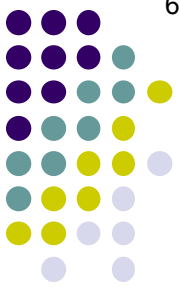
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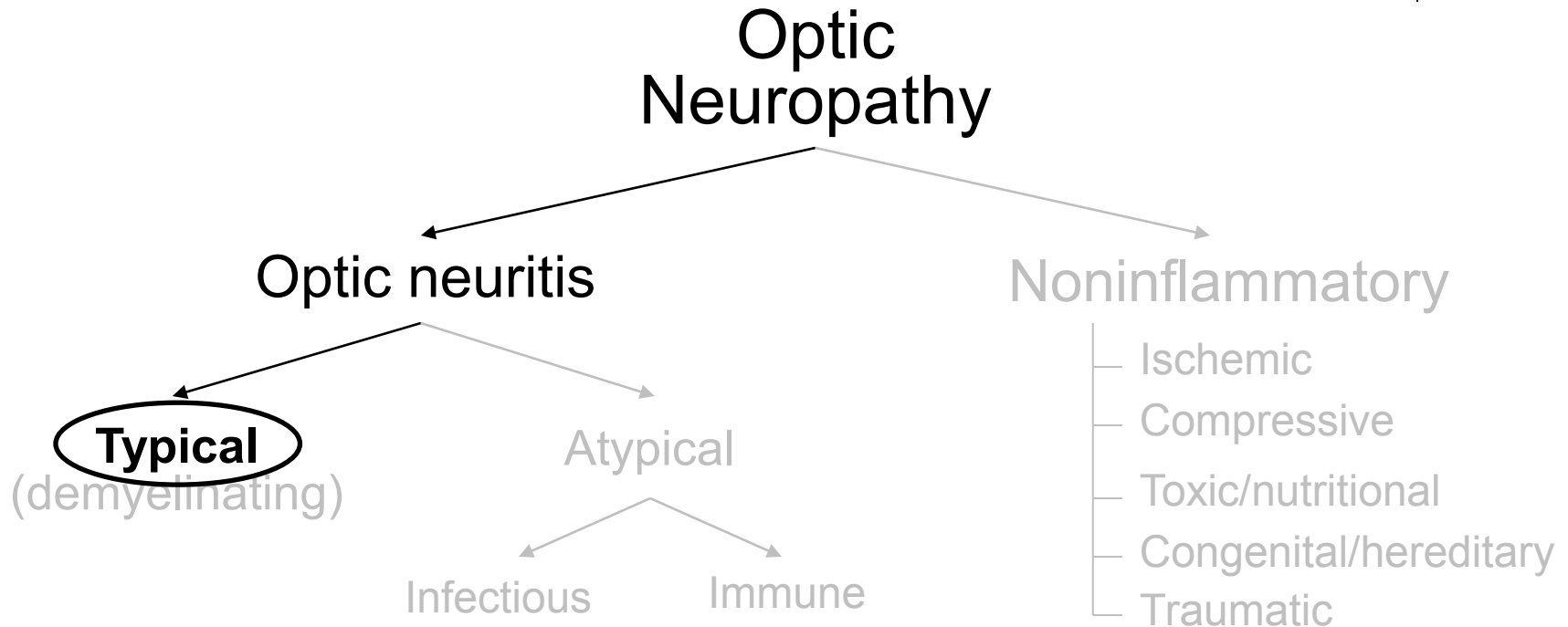
*Dyschromatopsia in typical optic neuritis: Is it **red-green**, or **blue-yellow**?*

Red-green

How common is it?



Typical Optic Neuritis



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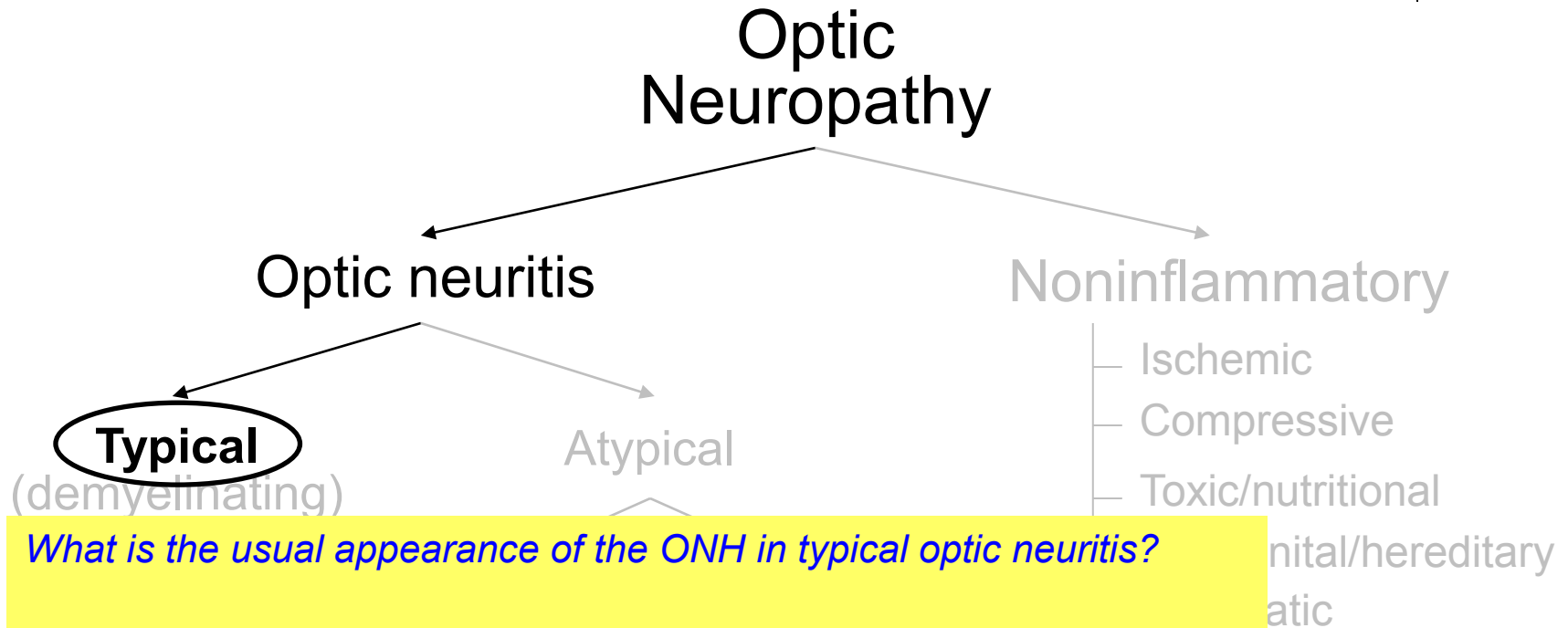
Red-green

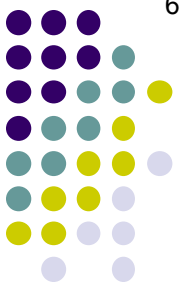
How common is it?

Per the *Neuro* book, it is “nearly universal”

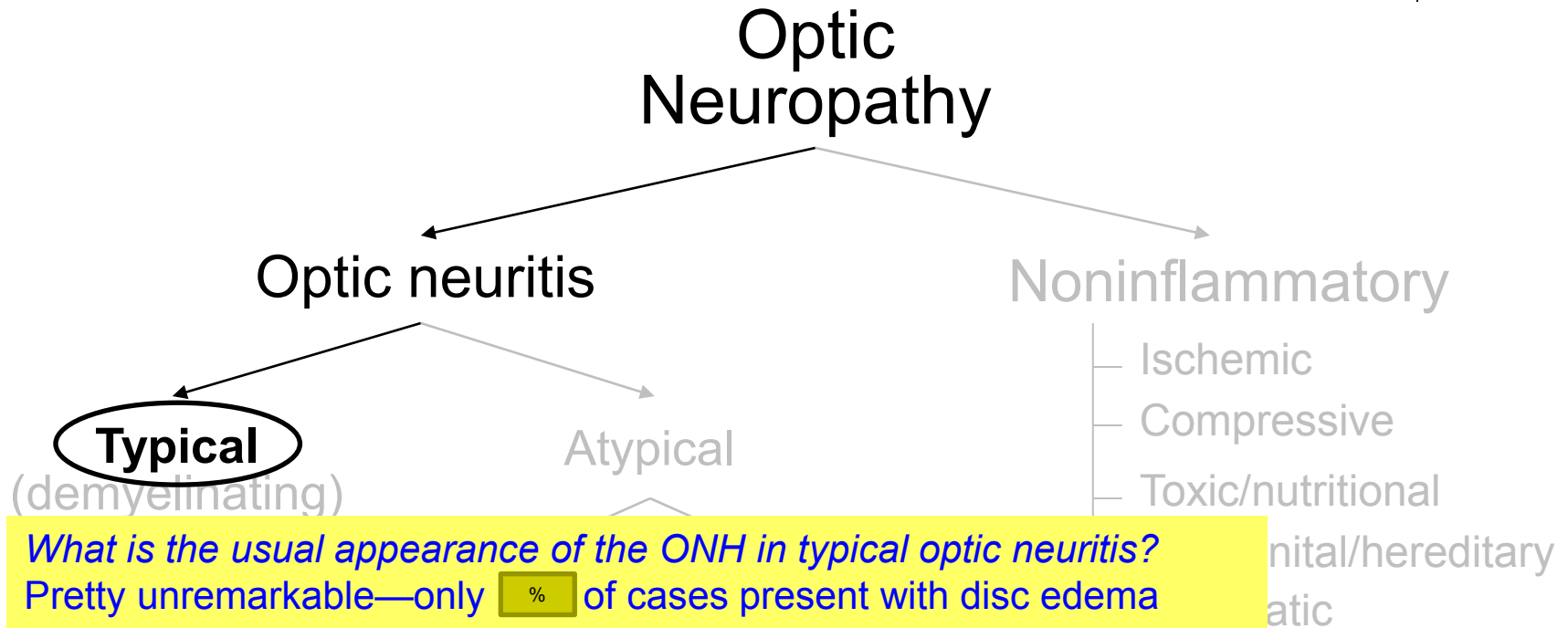


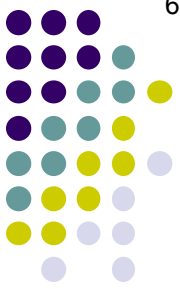
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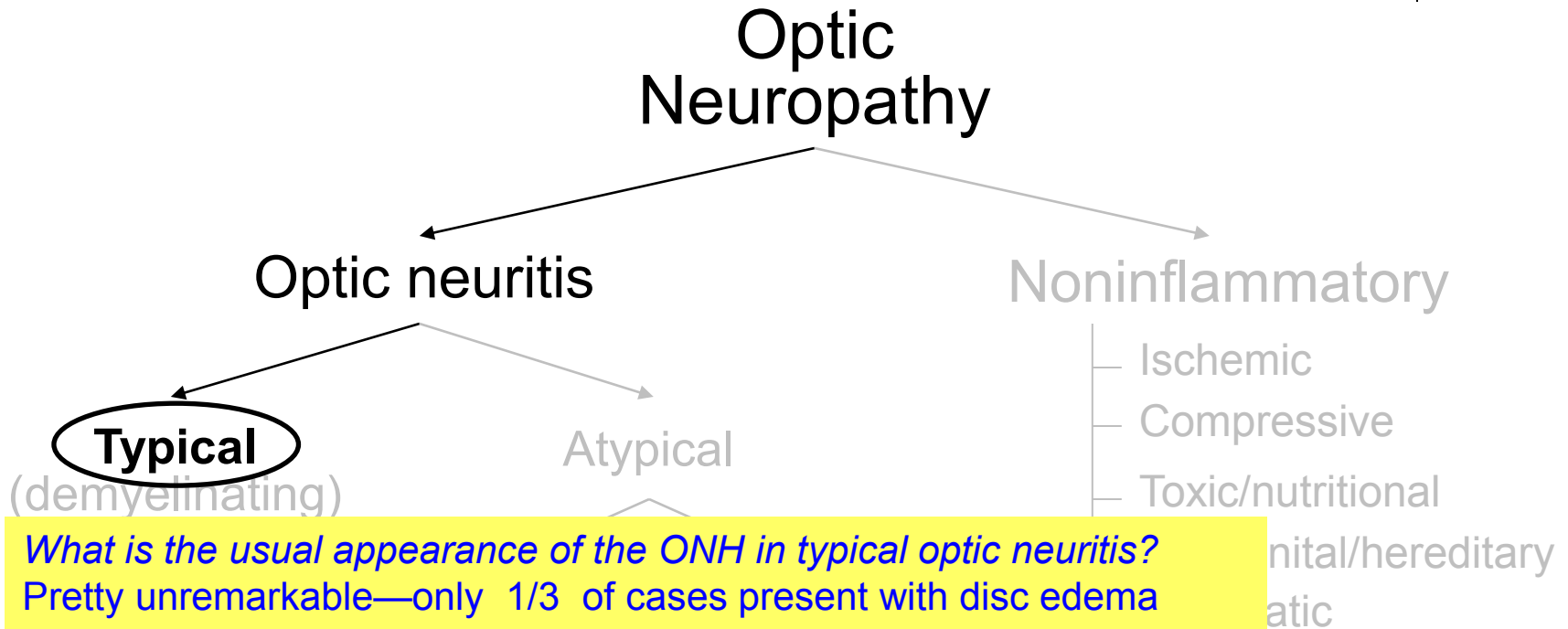


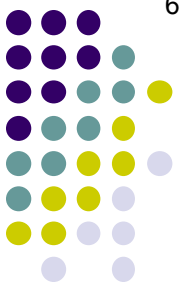
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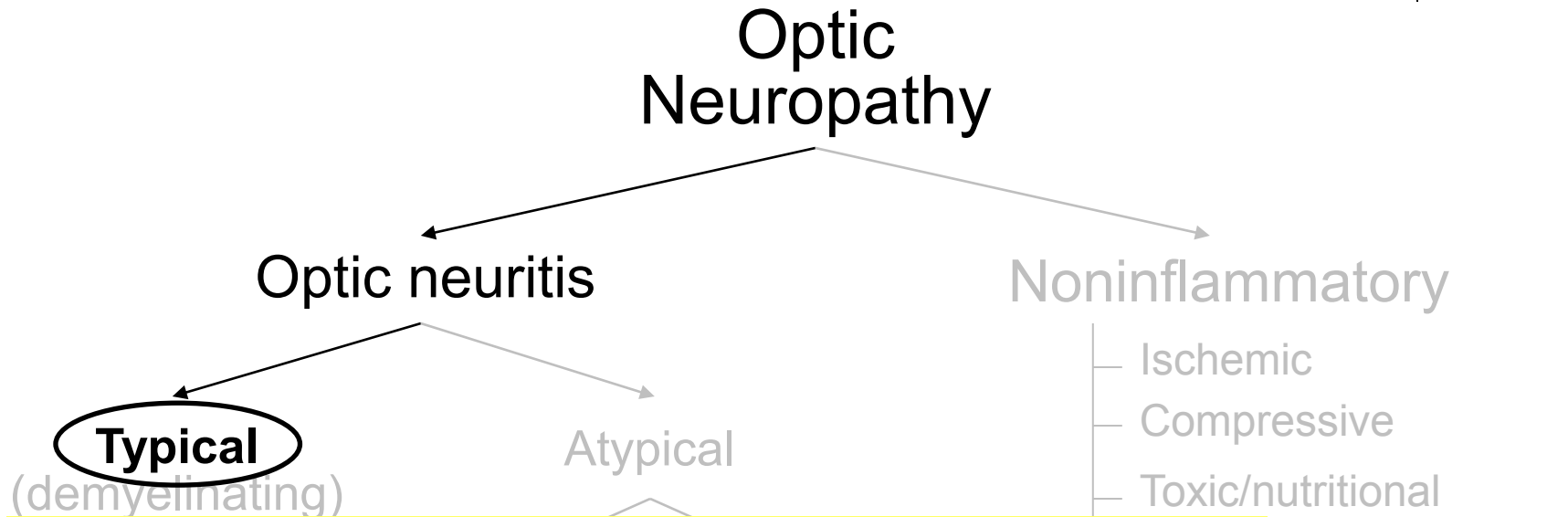


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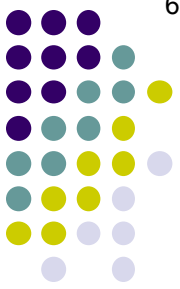


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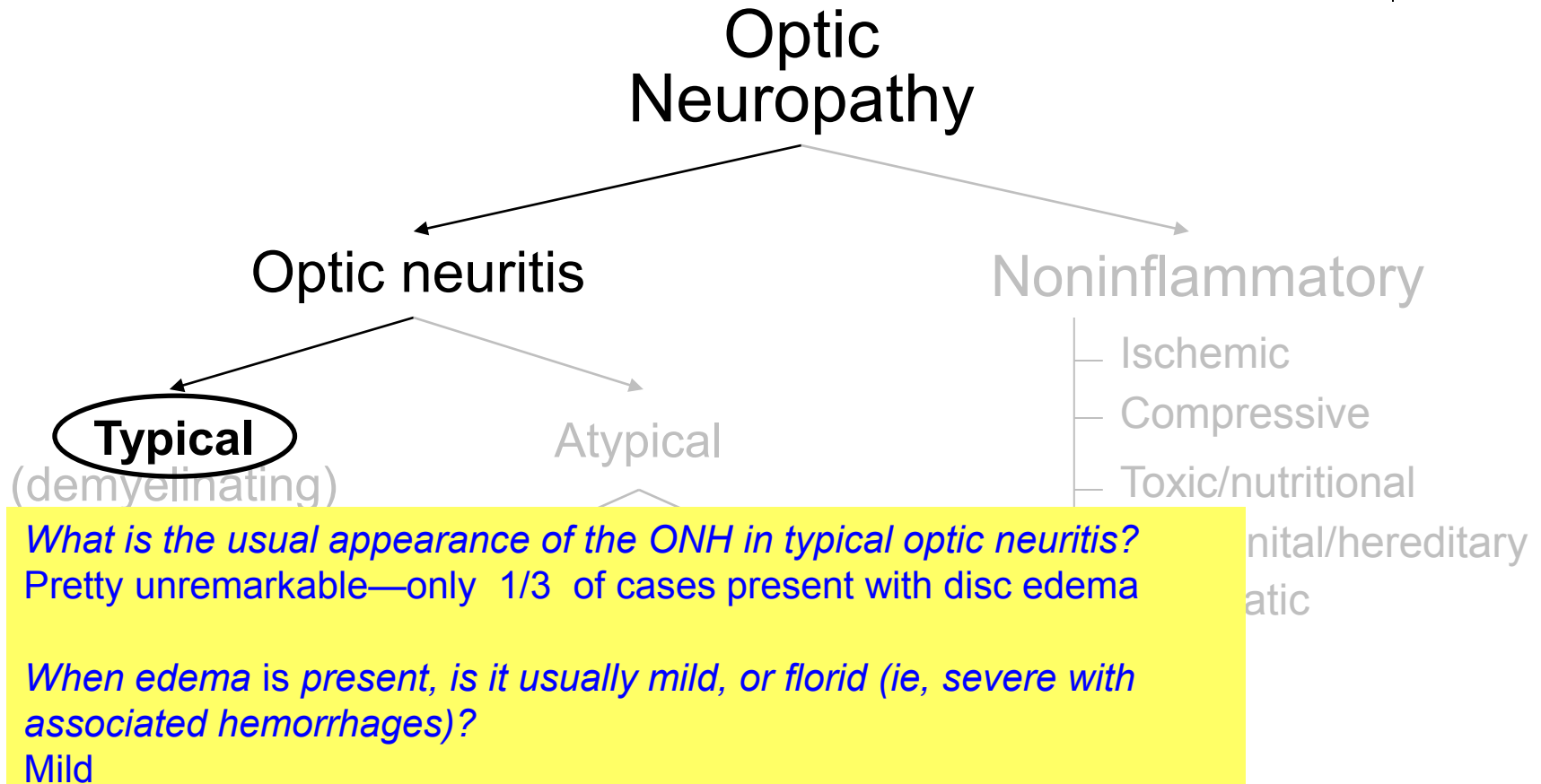


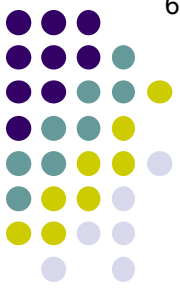
What is the usual appearance of the ONH in typical optic neuritis?
 Pretty unremarkable—only 1/3 of cases present with disc edema

When edema is present, is it usually mild, or florid (ie, severe with associated hemorrhages)?

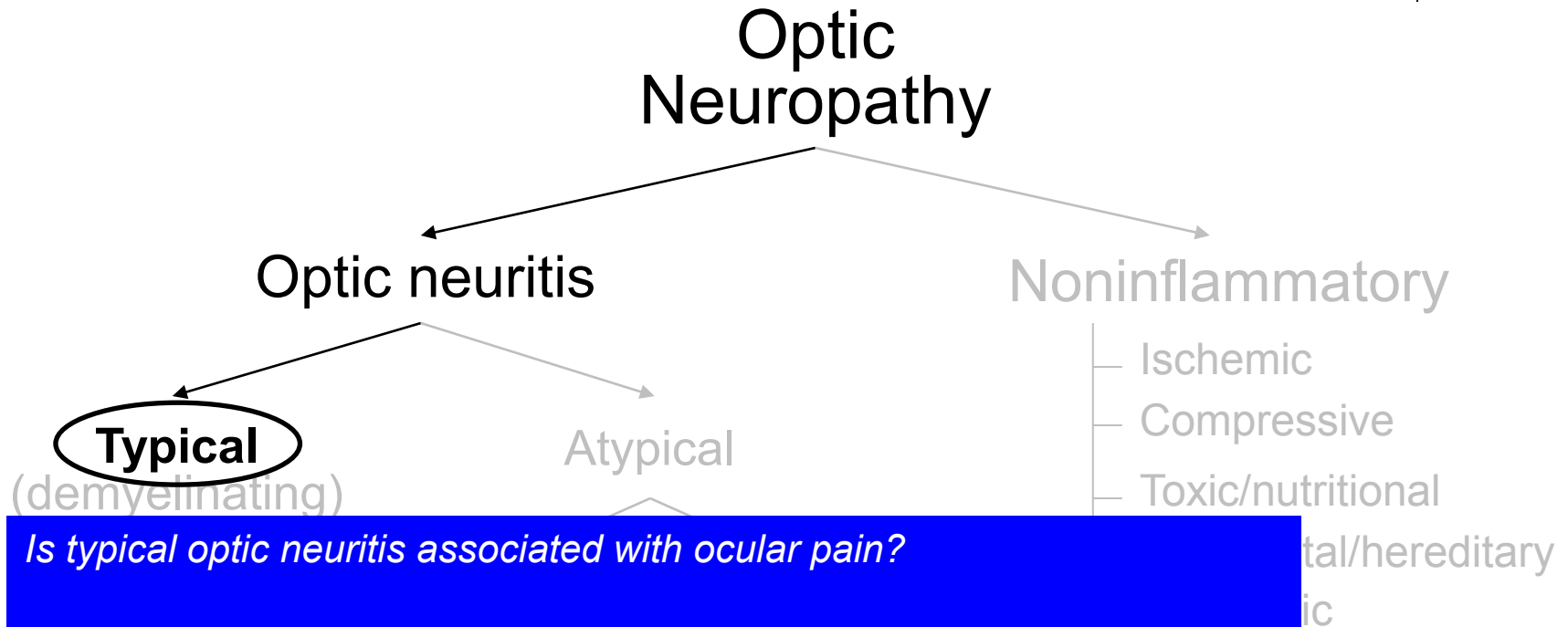


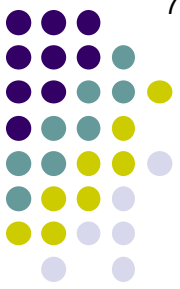
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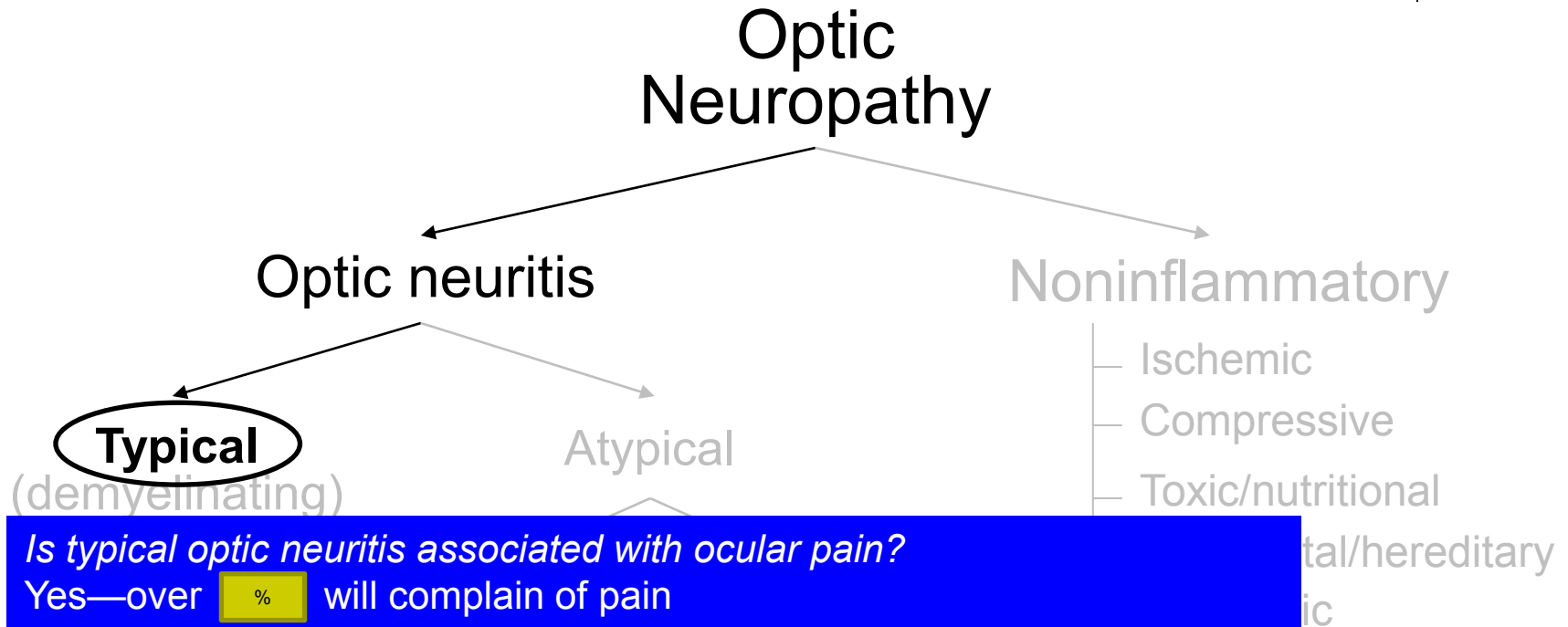


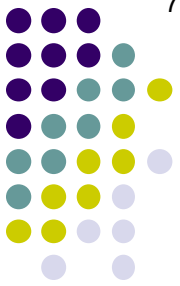
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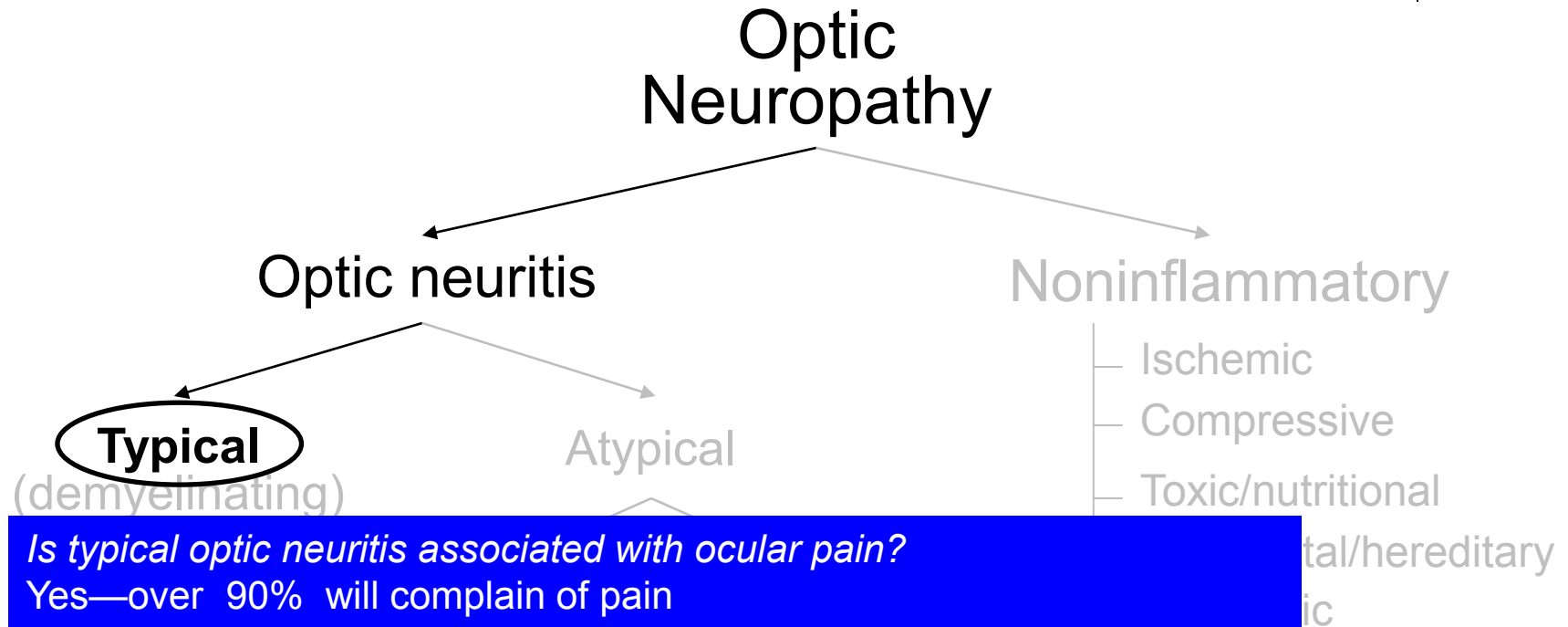


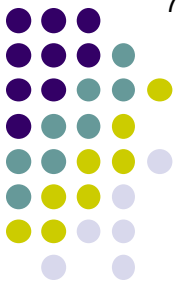
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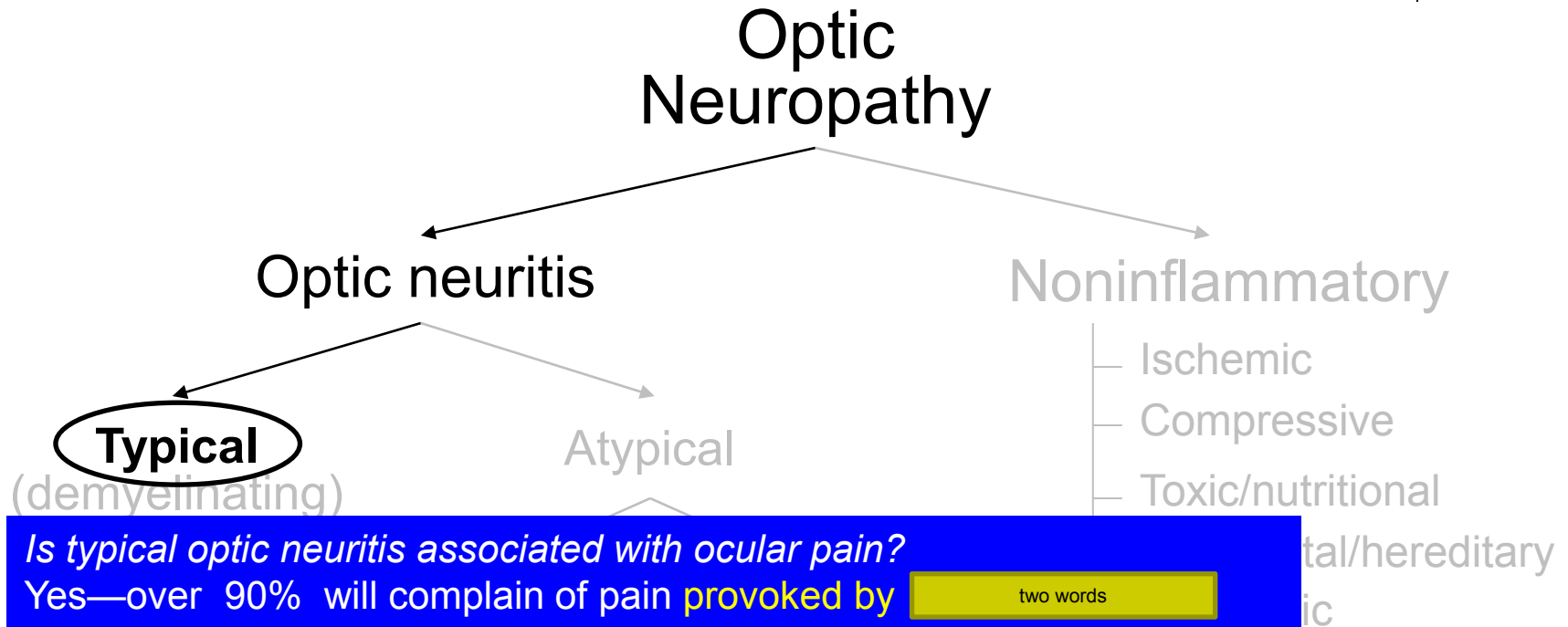


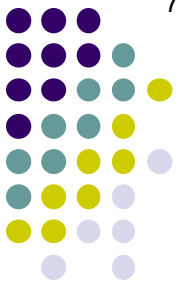
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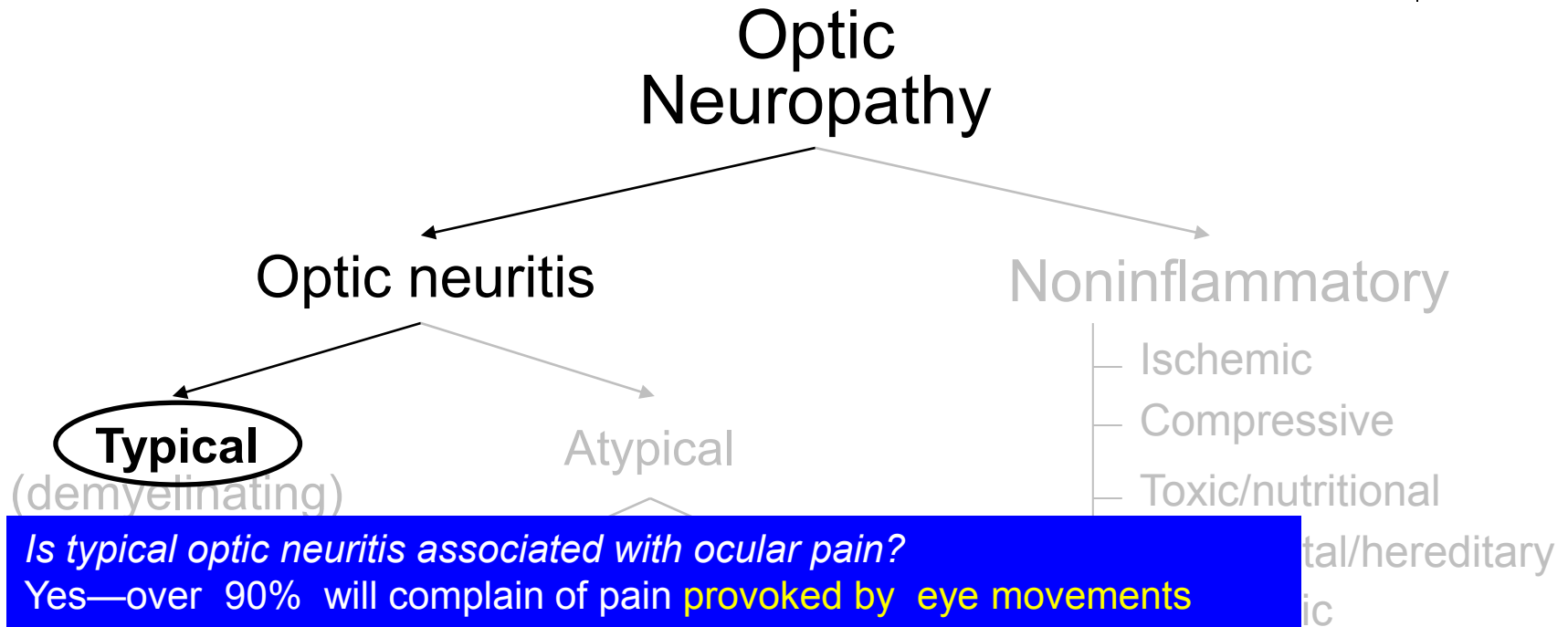


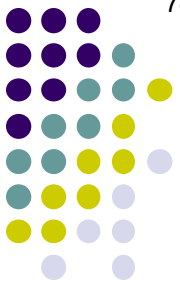
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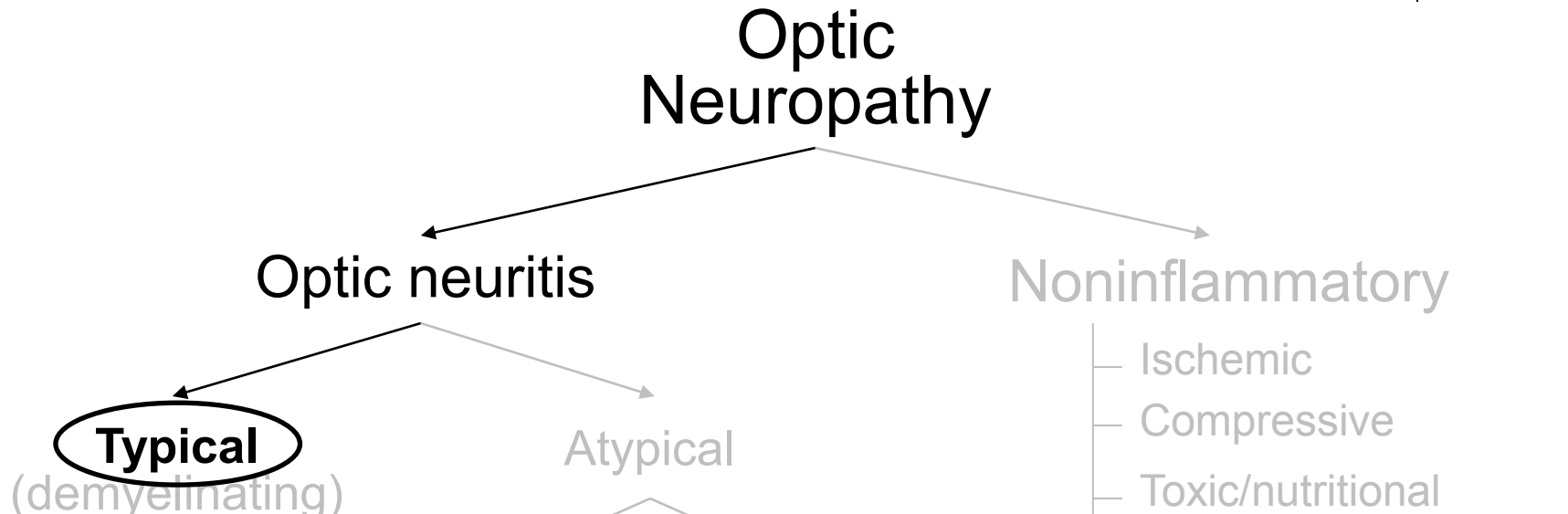


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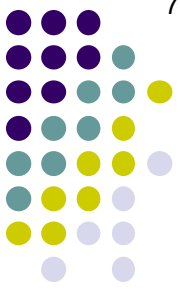
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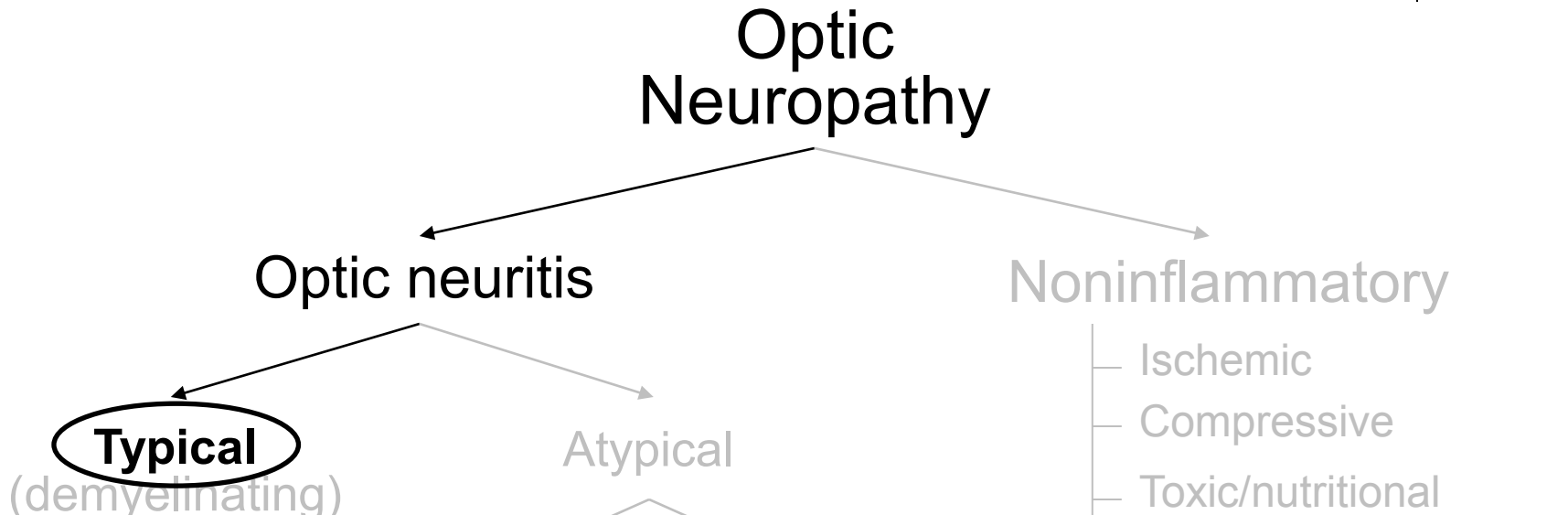
Is typical optic neuritis associated with ocular pain?

Yes—over 90% will complain of pain **provoked by eye movements**

Does the onset of pain typically precede, follow, or coincide with the loss of vision?



Typical Optic Neuritis



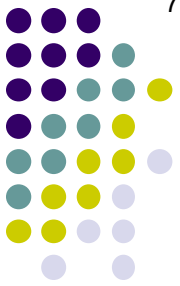
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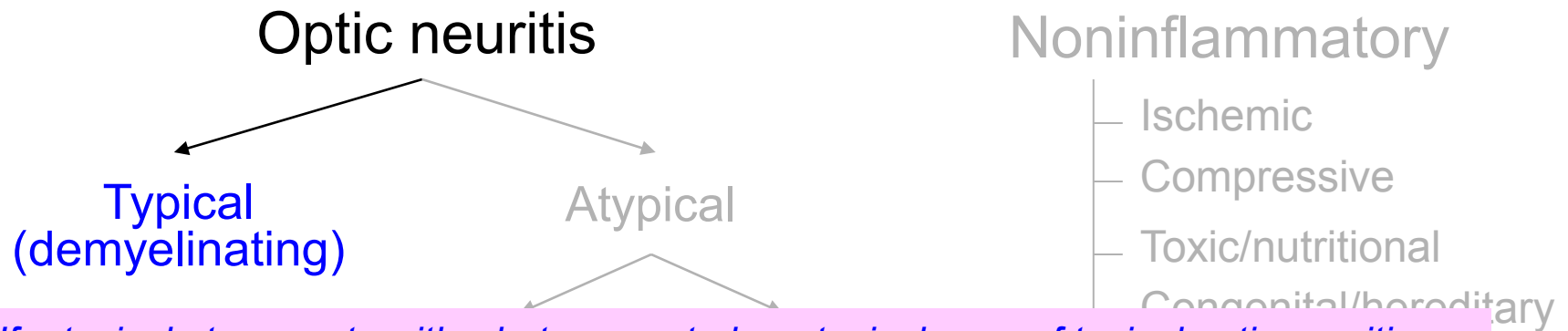
Does the onset of pain typically precede, follow, or coincide with the loss of vision?

While it doesn't have to, it often precedes it

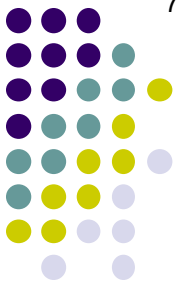
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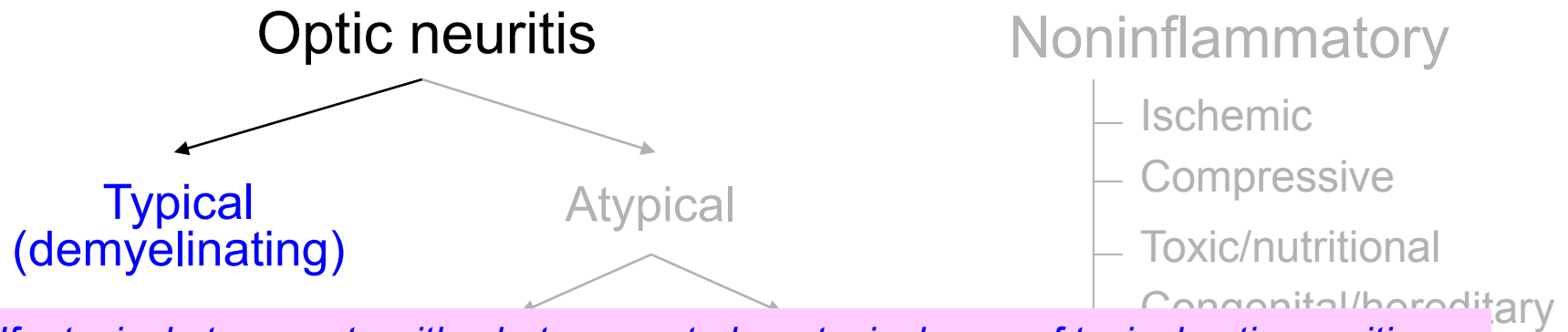
Optic Neuropathy



If a typical pt presents with what seems to be a typical case of typical optic neuritis, what sort of workup should be done?



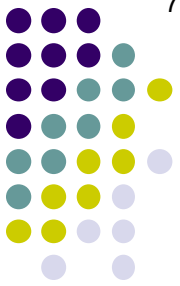
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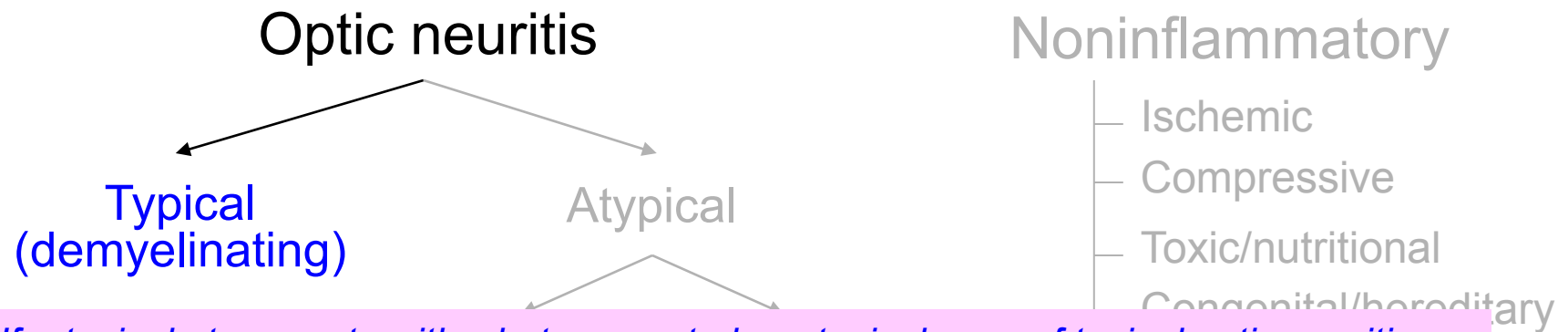
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MRI brain and orbits, with contrast. That's it.

Typical Optic Neuritis



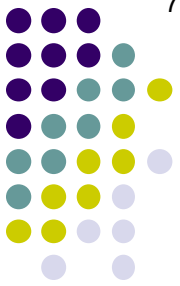
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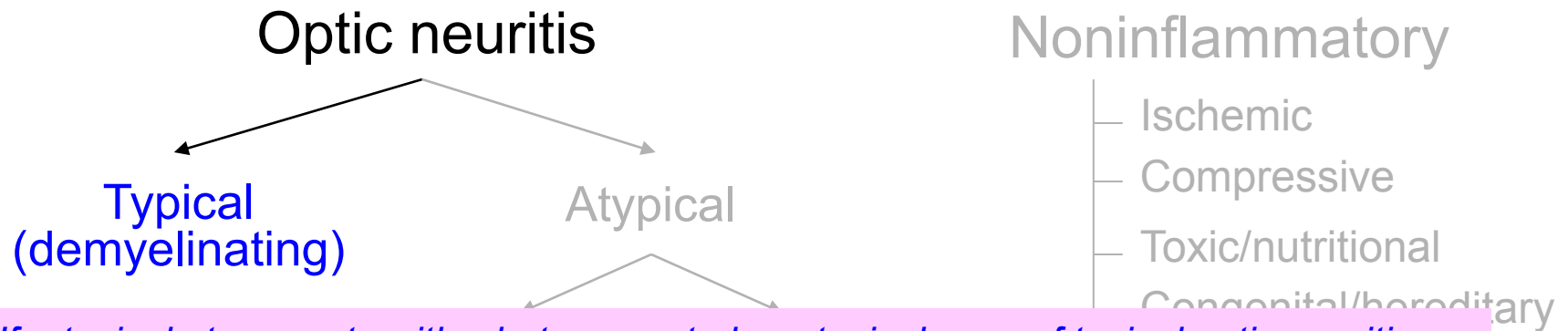
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What is the purpose of the MRI?



Typical Optic Neuritis

Optic Neuropathy

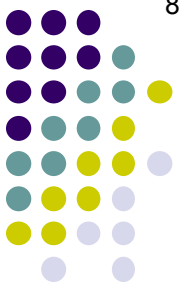


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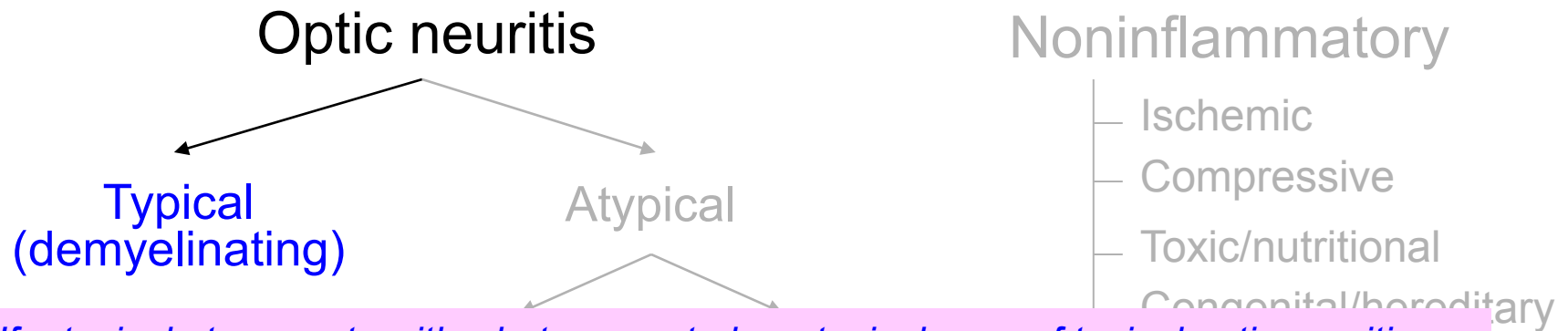
What is the purpose of the MRI?

To look for two words changes, the presence of which increases the likelihood of developing two diff words



Typical Optic Neuritis

Optic Neuropathy



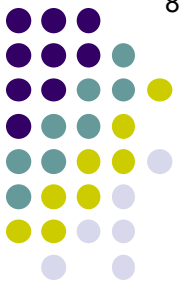
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What is the purpose of the MRI?

To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS)

Typical Optic Neuritis

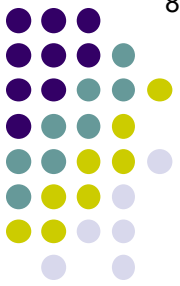


Optic Neuropathy

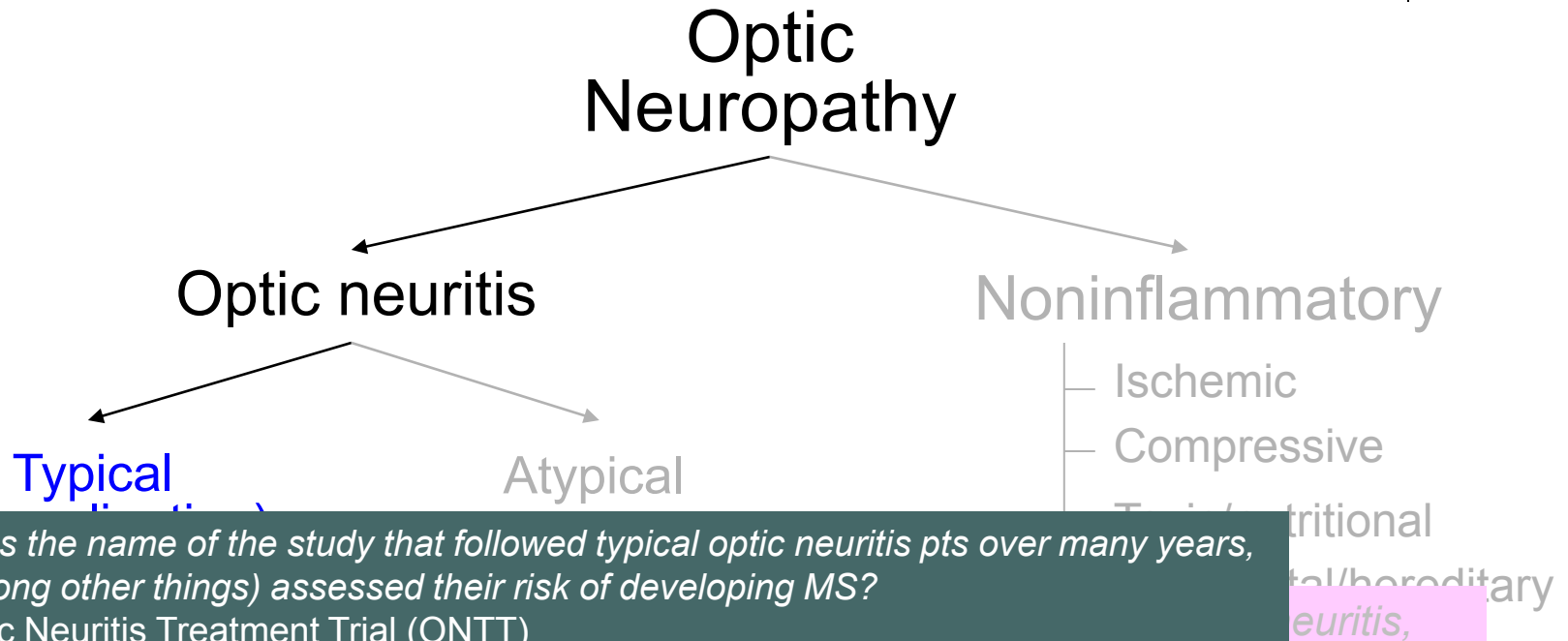


What was the name of the study that followed typical optic neuritis pts over many years, and (among other things) assessed their risk of developing MS?

To look for white-matter changes, the presence of which increases the likelihood of developing **multiple sclerosis (MS)**



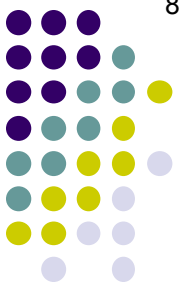
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Typical Optic Neuritis

Optic Neuropathy

Optic neuritis

Noninflammatory

Typical

Atypical

— Ischemic

— Compressive

— Toxic/nutritional

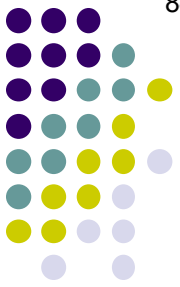
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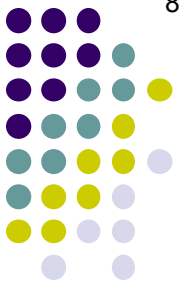
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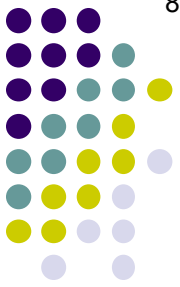
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*Per the ONTT, what proportion of typical optic neuritis pts develop MS by 15 years if...
...there were **no** white matter changes on MRI:*

To look for white-matter changes, the presence of which increases the likelihood of developing **multiple sclerosis (MS)**



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Optic Neuropathy

Optic neuritis

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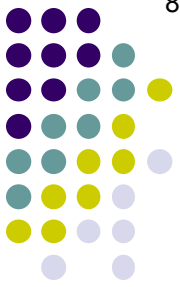
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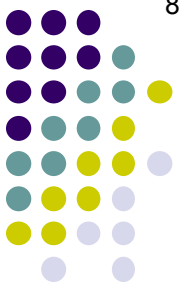
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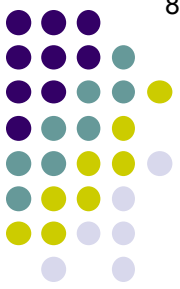
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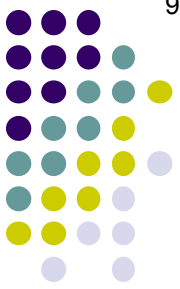
...there was no treatment?

...if even treated?

Why is knowing the likelihood of developing MS important?

To look at the likelihood of developing multiple sclerosis (MS)

the likelihood



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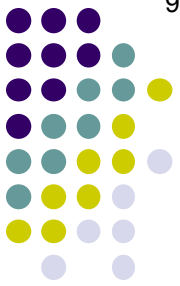
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Why is knowing the likelihood of developing MS important?

Because it influences decision-making vis a vis whether to initiate tx that can forestall MS onset (and may improve dz course)

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We will have much more to say about MS later in the set

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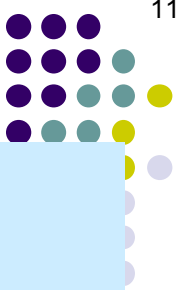
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So PO pred @1 mg/kg/d doesn't help—and seems to harm—optic neuritis pts.

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Did steroids have a positive impact on the risk of developing MS?

IV steroid group had a lower rate of developing MS than the control group.

But this benefit was not seen in the PO steroid group. In fact, the rate of MS was higher in the PO steroid group than in the control group.

Does this mean PO pred is contraindicated in typical optic neuritis?

Indeed they did—the PO pred group had an increased risk of recurrence of optic neuritis.

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IV steroids had no effect on the risk of developing MS. PO steroids had no effect on the risk of developing MS.

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No, subsequent studies found that **type of dosing** PO steroids hasten VA recovery without increasing the risk of recurrence

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Did steroids have a positive impact on the risk of developing MS?

Does this mean PO pred is contraindicated in typical optic neuritis?

No, subsequent studies found that megadose PO steroids hasten VA recovery without increasing the risk of recurrence

'Megadose'? How much pred are we talking about here?

Indeed they did—the PO pred group had an increased risk of recurrence of optic neuritis.

So PO pred @1 mg/kg/d doesn't help—and seems to harm—optic neuritis pts.

Typical Optic Neuritis

The ONTT evaluated what sort of drug as tx for typical optic neuritis?

Steroids

Two steroids were used—what were they? How were they dosed?

--IV methylprednisolone. 250 qid x 3 days (then pred 1 mg/kg/d x 11d, then tapered off)

--PO prednisone. 1 mg/kg/d x 14 days, then tapered off

With respect to vision, to what extent did steroids provide a long-term benefit?

None. The final VA outcome of the Steroid group was no different than that of the control group.

*Did steroids have **any** positive effects on vision?*

The IV group regained their final (best) vision a week or two faster than the control group—although to reiterate for emphasis, their final VA was **not** better than that of the controls. (The PO steroid group did not enjoy even this modest benefit.)

Did steroids have a positive impact on the risk of developing MS?

IV steroid treatment did not increase the risk of developing MS in the ONTT. The rate of MS was similar in both groups at presentation.

B. Does this mean PO pred is contraindicated in typical optic neuritis? No, subsequent studies found that megadose PO steroids hasten VA recovery without increasing the risk of recurrence. In the IV steroid and PO steroid groups, there was no difference in the rate of MS.

'Megadose'? How much pred are we talking about here?

D. A gram a day (same as the IV dose of methylprednisolone in the ONTT)

Indeed they did—the PO pred group had an increased risk of recurrence of optic neuritis.

So PO pred @1 mg/kg/d doesn't help—and seems to harm—optic neuritis pts.

Typical Optic Neuritis



Optic Neuropathy

Noninflammatory

- Ischemic
- Compressive
- Toxic/nutritional
- Congenital/hereditary

Atypical

Typical
(demyelinating)

[gender]
[age]

If a **typical pt** presents with what seems to be a typical case of typical optic neuritis,

As a review: Who is the typical
typical optic neuritis pt?

What is the purpose of the MRI?

To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS)

Typical Optic Neuritis



Optic Neuropathy

Noninflammatory

- Ischemic
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Typical
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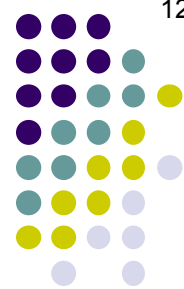
{ Female
Young adult

If a **typical pt** presents with what seems to be a typical case of typical optic neuritis, what should be done?

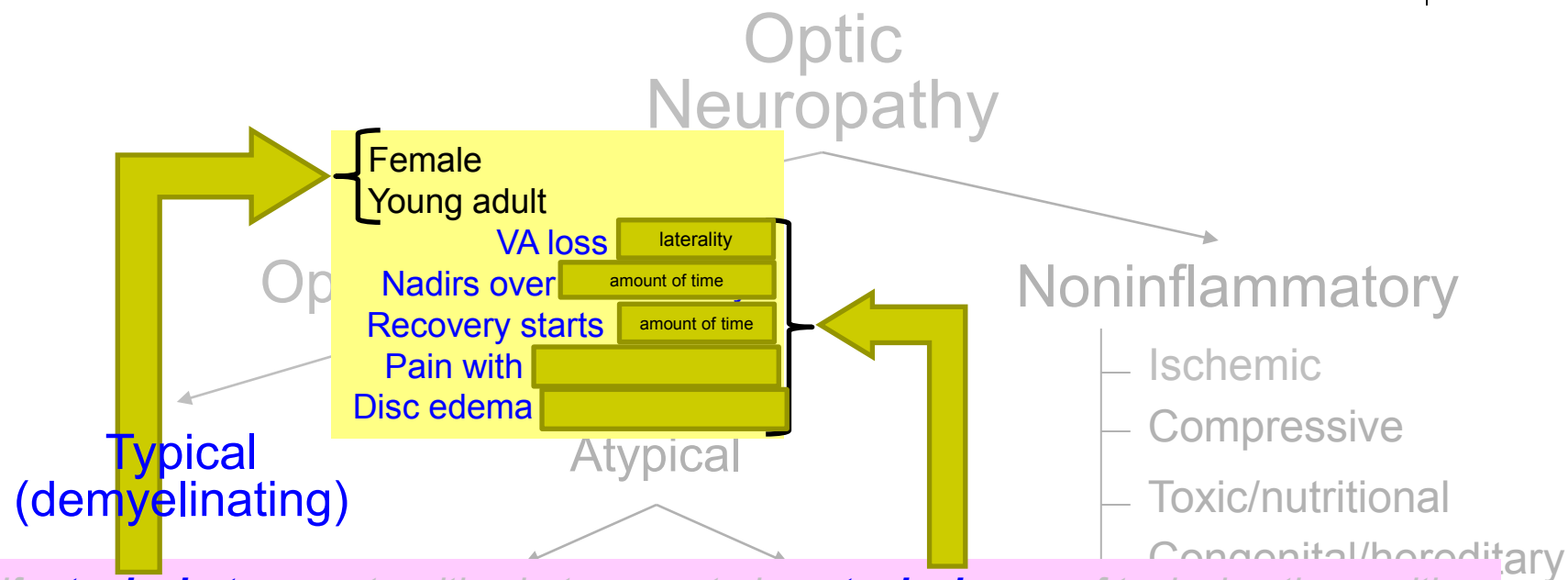
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Typical Optic Neuritis



If a **typical pt** presents with what seems to be a **typical case** of typical optic neuritis, what should be done?

As a review: Who is the typical typical optic neuritis pt?

How does a case of typical optic neuritis typically present?

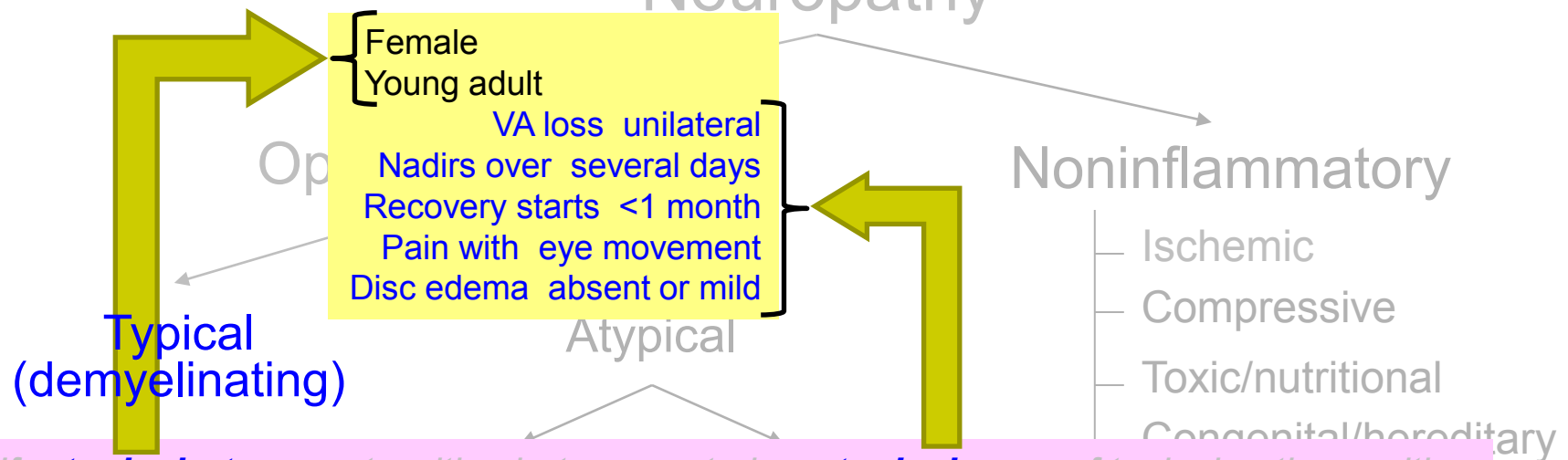
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Typical Optic Neuritis



Optic Neuropathy



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What is the purpose of the MRI?

To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS)

Typical Optic Neuritis



If the pt

deviates from the typical pattern...

Neuropathy

[Female
Young adult]

[Male
Older]

VA loss unilateral
Nadirs over several days
Recovery starts <1 month
Pain with eye movement
Disc edema absent or mild

No

Atypical

Typical
(demyelinating)

Compressive
Toxic/nutritional
Congenital/hereditary

If a **typical pt** presents with what seems to be a **typical case** of typical optic neuritis, what should be done?

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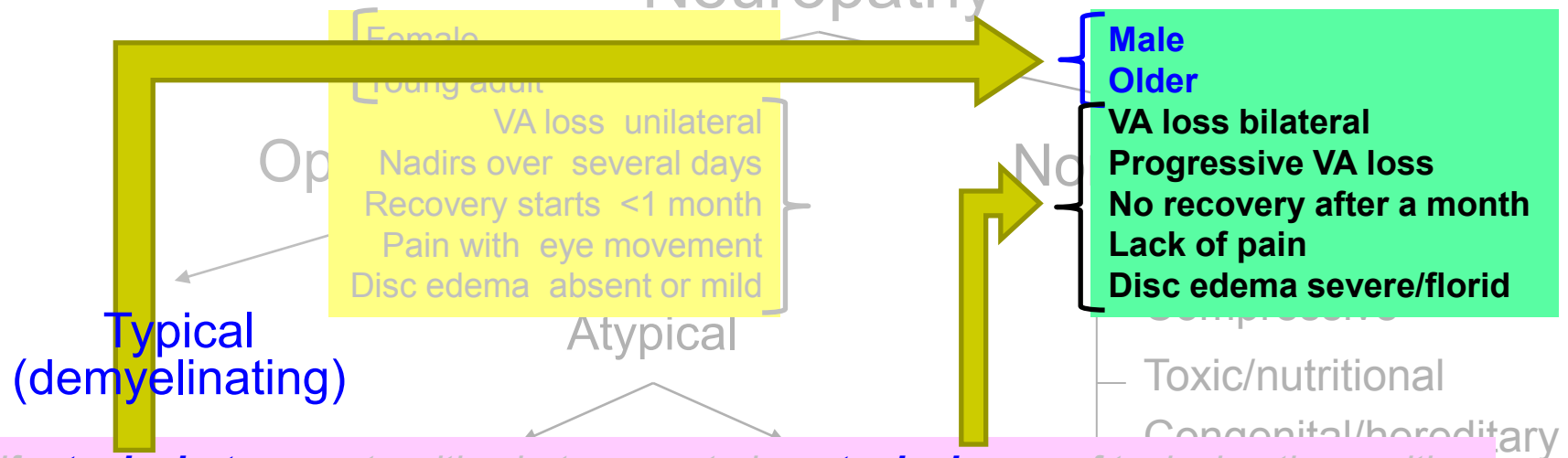
To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS)

No question—proceed when ready

Typical Optic Neuritis

If the pt or the presentation deviates from the typical pattern...

Neuropathy



If a **typical pt** presents with what seems to be an **atypical case** of typical optic neuritis, what should be done?

As a review: Who is the typical typical optic neuritis pt?

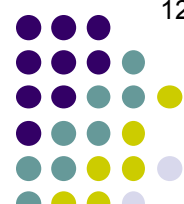
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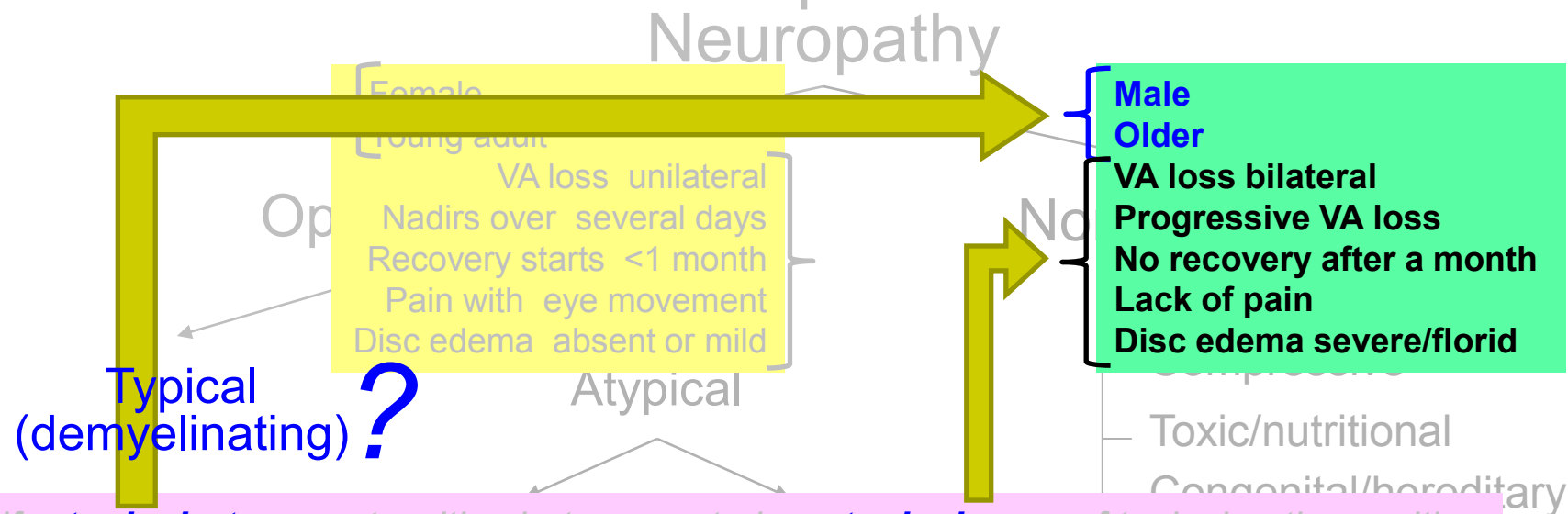
To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS)

No question—proceed when ready

Typical Optic Neuritis



If the pt or the presentation deviates from the typical pattern...
You should question the dx of typical (demyelinating) optic neuritis



If a **typical pt** presents with what seems to be an **atypical case** of typical optic neuritis, what should be done?

As a review: Who is the typical typical optic neuritis pt?

How does a case of typical optic neuritis typically present?

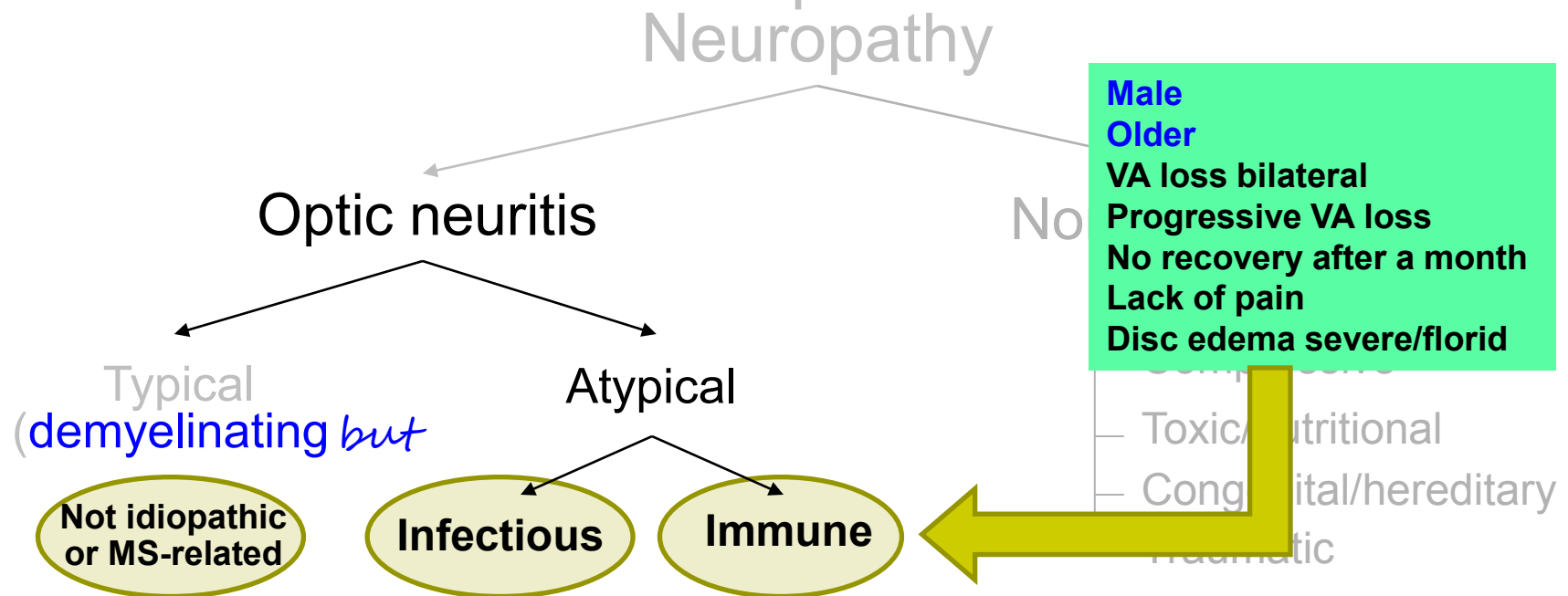
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Typical Optic Neuritis

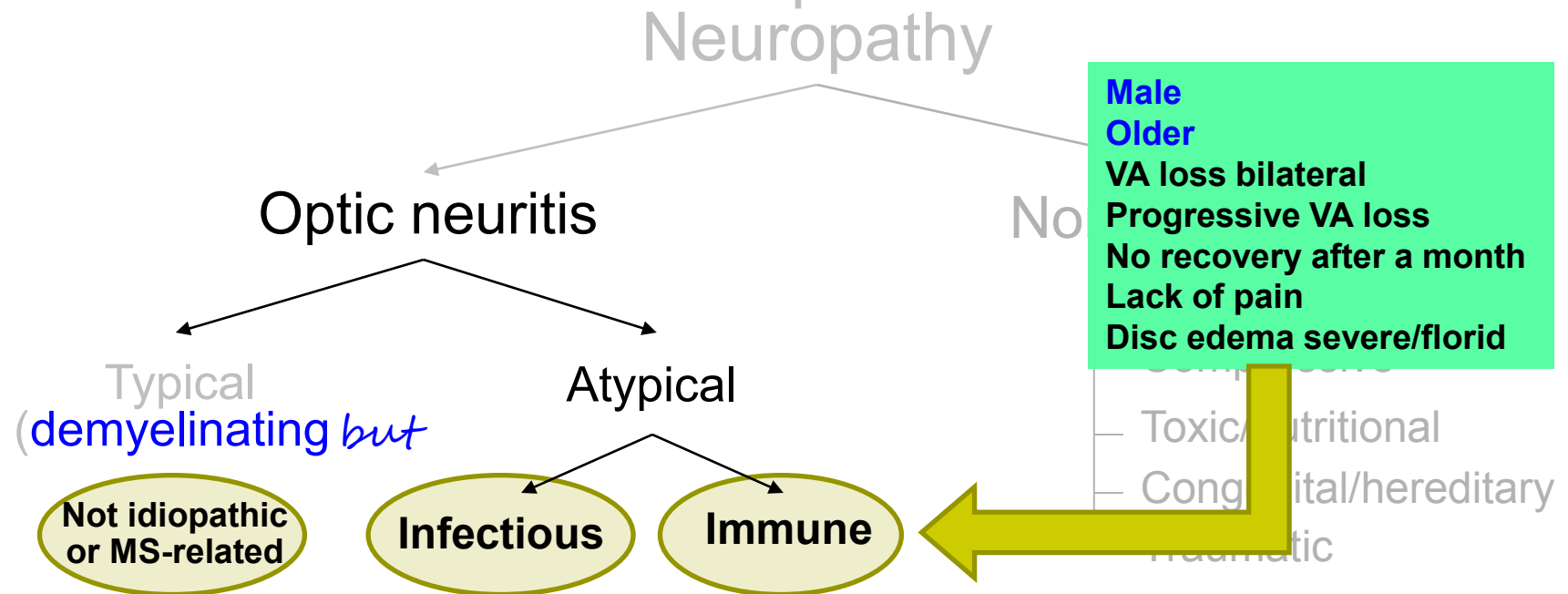
If the pt or the presentation deviates from the typical pattern...
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and institute a workup for infectious/autoimmune etiologies



No question—proceed when ready

Typical Optic Neuritis

If the pt or the presentation deviates from the typical pattern...
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What etiologies?

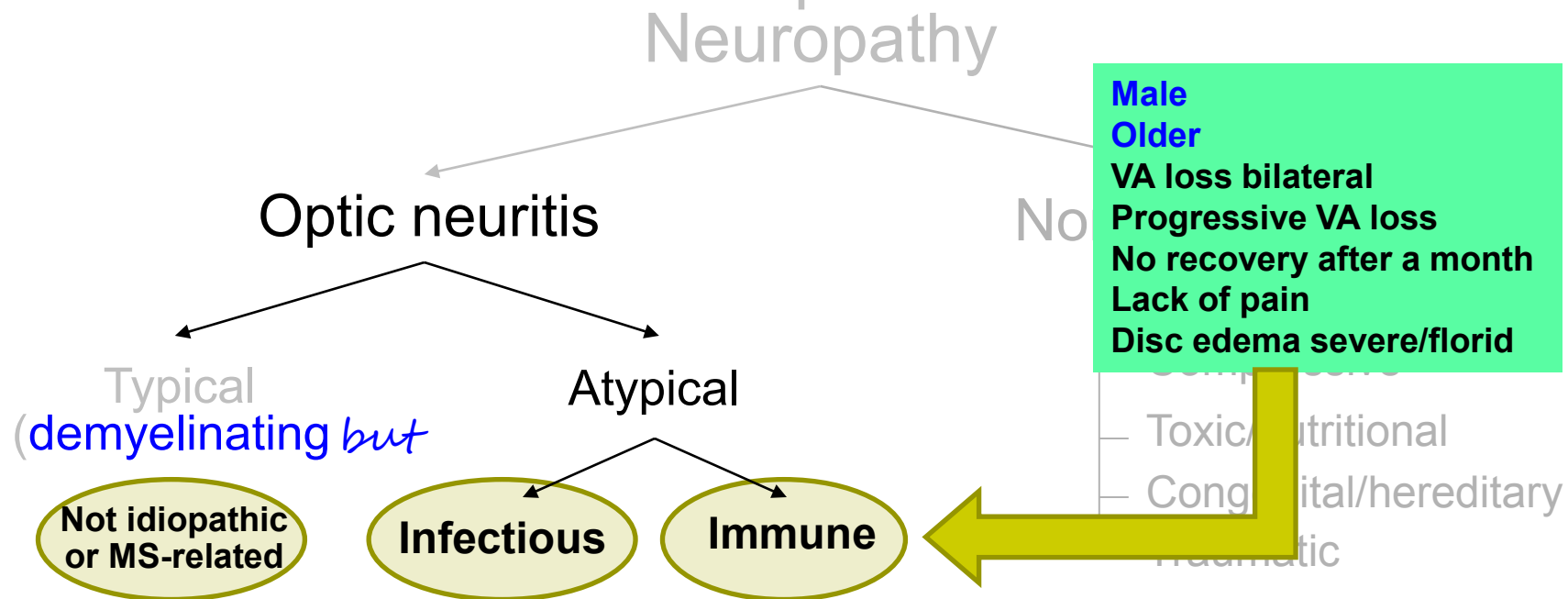
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(Cont)

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Typical Optic Neuritis

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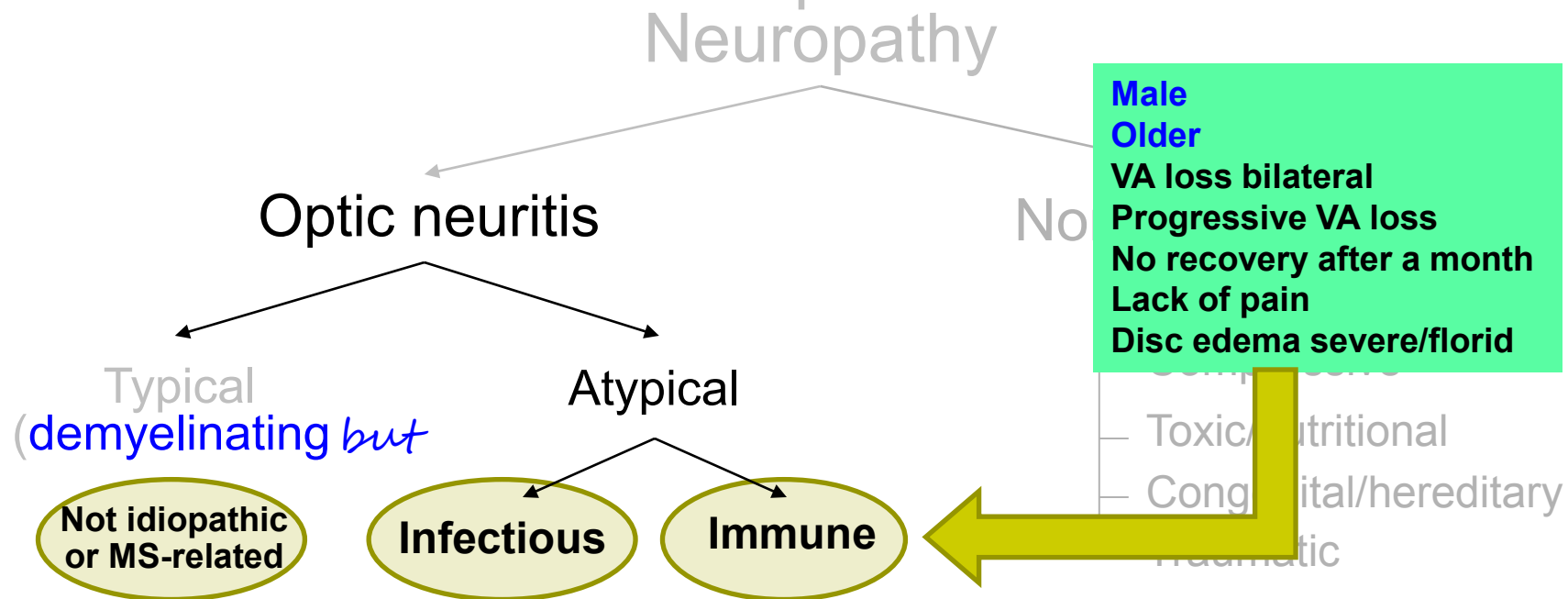
Syphilis
Bartonella
Lyme testing (if endemic)
Sarcoid
SLE

(Cont)

Granulomatosis w/ polyangiitis
LHON
Meningeal process
NMO(SD)
MOGAD

Typical Optic Neuritis

If the pt or the presentation deviates from the typical pattern...
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What etiologies? What studies?

Syphilis: ?

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Sarcoid

SLE

(Cont)

Granulomatosis w/ polyangiitis

LHON

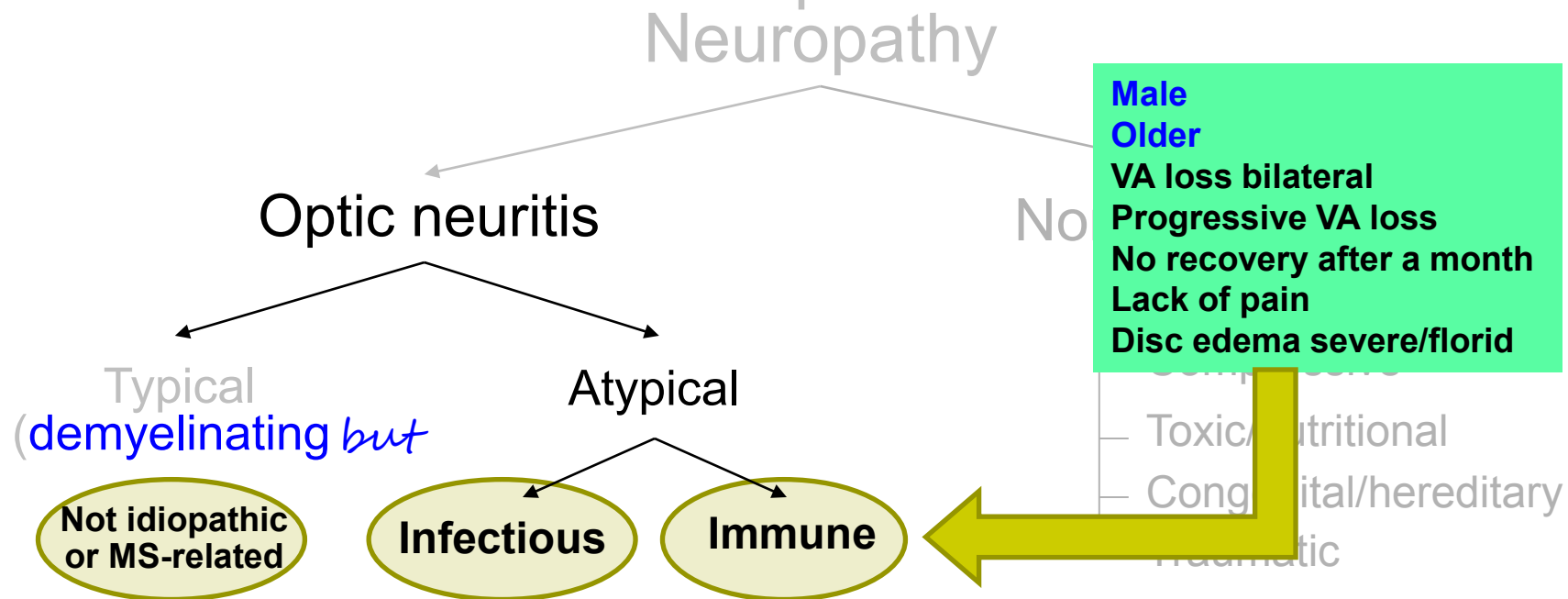
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(Cont)

Granulomatosis w/ polyangiitis

LHON

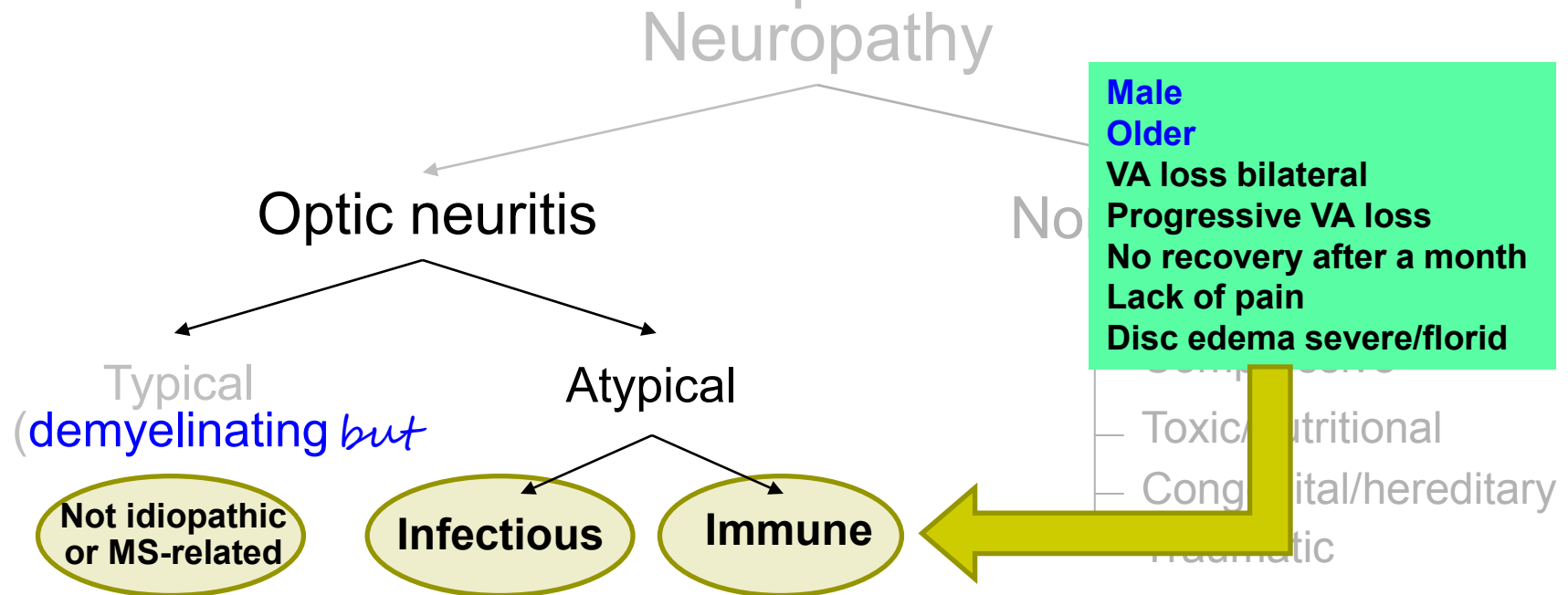
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LHON

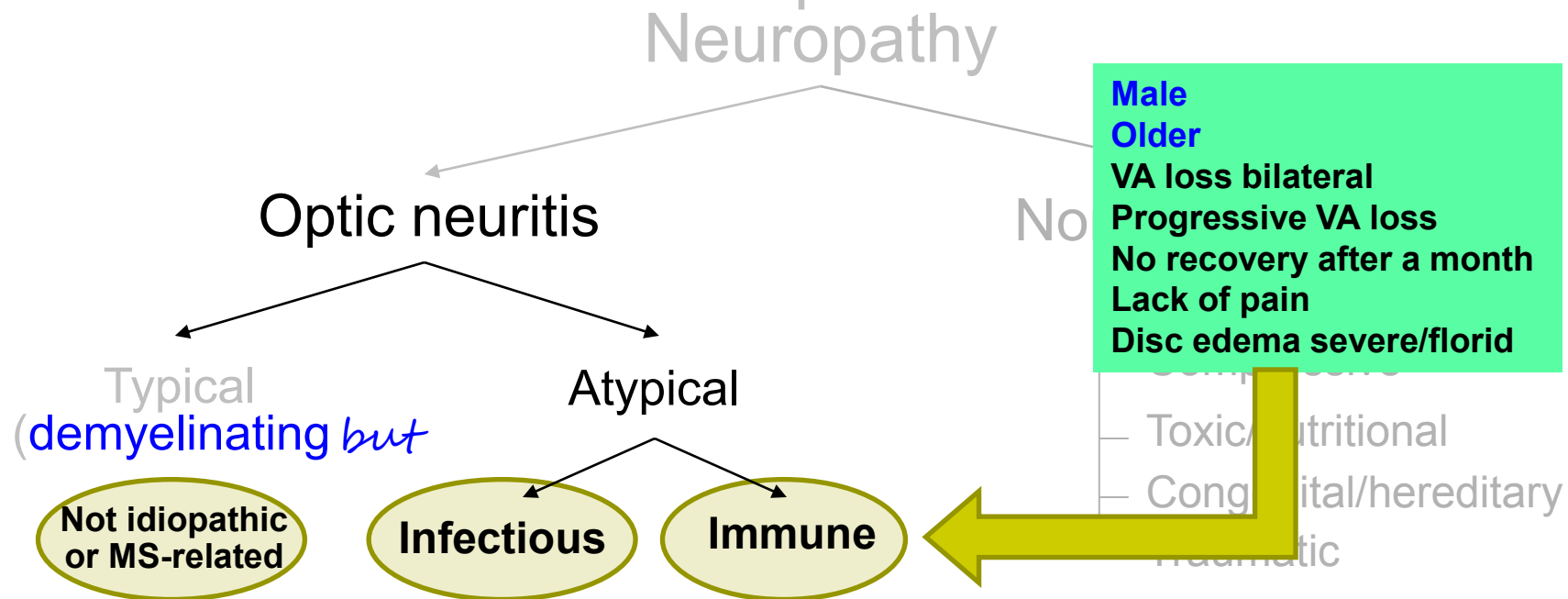
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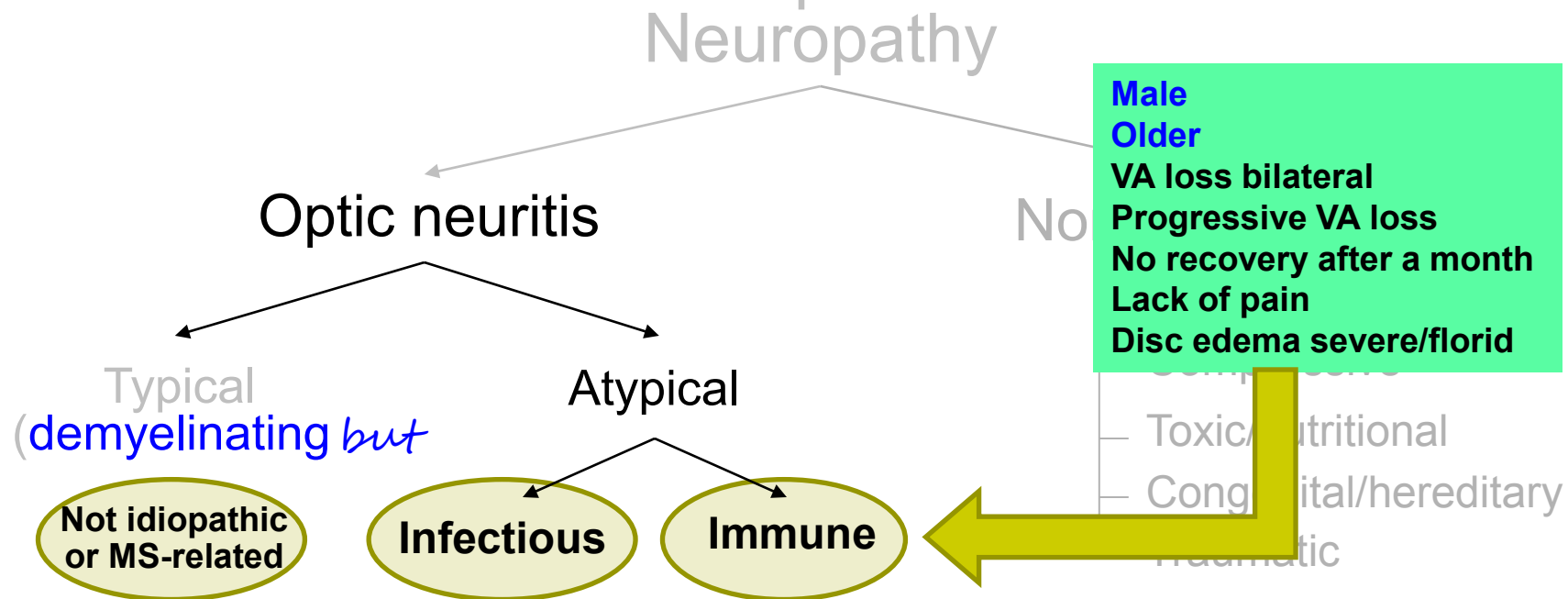
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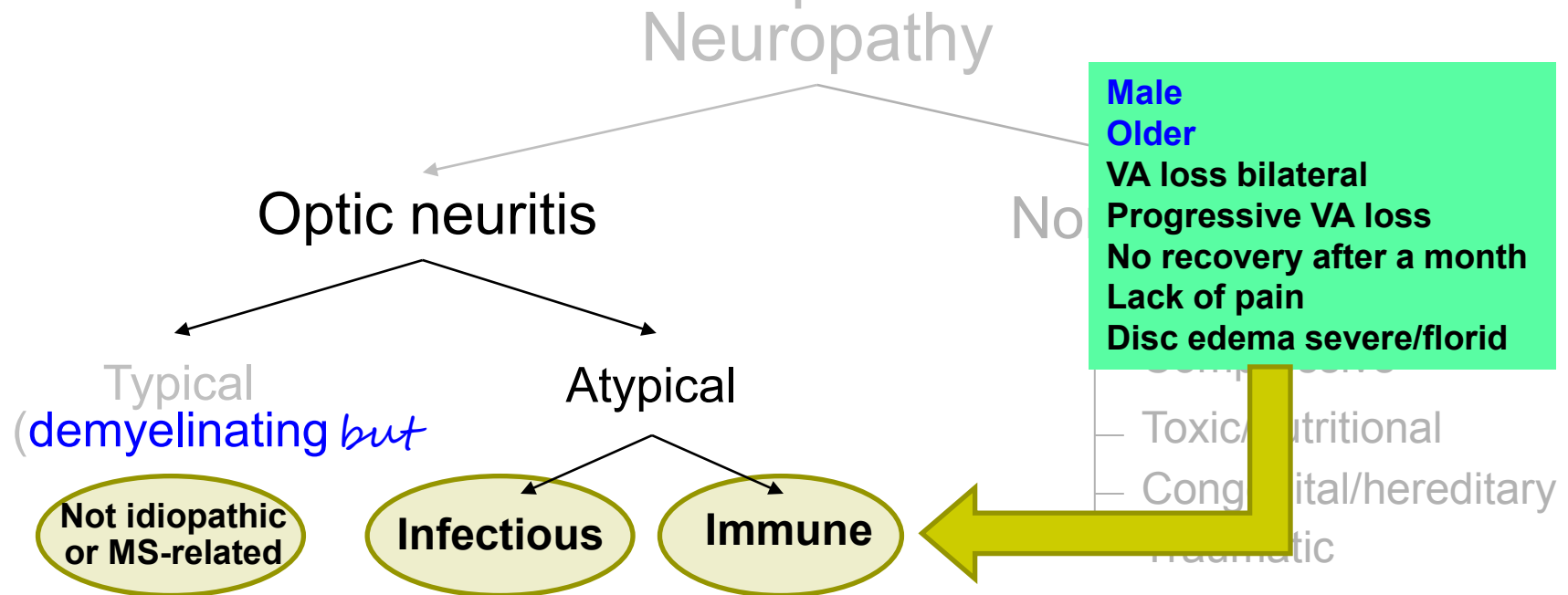
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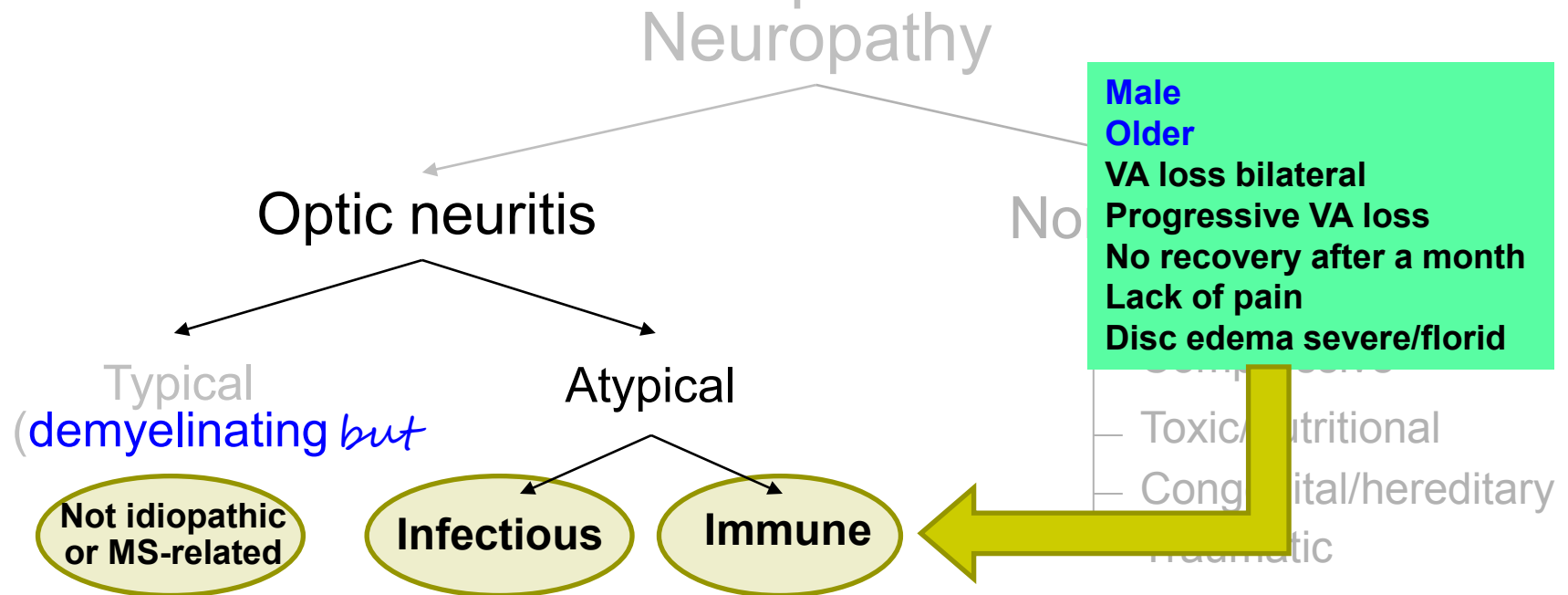
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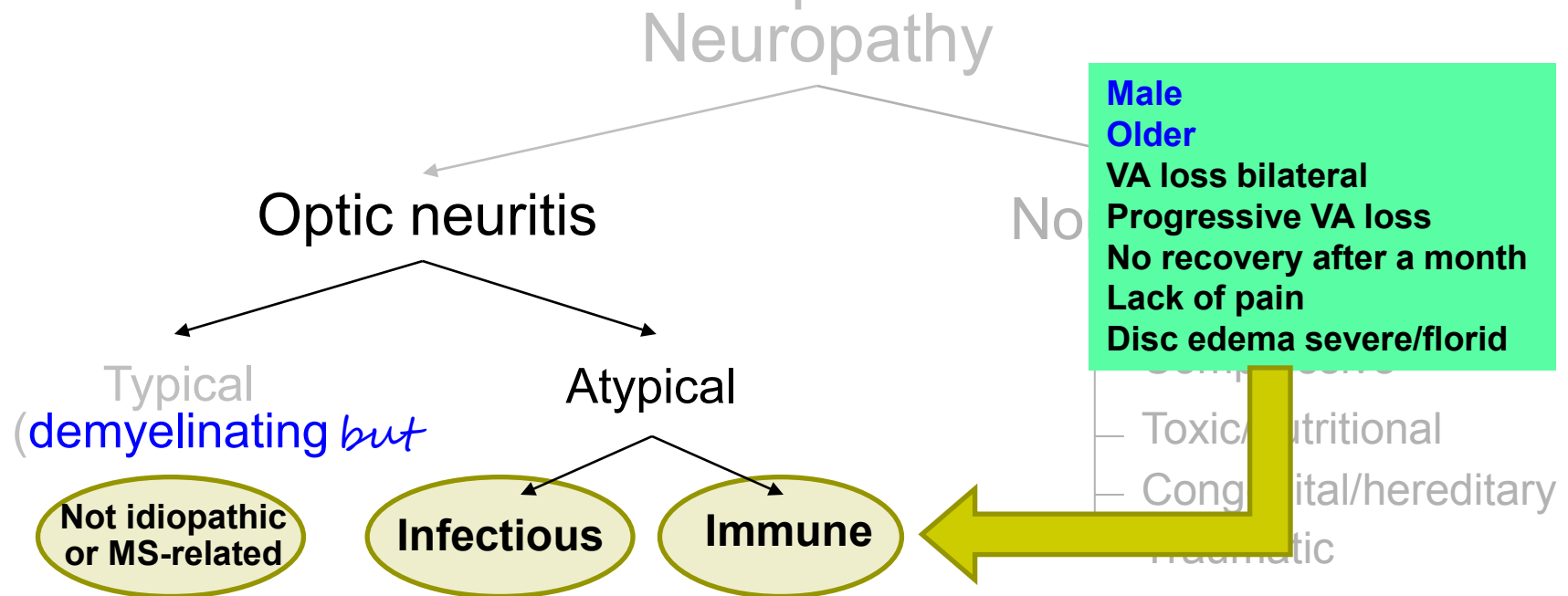
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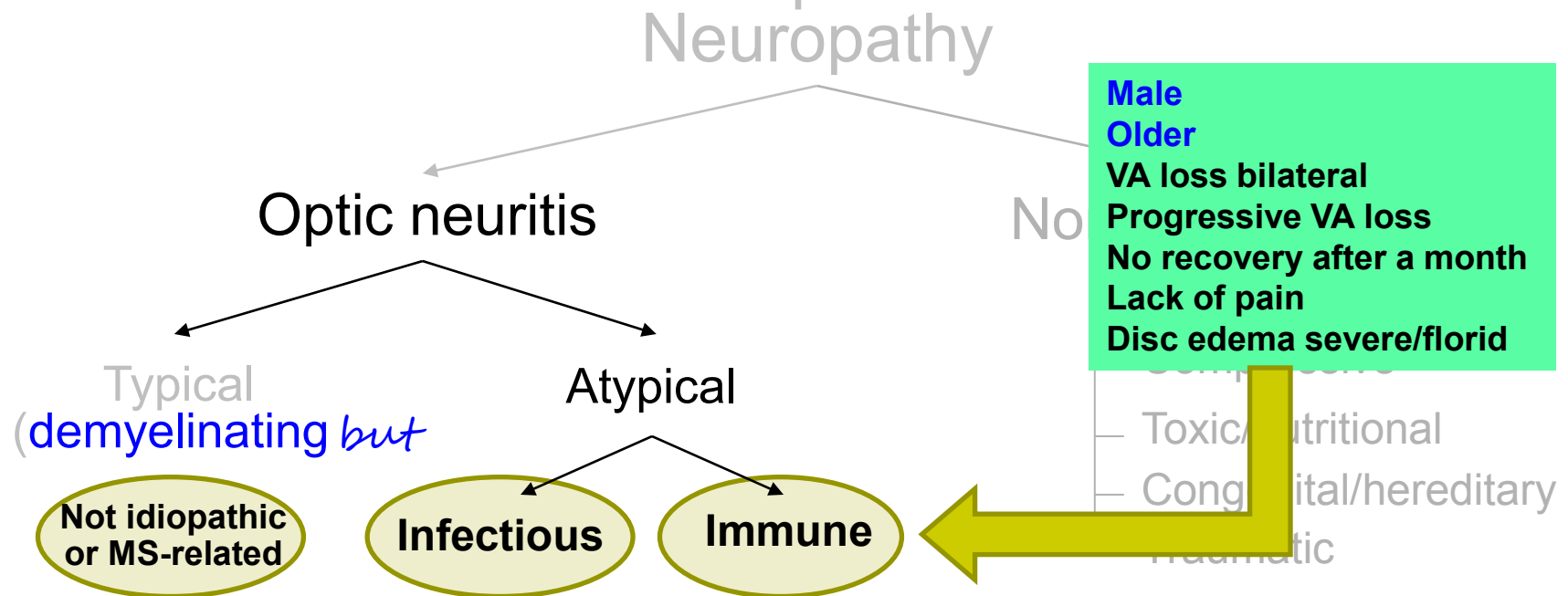
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(Cont)

Granulomatosis w/ polyangiitis

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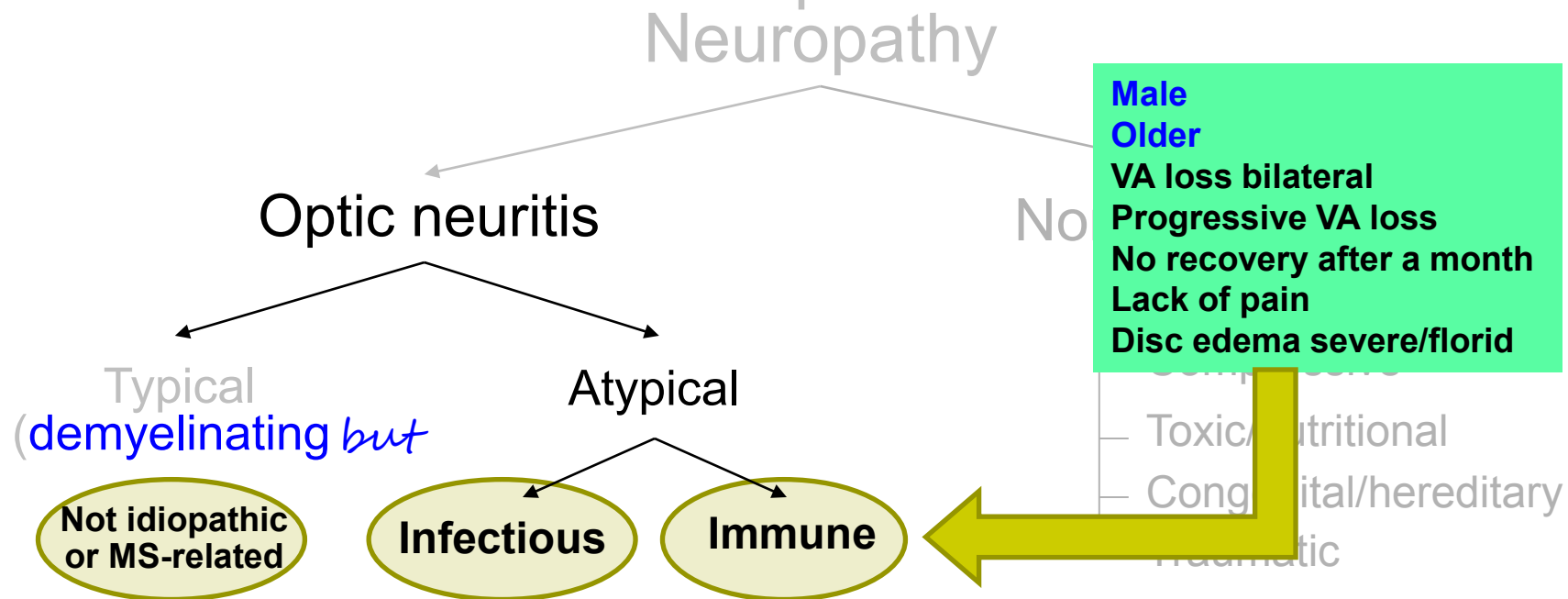
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(Cont)

Granulomatosis w/ polyangiitis

LHON

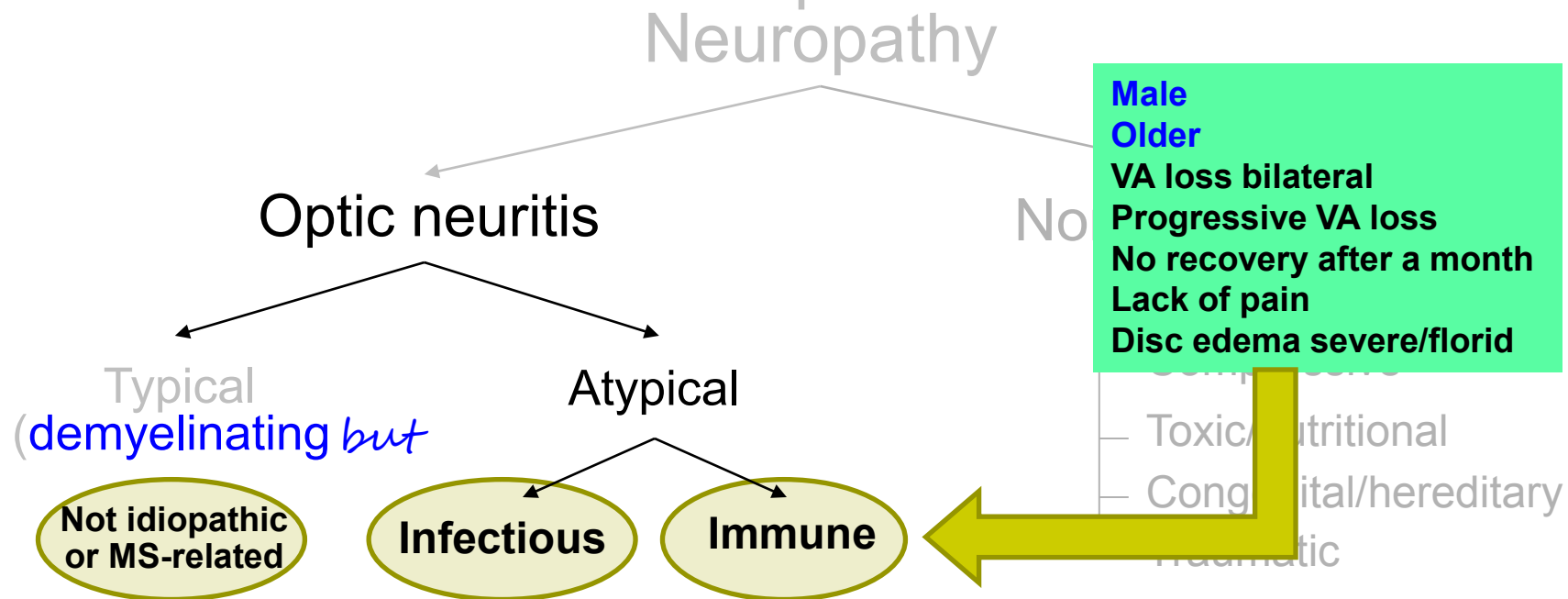
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(Cont)

Granulomatosis w/ polyangiitis: ?

LHON

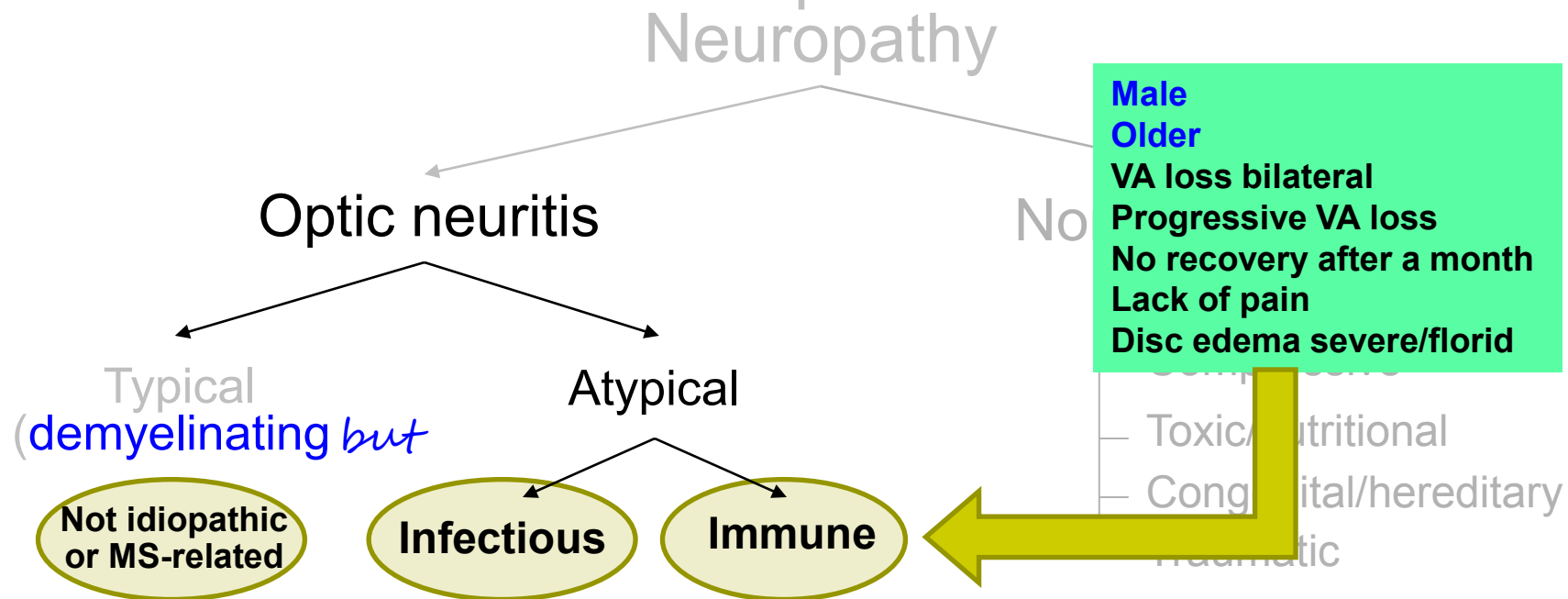
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(Cont)

Granulomatosis w/ polyangiitis: ANCA

LHON

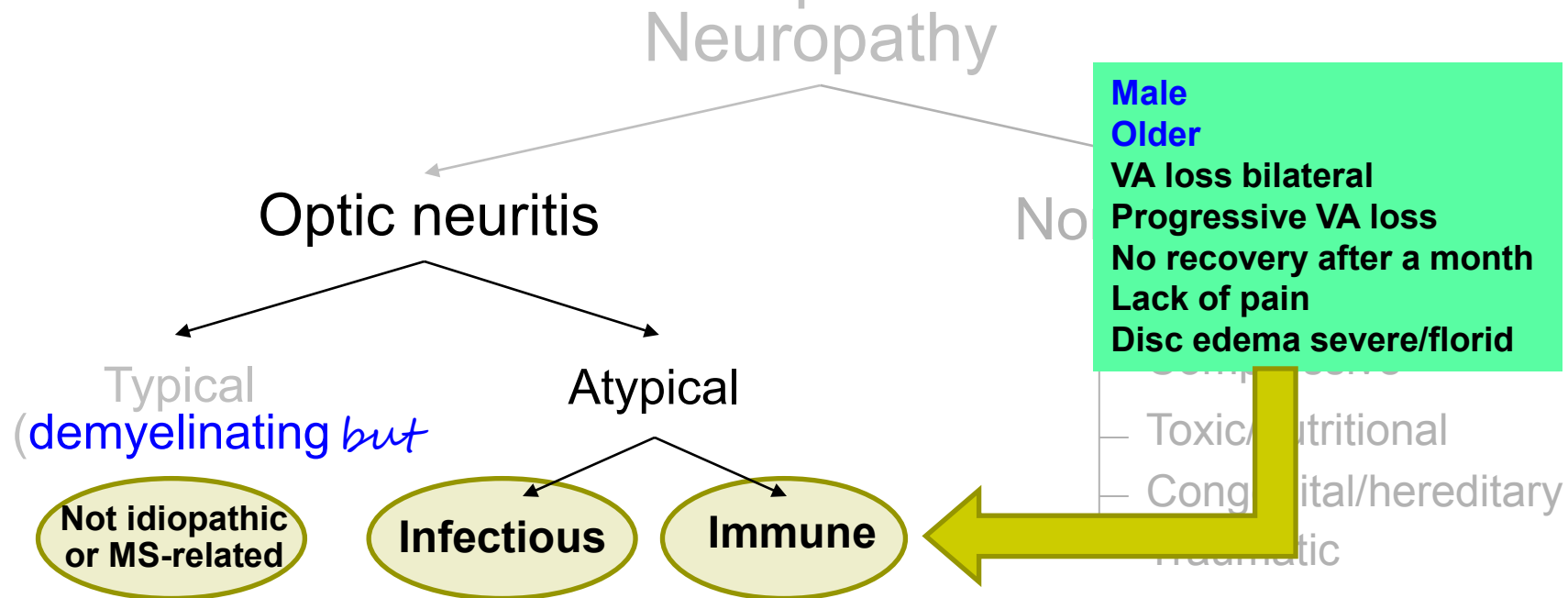
Meningeal process

NMO(SD)

MOGAD

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(Cont)

Granulomatosis w/ polyangiitis: ANCA

LHON: ?

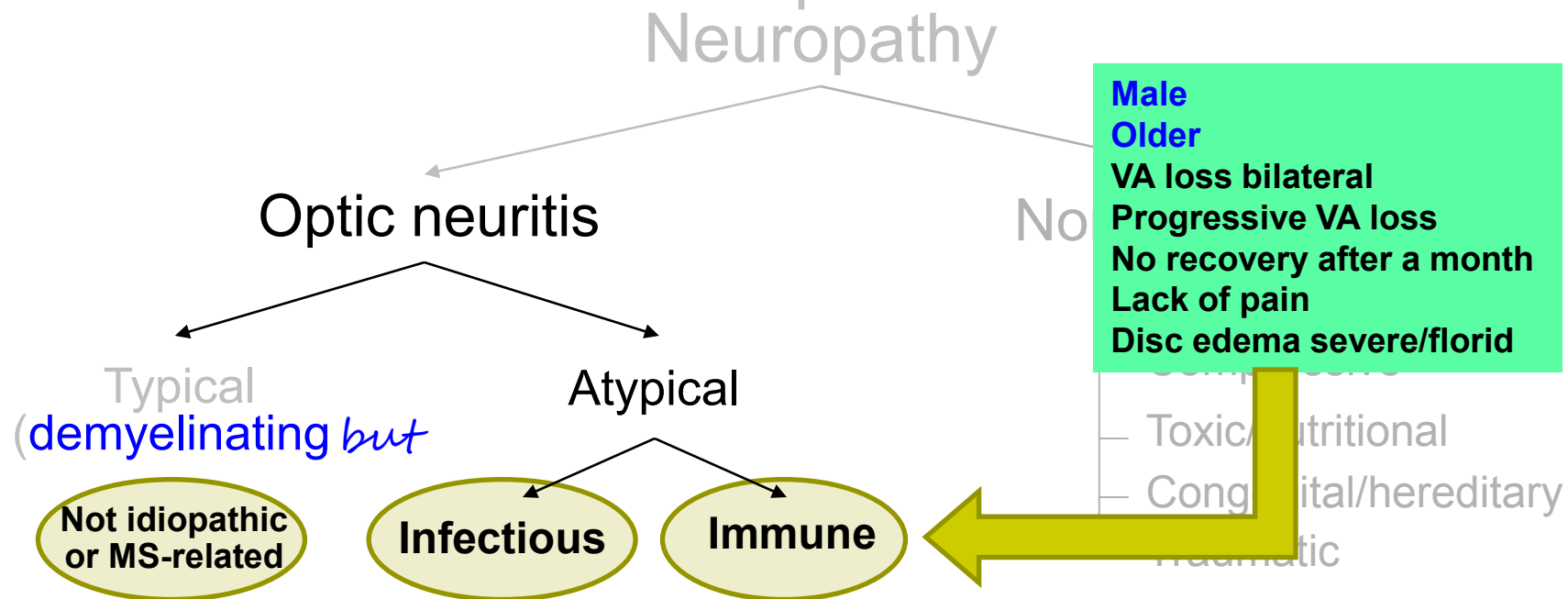
Meningeal process

NMO(SD)

MOGAD

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SLE: ESR, ANA, Anti-DNA

(Cont)

Granulomatosis w/ polyangiitis: ANCA

LHON: Genetic testing

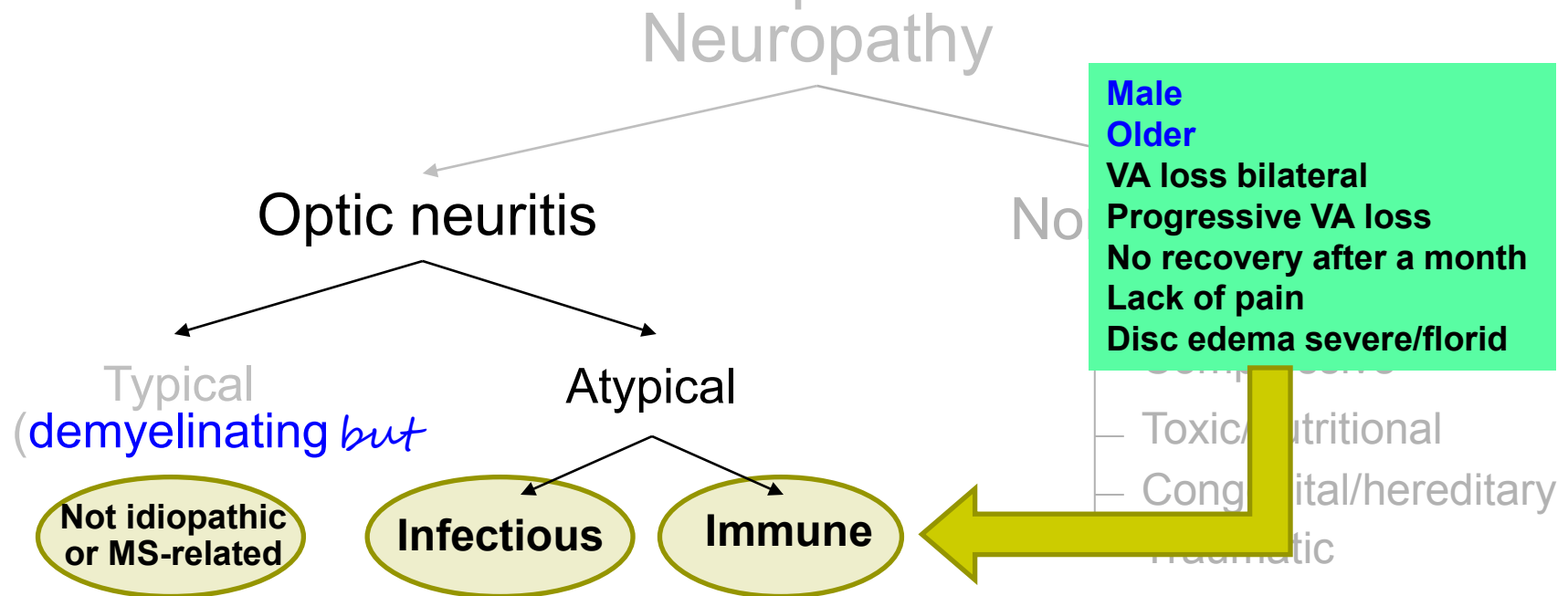
Meningeal process

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MOGAD

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(Cont)

Granulomatosis w/ polyangiitis: ANCA

LHON: Genetic testing

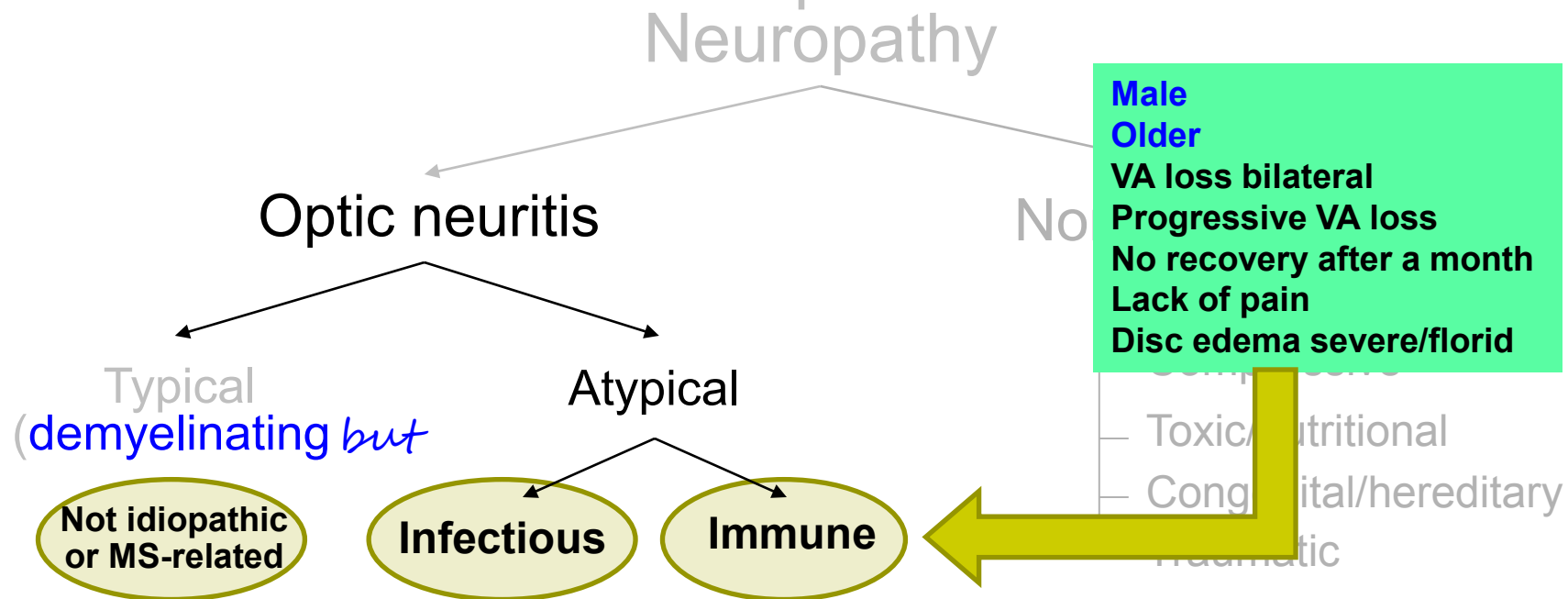
Meningeal process: ?

NMO(SD)

MOGAD

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(Cont)

Granulomatosis w/ polyangiitis: ANCA

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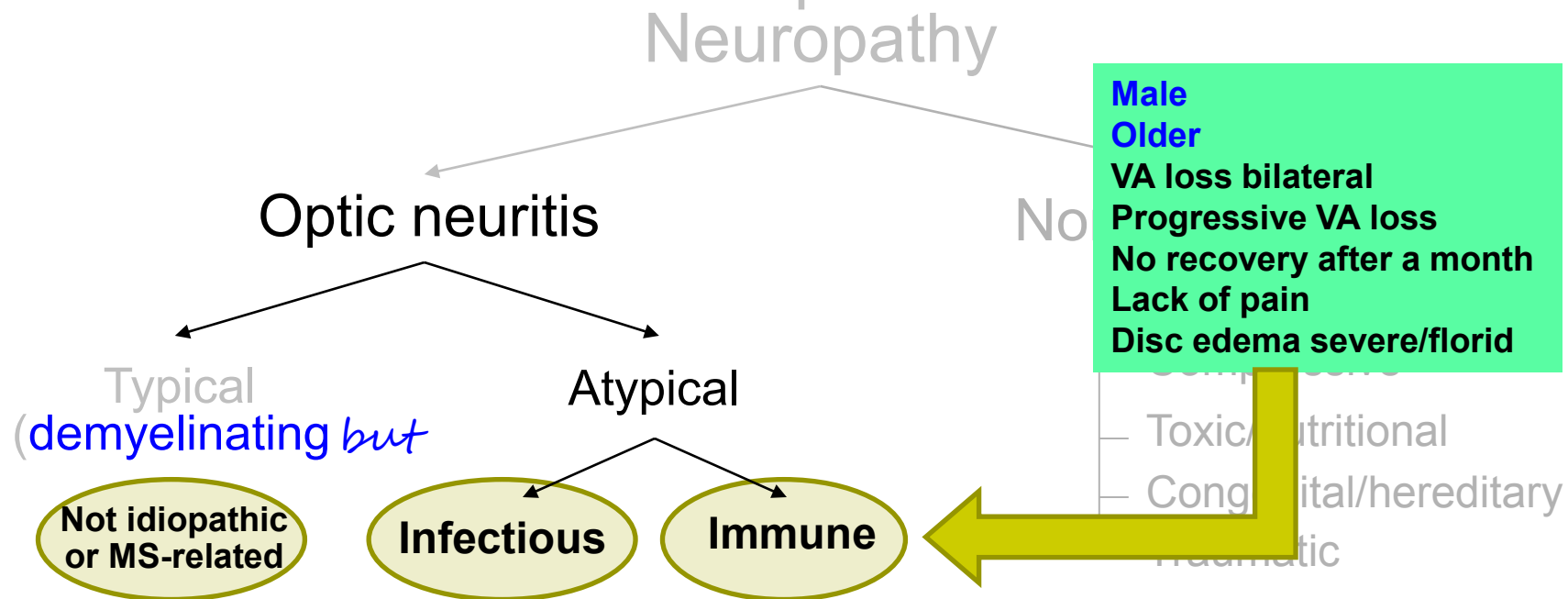
Meningeal process: LP with cytology

NMO(SD)

MOGAD

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(Cont)

Granulomatosis w/ polyangiitis: ANCA

LHON: Genetic testing

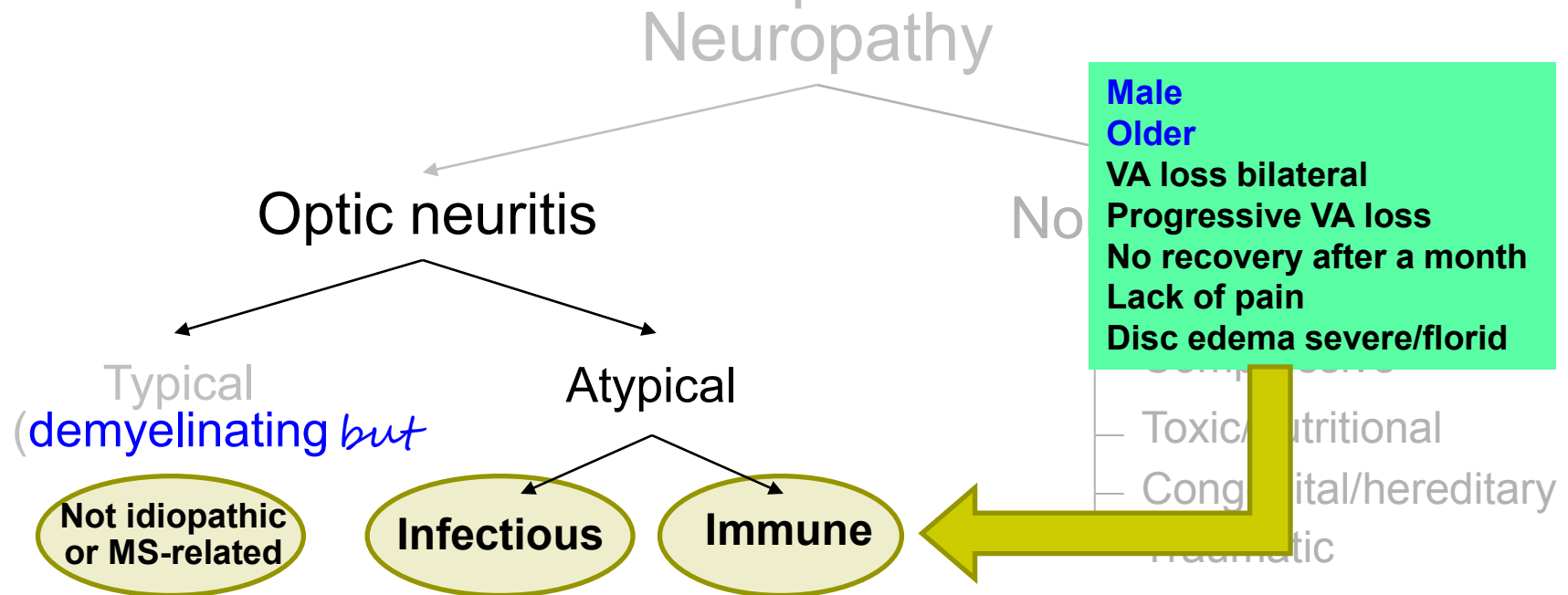
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MOGAD

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(Cont)

Granulomatosis w/ polyangiitis: ANCA

LHON: Genetic testing

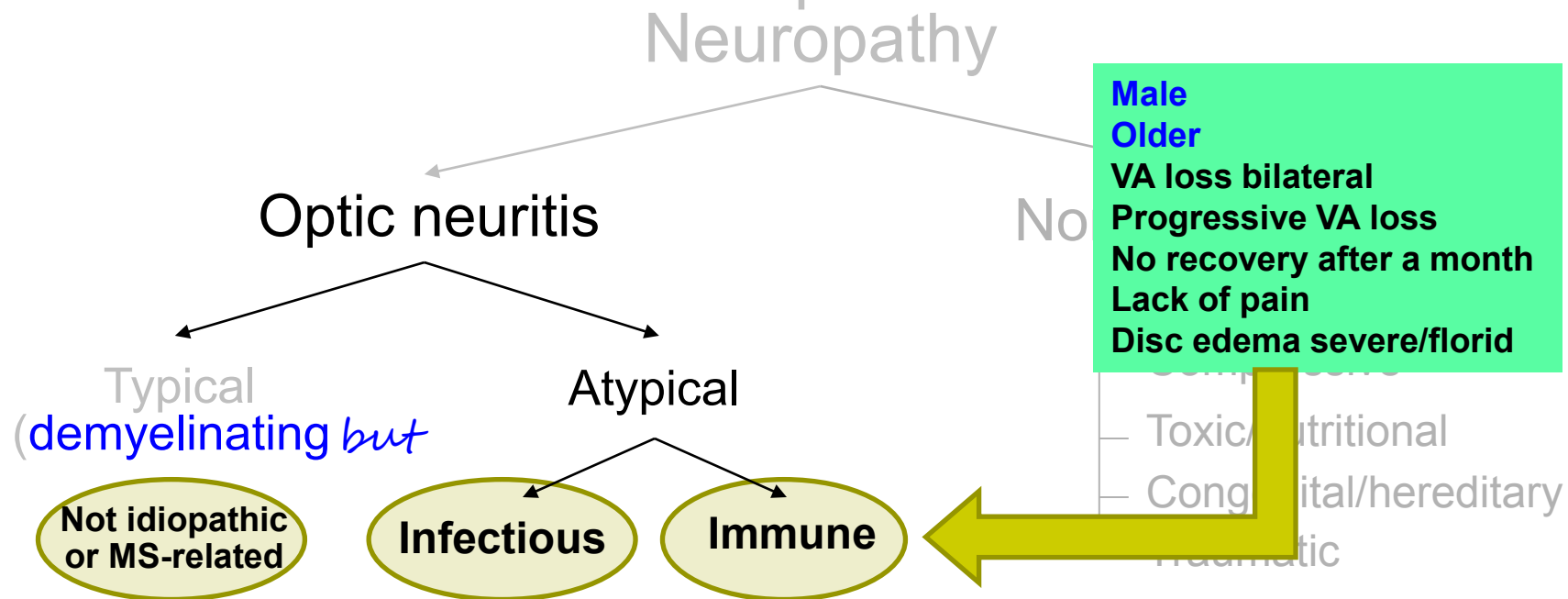
Meningeal process: LP with cytology

NMO(SD): Serum AQP4-IgG, spinal MRI

MOGAD

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(Cont)

Granulomatosis w/ polyangiitis: ANCA

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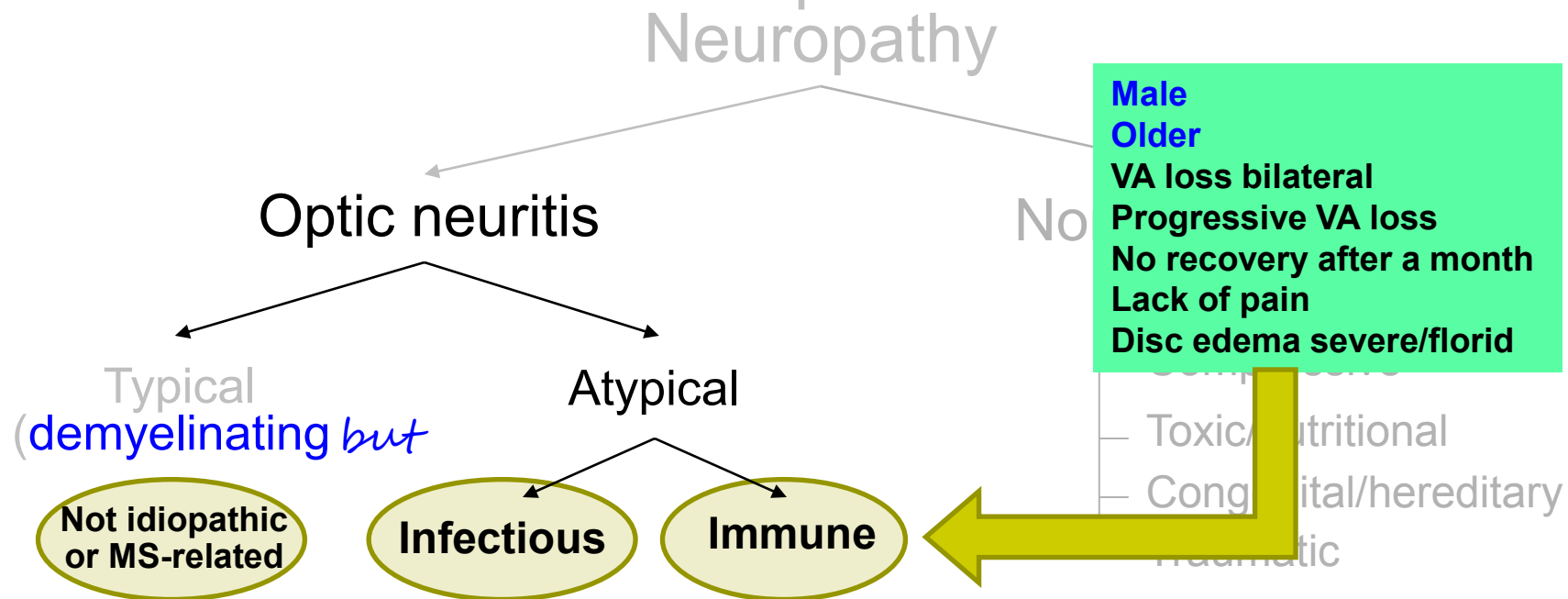
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MOGAD: ?

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(Cont)

Granulomatosis w/ polyangiitis: ANCA

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Meningeal process: LP with cytology

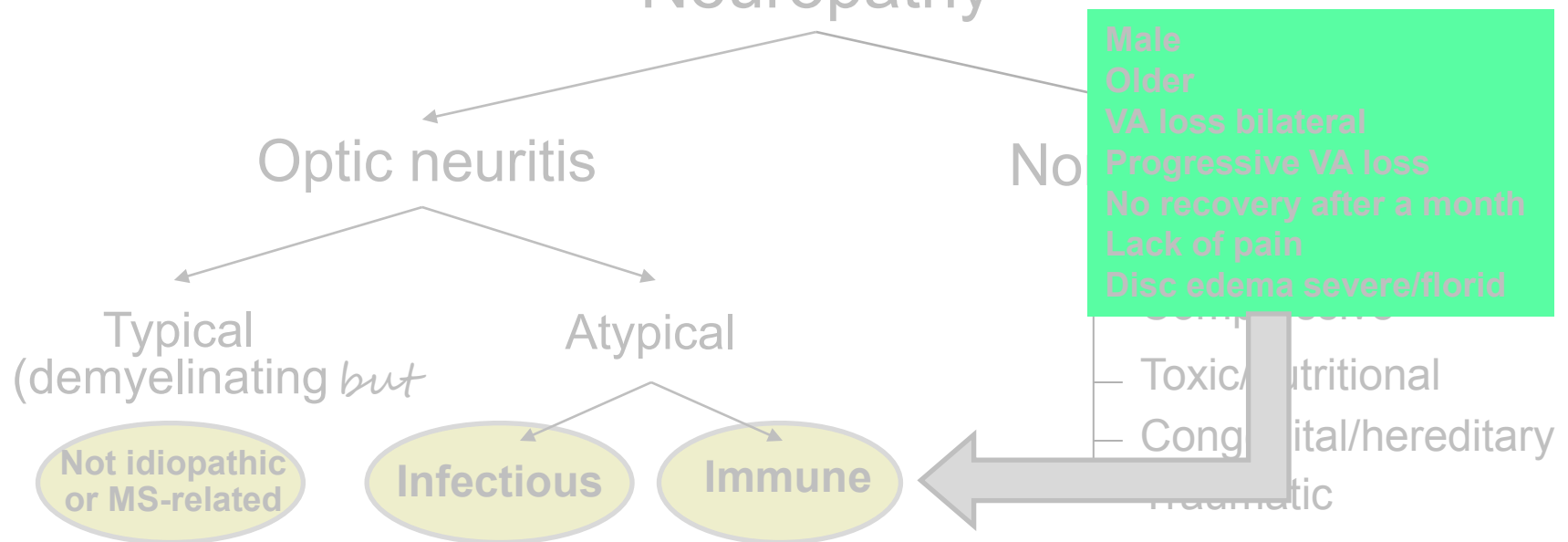
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MOGAD: Serum MOG-IgG

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Neuropathy



What etiologies? What studies?

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Lyme testing (if endemic): Serum/CSF ELISA

(Cont)

Granulomatosis w/ polyangiitis: ANCA

LHON: Genetic testing

Meningeal process: LP with cytology

NMO(SD): Serum AQP4-IgG, spinal MRI
MOGAD: Serum MOG-IgG

*We will address these conditions in
considerable detail later in the set*

Typical Optic Neuritis

If the pt or the presentation deviates from the typical pattern...
You should question the dx of typical (demyelinating) optic neuritis,
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Neuropathy

Optic neuritis

No

Male
Older
VA loss bilateral
Progressive VA loss
No recovery after a month
Lack of pain

But first let's take a minute to drill down on MS

Typical (demyelinating but

— Toxic/nutritional
— Congenital/hereditary
— Traumatic

Not idiopathic
or MS-related

Infectious

Immune

What etiologies? What studies?

Syphilis: Serum and CSF RPR/TPPA

Bartonella: IgM titers

Lyme testing (if endemic): Serum/CSE ELISA

(Cont)

Granulomatosis w/ polyangiitis: ANCA

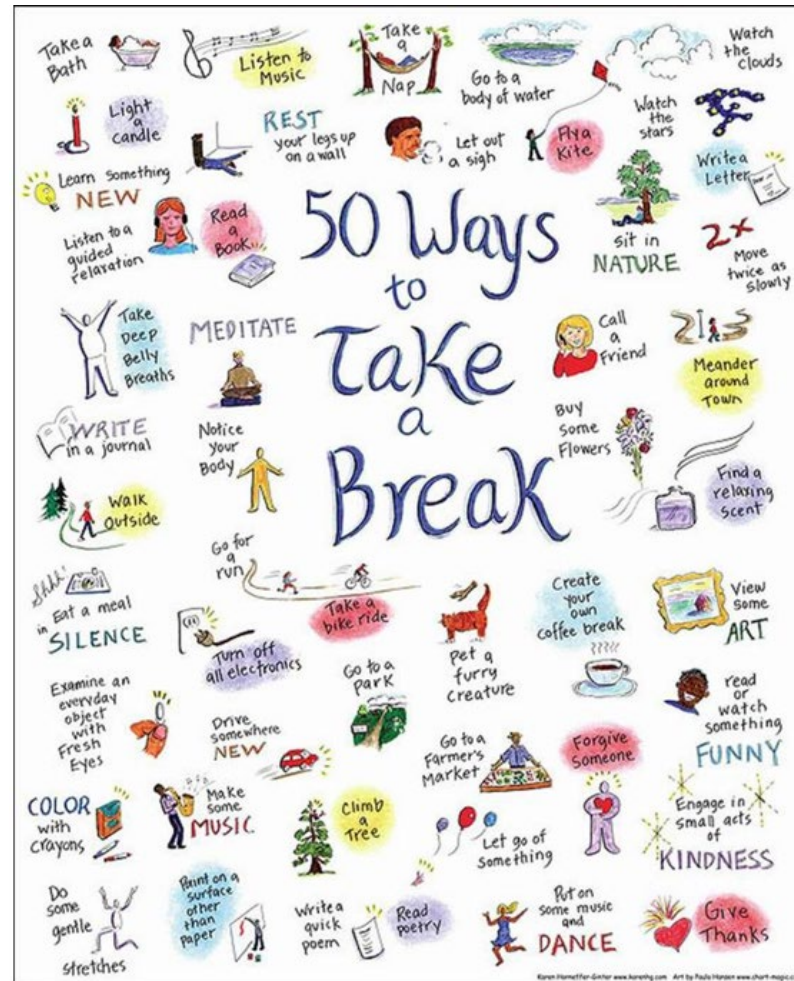
LHON: Genetic testing

Meningeal process: LP with cytology

NMO(SD): Serum AQP4-IgG, spinal MRI
MOGAD: Serum MOG-IgG

*We will address these conditions in
considerable detail later in the set*

Typical Optic Neuritis

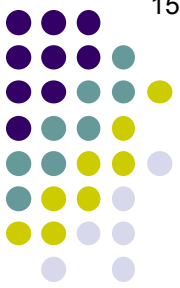


(This is a good point in the set to take a break)

Typical Optic Neuritis

CDMS: *Basics*

What does CDMS stand for in this context?

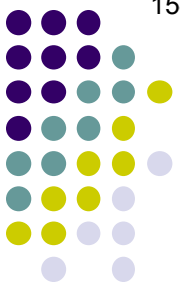


Typical Optic Neuritis

CDMS: *Basics*

What does CDMS stand for in this context?

Clinically-definite multiple sclerosis



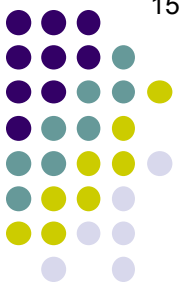
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In a nutshell, what is MS?



Typical Optic Neuritis

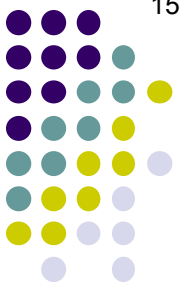
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In a nutshell, what is MS?

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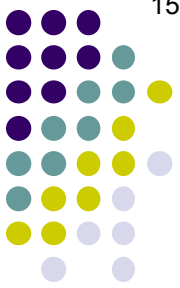
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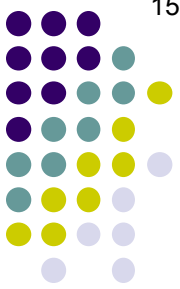
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Yes, it is more common in

M vs F



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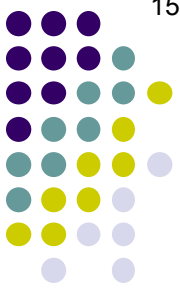
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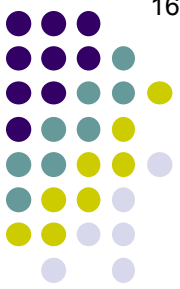
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Yes, it is more common in women (# to # times more common, in fact)



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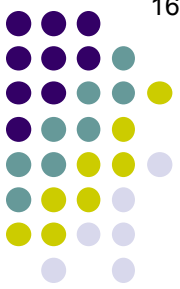
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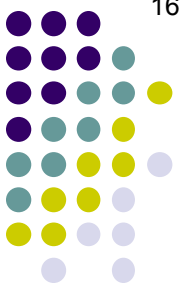
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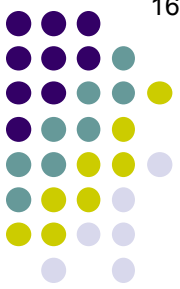
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life stage

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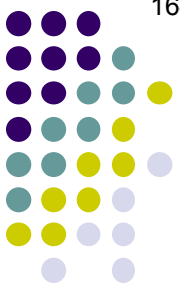
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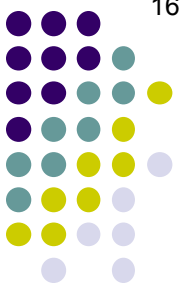
Is there an age predilection?

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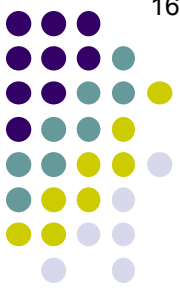
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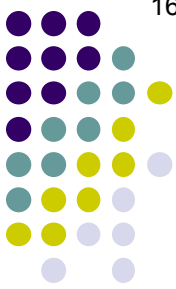
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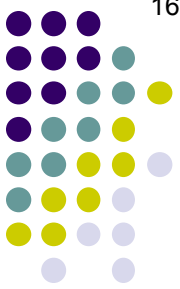
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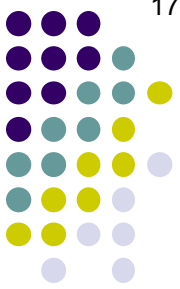
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Is there a racial predilection?

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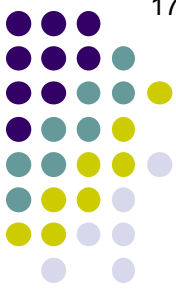
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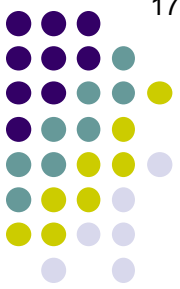
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There is a geographic predilection—what is it?

It is more prevalent among people who live closer to v farther from the equator

Typical Optic Neuritis

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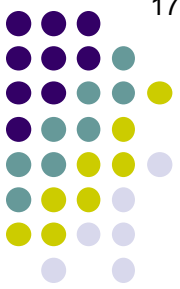
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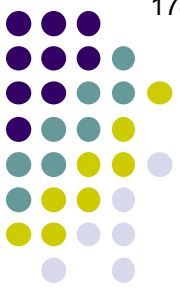
There is a geographic predilection—what is it?

It is more prevalent among people who live farther from the equator

What is the classic two-word description of the typical clinical course in MS?

Typical Optic Neuritis

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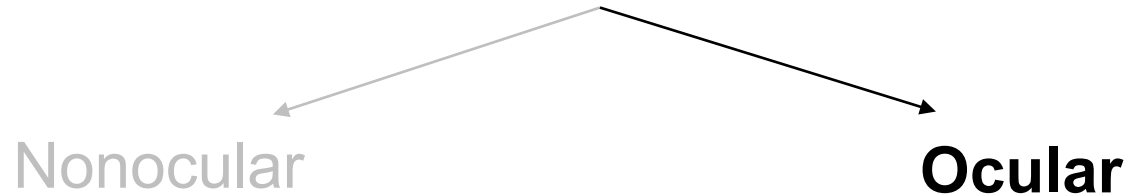
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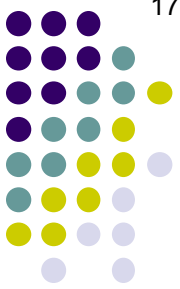
‘Relapsing-remitting’

Typical Optic Neuritis

CDMS: *Manifestations*

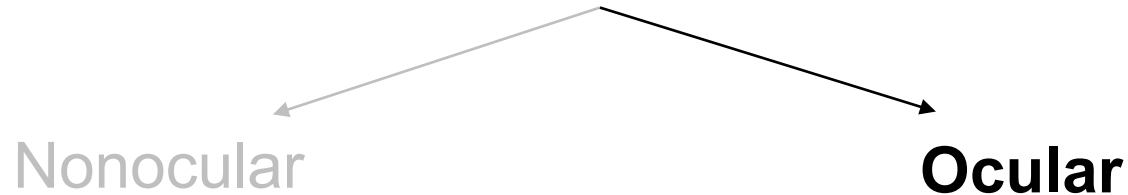


Are ocular manifestations common in MS?



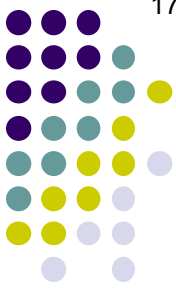
Typical Optic Neuritis

CDMS: *Manifestations*



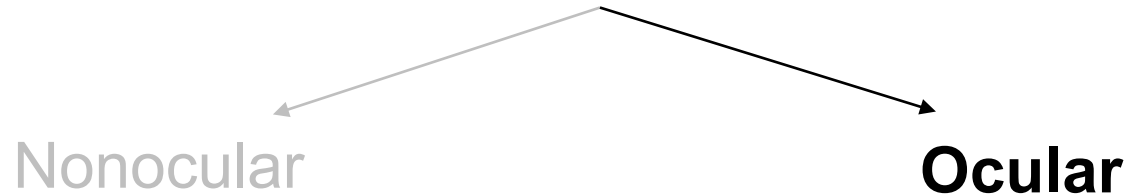
Are ocular manifestations common in MS?

Indeed they are—optic neuritis occurs in % of MS cases



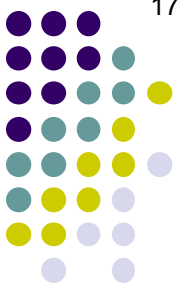
Typical Optic Neuritis

CDMS: *Manifestations*



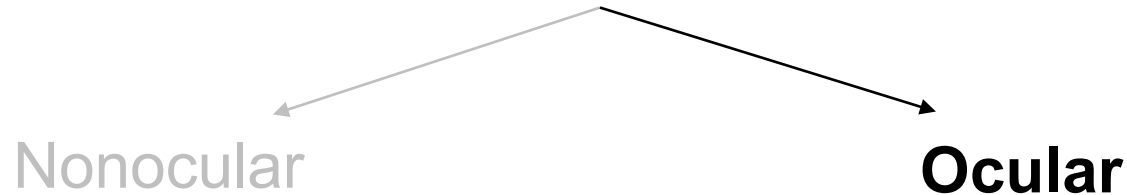
Are ocular manifestations common in MS?

Indeed they are—optic neuritis occurs in 75% of MS cases



Typical Optic Neuritis

CDMS: *Manifestations*

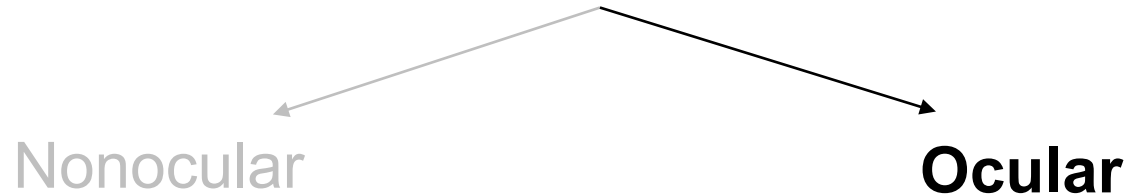


Are ocular manifestations common in MS?

Indeed they are—optic neuritis occurs in 75% of MS cases (and is the presenting symptom in %)

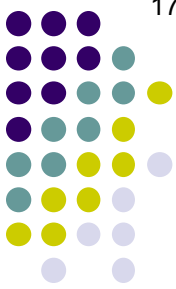
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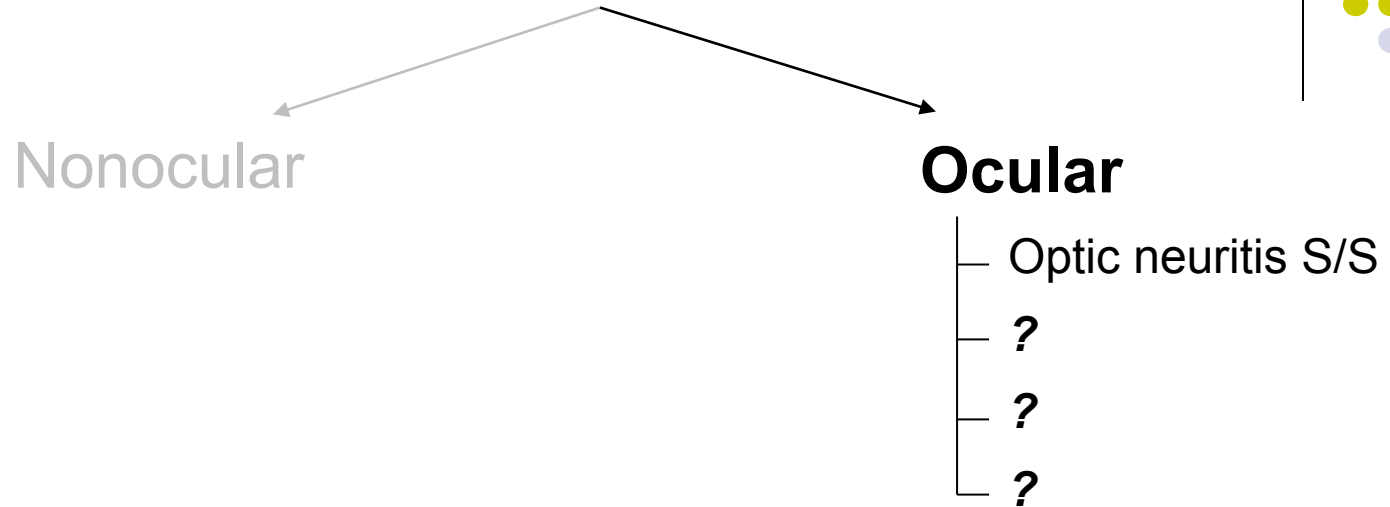
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Typical Optic Neuritis

CDMS: *Manifestations*



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*Three **non**-neuritis ocular manifestations are often encountered as well—what are they?*

Typical Optic Neuritis

CDMS: *Manifestations*

Nonocular

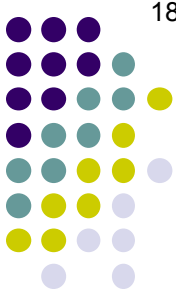
Ocular

- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- Uveitis

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Typical Optic Neuritis

CDMS: *Manifestations*

Nonocular

In a nutshell, what is a nystagmus and/or oscillation?

Ocular

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Typical Optic Neuritis

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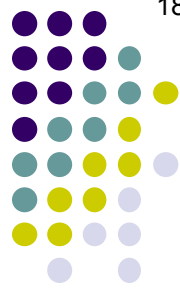
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In a nutshell, what is a nystagmus and/or oscillation?

Both are involuntary eye-movement patterns that involve displacement of gaze off of its intended target, followed by a refixation movement

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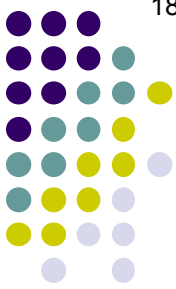
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What is the difference between a nystagmus and an oscillation?

In a nystagmus, the velocity of the displacement movement is by definition slow v fast, whereas in an oscillation it's by definition slow v fast

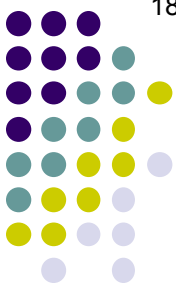
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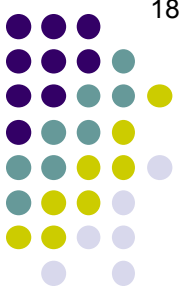
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But I thought jerk nystagmus was fast, and pendular nystagmus was slow. What's the deal?

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What's the deal?

You thought correct—jerk is fast, pendular slow. But these terms refer to the speed of the **refixation** movement—the initial displacement is slow in both.

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Is nystagmus/oscillations a common, or rare occurrence in MS?

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Common (especially nystagmus)

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Common (especially nystagmus)

Is there a particular direction (ie, horizontal, vertical, rotary) in which the nystagmus tends to manifest?

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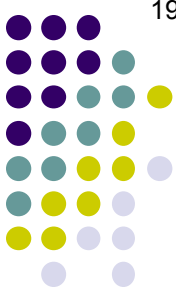
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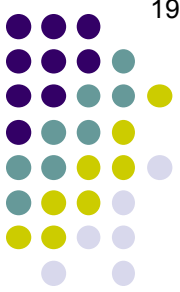
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Is diplopia a common manifestation of MS?

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Typical Optic Neuritis

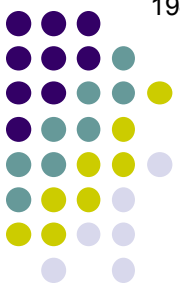
CDMS: *Manifestations*

Nonocular

Is diplopia a common manifestation of MS?
Indeed it is

Ocular

- Optic neuritis S/S
- Nystagmus/oscillations
- **Diplopia**
- Uveitis



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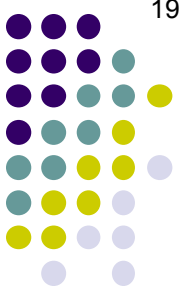
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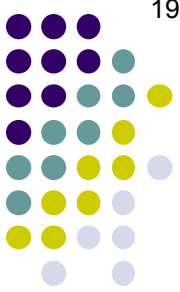
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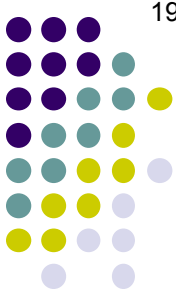
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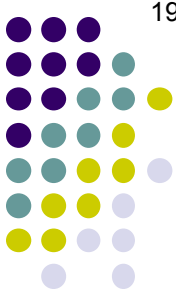
--The *Internuclear* pathway

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Broadly speaking, what constitutes the supranuclear pathways?

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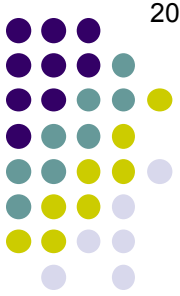
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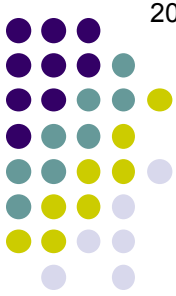
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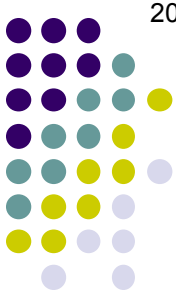
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What does PSP stand for in this context?

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What does PSP stand for in this context?
Progressive **supranuclear** palsy

Ocular

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Optic neuritis S/S

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Typical Optic Neuritis

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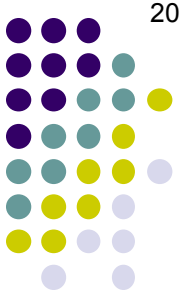
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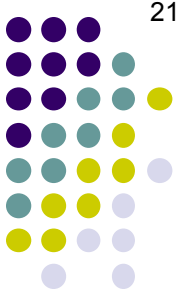
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Which two cranial nerve nuclei share an internuclear connection of well-established clinical importance?



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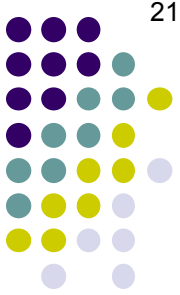
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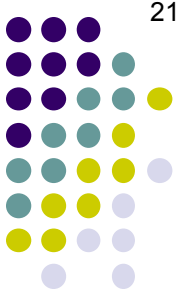
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Which two cranial nerve nuclei share an internuclear connection of well-established clinical importance?
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What is the name of the internuclear connection shared by these two nuclei?



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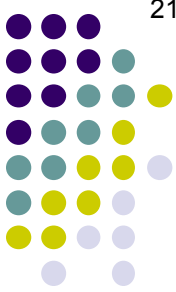
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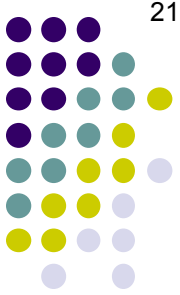
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An **internuclear ophthalmoplegia (INO)**

Ocular

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In a nutshell, how does a unilateral INO manifest?

Typical Optic Neuritis

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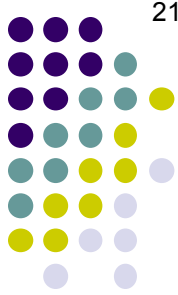
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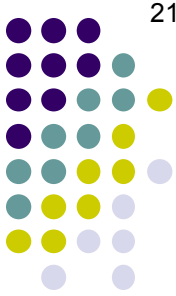
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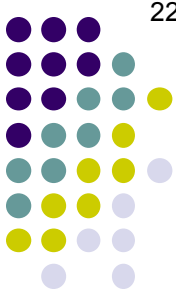
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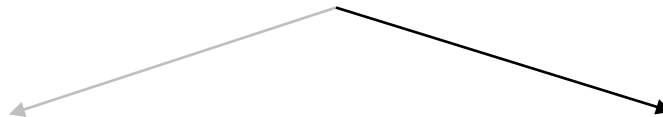
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*How does a **bilateral** INO manifest?*

Damage to the INO results in what clinical condition?
An **internuclear ophthalmoplegia (INO)**



CDMS: *Manifestations*



Ocular

An **internuclear ophthalmoplegia (INO)**

Diplopia

Typical Optic Neuritis

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*How does a **bilateral** INO manifest?*

With the same motility difficulties, but on attempted lateral gaze in *either* direction. Both eyes are often exotropic in primary, resulting in a WEBINO (acronym for wall-eyed bilateral INO).

Damage to the INO results in what clinical condition?
An **internuclear ophthalmoplegia (INO)**



Typical Optic Neuritis



Right gaze



Primary



Left gaze

WEBINO

Typical Optic Neuritis

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If you see a young person with a WEBINO, think MS!

An **internuclear ophthalmoplegia (INO)**



Typical Optic Neuritis

CDMS: *Manifestations*

What constitutes the infranuclear pathway?



Optic Neuritis S/S

Visual evoked potentials/oscillations

Why?

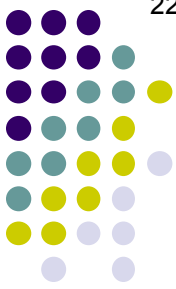
--The *Infranuclear* pathway

Typical Optic Neuritis

CDMS: *Manifestations*

What constitutes the infranuclear pathway?

Everything after the nuclei: the axons as they run through the brainstem to enter the subarachnoid space; the 'cranial nerve' portion as it passes through the subarachnoid space into the cavernous sinus and then the orbit to the neuromuscular junction; the junction itself; and finally the EOMs themselves.



Optic Neuritis S/S

Visual evoked potentials/oscillations

Why?

--The *Infranuclear* pathway

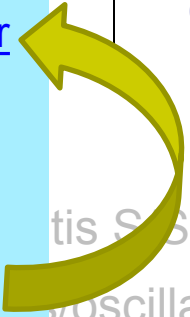
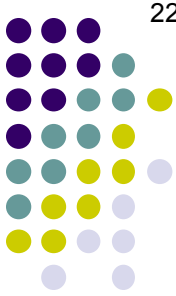
Typical Optic Neuritis

CDMS: *Manifestations*

What constitutes the infranuclear pathway?

Everything after the nuclei: the axons as they run through the brainstem to enter the subarachnoid space; the 'cranial nerve' portion as it passes through the subarachnoid space into the cavernous sinus and then the orbit to the neuromuscular junction; the junction itself; and finally the EOMs themselves.

Note that the only portion of the infranuclear pathway that is located within the CNS is the [redacted] portion, ie, the axon bundle that has left the CN nucleus, but is still within the substance of the brainstem.



--The *Infranuclear* pathway

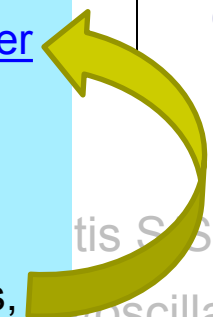
Typical Optic Neuritis

CDMS: *Manifestations*

What constitutes the infranuclear pathway?

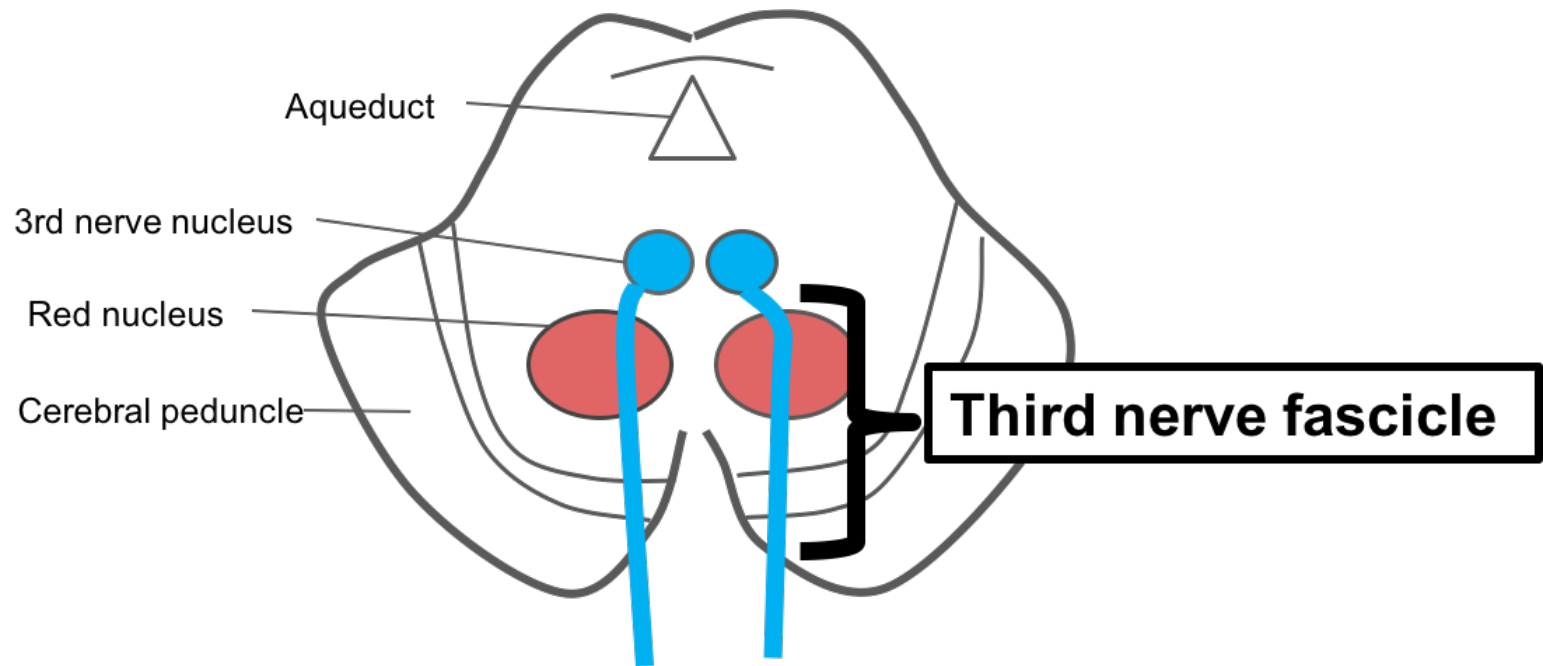
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Note that the only portion of the infranuclear pathway that is located within the CNS is the *fascicular portion*, ie, the axon bundle that has left the CN nucleus, but is still within the substance of the brainstem.



--The *Infranuclear* pathway

Typical Optic Neuritis



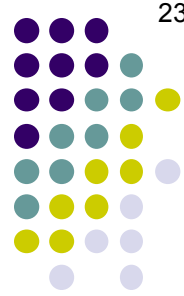
Cranial nerve fascicle

Typical Optic Neuritis

CDMS: *Manifestations*

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Optic Neuritis S/S
Fluctuating vision
oscillations

Why?

--The **Infranuclear** pathway

Typical Optic Neuritis

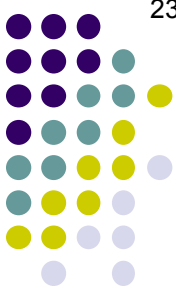
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The cranial-nerve nuclei and their fascicles are located within the brainstem. Given this, it shouldn't come as a surprise that, generally speaking, lesions of the nuclei and/or fascicles do not present with *isolated* EOM abnormalities; ie, the ophthalmoparesis is almost always accompanied by **nonocular** signs and symptoms of CNS damage—that is, a stroke-like presentation.

--The *Infranuclear* pathway



itis S/S

s/oscillations

hey?



Typical Optic Neuritis

CDMS: *Manifestations*

What constitutes the infranuclear level?
Everything after the nuclei: the area between the subarachnoid space; the 'cranial' subarachnoid space into the cavity of the neuromuscular junction; the junction itself.
Note that the only portion of the CNS is the fascicular portion, i.e., the portion that has entered the subarachnoid space.

What term is used to describe conditions presenting with motility dysfunction 2ndry to fascicle damage + non-ocular CNS findings?

The cranial-nerve nuclei and the cranial-nerve fascicles.
Given this, it shouldn't come as a surprise that cranial-nerve nuclei and/or fascicles do not present with isolated ophthalmoparesis.

Ophthalmoparesis is almost always accompanied by nonocular signs and symptoms of CNS damage—that is, a stroke-like presentation.

--The *Infranuclear* pathway



Typical Optic Neuritis

CDMS: *Manifestations*

What constitutes the infranuclear level?
Everything after the nuclei: the area between the subarachnoid space; the 'cranial' subarachnoid space into the cavity of the neuromuscular junction; the junction itself.
Note that the only portion of the optic nerve in the CNS is the fascicular portion, i.e., the portion that has entered the subarachnoid space.

The cranial-nerve nuclei and the optic nerve itself.
Given this, it shouldn't come as a surprise that optic neuritis and/or fascicles do not present with isolated

ophthalmoparesis is almost always accompanied by nonocular signs and symptoms of CNS damage—that is, a stroke-like presentation.

What term is used to describe conditions presenting with motility dysfunction 2ndry to fascicle damage + non-ocular CNS findings?

Fascicular syndrome

--The ***Infranuclear*** pathway



Typical Optic Neuritis

CDMS: *Manifestations*

What constitutes the infranuclear level?
Everything after the nuclei: the area between the subarachnoid space; the 'cranial' subarachnoid space into the cavity of the neuromuscular junction; the junction itself. Note that the only portion of the CNS is the fascicular portion, is still within the substance of the brain but has entered the subarachnoid space.

The cranial-nerve nuclei and the fascicles themselves. Given this, it shouldn't come as a surprise that if the nuclei and/or fascicles do not properly conduct, the result is

ophthalmoparesis is almost always accompanied by nonocular signs and symptoms of CNS damage—that is, a stroke-like presentation.

--The *Infranuclear* pathway

What term is used to describe conditions presenting with motility dysfunction 2ndary to fascicle damage + non-ocular CNS findings?

Fascicular syndrome

Four fascicular syndromes involve the CN3 fascicle—what are they?

--?

--?

--?

--?



Typical Optic Neuritis

CDMS: *Manifestations*

What constitutes the infranuclear level?
Everything after the nuclei: the area between the subarachnoid space; the 'cranial' subarachnoid space into the cavity of the neuromuscular junction; the junction itself. Note that the only portion of the CNS is the fascicular portion, which is still within the substance of the nerve but has entered the subarachnoid space.

The cranial-nerve nuclei and the fascicles themselves. Given this, it shouldn't come as a surprise that if the nuclei and/or fascicles do not project properly, the result is

ophthalmoparesis is almost always accompanied by nonocular signs and symptoms of CNS damage—that is, a stroke-like presentation.

What term is used to describe conditions presenting with motility dysfunction 2ndary to fascicle damage + non-ocular CNS findings?

Fascicular syndrome

Four fascicular syndromes involve the CN3 fascicle—what are they?

- Weber syndrome
- Benedikt syndrome
- Claude syndrome
- Nothnagel syndrome

--The ***Infranuclear*** pathway



Typical Optic Neuritis

CDMS: *Manifestations*

What constitutes the infranuclear level?
Everything after the nuclei: the area between the subarachnoid space; the 'cranial' subarachnoid space into the cavity of the neuromuscular junction; the junction of the nerve with the muscle.
Note that the only portion of the CNS is the fascicular portion, which is still within the substance of the nerve but has entered the subarachnoid space.

The cranial-nerve nuclei and the fascicles are in the CNS.
Given this, it shouldn't come as a surprise that if the nuclei and/or fascicles do not project properly, there will be ophthalmoparesis.

Ophthalmoparesis is almost always accompanied by nonocular signs and symptoms of CNS damage—that is, a stroke-like presentation.

What term is used to describe conditions presenting with motility dysfunction secondary to fascicle damage + non-ocular CNS findings?

Fascicular syndrome

Four fascicular syndromes involve the CN3 fascicle—what are they?

- Weber syndrome
- Benedikt syndrome
- Claude syndrome
- Nothnagel syndrome

Three fascicular syndromes involve the CN6 fascicle—what are they?

- ?
- ?
- ?

--The **Infranuclear pathway**



Typical Optic Neuritis

CDMS: *Manifestations*

What constitutes the infranuclear level?
Everything after the nuclei: the area between the subarachnoid space; the 'cranial' subarachnoid space into the cavity of the neuromuscular junction; the junction of the nerve with the muscle.
Note that the only portion of the optic nerve that is within the CNS is the fascicular portion, which enters the subarachnoid space.

The cranial-nerve nuclei and the optic nerve fascicles do not project to the same level of the brainstem. Given this, it shouldn't come as a surprise that optic neuritis and/or fascicles do not project to the same level of the brainstem. Optic neuritis is almost always accompanied by nonocular signs and symptoms of CNS damage—that is, a stroke-like presentation.

What term is used to describe conditions presenting with motility dysfunction secondary to fascicle damage + non-ocular CNS findings?

Fascicular syndrome

Four fascicular syndromes involve the CN3 fascicle—what are they?

- Weber syndrome
- Benedikt syndrome
- Claude syndrome
- Nothnagel syndrome

Three fascicular syndromes involve the CN6 fascicle—what are they?

- Millard-Gubler syndrome
- Foville syndrome
- Raymond syndrome

--The **Infranuclear pathway**

Typical Optic Neuritis

CDMS: *Manifestations*

Nonocular

Is diplopia a common manifestation of MS?
Indeed it is

Taking a step back: Which three cranial nerves are responsible for controlling eye position (and thus are implicated in diplopia)?
3, 4 and 6

Step-back II: The EOM control pathway has four levels or subsections. What are they?
--The *Supranuclear* pathways
--The *Internuclear* pathway
--The *Nuclear* level: The CN3, 4 and 6 nuclei themselves
--The *Infranuclear* pathway

At last: Which of these portions of the EOM control pathway can be affected in MS?

Ocular

- Optic neuritis S/S
- Nystagmus/oscillations
- **Diplopia**
- Uveitis



Typical Optic Neuritis

CDMS: *Manifestations*

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Taking a step back: Which three cranial nerves are responsible for controlling eye position (and thus are implicated in diplopia)?
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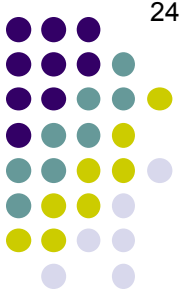
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At last: Which of these portions of the EOM control pathway can be affected in MS?

Recall that MS was defined as a neurodegenerative disorder of the CNS. The last portion of the EOM pathway that is located within the CNS is the nerve .

Ocular

- Optic neuritis S/S
- Nystagmus/oscillations
- **Diplopia**
- Uveitis



Typical Optic Neuritis

CDMS: *Manifestations*



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Ocular

- Optic neuritis S/S
- Nystagmus/oscillations
- **Diplopia**
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Typical Optic Neuritis

CDMS: *Manifestations*

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At last: Which of these portions of the EOM control pathway can be affected in MS?

Recall that MS was defined as a neurodegenerative disorder of the CNS. The last portion of the EOM pathway that is located within the CNS is the nerve fascicles. **Thus, MS damage can (and does) occur in the *supranuclear*, *internuclear*, and *nuclear* portions, as well as the fascicular section of the *infranuclear* portion.**

Ocular

- Optic neuritis S/S
- Nystagmus/oscillations
- **Diplopia**
- Uveitis



Typical Optic Neuritis

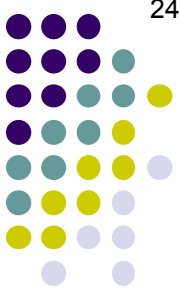
CDMS: *Manifestations*

Nonocular

MS conveys an increased risk of uveitis. How much?

Ocular

- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- **Uveitis**



Typical Optic Neuritis

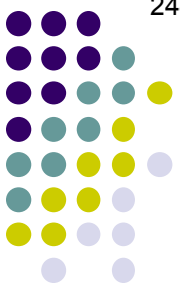
CDMS: *Manifestations*

Nonocular

MS conveys an increased risk of uveitis. How much?
MS pts are # times more likely to experience uveitis than are non-MS individuals!

Ocular

- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- **Uveitis**



Typical Optic Neuritis

CDMS: *Manifestations*

Nonocular

MS conveys an increased risk of uveitis. How much?
MS pts are 10 times more likely to experience uveitis than are non-MS individuals!

Ocular

- Optic neuritis S/S
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- Diplopia
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Typical Optic Neuritis

CDMS: *Manifestations*

Nonocular

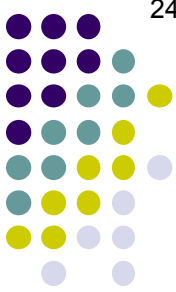
MS conveys an increased risk of uveitis. How much?

MS pts are 10 times more likely to experience uveitis than are non-MS individuals!

What proportion of MS pts will develop uveitis at some point?

Ocular

- Optic neuritis S/S
- Nystagmus/oscillations
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Typical Optic Neuritis

CDMS: *Manifestations*

Nonocular

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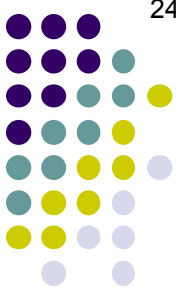
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What proportion of MS pts will develop uveitis at some point?

About 1/3

Ocular

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Typical Optic Neuritis

CDMS: *Manifestations*

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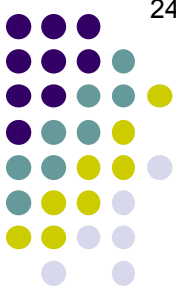
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In those MS pts who develop it: Does it tend to precede, or follow, their MS diagnosis?

Ocular

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Typical Optic Neuritis

CDMS: *Manifestations*

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To follow

Ocular

Optic neuritis S/S

Nystagmus/oscillations

Diplopia

Uveitis

Typical Optic Neuritis

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In those MS pts who develop it: Does it tend to precede, or follow, their MS diagnosis?

To follow, **but**: As many as % of MS pts will manifest uveitis up to amount of time prior to their eventual MS diagnosis!

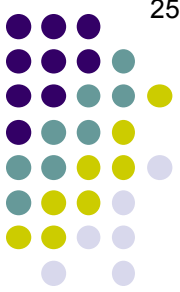
Ocular

Optic neuritis S/S

Nystagmus/oscillations

Diplopia

Uveitis



Typical Optic Neuritis

CDMS: *Manifestations*

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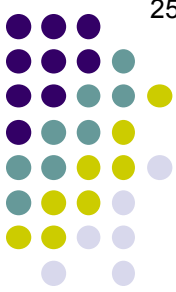
About 1/3

In those MS pts who develop it: Does it tend to precede, or follow, their MS diagnosis?

To follow, but: As many as 25% of MS pts will manifest uveitis up to 10 years prior to their eventual MS diagnosis!

Ocular

- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- **Uveitis**





Typical Optic Neuritis

CDMS: *Manifestations*

Nonocular

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About 1/3

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To follow, but: As many as 25% of MS pts will manifest uveitis up to 10 years prior to their eventual MS diagnosis!

MS has several HLA associations, one of which conveys a higher risk of developing uveitis. Which one?

Ocular

Optic neuritis S/S

Nystagmus/oscillations

Diplopia

Uveitis

Typical Optic Neuritis

CDMS: *Manifestations*

Nonocular

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HLA-DR15

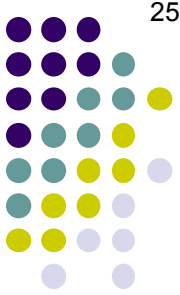
Ocular

Optic neuritis S/S

Nystagmus/oscillations

Diplopia

Uveitis



Typical Optic Neuritis

CDMS: *Manifestations*

Nonocular

MS conveys an increased risk of uveitis. How much?

MS pts are 10 times more likely to experience uveitis than are non-MS individuals!

Taking a step back: There are four types of uveitis, based on the location of the inflammation. What are they?

--?

--?

--?

--?

Ocular

- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- **Uveitis**



Typical Optic Neuritis

CDMS: *Manifestations*

Nonocular

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Taking a step back: There are four types of uveitis, based on the location of the inflammation. What are they?

--Anterior

--Intermediate

--Posterior

--Panuveitis

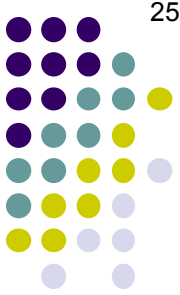
Ocular

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Typical Optic Neuritis

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--Anterior: ?

--Intermediate

--Posterior

--Panuveitis

Ocular

Optic neuritis S/S

Nystagmus/oscillations

Diplopia

Uveitis



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*Taking a step back: There are four types of uveitis, based on the location of the inflammation. What are they? **How is each defined?***

--Anterior: The primary location of inflammation is the

two diff words

two words

and/or

--Intermediate

--Posterior

--Panuveitis

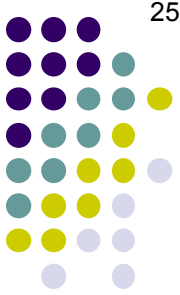
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Typical Optic Neuritis

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*Taking a step back: There are four types of uveitis, based on the location of the inflammation. What are they? **How is each defined?***

--Anterior: **The primary location of inflammation is the anterior chamber and/or anterior vitreous**

--Intermediate

--Posterior

--Panuveitis

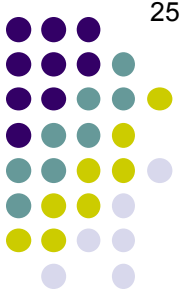
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--Intermediate: **?**

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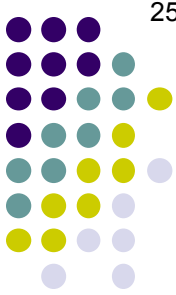
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--Anterior: The primary location of inflammation is the anterior chamber and/or anterior vitreous

--Intermediate: The primary location of inflammation is the two or three words, +/- the

two words

--Posterior

--Panuveitis

Ocular

Optic neuritis S/S

Nystagmus/oscillations

Diplopia

Uveitis

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--Posterior

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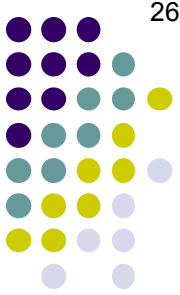
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--Posterior: ?

--Panuveitis

Ocular

Optic neuritis S/S

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Typical Optic Neuritis

CDMS: *Manifestations*

Nonocular

MS conveys an increased risk of uveitis. How much?

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*Taking a step back: There are four types of uveitis, based on the location of the inflammation. What are they? **How is each defined?***

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--Posterior: The site of inflammation is the [] and/or []

--Panuveitis

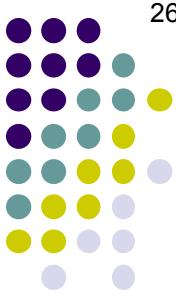
Ocular

Optic neuritis S/S

Nystagmus/oscillations

Diplopia

Uveitis



Typical Optic Neuritis

CDMS: *Manifestations*

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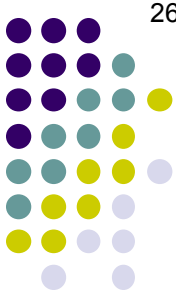
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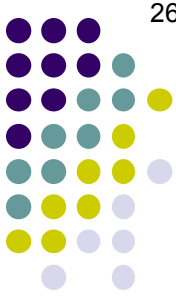
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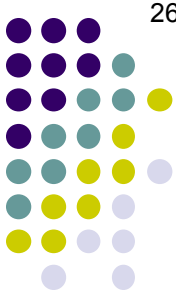
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Which form is most likely to occur in MS?

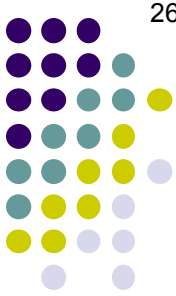
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Intermediate uveitis

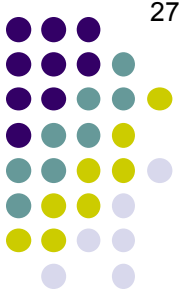
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Optic neuritis S/S

Nystagmus/oscillations

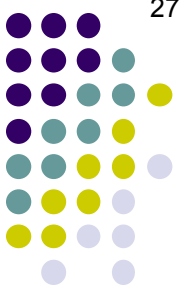
Diplopia

Uveitis



Typical Optic Neuritis

CDMS: *Manifestations*



Is intermediate uveitis in MS a unilateral, or bilateral condition?

MS con
MS pts
are non

uritis S/S

us/oscillations

Taking
the loca
defined

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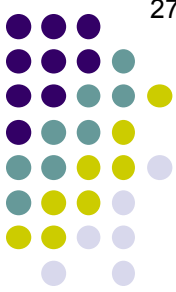
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Which form is most likely to occur in MS?

Intermediate uveitis

Typical Optic Neuritis

CDMS: *Manifestations*



Is intermediate uveitis in MS a unilateral, or bilateral condition?

It is bilateral

MS con
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Which form is most likely to occur in MS?

Intermediate uveitis

Typical Optic Neuritis

CDMS: *Manifestations*



Is intermediate uveitis in MS a unilateral, or bilateral condition?

It is bilateral in almost all (>%) cases

MS con
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Which form is most likely to occur in MS?

Intermediate uveitis

Typical Optic Neuritis

CDMS: *Manifestations*



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It is **bilateral** in almost all (>95%) cases

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MS pts
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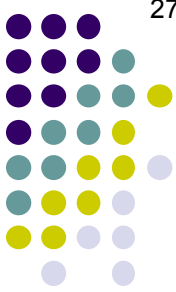
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Typical Optic Neuritis

CDMS: *Manifestations*



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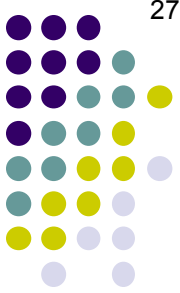
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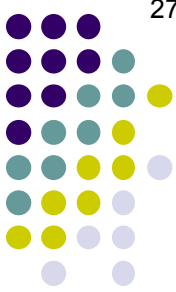
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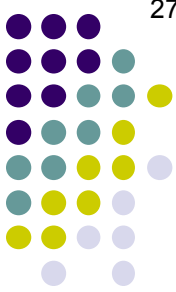
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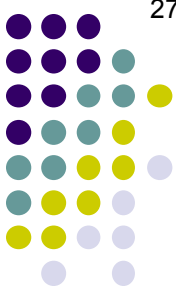
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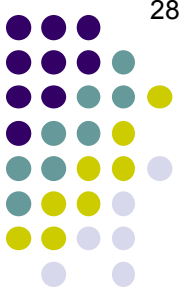
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uritis S/S

us/oscillations

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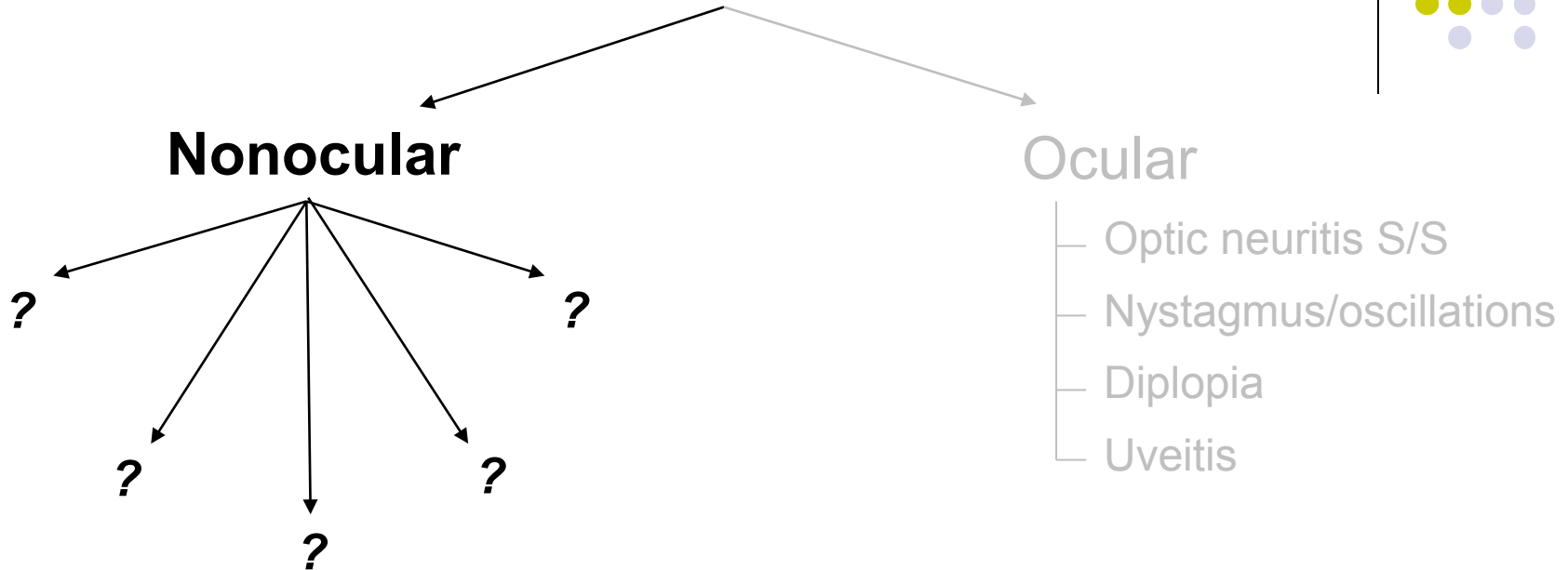
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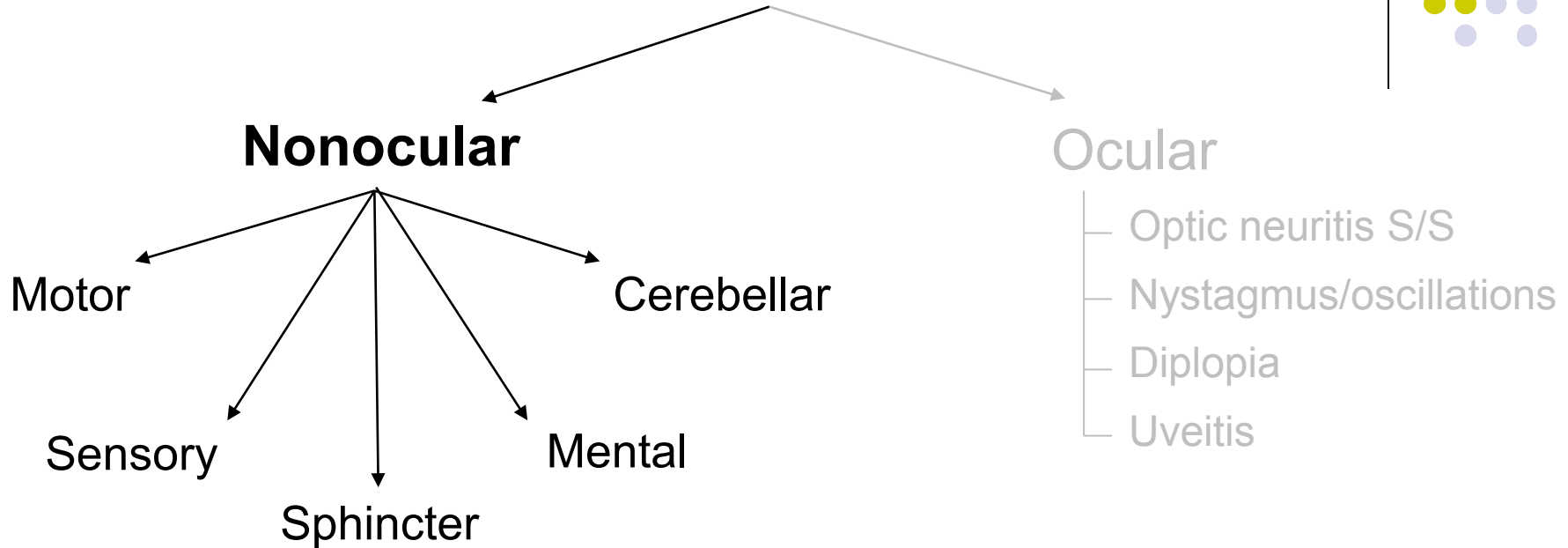
CDMS: *Manifestations*



The Neuro book divvies the nonocular S/S of MS into five groups—what are they?

Typical Optic Neuritis

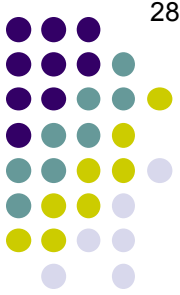
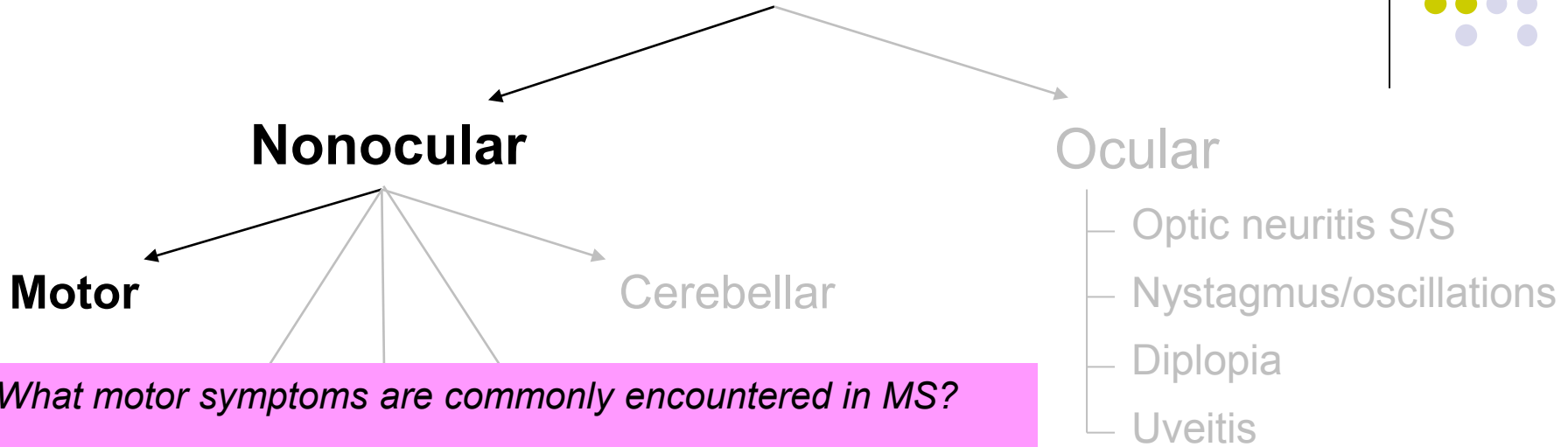
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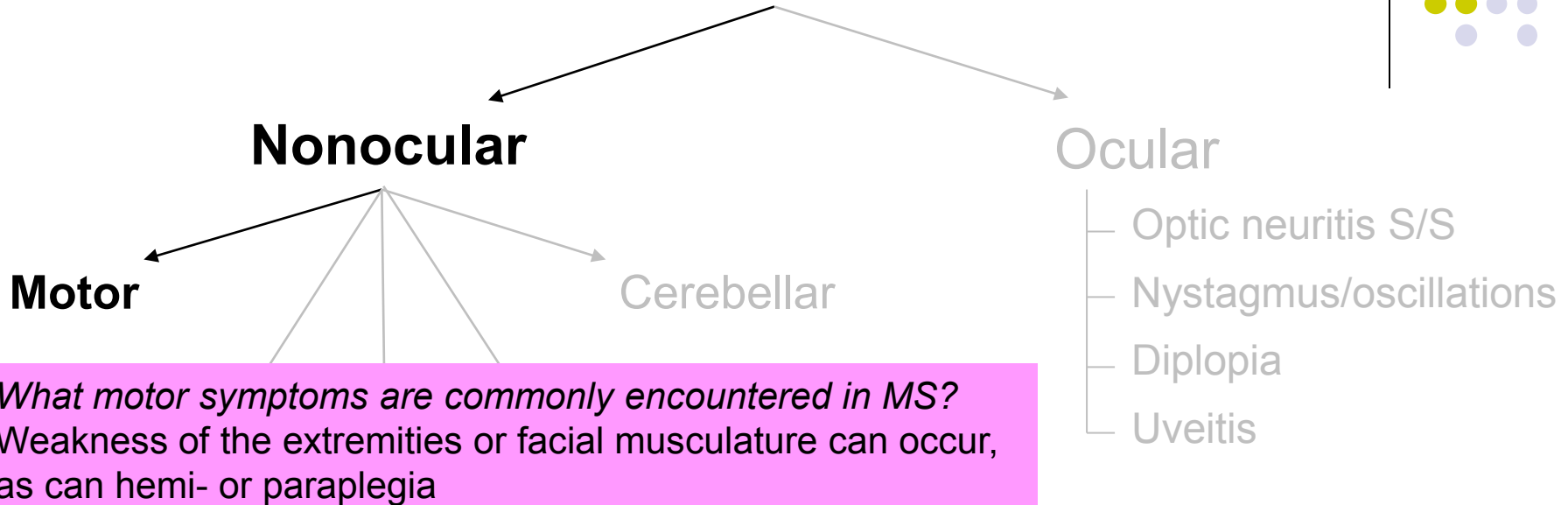
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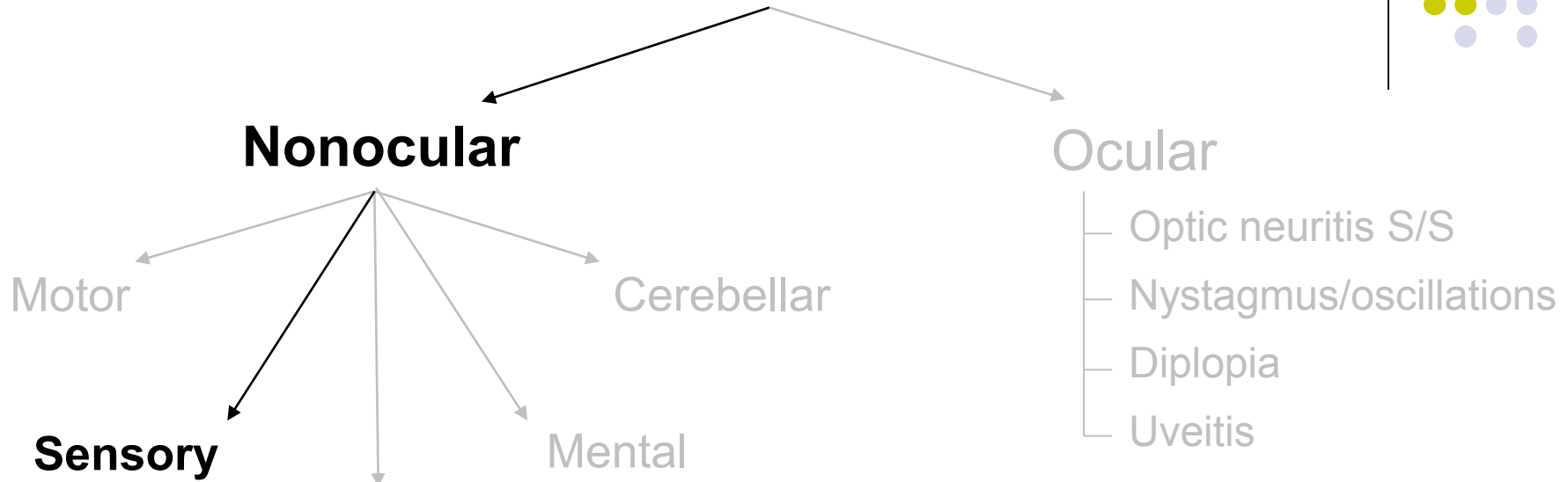
Typical Optic Neuritis

CDMS: *Manifestations*



Typical Optic Neuritis

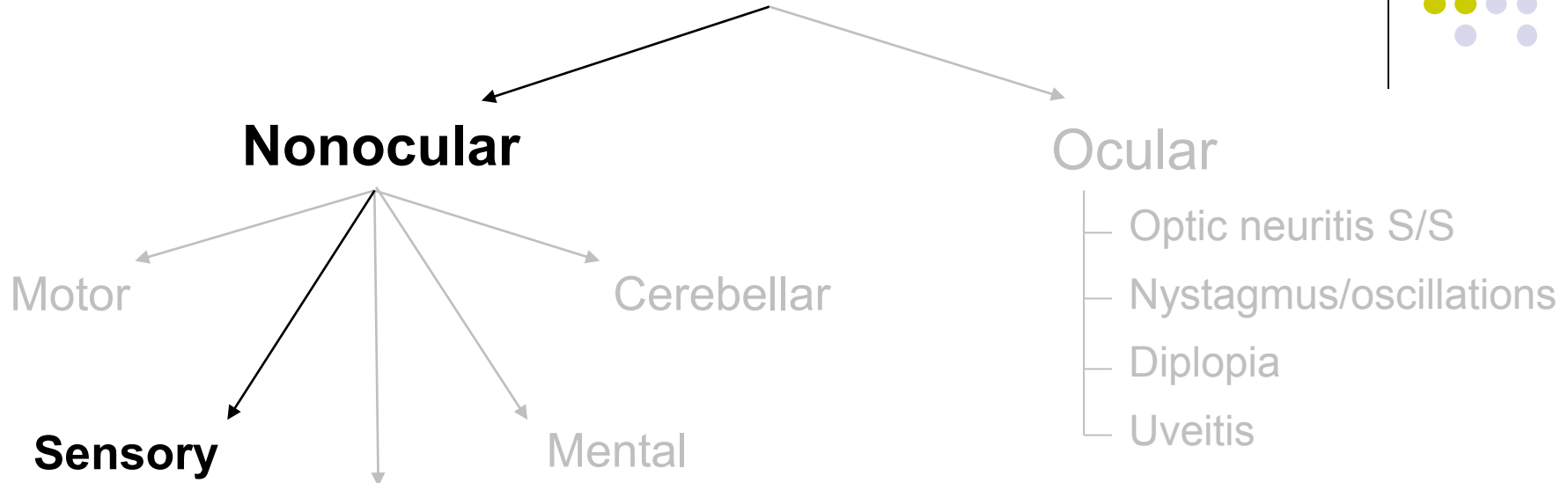
CDMS: *Manifestations*



What sensory symptoms commonly occur in MS?

Typical Optic Neuritis

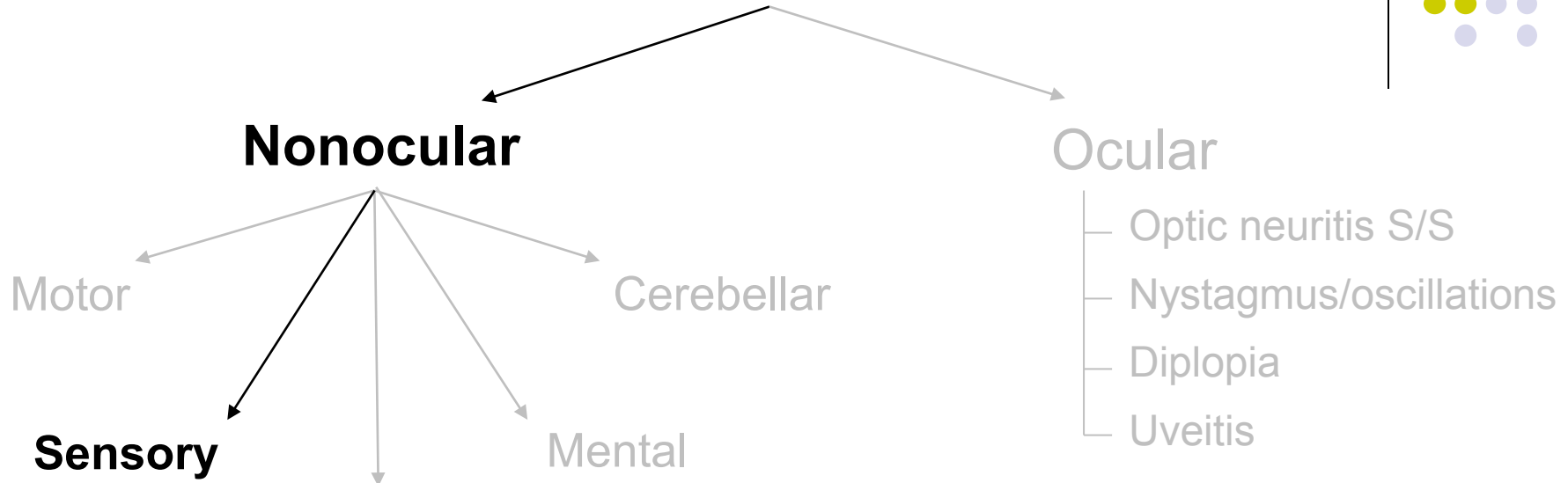
CDMS: *Manifestations*



What sensory symptoms commonly occur in MS?
Paresthesias of the face and/or body

Typical Optic Neuritis

CDMS: *Manifestations*

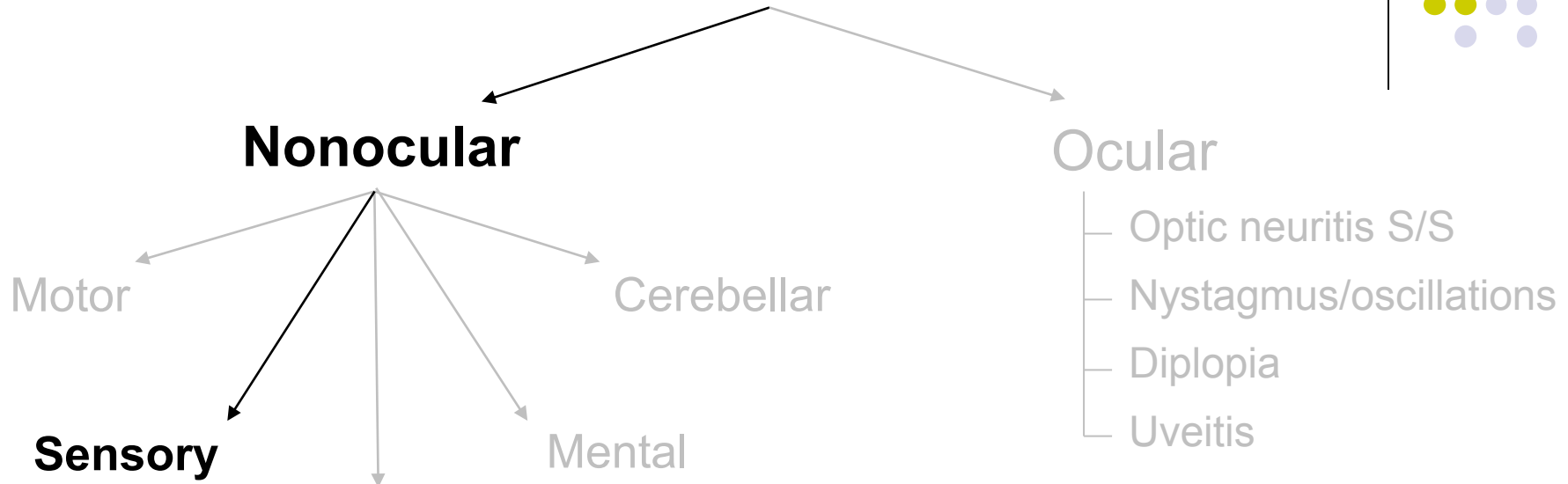


What sensory symptoms commonly occur in MS?

Paresthesias of the face and/or body (classic presentation: paresthesia of the trunk described as ' ')

Typical Optic Neuritis

CDMS: *Manifestations*

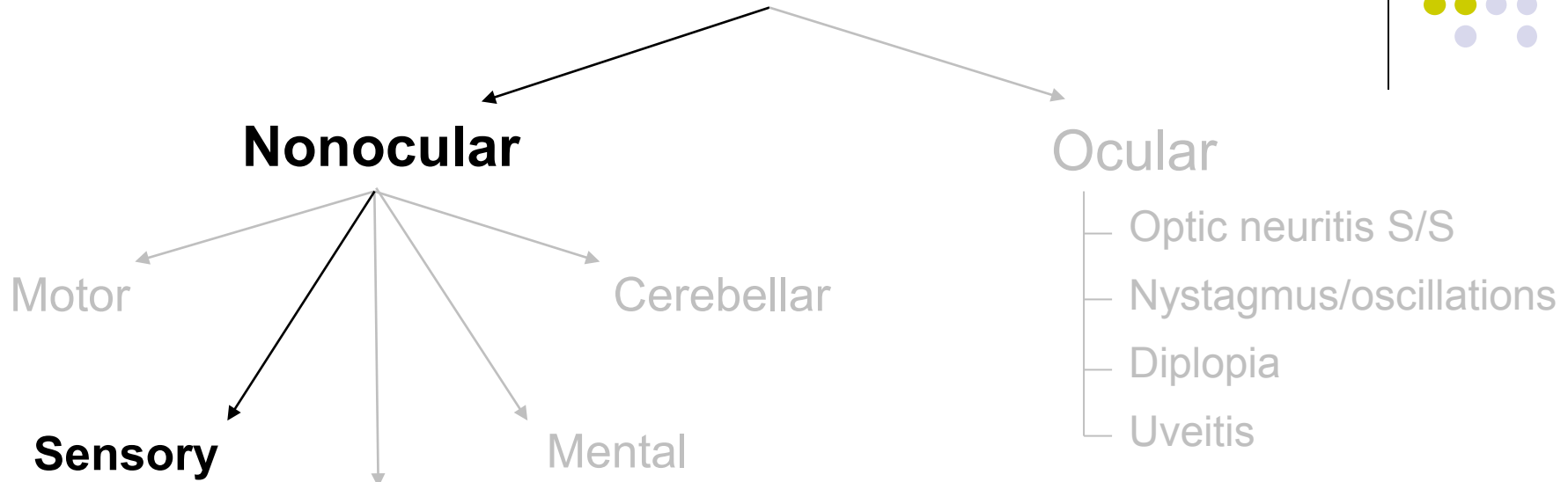


What sensory symptoms commonly occur in MS?

Paresthesias of the face and/or body (classic presentation: paresthesia of the trunk described as 'bandlike')

Typical Optic Neuritis

CDMS: *Manifestations*



What sensory symptoms commonly occur in MS?

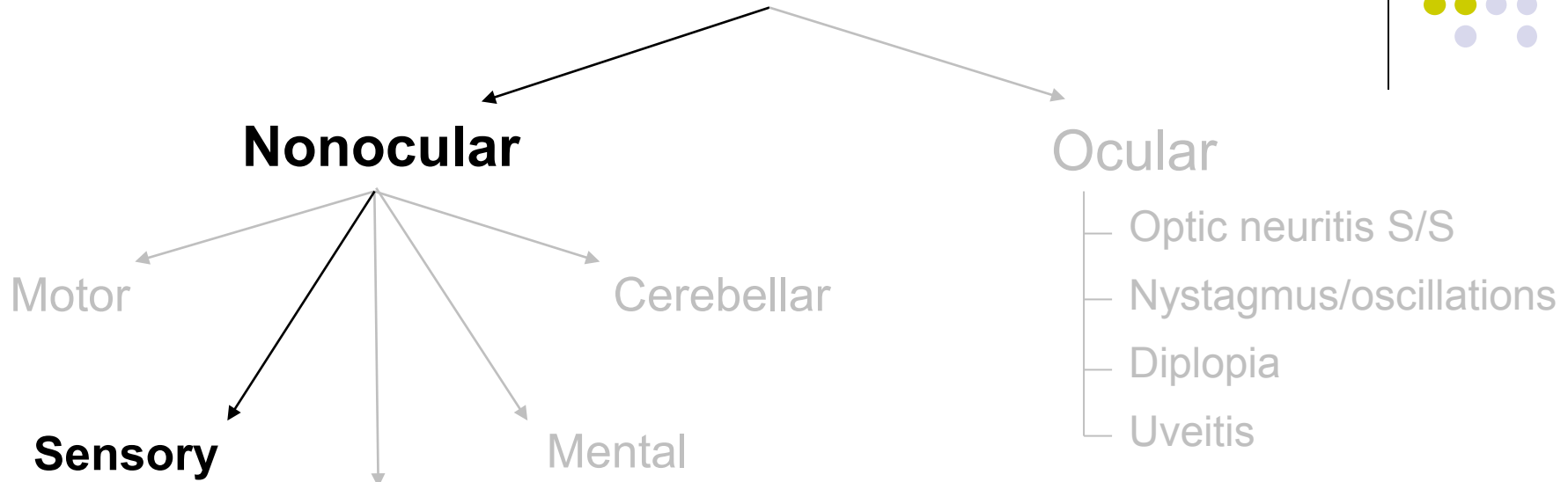
Paresthesias of the face and/or body (classic presentation: paresthesia of the trunk described as 'bandlike')

Speaking of sensory symptoms in MS: What is Lhermitte's sign?

Shock-like sensations precipitated by a movement

Typical Optic Neuritis

CDMS: *Manifestations*



What sensory symptoms commonly occur in MS?

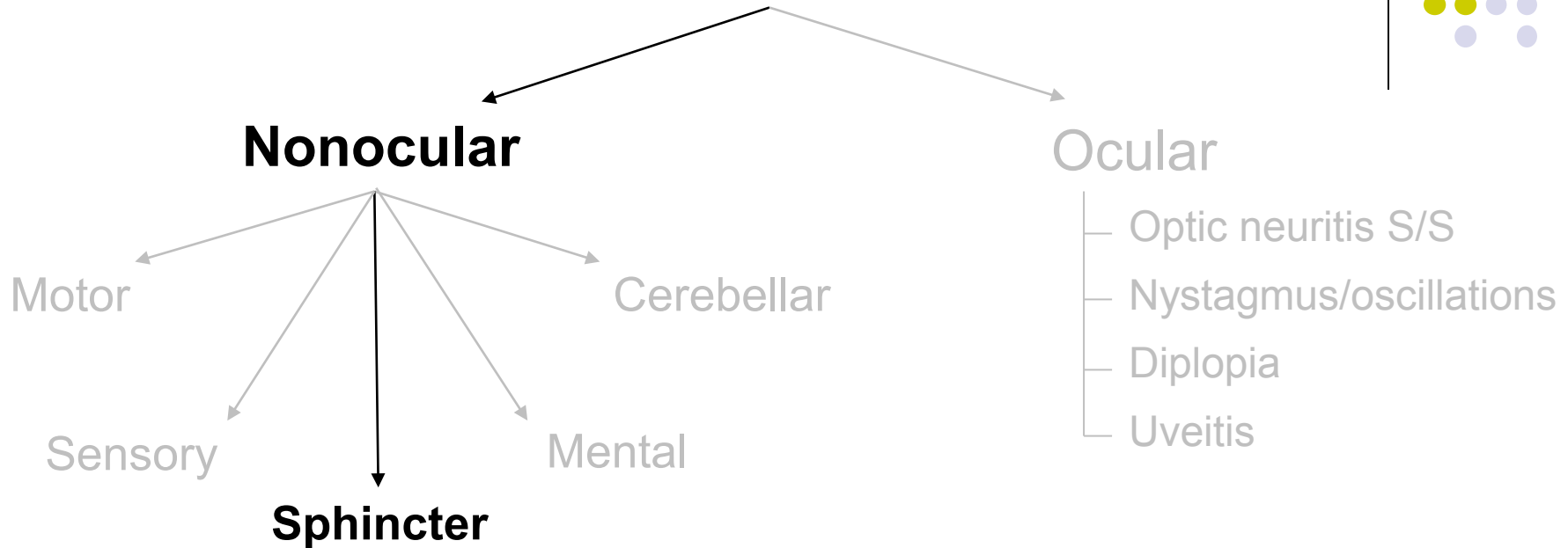
Paresthesias of the face and/or body (classic presentation: paresthesia of the trunk described as 'bandlike')

Speaking of sensory symptoms in MS: What is Lhermitte's sign?

Shock-like sensations precipitated by neck flexion

Typical Optic Neuritis

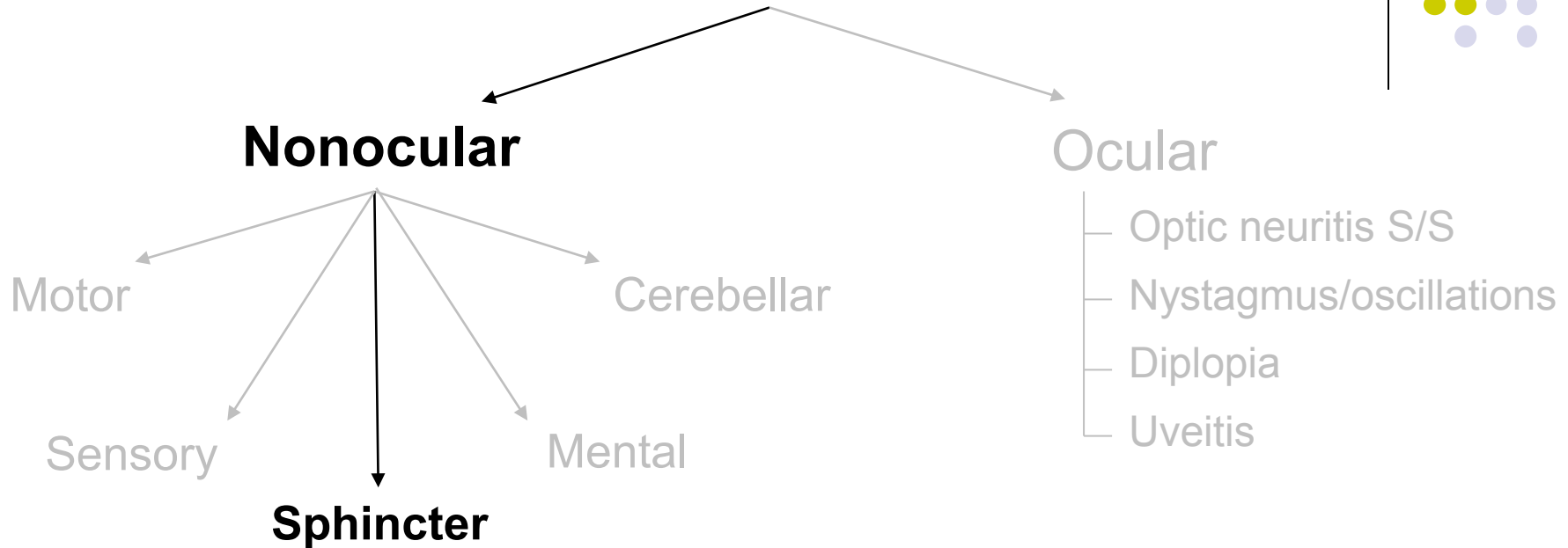
CDMS: *Manifestations*



Which sphincter are we talking about here?

Typical Optic Neuritis

CDMS: *Manifestations*

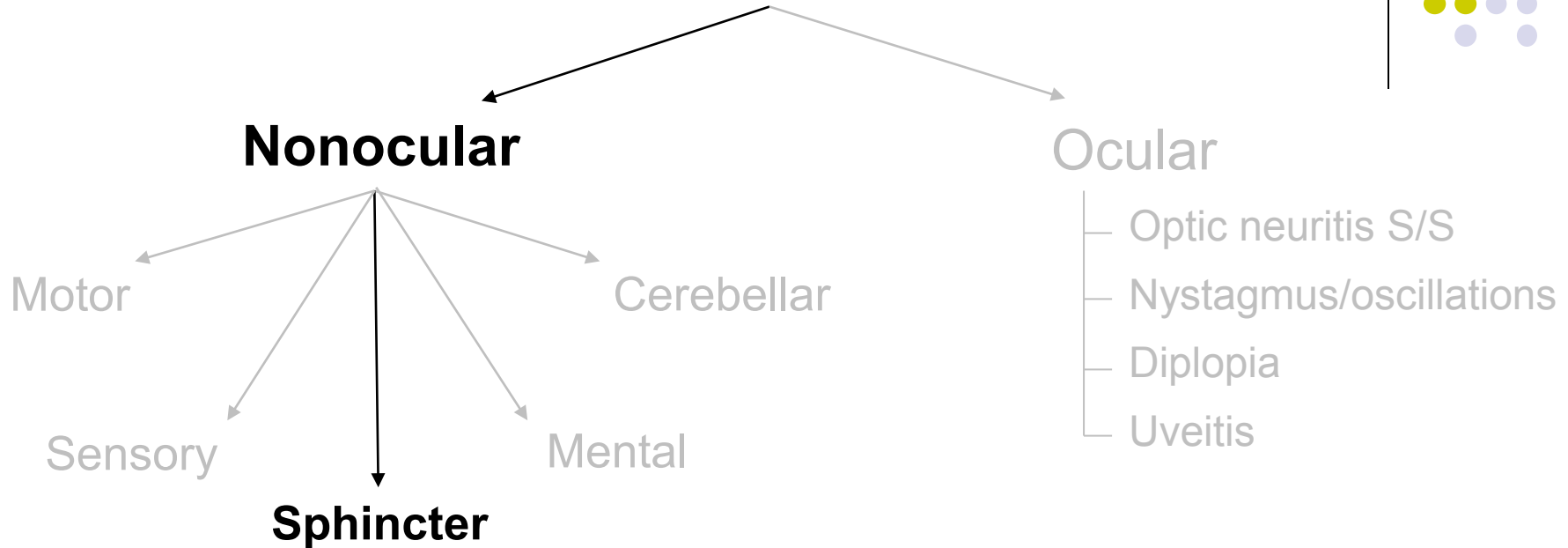


Which sphincter are we talking about here?

The bladder sphincter

Typical Optic Neuritis

CDMS: *Manifestations*



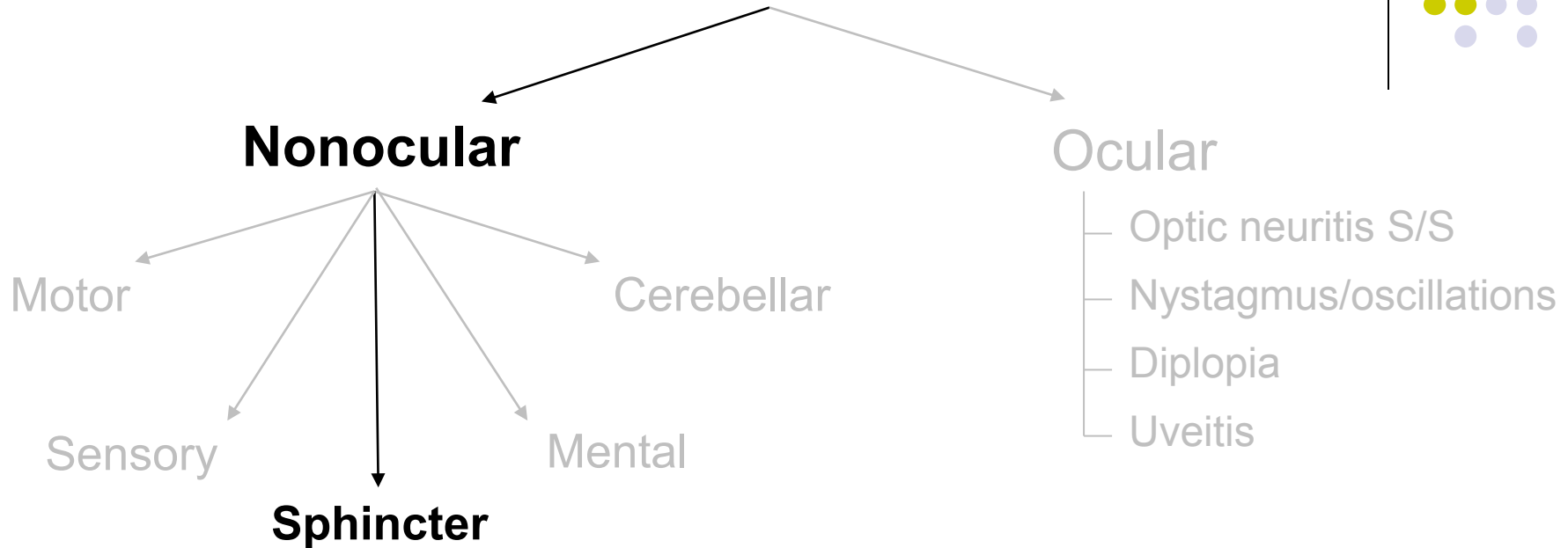
Which sphincter are we talking about here?

The bladder sphincter

What bladder sphincter-related symptoms occur in MS?

Typical Optic Neuritis

CDMS: *Manifestations*



Which sphincter are we talking about here?

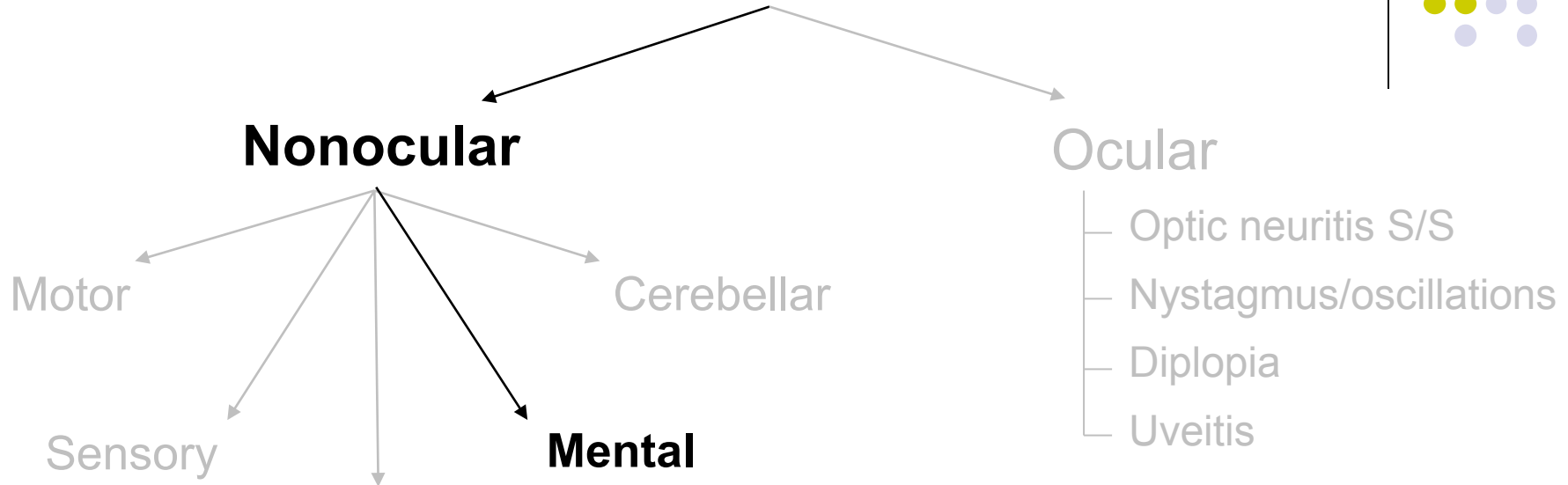
The bladder sphincter

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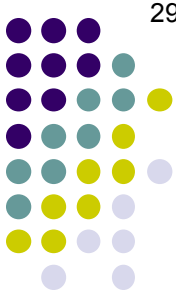
Incontinence, frequency, and/or urgency

Typical Optic Neuritis

CDMS: *Manifestations*

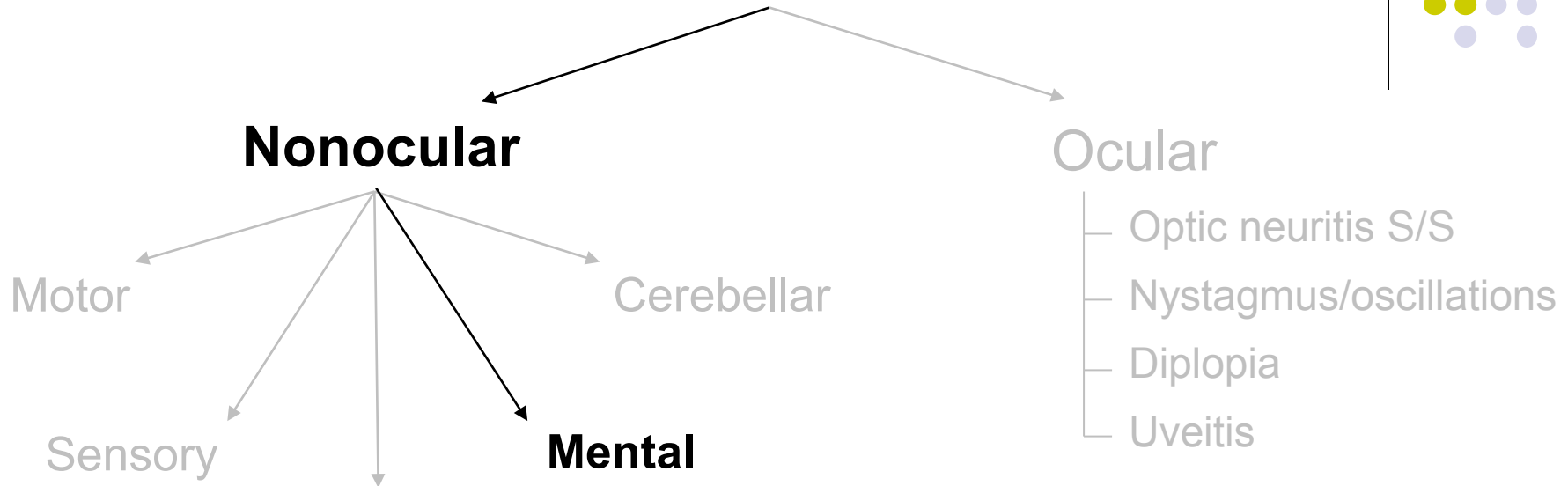


S What mental *manifestations* are commonly encountered in MS?



Typical Optic Neuritis

CDMS: *Manifestations*

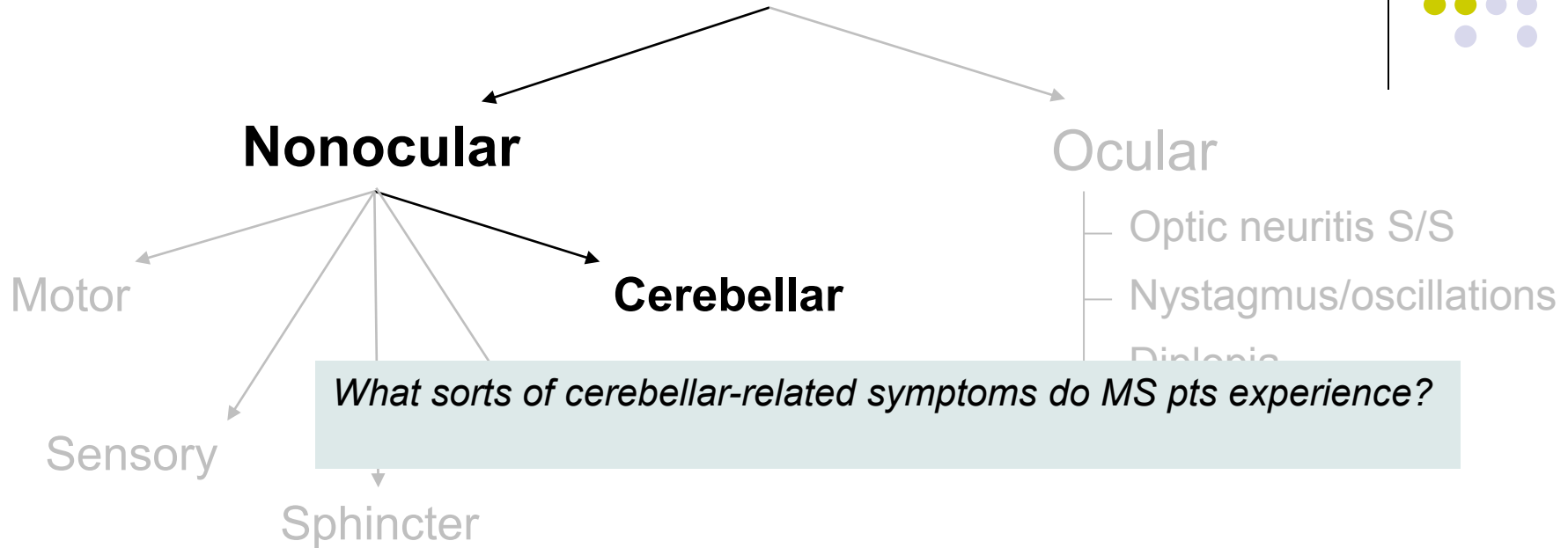


S
What mental *manifestations* are commonly encountered in MS?
Primarily emotional issues: Lability; depression; irritability



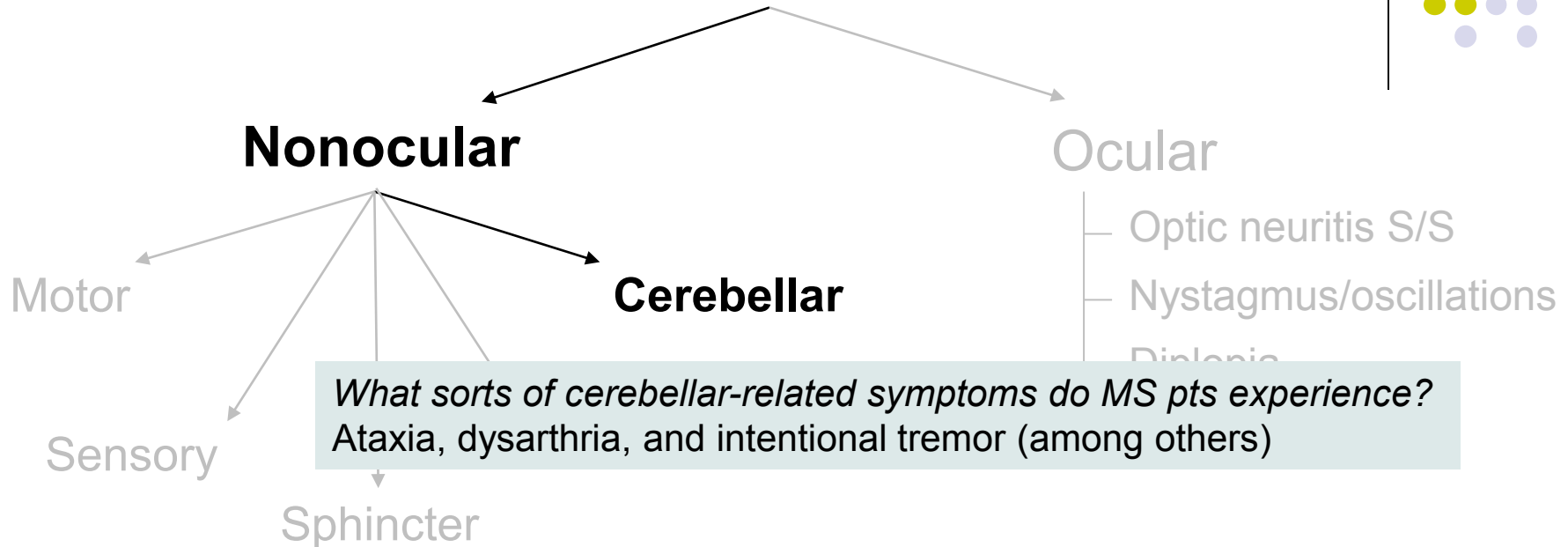
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CDMS: *Manifestations*



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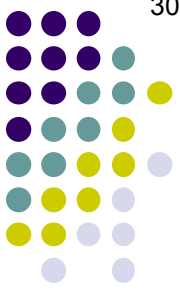
Typical Optic Neuritis

CDMS: *Evaluation*

Labs

Imaging

What lab test cinches a diagnosis of MS?



Typical Optic Neuritis

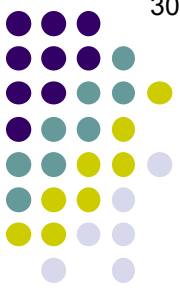
CDMS: *Evaluation*

Labs

Imaging

What lab test cinches a diagnosis of MS?

There ain't none



Typical Optic Neuritis

CDMS: *Evaluation*

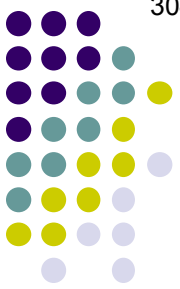
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What imaging finding is pathognomonic for MS?



Typical Optic Neuritis

CDMS: *Evaluation*

Labs

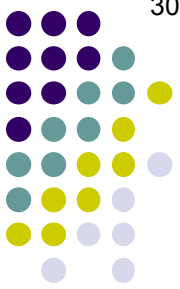
What lab test cinches a diagnosis of MS?

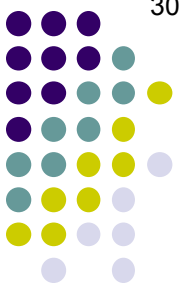
There ain't none

Imaging

What imaging finding is pathognomonic for MS?

Same as labs—no such thing exists





Typical Optic Neuritis

CDMS: *Evaluation*

Labs

Imaging

What lab test cinches a diagnosis of MS?

There isn't one.

Remember, MS is a *clinical* diagnosis—labs and imaging are contributory, but of themselves cannot make it!

Same as labs—no such thing exists

Typical Optic Neuritis

CDMS: *Evaluation*

Labs

Imaging

OK, so what lab(s) are contributory vis a vis diagnosing MS?



Typical Optic Neuritis

CDMS: *Evaluation*

Labs

Imaging

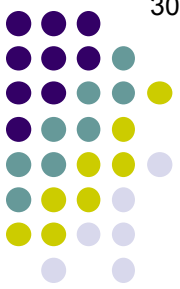
OK, so what lab(s) are contributory vis a vis diagnosing MS?

The finding of

two words

in the

a body fluid



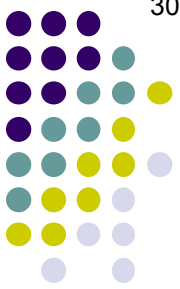
Typical Optic Neuritis

CDMS: *Evaluation*

Labs

Imaging

OK, so what lab(s) are contributory vis a vis diagnosing MS?
The finding of oligoclonal bands in the CSF



Typical Optic Neuritis

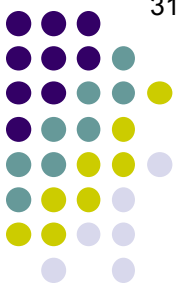
CDMS: *Evaluation*

Labs

Imaging

OK, so what lab(s) are contributory vis a vis diagnosing MS?
The finding of oligoclonal bands in the CSF

Which immunoglobulin form (IgA, IgE, IgG, etc) do the bands take?



Typical Optic Neuritis

CDMS: *Evaluation*

Labs

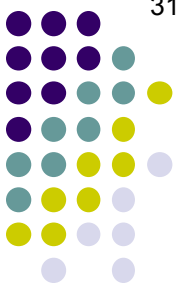
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Typical Optic Neuritis

CDMS: *Evaluation*

Labs

Imaging

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What proportion of CDMS pts manifest these CSF bands?



Typical Optic Neuritis

CDMS: *Evaluation*

Labs

Imaging

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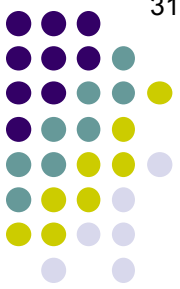
The finding of oligoclonal bands in the CSF

Which immunoglobulin form (IgA, IgE, IgG, etc) do the bands take?

IgG

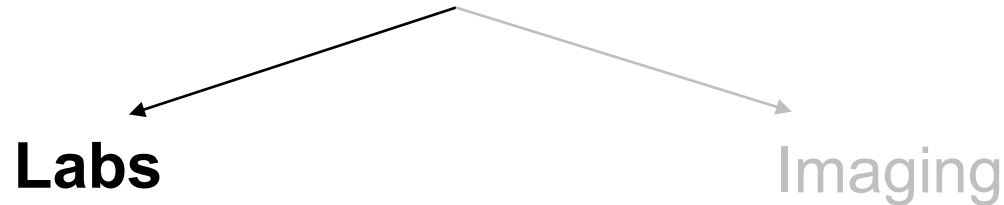
What proportion of CDMS pts manifest these CSF bands?

Over 90%



Typical Optic Neuritis

CDMS: *Evaluation*

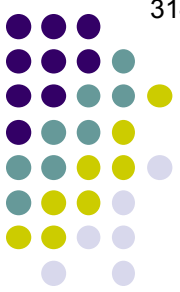


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Are similar bands found in the serum of CDMS pts?



Typical Optic Neuritis

CDMS: *Evaluation*

Labs

Imaging

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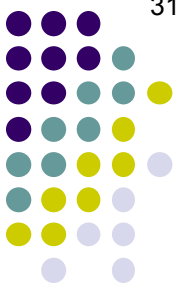
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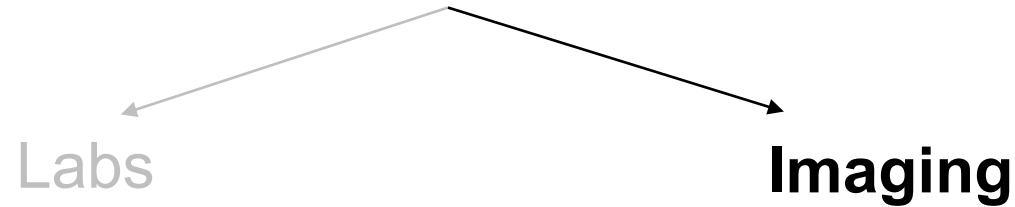
Are similar bands found in the serum of CDMS pts?

No

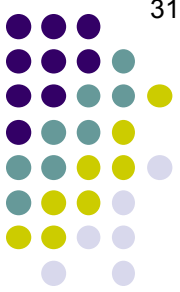


Typical Optic Neuritis

CDMS: *Evaluation*

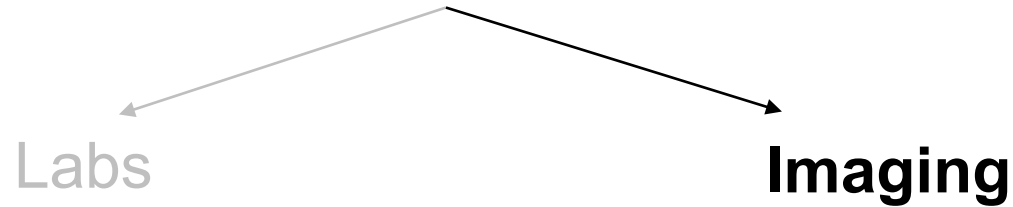


Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?



Typical Optic Neuritis

CDMS: *Evaluation*



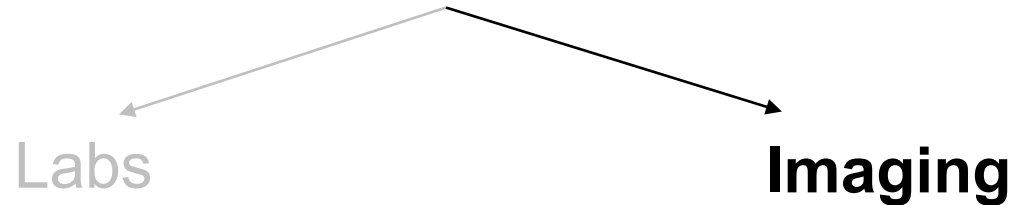
Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?

MRI



Typical Optic Neuritis

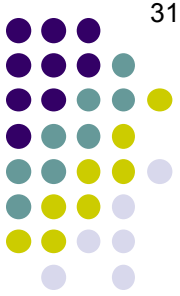
CDMS: *Evaluation*



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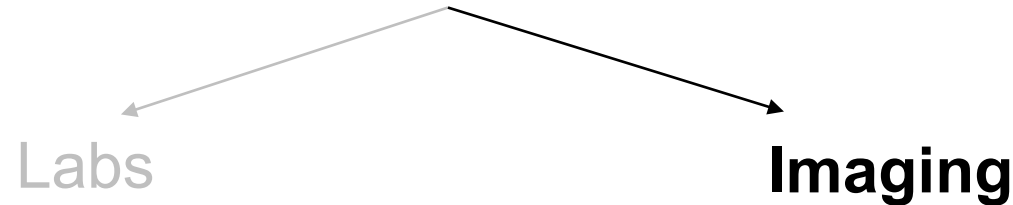
MRI

In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?



Typical Optic Neuritis

CDMS: *Evaluation*

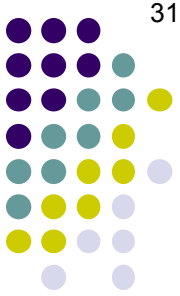


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FLAIR



Typical Optic Neuritis

CDMS: *Evaluation*

Labs

Imaging

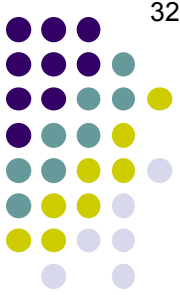
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FLAIR

What does FLAIR stand for in this context?



Typical Optic Neuritis

CDMS: *Evaluation*

Labs

Imaging

Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?

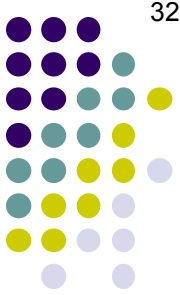
MRI

In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?

FLAIR

What does FLAIR stand for in this context?

Fluid-attenuated inversion recovery



Typical Optic Neuritis

CDMS: *Evaluation*

Labs

Imaging

Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?

MRI

*In addition to the usual series (T1; T2; w/w/o **gadolinium**), there is an image-type that is especially useful—what is it?*

FLAIR

Do MS lesions enhance with gadolinium?



Typical Optic Neuritis

CDMS: *Evaluation*

Labs

Imaging

Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?

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FLAIR

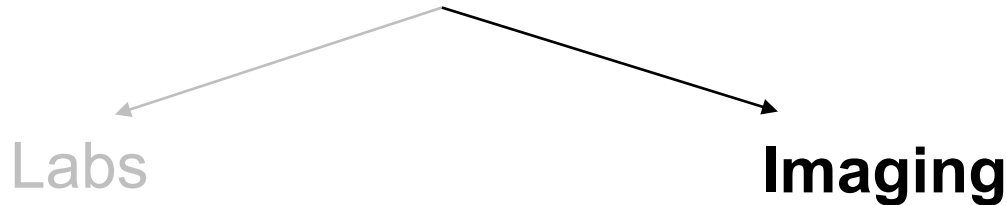
Do MS lesions enhance with gadolinium?

Yes



Typical Optic Neuritis

CDMS: *Evaluation*



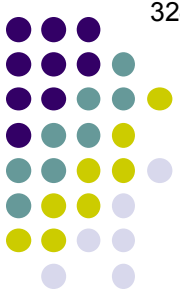
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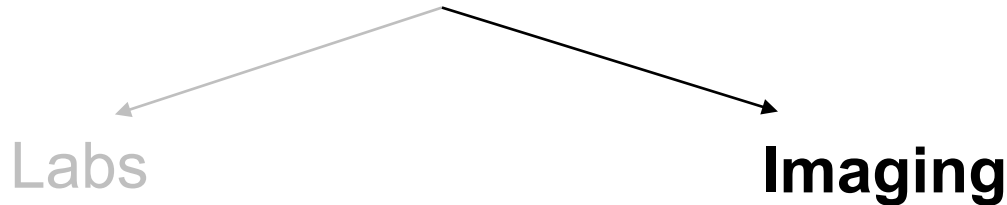
FLAIR

Other than optic-nerve changes, what imaging findings are typically encountered in MS?



Typical Optic Neuritis

CDMS: *Evaluation*



Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?

MRI

In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?

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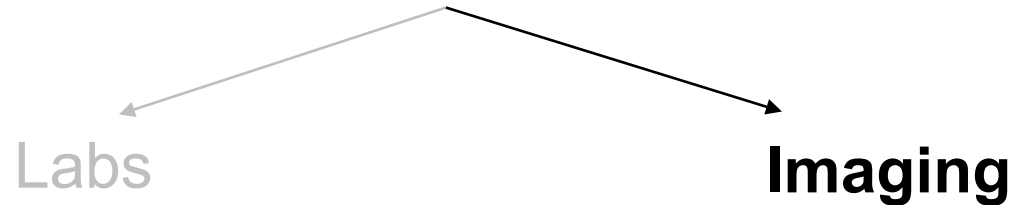
uni- vs multifocal; white- vs gray matter

lesions



Typical Optic Neuritis

CDMS: *Evaluation*



Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?

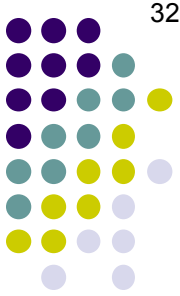
MRI

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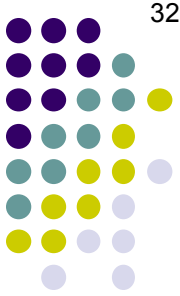
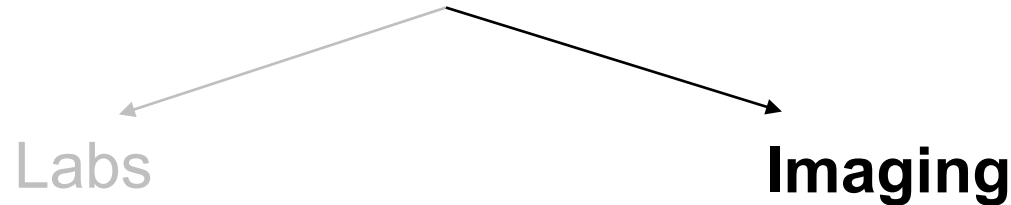
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Multifocal white-matter lesions



Typical Optic Neuritis

CDMS: *Evaluation*



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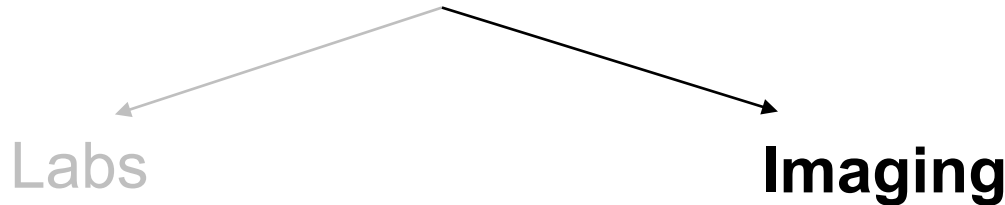
FLAIR

Other than optic-nerve changes, what imaging findings are typically encountered in MS?

Multifocal white-matter lesions, usually  in shape

Typical Optic Neuritis

CDMS: *Evaluation*



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In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?

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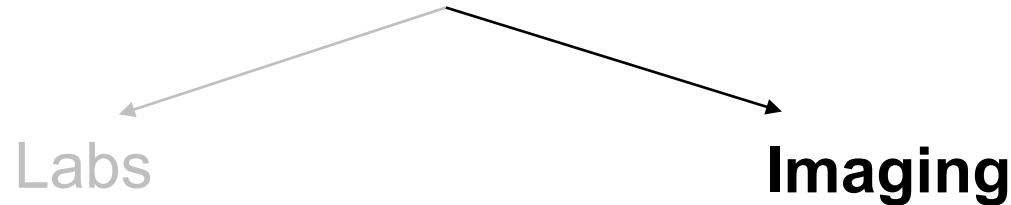
Other than optic-nerve changes, what imaging findings are typically encountered in MS?

Multifocal white-matter lesions, **usually ovoid in shape**



Typical Optic Neuritis

CDMS: *Evaluation*



Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?

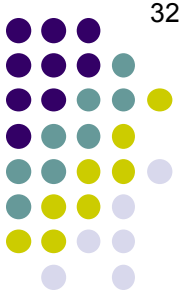
MRI

In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?

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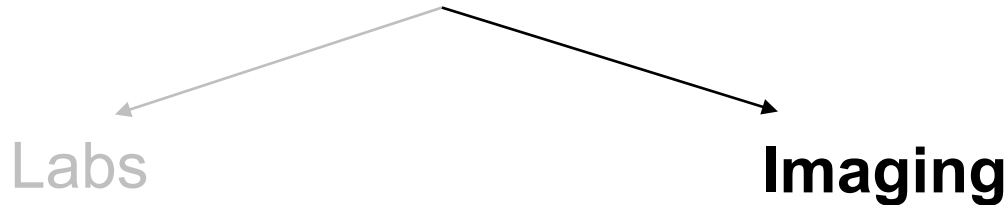
Other than optic-nerve changes, what imaging findings are typically encountered in MS?

Multifocal white-matter lesions, usually ovoid in shape and periventricular in location



Typical Optic Neuritis

CDMS: *Evaluation*



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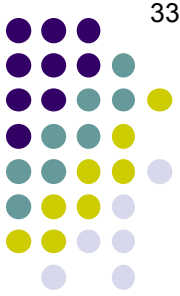
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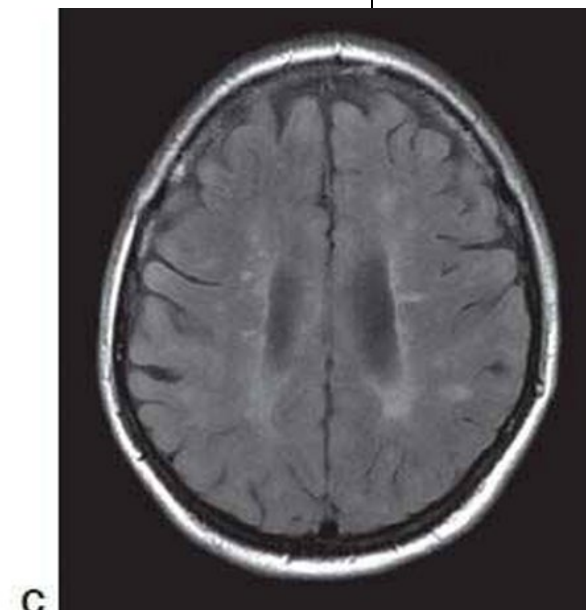
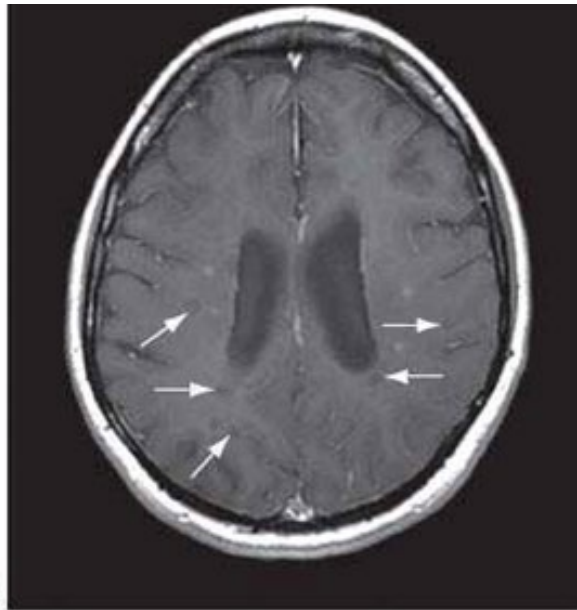
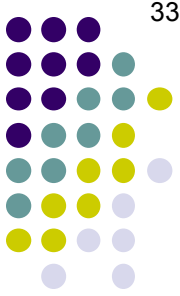
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Other than optic-nerve changes, what imaging findings are typically encountered in MS?

Multifocal white-matter lesions, **usually ovoid in shape** and periventricular in location



Typical Optic Neuritis



MRI of a patient with multiple sclerosis (MS) shows demyelinating plaques.

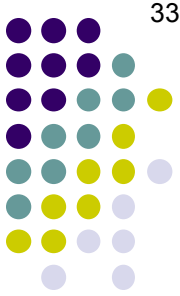
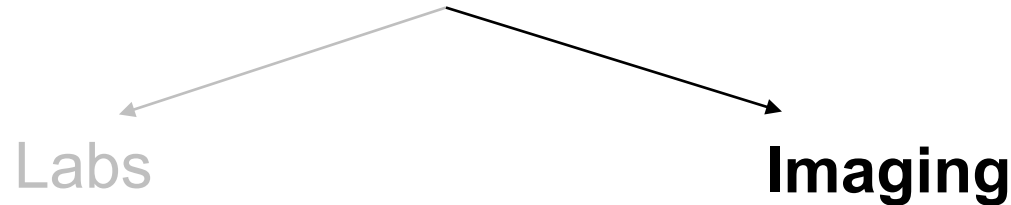
A, T1-weighted, postgadolinium MRI scan demonstrates enhancing white matter lesions bilaterally, as well as "black holes" (*arrows*).

B, T2-weighted MRI scan shows periventricular, multifocal, hyperintense white matter lesions consistent with demyelination.

C, FLAIR scan confirms periventricular ovoid white matter lesions.

Typical Optic Neuritis

CDMS: *Evaluation*



Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?

MRI

In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?

FLAIR

Other than optic-nerve changes, what imaging findings are typically encountered in MS?

Multifocal white-matter lesions, usually ovoid in shape and periventricular in location

What is the eponymous name for these ovoid lesions?

Typical Optic Neuritis

CDMS: *Evaluation*

Labs

Imaging

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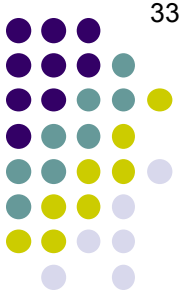
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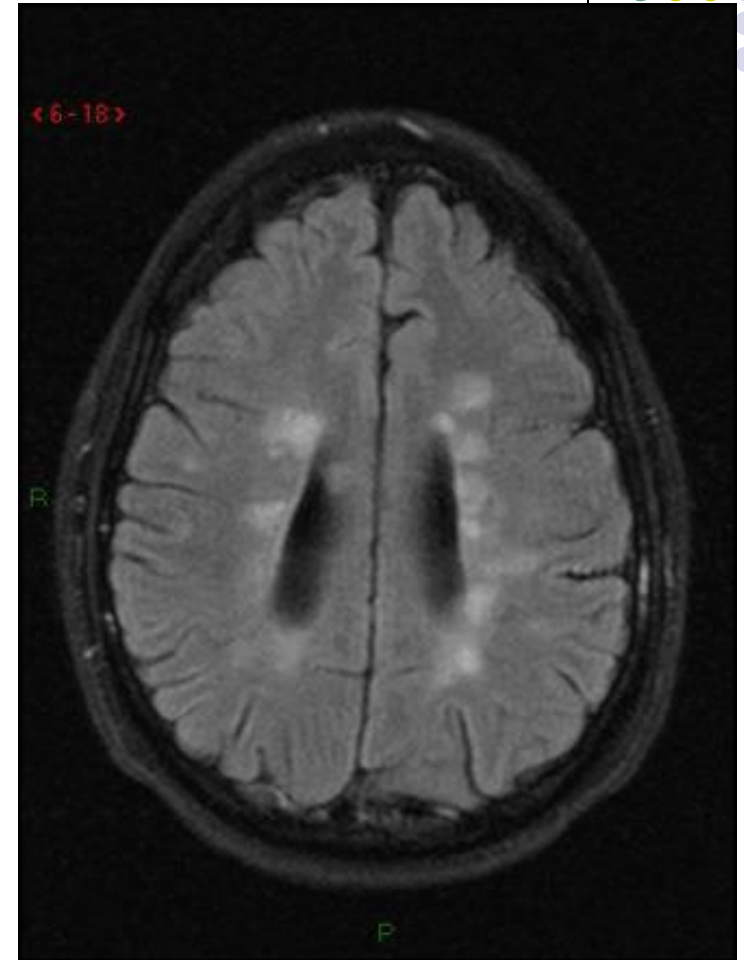
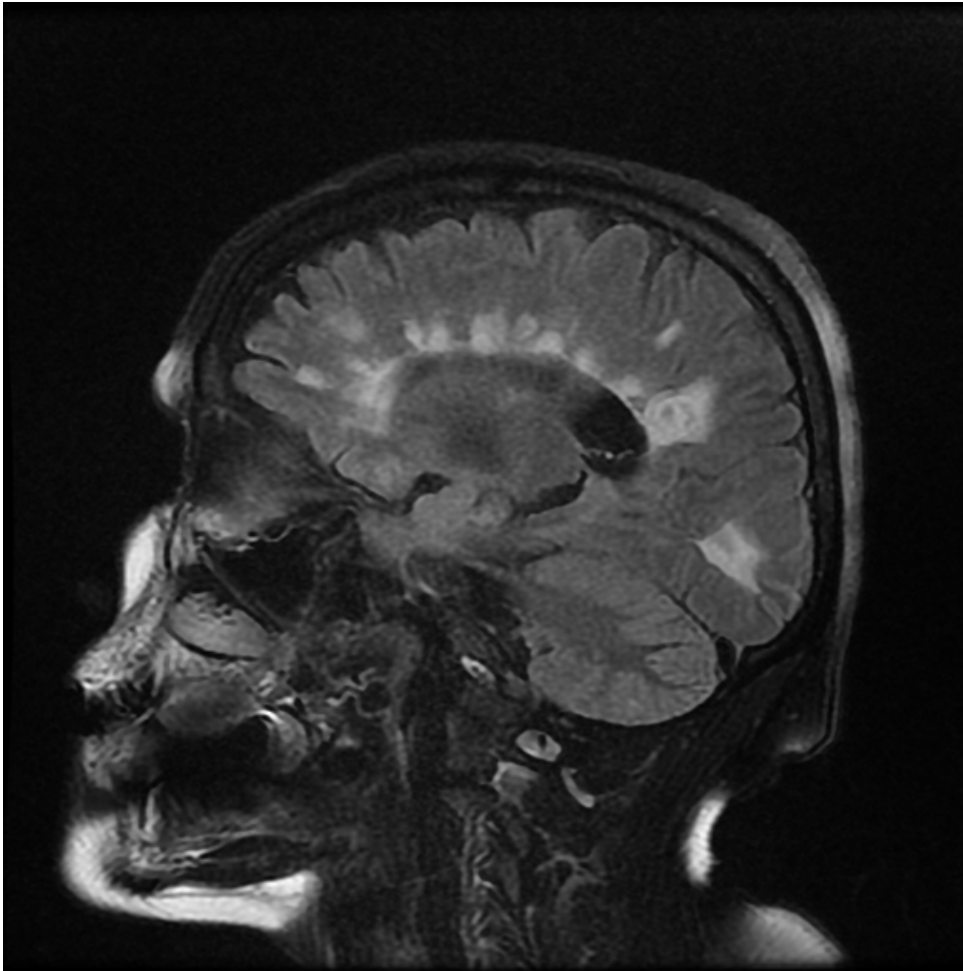
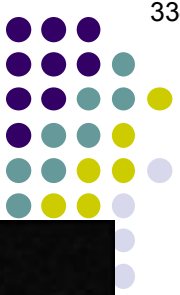
Multifocal white-matter lesions, usually ovoid in shape and periventricular in location

What is the eponymous name for these ovoid lesions?

Dawson's fingers



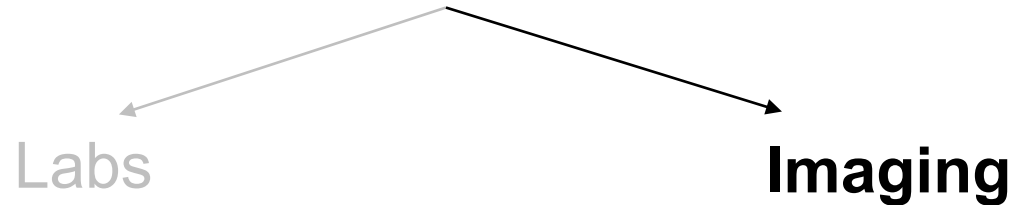
Typical Optic Neuritis



MS: Dawson's fingers

Typical Optic Neuritis

CDMS: *Evaluation*



Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?

MRI

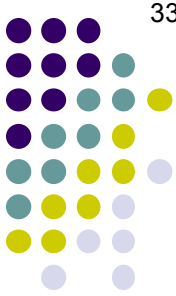
In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?

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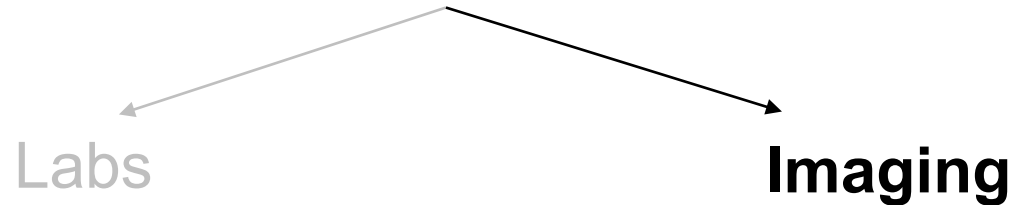
Multifocal white-matter lesions, **usually ovoid in shape** and periventricular in location

What proportion of CDMS pts manifest these findings?



Typical Optic Neuritis

CDMS: *Evaluation*



Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?

MRI

In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?

FLAIR

Other than optic-nerve changes, what imaging findings are typically encountered in MS?

Multifocal white-matter lesions, **usually ovoid in shape** and periventricular in location

What proportion of CDMS pts manifest these findings?

About 90%



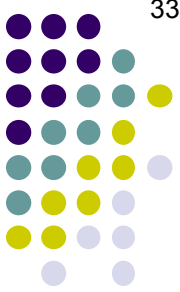
Typical Optic Neuritis

CDMS: *Treatment*

Steroids

DMT

Do steroids still have a role in managing MS?



Typical Optic Neuritis

CDMS: *Treatment*

Steroids

DMT

Do steroids still have a role in managing MS?

Mos def—they are the go-to therapy for acute exacerbations



Typical Optic Neuritis

CDMS: *Treatment*

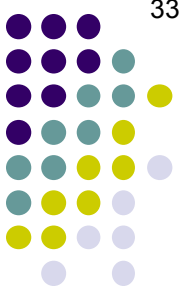
Steroids

DMT

Do steroids still have a role in managing MS?

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Is the dose low, or high?



Typical Optic Neuritis

CDMS: *Treatment*

Steroids

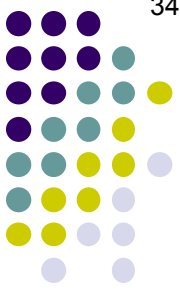
DMT

Do steroids still have a role in managing MS?

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Is the dose low, or high?

High



Typical Optic Neuritis

CDMS: *Treatment*

Steroids

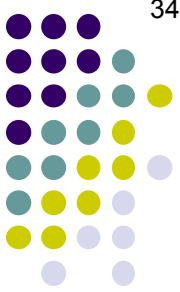
DMT

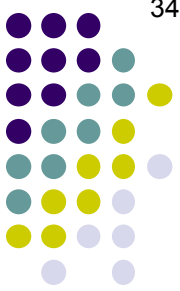
Do steroids still have a role in managing MS?

Mos def—they are the go-to therapy for acute exacerbations

Is the dose low, or high? Is the preferred route PO, IM, or IV?

High.





Typical Optic Neuritis

CDMS: *Treatment*

Steroids

DMT

Do steroids still have a role in managing MS?

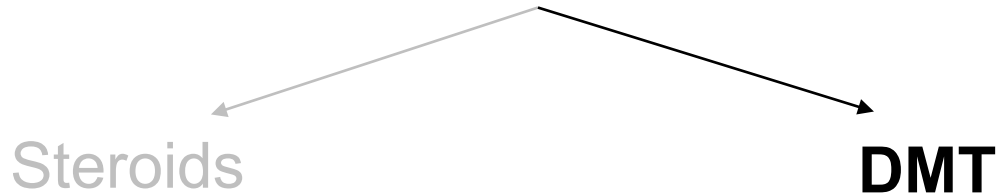
Mos def—they are the go-to therapy for acute exacerbations

Is the dose low, or high? Is the preferred route PO, IM, or IV?

High. IV.

Typical Optic Neuritis

CDMS: *Treatment*

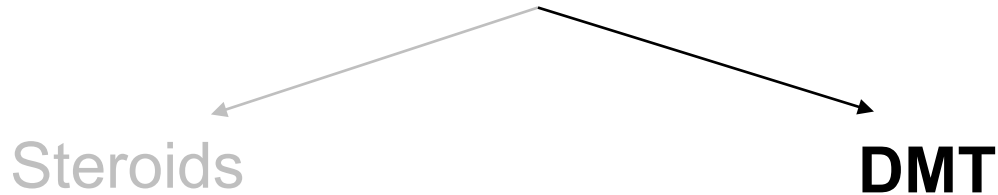


What does DMT stand for in this context?

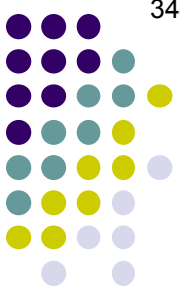


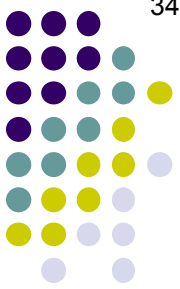
Typical Optic Neuritis

CDMS: *Treatment*



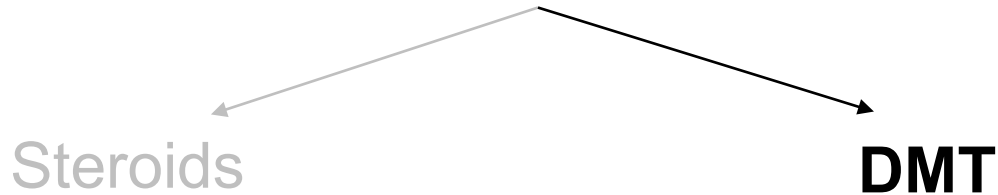
What does DMT stand for in this context?
Disease-modifying therapy





Typical Optic Neuritis

CDMS: *Treatment*



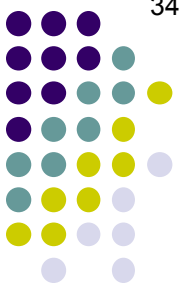
What does DMT stand for in this context?
Disease-modifying therapy

There are three classes of DMTs—what are they?

--?

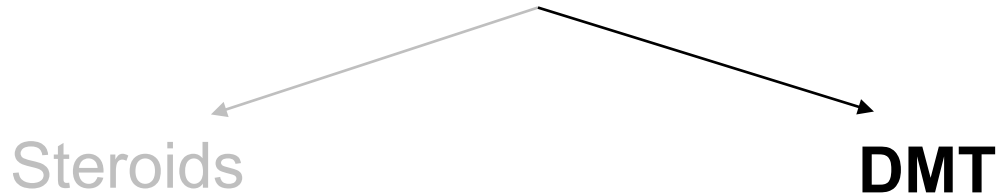
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--?



Typical Optic Neuritis

CDMS: *Treatment*



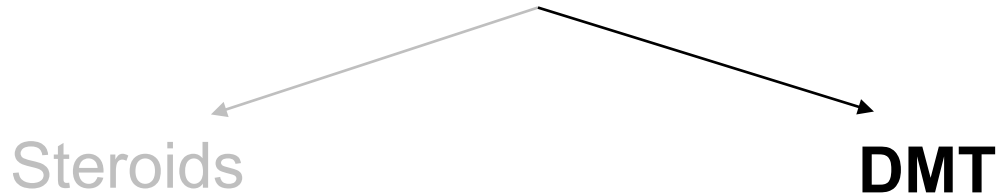
What does DMT stand for in this context?
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There are three classes of DMTs—what are they?

- Interferons
- Monoclonal antibodies
- Immunomodulators

Typical Optic Neuritis

CDMS: *Treatment*

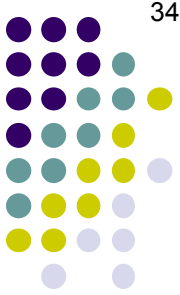


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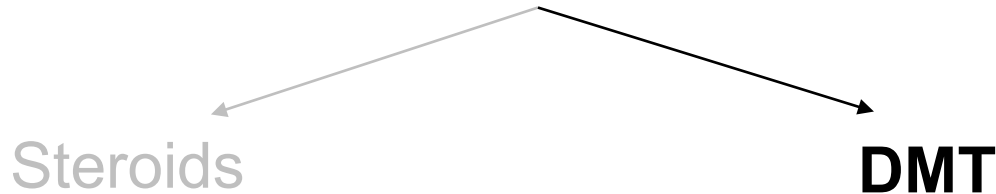
- Interferons
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- Immunomodulators

*One immunomodulator is notorious for causing macular edema—
which one?*



Typical Optic Neuritis

CDMS: *Treatment*

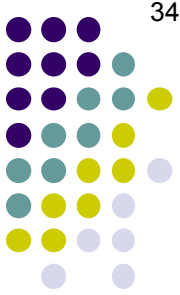


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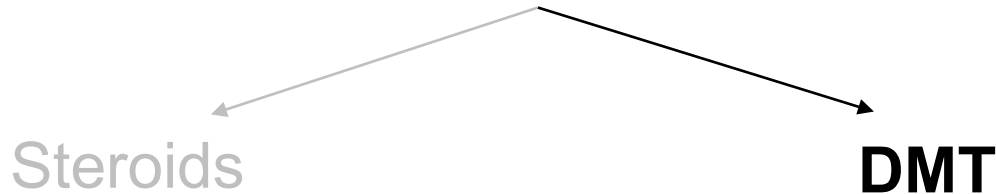
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Fingolimod



Typical Optic Neuritis

CDMS: *Treatment*

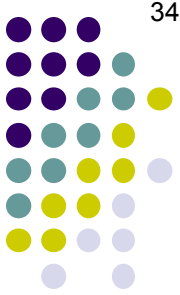


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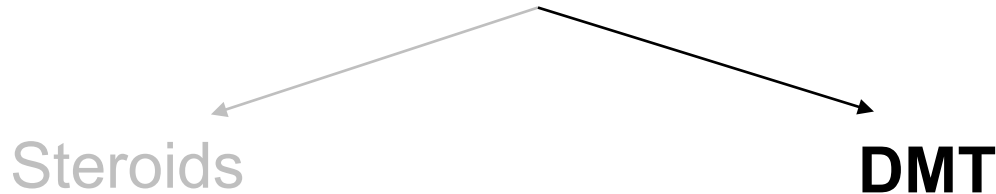
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By what name is fingolimod-associated macular edema known?



Typical Optic Neuritis

CDMS: *Treatment*

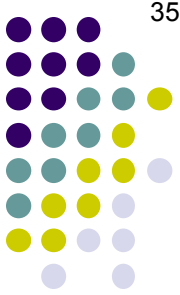


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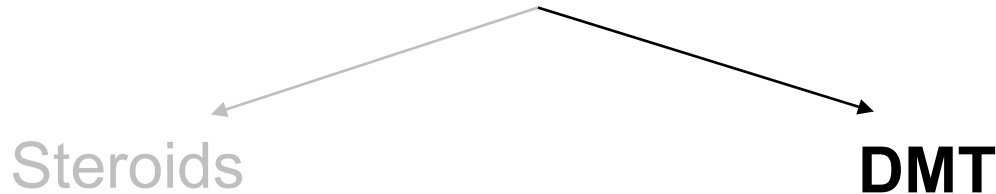
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By what name is fingolimod-associated macular edema known?
It is called 'fingolimod-associated macular edema' (FAME)



Typical Optic Neuritis

CDMS: *Treatment*



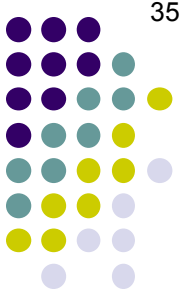
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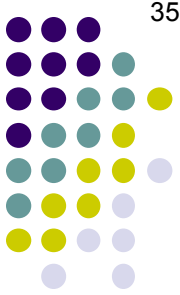
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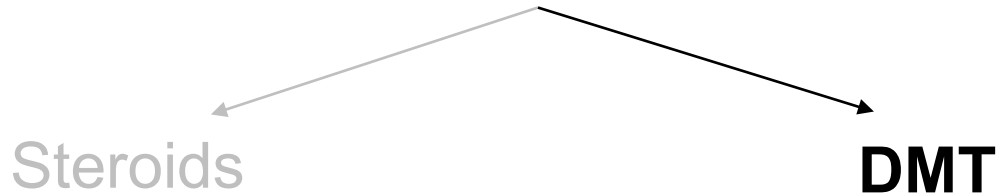
What is the tx for FAME?





Typical Optic Neuritis

CDMS: *Treatment*



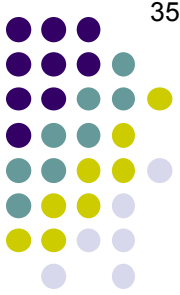
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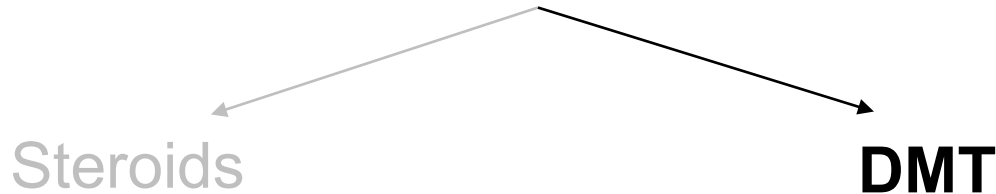
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What is the tx for FAME?
Cessation of the medication



Typical Optic Neuritis

CDMS: *Treatment*



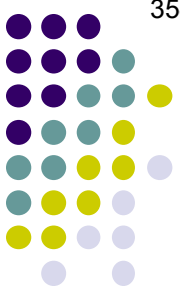
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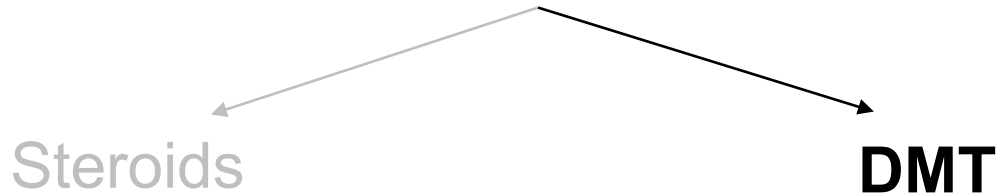
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*What is the tx for FAME? **Is it effective?***
Cessation of the medication.



Typical Optic Neuritis

CDMS: *Treatment*



What does DMT stand for in this context?
Disease-modifying therapy

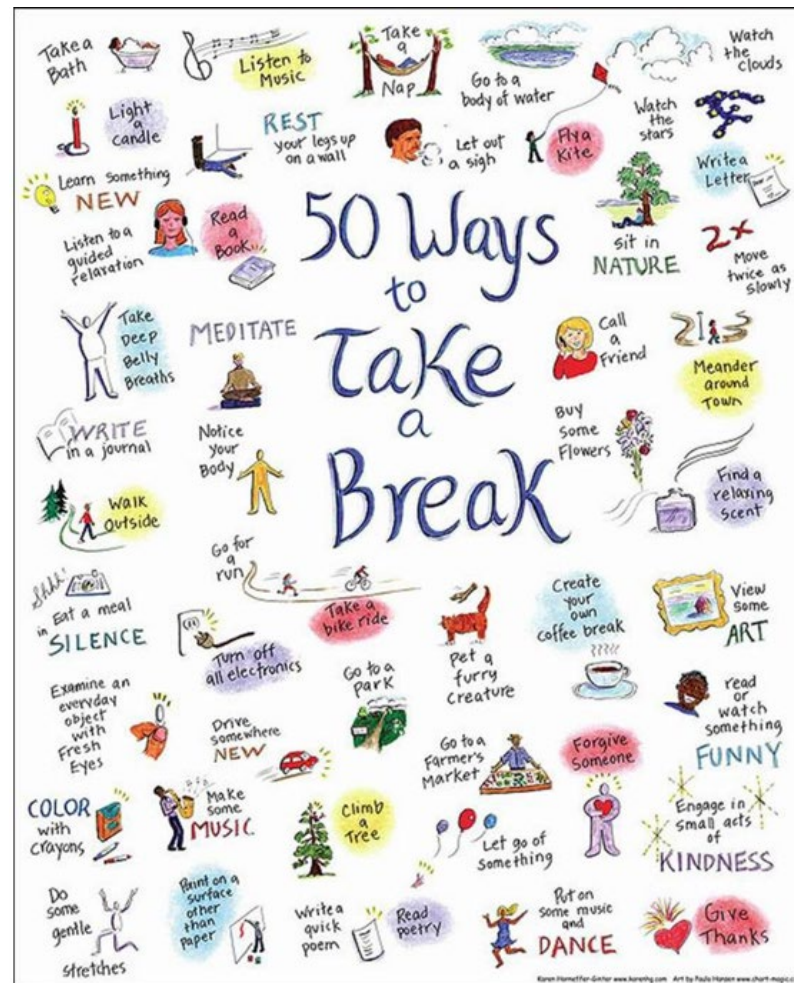
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It is called 'fingolimod-associated macular edema' (FAME)

*What is the tx for FAME? *Is it effective?**
Cessation of the medication. *Yes.*

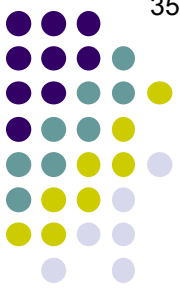
Typical Optic Neuritis



(This is a good point in the set to take a break)

Optic neuritis

As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself:



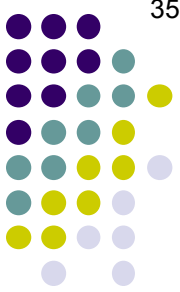
Does this pt have 'clinically isolated **Optic neuritis**'?

As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself:
'Does this pt have clinically isolated optic neuritis, or...

↙
aka clinically isolated syndrome (CIS)

Typical Optic Neuritis

Does she have MS?



Does this pt have 'clinically isolated Optic neuritis'?

As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself:
'Does this pt have clinically isolated optic neuritis, or...does she have MS?'

aka clinically isolated syndrome (CIS)

No question—proceed when ready

Typical Optic Neuritis

MS



Does this pt have 'clinically isolated **Optic neuritis**'?

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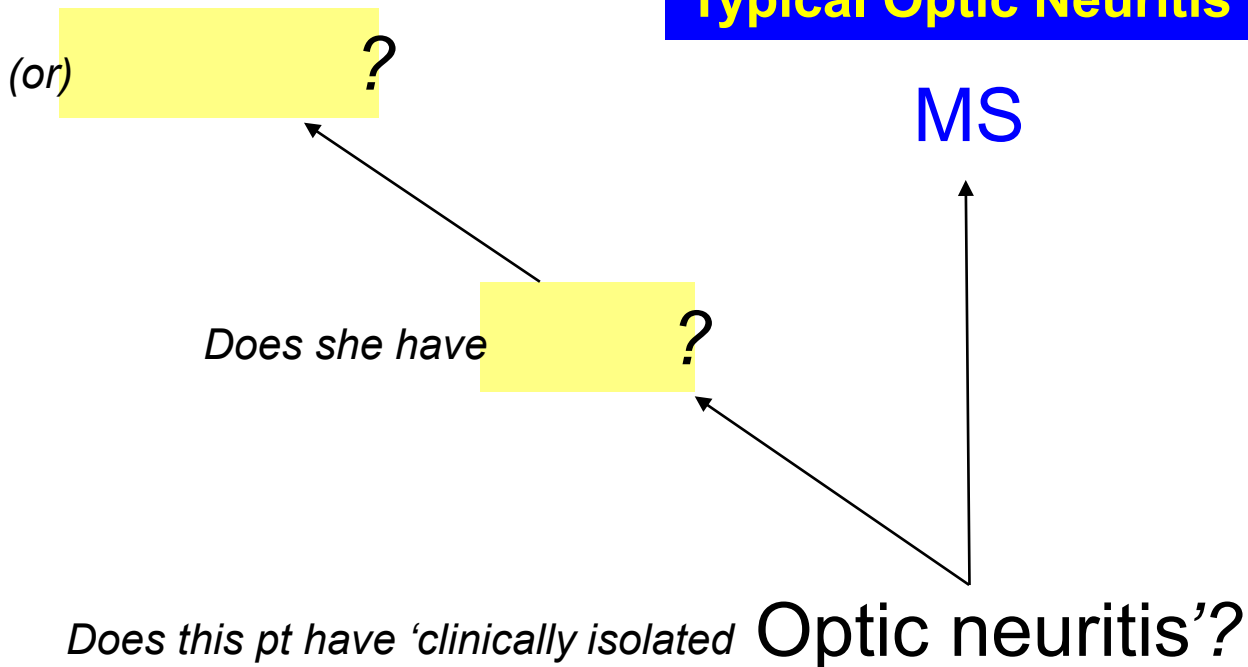
But the *Neuro* book places great emphasis on asking two additional questions:

1) 'Does this pt have clinically isolated optic neuritis, or...





Typical Optic Neuritis



As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself: 'Does this pt have clinically isolated optic neuritis, or...does she have MS?

But the *Neuro* book places great emphasis on asking two additional questions:

1) 'Does this pt have clinically isolated optic neuritis, or...does she have

what shorter abb. stands for

(or

what longer abb. stands for

)?

Typical Optic Neuritis

(or) NMOSD?

MS

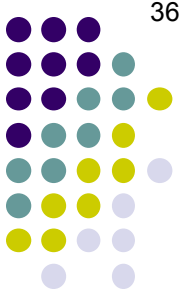
Does she have NMO?

Does this pt have 'clinically isolated Optic neuritis'?

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But the *Neuro* book places great emphasis on asking two additional questions:

1) 'Does this pt have clinically isolated optic neuritis, or...does she have neuromyelitis optica (or neuromyelitis optica spectrum disorder)?



Typical Optic Neuritis

(or) NMOSD?

MS

Does she have NMO?

Does she have ?

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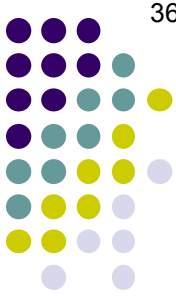
1) 'Does this pt have clinically isolated optic neuritis, or...does she have neuromyelitis optica (or neuromyelitis optica spectrum disorder)?

And:

2) 'Does this pt have clinically isolated optic neuritis, or...does she have

what abb. stands for

?



Typical Optic Neuritis

(or) NMOSD?

MS

Does she have NMO?

Does she have MOGAD?

Does this pt have 'clinically isolated Optic neuritis'?

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And:

2) 'Does this pt have clinically isolated optic neuritis, or...does she have myelin oligodendrocyte glycoprotein IgG-associated disorder ?





Typical Optic Neuritis

(or) NMOSD?

MS

Does she have NMO?

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As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself: 'Does this pt have clinically isolated optic neuritis, or...does she have MS?

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1) *Why the emphasis on these two questions/conditions?*

2) myelin oligodendrocyte glycoprotein IgG-associated disorder ?



Typical Optic Neuritis

(or) NMOSD?

MS

Does she have NMO?

Does she have MOGAD?

Does this pt have 'clinically isolated Optic neuritis'?

As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself: 'Does this pt have clinically isolated optic neuritis, or...does she have MS?

the *Neuro* book places great emphasis on asking two additional questions

Why the emphasis on these two questions/conditions?

For several reasons related to dz management:

--?

--?

myelin oligodendrocyte glycoprotein IgG-associated disorder ?



Typical Optic Neuritis

(or) NMOSD?

MS

Does she have NMO?

Does she have MOGAD?

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As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself: 'Does this pt have clinically isolated optic neuritis, or...does she have MS?

the *Neuro* book places great emphasis on asking two additional questions

Why the emphasis on these two questions/conditions?

For several reasons related to dz management:

- Differences in pathophysiology means tx for NMO(SD), MOG and MS differ; and
- ?

myelin oligodendrocyte glycoprotein IgG-associated disorder ?



Typical Optic Neuritis

(or) NMOSD?

MS

Does she have NMO?

Does she have MOGAD?

Does this pt have 'clinically isolated Optic neuritis'?

As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself: 'Does this pt have clinically isolated optic neuritis, or...does she have MS?

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Why the emphasis on these two questions/conditions?

For several reasons related to dz management:

- Differences in pathophysiology means tx for NMO(SD), MOG and MS differ; and
- Some MS txs are ineffective in one —and worse, are deleterious in the other

myelin oligodendrocyte glycoprotein IgG-associated disorder?



Typical Optic Neuritis

(or) NMOSD?

MS

Does she have NMO?

Does she have MOGAD?

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Why the emphasis on these two questions/conditions?

For several reasons related to dz management:

- Differences in pathophysiology means tx for NMO(SD), MOG and MS differ; and
- Some MS txs are ineffective in MOG —and worse, are deleterious in NMO(SD)

myelin oligodendrocyte glycoprotein IgG-associated disorder?

Typical Optic Neuritis

NMOSD

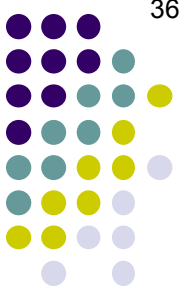
MS

NMO
aka ?

MOGAD

Optic neuritis

By what eponymous name is NMO also known?



Typical Optic Neuritis

NMOSD

MS

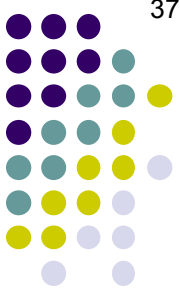
NMO
aka Devic's dz

MOGAD

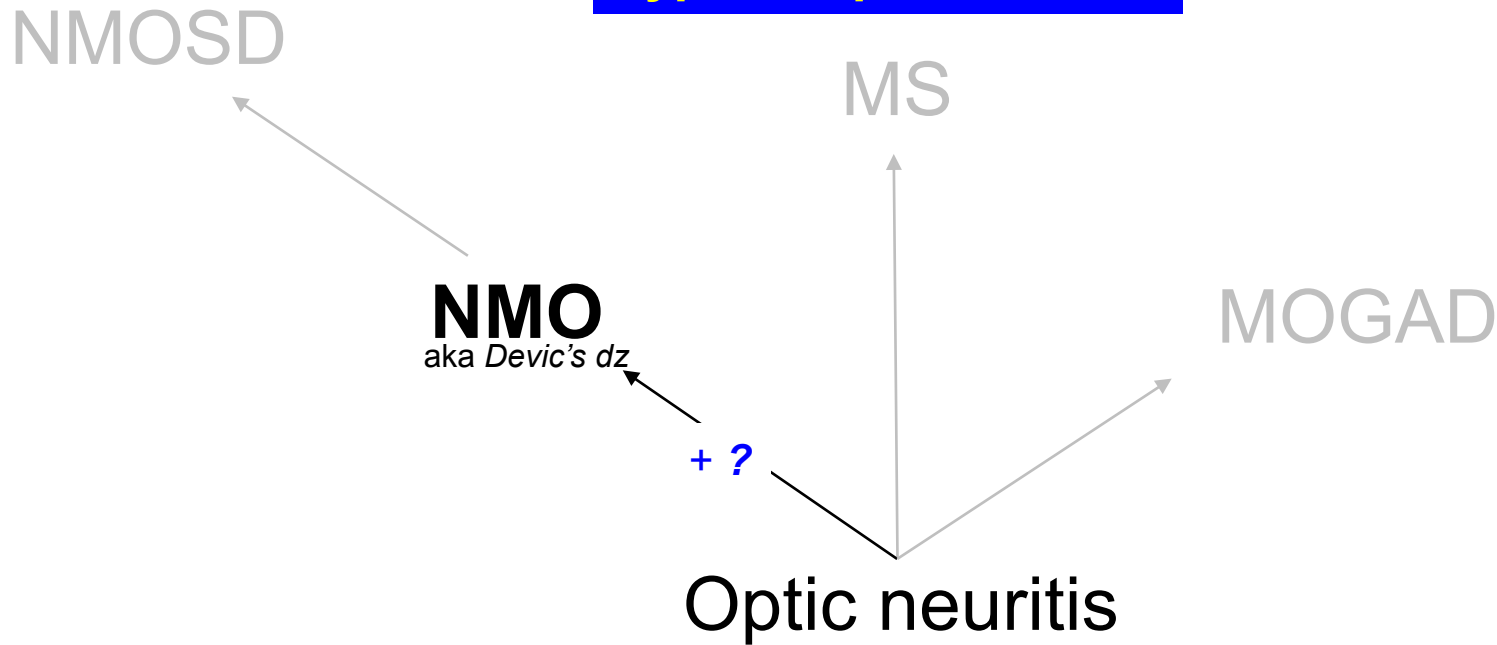
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Typical Optic Neuritis

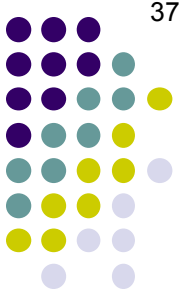
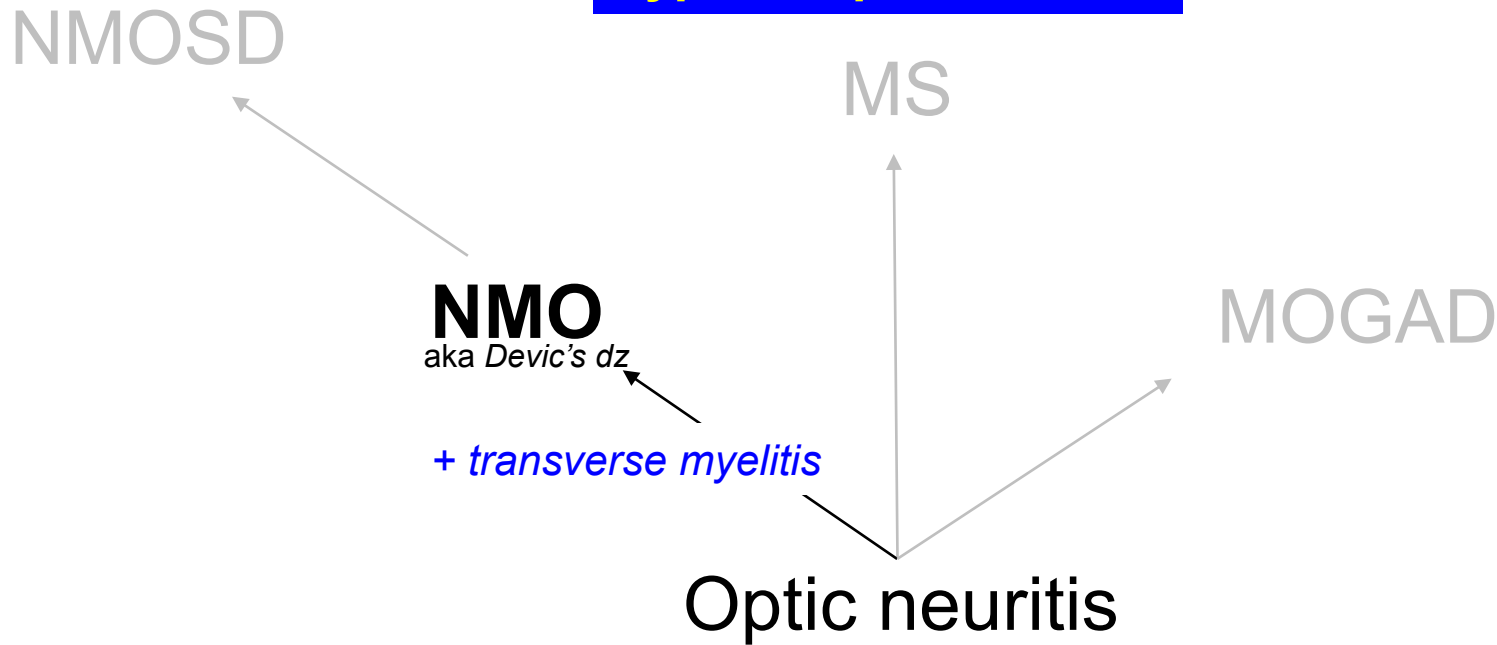


By what eponymous name is NMO also known?

Devic's dz

NMO involves two separate and specific inflammatory processes. One is optic neuritis. What is the other?

Typical Optic Neuritis



By what eponymous name is NMO also known?

Devic's dz

NMO involves two separate and specific inflammatory processes. One is optic neuritis.

What is the other?

Longitudinally extensive transverse myelitis

Typical Optic Neuritis

NMOSD

MS

MOGAD

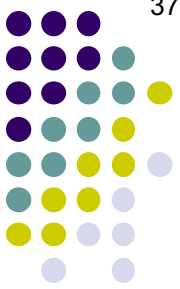
NMO

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What is transverse myelitis?

What is the other?

Longitudinally extensive **transverse myelitis**





Typical Optic Neuritis

NMOSD

MS

NMO

aka Devic's dz

MOGAD

What is transverse myelitis?
Inflammation of the spinal cord

What is the other?

Longitudinally extensive

transverse myelitis



Typical Optic Neuritis

NMOSD

MS

MOGAD

NMO

aka Devic's dz

What is transverse myelitis?
Inflammation of the spinal cord

How does transverse myelitis present clinically?

What is the other?

Longitudinally extensive

transverse myelitis



Typical Optic Neuritis

NMOSD

MS

MOGAD

NMO

aka Devic's dz

What is transverse myelitis?

Inflammation of the spinal cord

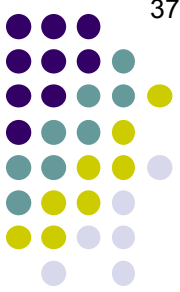
How does transverse myelitis present clinically?

As a symmetric para- or quadriplegia, often with sensory loss

What is the other?

Longitudinally extensive

transverse myelitis



Typical Optic Neuritis

NMOSD

MS

MOGAD

NMO

aka Devic's dz

What is transverse myelitis?

Inflammation of the spinal cord

How does transverse myelitis present clinically?

As a symmetric para- or quadriplegia, often with sensory loss

But MS can also present with paresis + sensory loss. How is this any different?

What is the other?

Longitudinally extensive

transverse myelitis



Typical Optic Neuritis

NMOSD

MS

MOGAD

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aka Devic's dz

What is transverse myelitis?

Inflammation of the spinal cord

How does transverse myelitis present clinically?

As a **symmetric** para- or quadriparesis, often with sensory loss

But MS can also present with paresis + sensory loss. How is this any different?

The difference is the symmetry. Whereas NMO presents with bilaterally symmetric motor and/or sensory loss, **symmetric deficits are distinctly uncommon in MS.**

What is the other?

Longitudinally extensive

transverse myelitis



Typical Optic Neuritis

NMOSD

MS

MOGAD

NMO

aka Devic's dz

What is transverse myelitis?

Inflammation of the spinal cord

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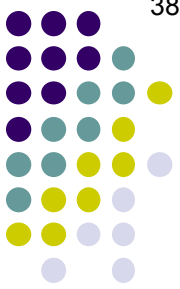
As a symmetric para- or quadriplegia, often with sensory loss

How are the optic neuritis and transverse myelitis episodes related temporally?

What is the other?

Longitudinally extensive

transverse myelitis



Typical Optic Neuritis

NMOSD

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MOGAD

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What is transverse myelitis?

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How are the optic neuritis and transverse myelitis episodes related temporally?

They usually occur within unit of time to unit of time of each other

What is the other?

Longitudinally extensive **transverse myelitis**



Typical Optic Neuritis

NMOSD

MS

MOGAD

NMO

aka Devic's dz

What is transverse myelitis?

Inflammation of the spinal cord

How does transverse myelitis present clinically?

As a symmetric para- or quadriplegia, often with sensory loss

How are the optic neuritis and transverse myelitis episodes related temporally?

They usually occur within weeks to months of each other

What is the other?

Longitudinally extensive

transverse myelitis



Typical Optic Neuritis

NMOSD

MS

MOGAD

NMO

aka Devic's dz

What is transverse myelitis?

Inflammation of the spinal cord

How does transverse myelitis present clinically?

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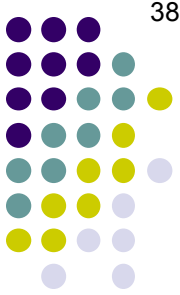
They usually occur within weeks to months of each other, but can be separated by several

unit of
time

What is the other?

Longitudinally extensive

transverse myelitis



Typical Optic Neuritis

NMOSD

MS

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NMO

aka Devic's dz

What is transverse myelitis?

Inflammation of the spinal cord

How does transverse myelitis present clinically?

As a symmetric para- or quadriplegia, often with sensory loss

How are the optic neuritis and transverse myelitis episodes related temporally?

They usually occur within weeks to months of each other, but can be separated by several years

What is the other?

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transverse myelitis



Typical Optic Neuritis

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How does transverse myelitis manifest on MRI?

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Longitudinally extensive **transverse myelitis**



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They usually occur within weeks to months of each other, but can be separated by several years

How does transverse myelitis manifest on MRI?

As a hyperintense signal on T2 imaging

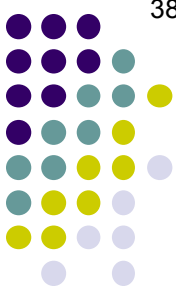
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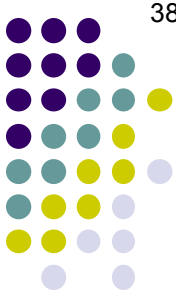
Longitudinally extensive **transverse myelitis**

Typical Optic Neuritis



Sagittal T2-weighted MRI of the spinal cord in a patient with NMOSD depicting a hyperintense lesion





Typical Optic Neuritis

NMOSD

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How does transverse myelitis present clinically?

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How does transverse myelitis manifest on MRI?

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Longitudinally extensive transverse myelitis

How extensive (ie, long) are these lesions?



Typical Optic Neuritis

NMOSD

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What is transverse myelitis?

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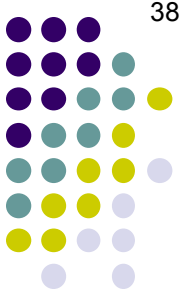
How extensive (ie, long) are these lesions?

2-3 vertebral segments or so

Typical Optic Neuritis



Sagittal T2-weighted MRI of the spinal cord in a patient with NMOSD depicting a hyperintense lesion **over more than 3 vertebral segments**



Typical Optic Neuritis

NMOSD

MS

MOGAD

NMO

aka Devic's dz

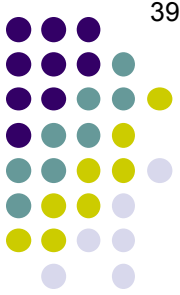
What is transverse myelitis?

So, the spinal cord lesions in NMO are longitudinally extensive...Perchance, is the same true of the optic nerve lesions in NMO?

What is the other?

Longitudinally extensive transverse myelitis

How extensive (ie, long) are these lesions?
2-3 vertebral segments or so



Typical Optic Neuritis

NMOSD

MS

MOGAD

NMO

aka Devic's dz

What is transverse myelitis?

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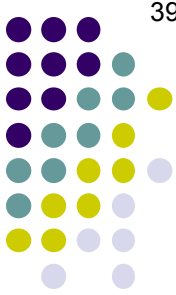
Indeed it is! Further, in addition to longer, the optic nerve lesions in NMO tend to be more than those found in typical optic neuritis.

anterior vs
posterior

What is the other?

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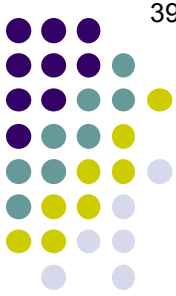
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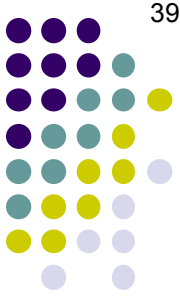
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Typical Optic Neuritis



MRI findings in NMOSD-associated optic neuritis:
Enhancement is **bilateral**, **extensive**, and **posterior**.



MRI findings in MS-associated optic neuritis:
Enhancement is **unilateral**, **short**, and **anterior**.

Typical Optic Neuritis

NMOSD

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MOGAD

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What is transverse myelitis?

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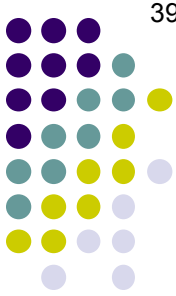
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Q How posterior are we talking about here?

A They can extend to the two words (which is almost unheard of in typical optic neuritis)

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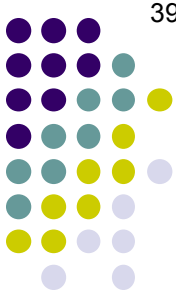
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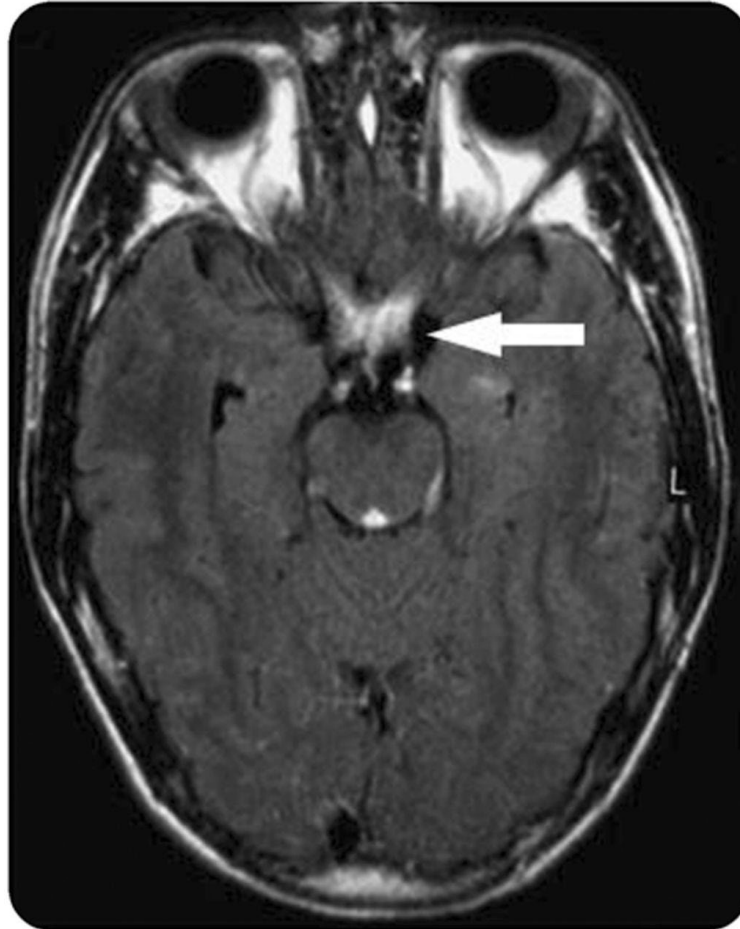
Longitudinally extensive transverse myelitis

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Typical Optic Neuritis



Thirteen-year-old girl presenting with bilateral visual loss due to NMO-associated optic neuritis. Axial FLAIR brain imaging showed optic chiasm involvement (white arrow).

Typical Optic Neuritis

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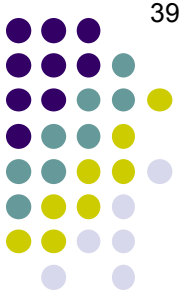
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A It raises the possibility that [] and/or [two words] VF defects might be found

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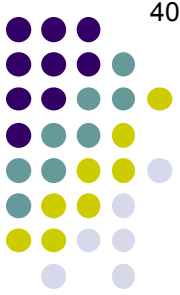
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Typical Optic Neuritis

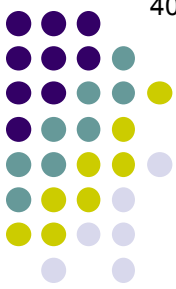
NMOSD

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T They can extend

Q What does chronic
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Speaking of VA loss in NMO(SD)—does it tend to be on the mild-to-moderate side a la typical optic neuritis?

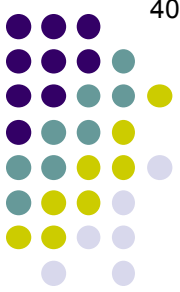
True of the

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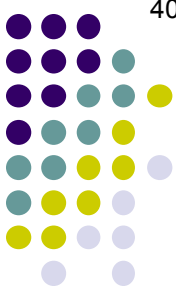
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Snellen VA

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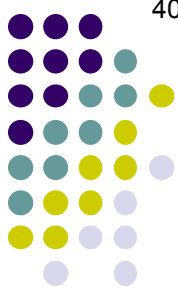
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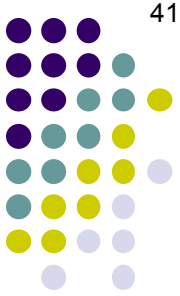
NMO

aka Devic's dz

+ *transverse myelitis*

Optic neuritis

NMO is an antibody-mediated autoimmune condition. What is the target of the antibodies?



Typical Optic Neuritis

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The protein what AQP4 stands for (AQP4)



Typical Optic Neuritis

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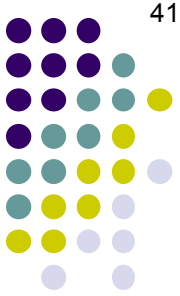
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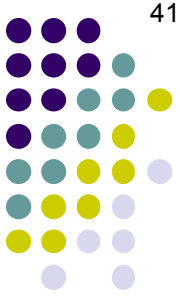
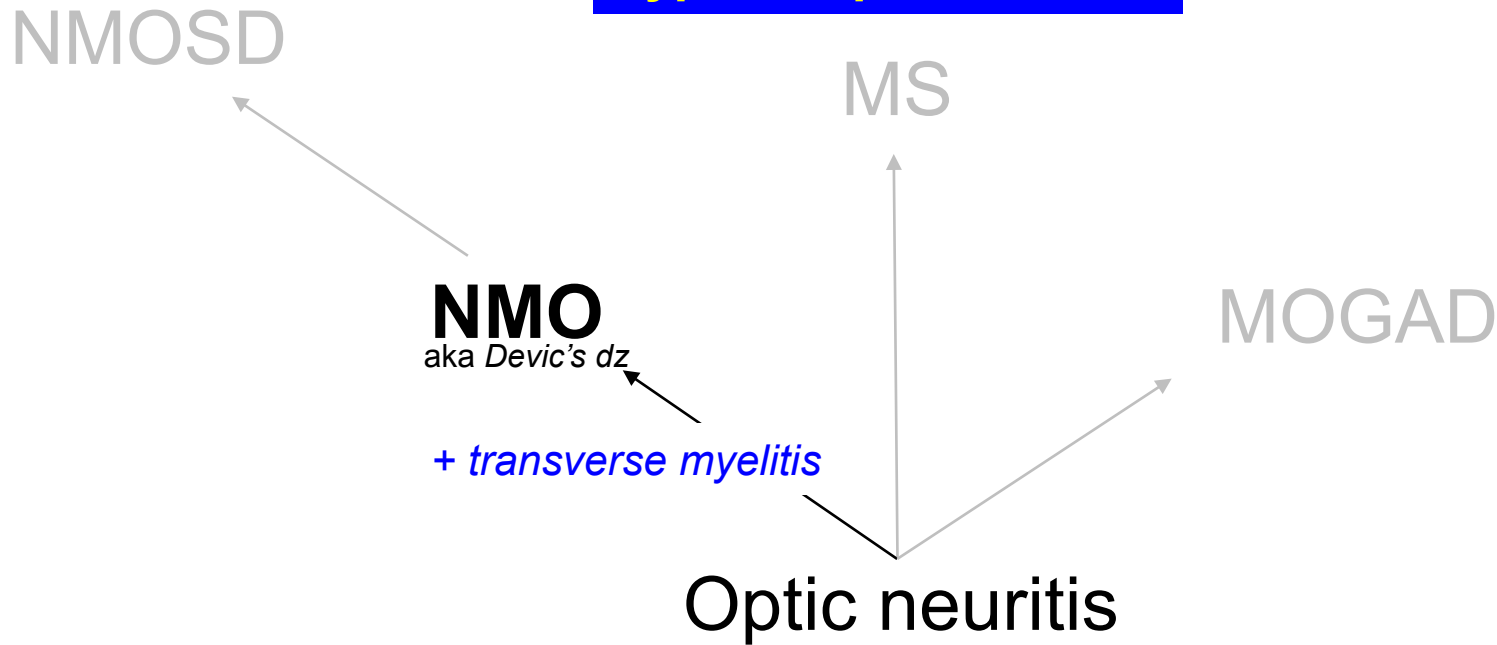
+ *transverse myelitis*

Optic neuritis

NMO is an antibody-mediated autoimmune condition. What is the target of the antibodies?
The protein aquaporin-4 (AQP4)



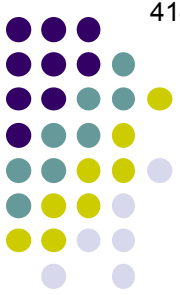
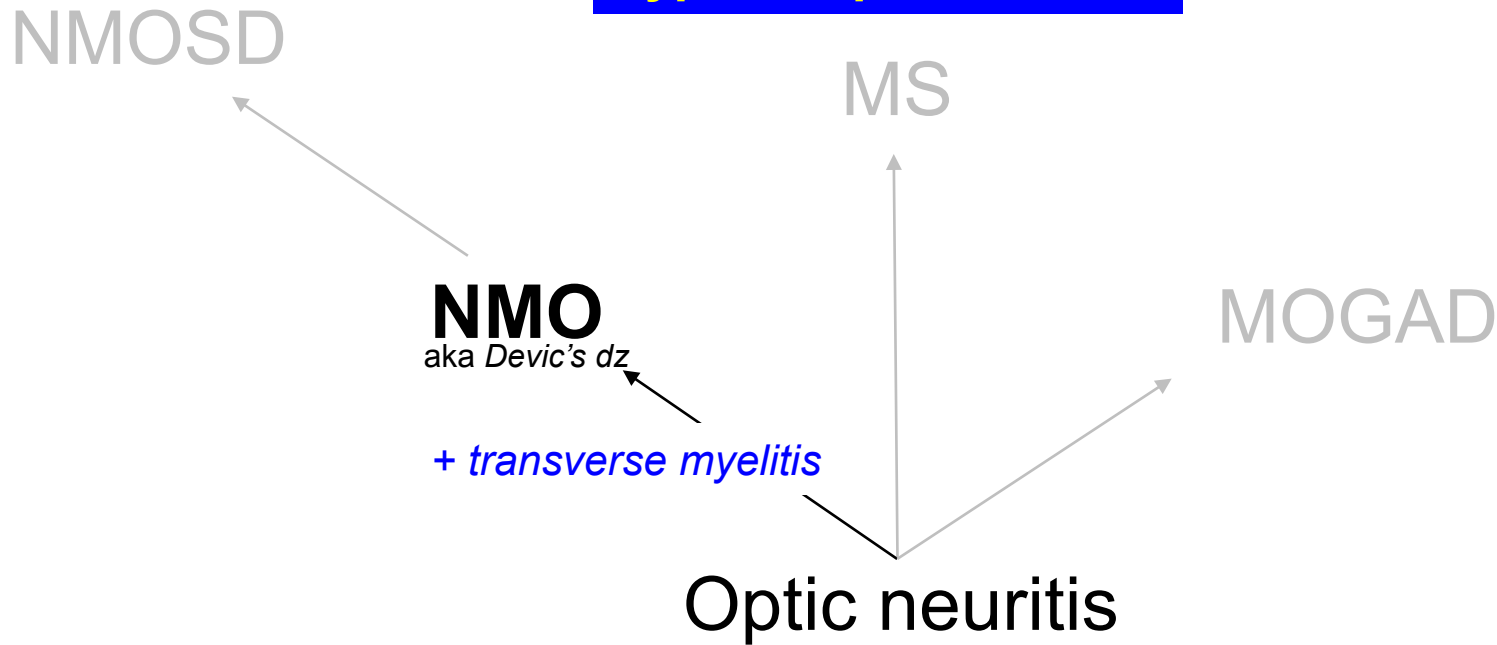
Typical Optic Neuritis



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What does this protein do?

Typical Optic Neuritis



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What does this protein do?

It is the main water channel protein in CNS cell type cells

Typical Optic Neuritis

NMOSD

MS

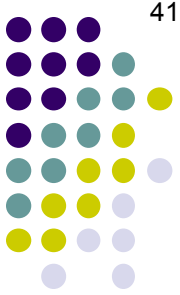
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Optic neuritis

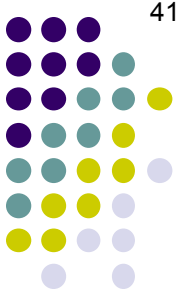
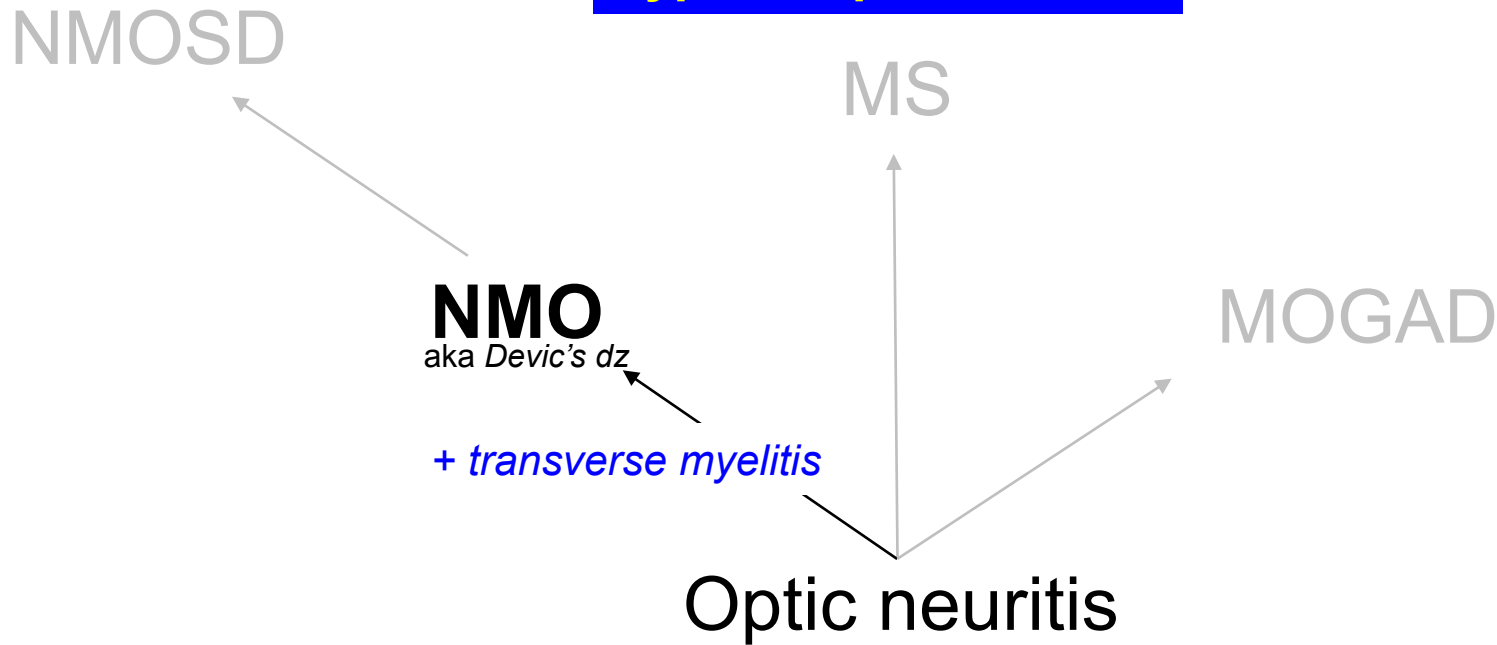


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Typical Optic Neuritis



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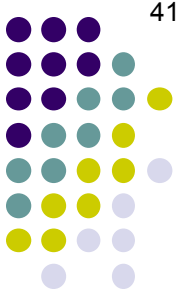
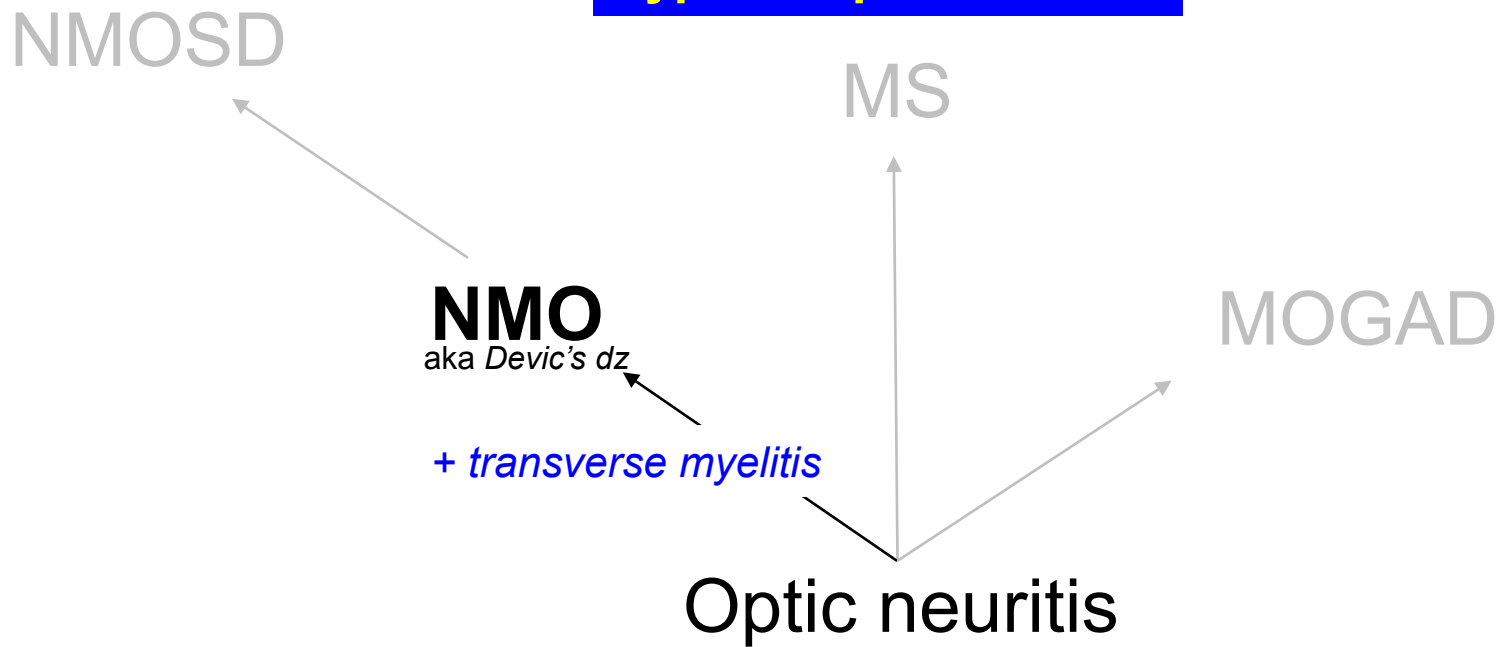
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They maintain oligodendrocyte viability—so, astrocyte loss → oligodendrocyte loss

Typical Optic Neuritis



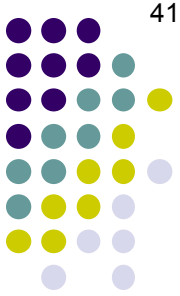
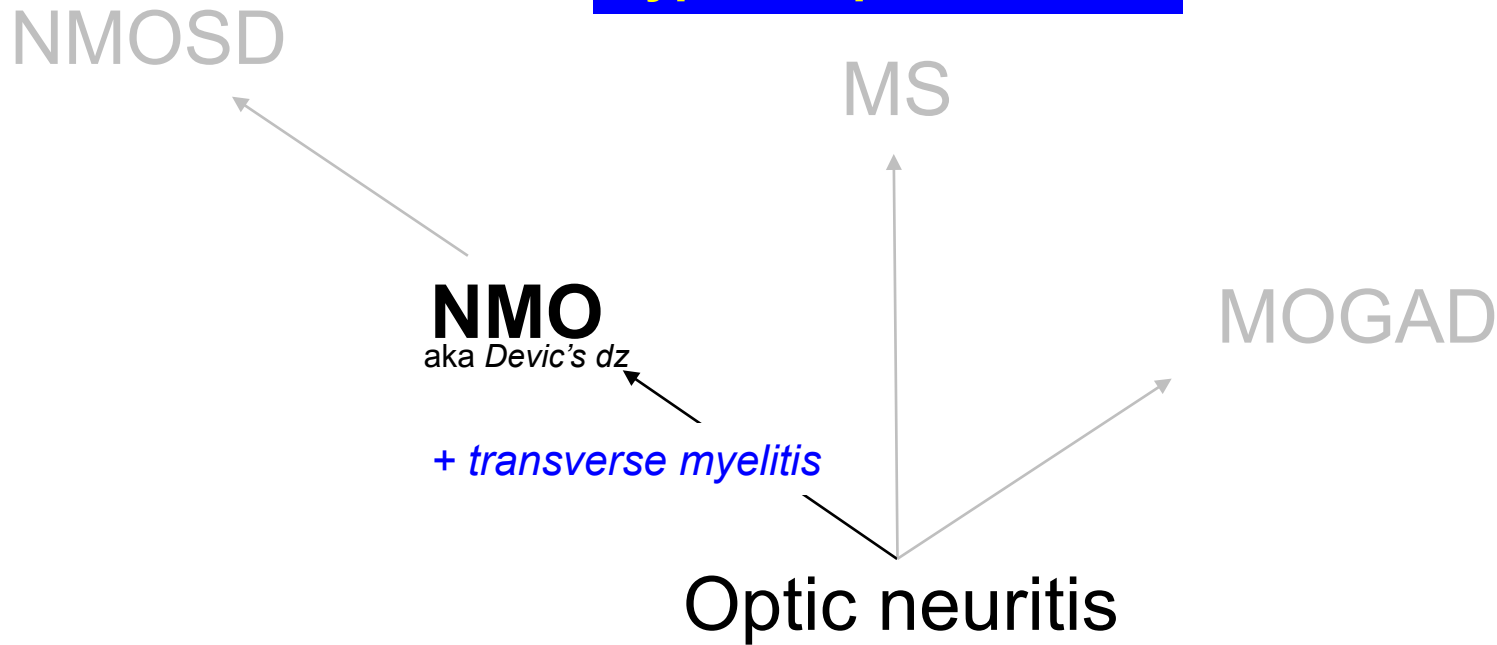
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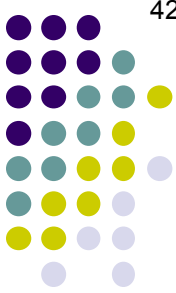
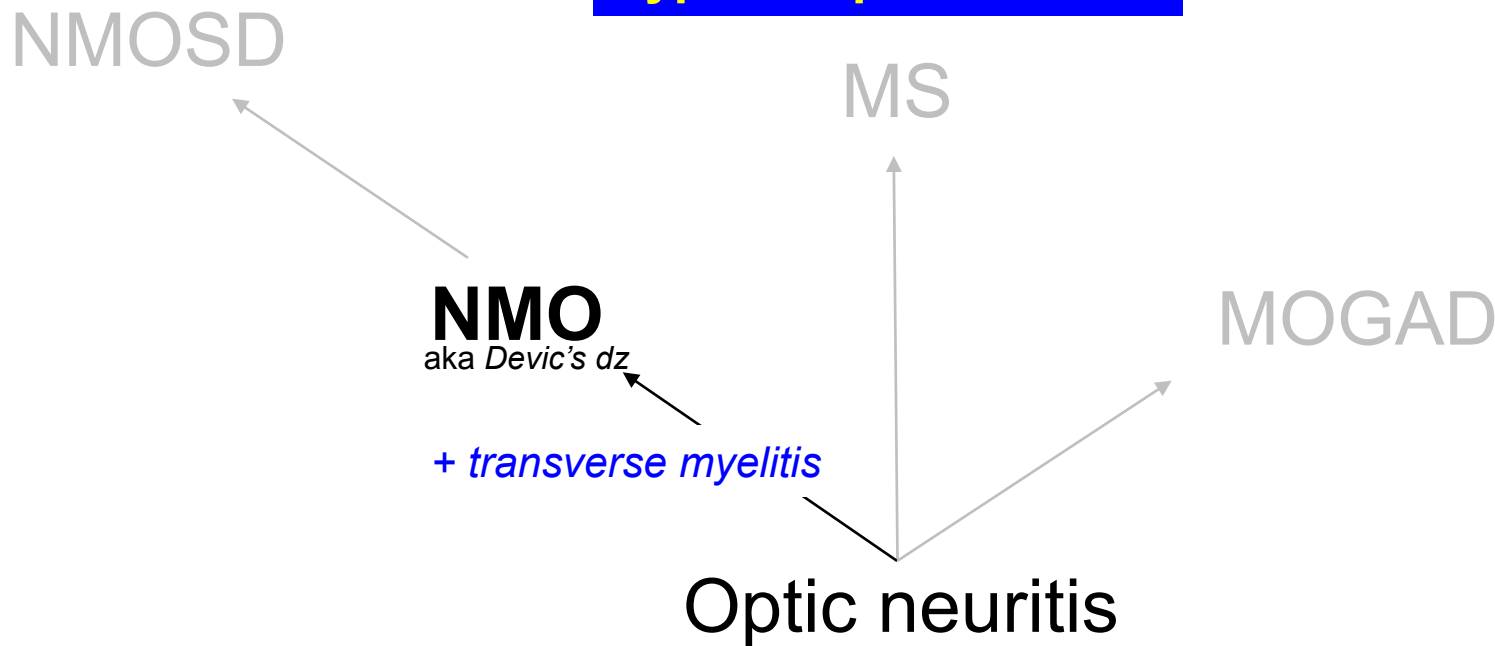
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 They provide myelin in the CNS—oligodendrocyte loss = demyelination

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+ *transverse myelitis*

Optic neuritis

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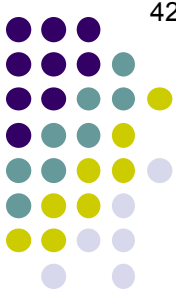
What is it? Typical (demyelinating but protein in astroglial cells

In the CNS, astrocytes do? The viability—so, astrocyte loss → oligodendrocyte loss

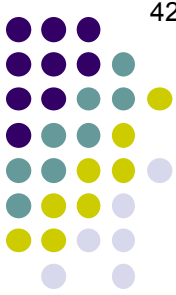
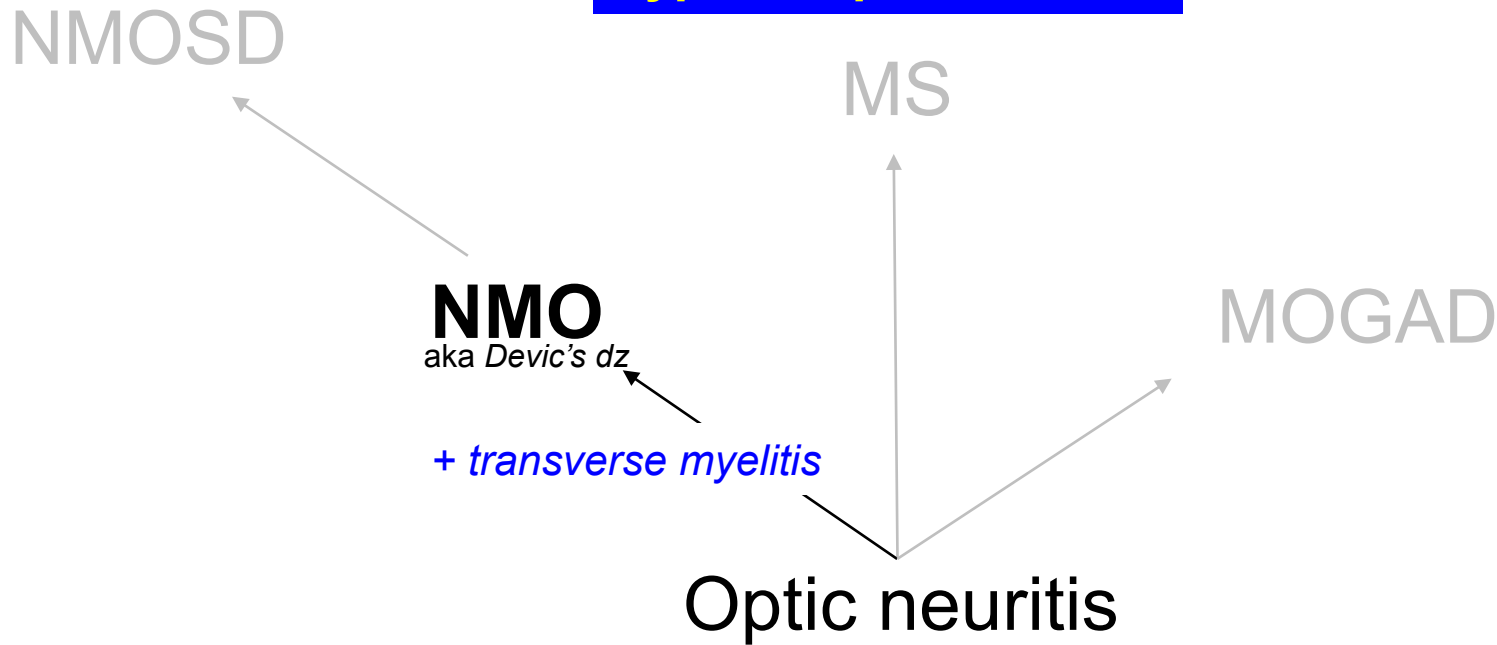
Not idiopathic
or MS-related

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Typical Optic Neuritis



NMO is an antibody-mediated autoimmune condition. What is the target of the antibodies?

The protein **aquaporin-4 (AQP4)**

Is lab testing available to detect antibodies against AQP4?

Yes, and they form part of the diagnostic criteria for NMO

It is the main water channel protein in astroglial cells

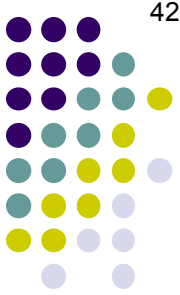
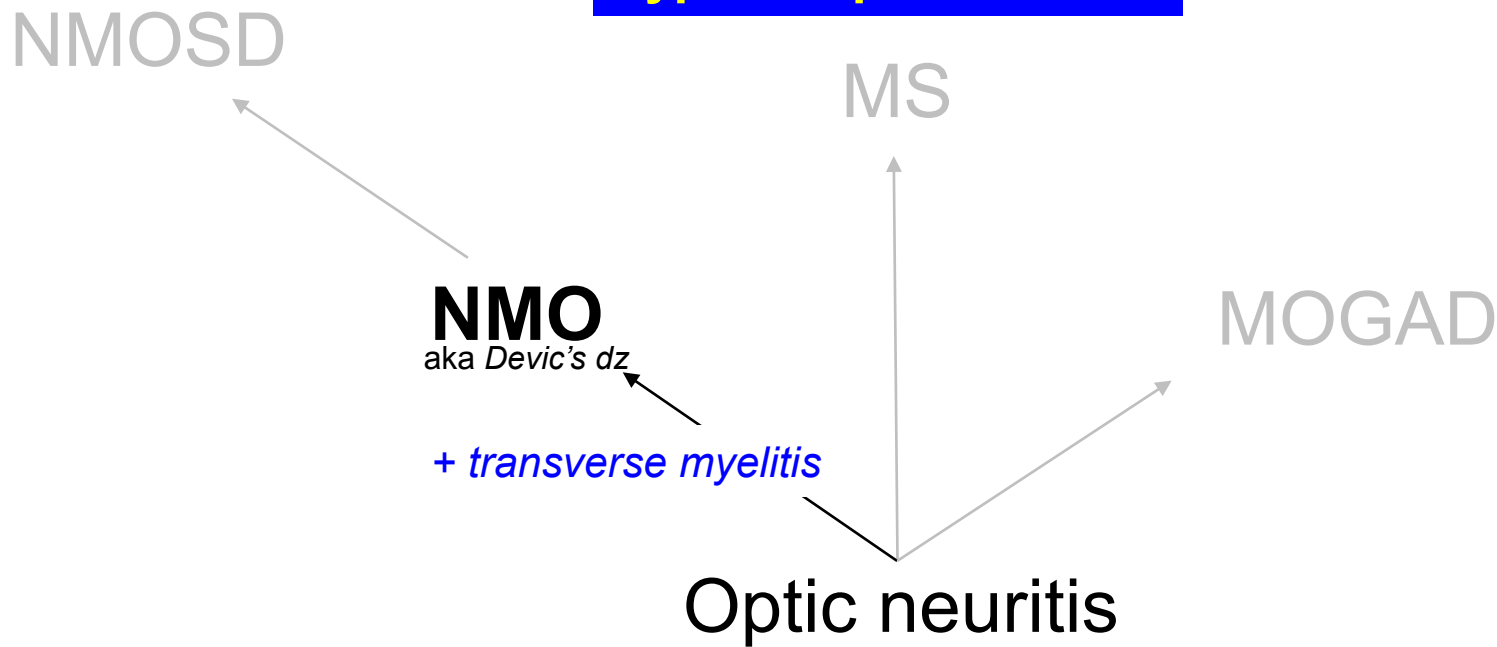
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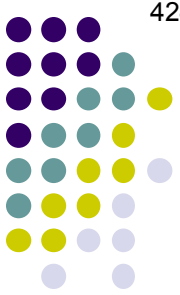
NMO

aka Devic's dz

Optic neuritis

+ ?

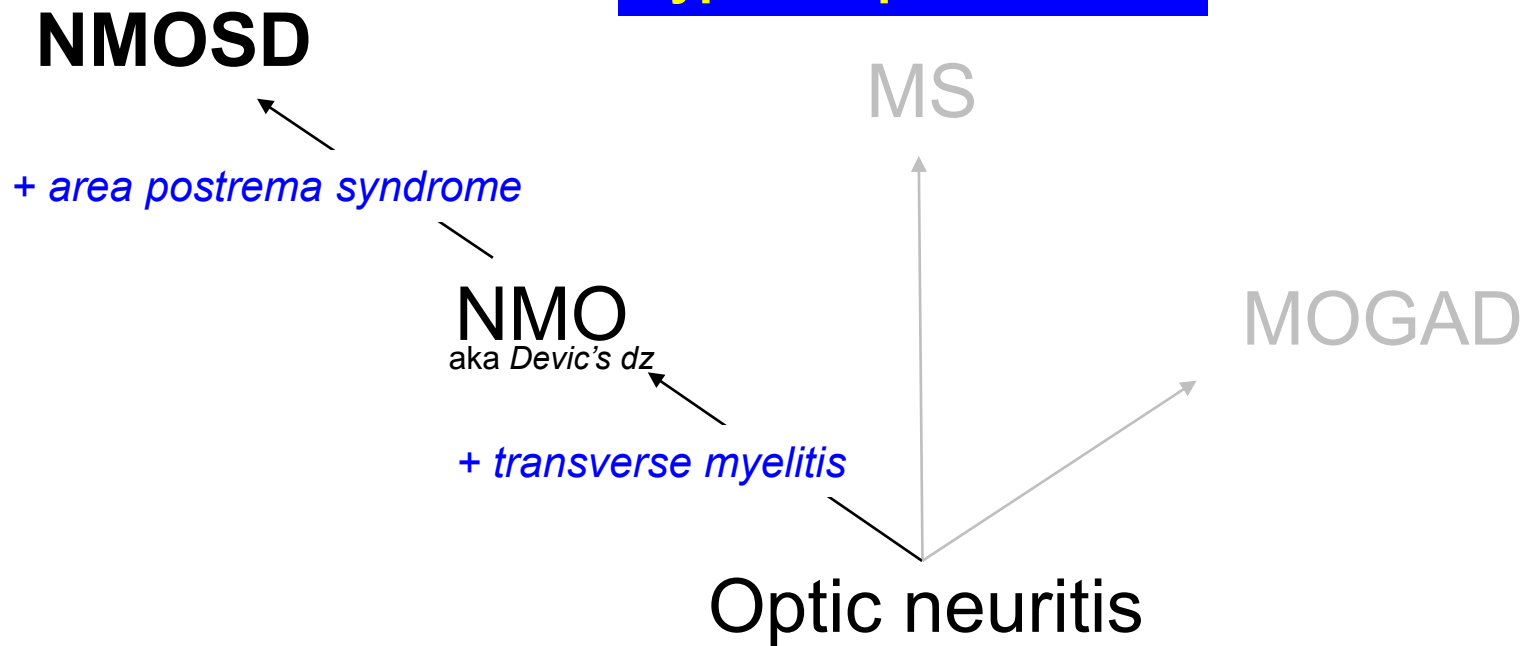
+ transverse myelitis



NMOSD involves three separate and specific inflammatory processes. Two are optic neuritis and longitudinally extensive transverse myelitis. What is the third?



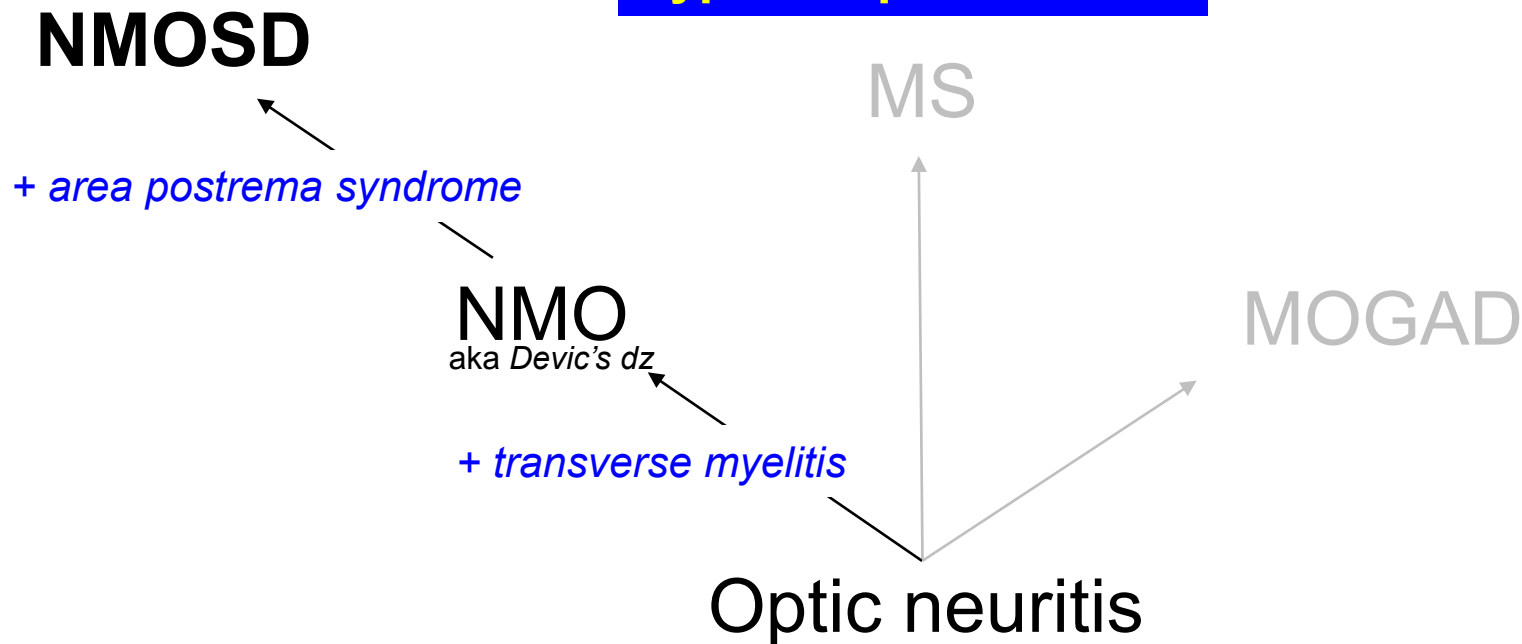
Typical Optic Neuritis



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 Area postrema syndrome



Typical Optic Neuritis



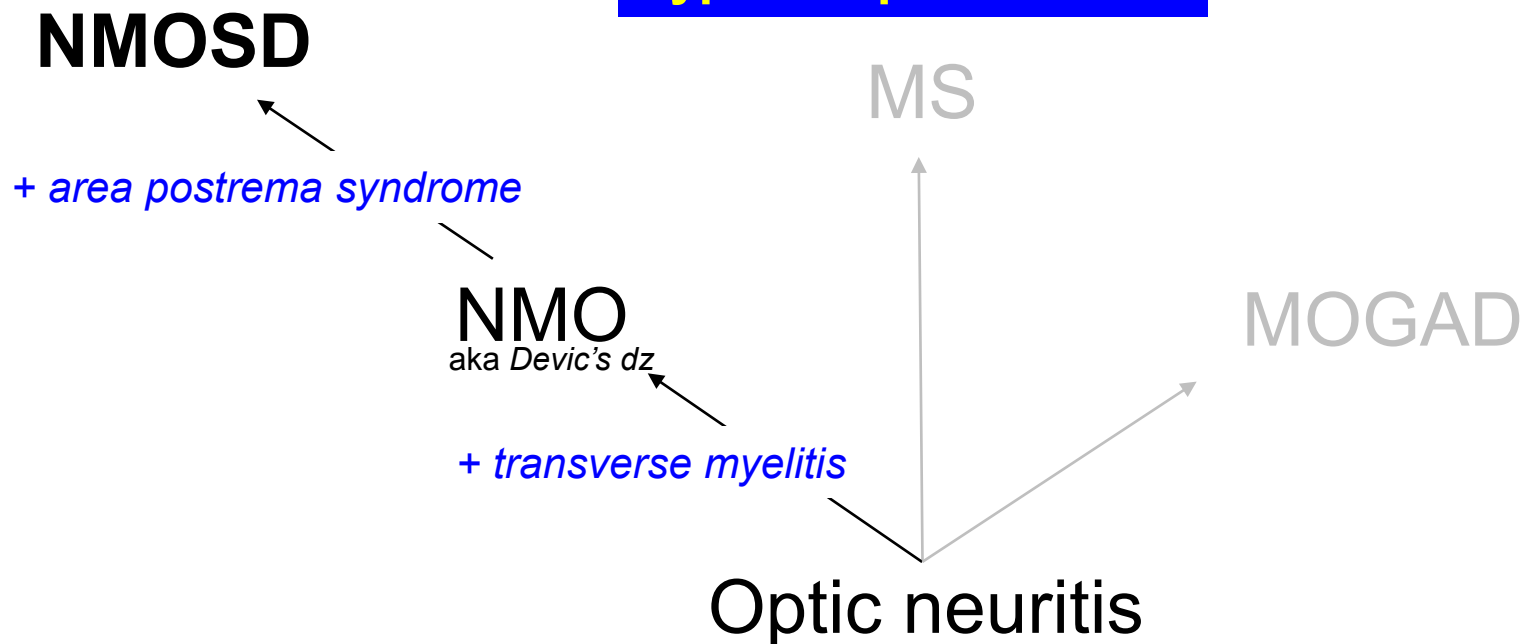
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Area postrema syndrome

What is the area postrema?



Typical Optic Neuritis

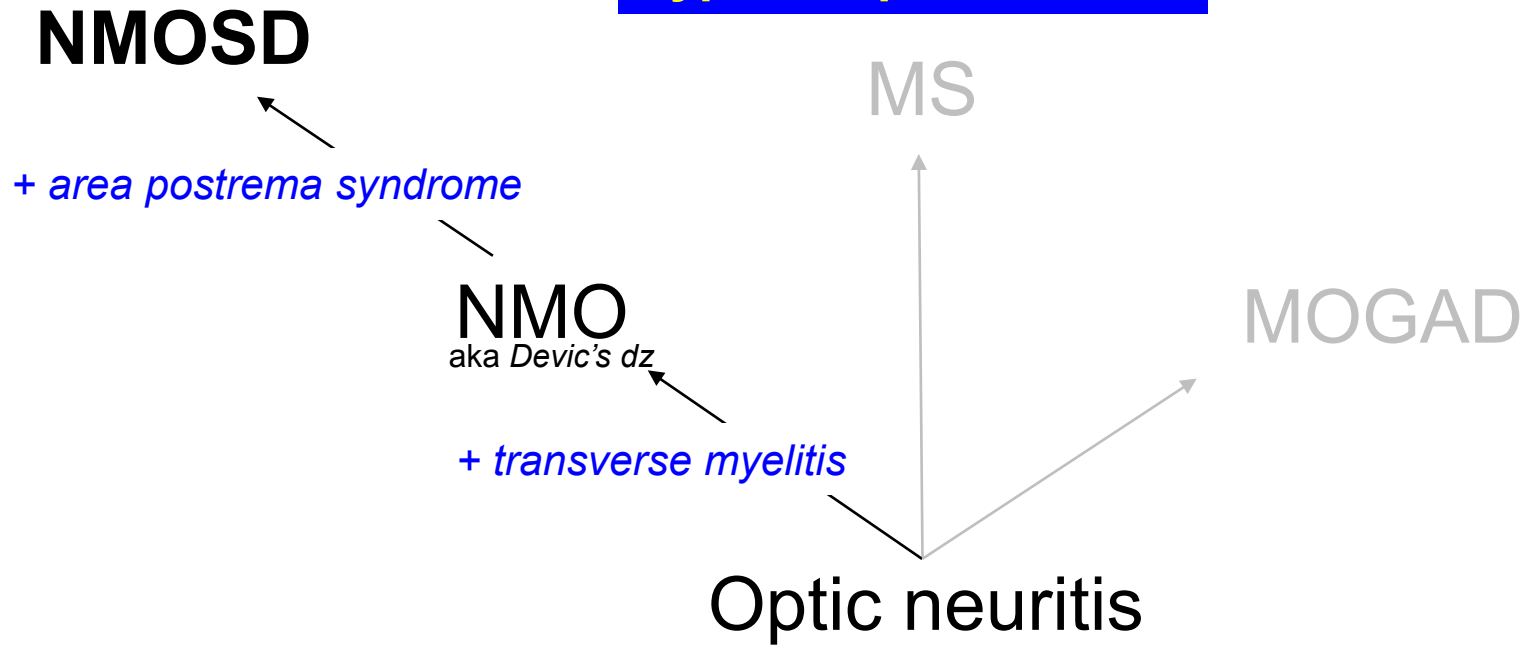


NMOSD involves three separate and specific inflammatory processes. Two are optic neuritis and longitudinally extensive transverse myelitis. What is the third?
 Area postrema syndrome

What is the area postrema?
 A portion of the posterior medulla



Typical Optic Neuritis



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How does area postrema syndrome present clinically?

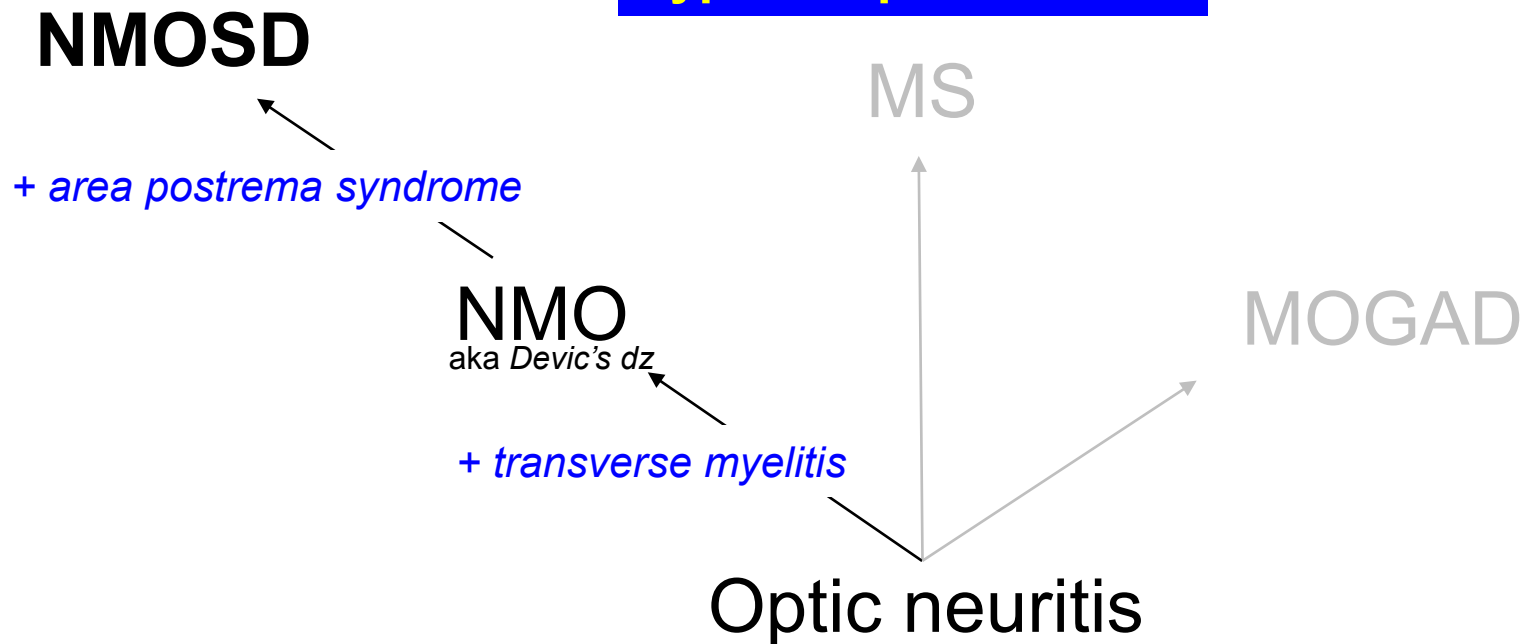
With intractable episodes of one or both of the following:

--?

--?



Typical Optic Neuritis



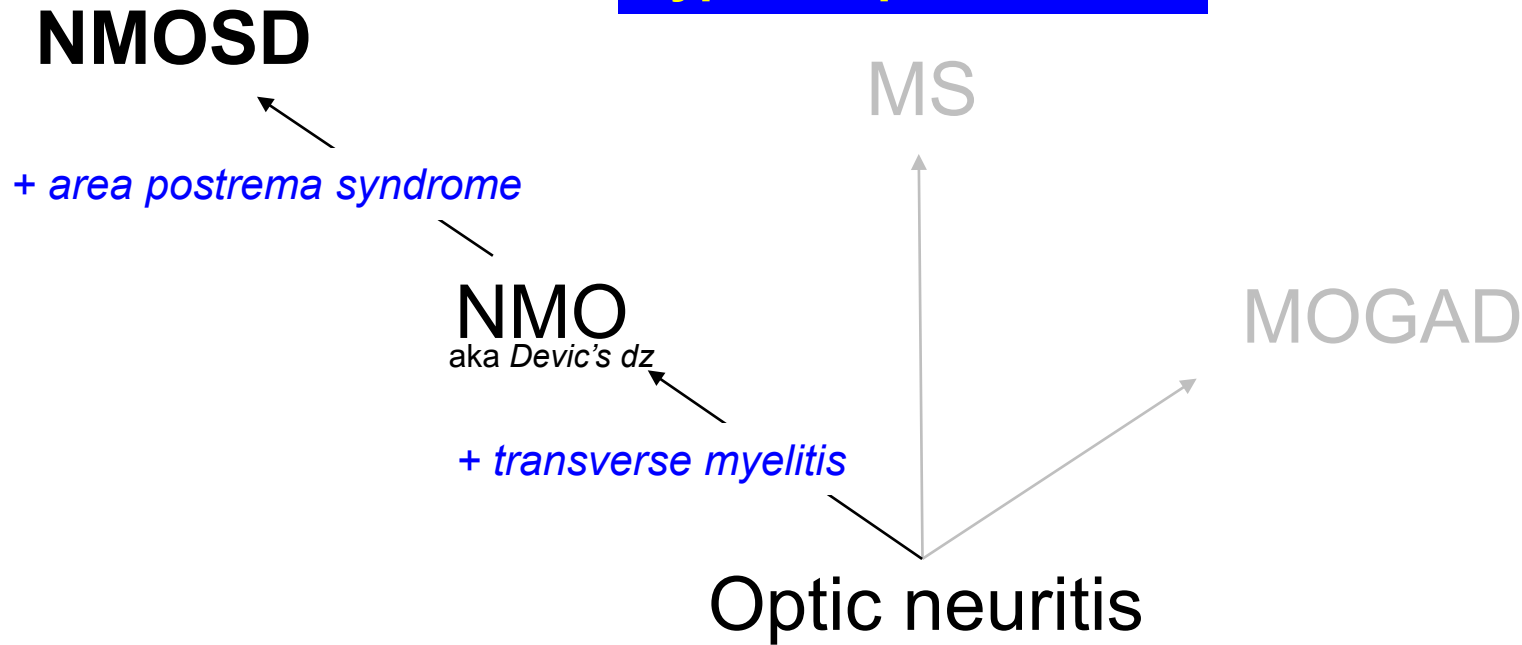
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How does area postrema syndrome present clinically?
 With intractable episodes of one or both of the following:
 --Hiccups
 --Nausea/vomiting



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How does area postrema syndrome present clinically?
 With intractable hiccups and vomiting

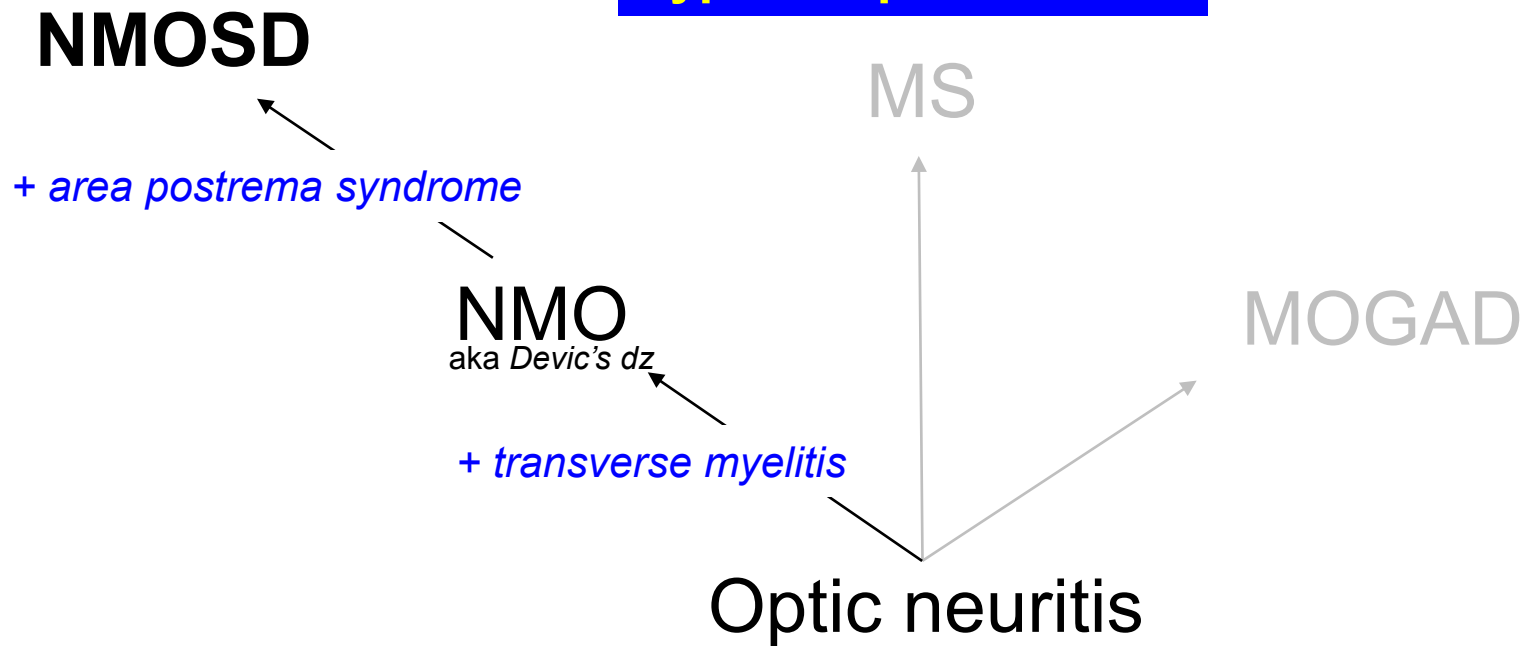
Hiccups

How long do hiccups have to last to be considered 'intractable'?

--Nausea/vomiting



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How does area postrema syndrome present clinically?

With intractable hiccups and/or vomiting. How long do hiccups have to last to be considered 'intractable'?

--Hiccups

--Nausea/vomiting

How long do hiccups have to last to be considered 'intractable'?

At least 30 days or so



Typical Optic Neuritis

NMOSD

+ *area postrema syndrome*

NMO

aka Devic's dz

MS

MOGAD

Speaking of intractable hiccups... Only two conditions addressed in the BCSC can present with them. One is NMOSD; what is the other?

NMOSD in
neuritis and
Area postrema

What is the
A portion of

How does a
With intract

Hiccups

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Wallenberg's hallmark nonocular symptom is

sensory vs
motor

Hiccups



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Loss of two specific types sensation

Hiccups



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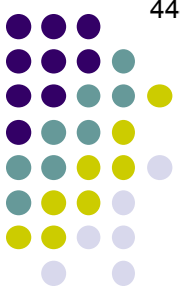
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Loss of pain and temperature sensation to the ipsi- vs contralateral face and ipsi- vs contralateral body

Hiccups



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The ipsilateral vertebral or (less commonly) posterior inferior cerebellar artery

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For more on Wallenberg syndrome, see slide-set N3

NMOSD in

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NMOSD

Like NMO, does NMOSD involve antibodies against the AQP4 protein?

+ area postrema syndrome

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+ transverse myelitis

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Indeed it does

Also as with NMO, is it found in three locations—what are they?
Indeed it is

The AQP4 water channel membrane protein is found mainly in three locations—what are they?

--?

--?

--?

(In retrospect, this should not be surprising)

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--The area postrema

--The spinal cord

--The optic nerve

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locations—what are they?

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little place (two words)

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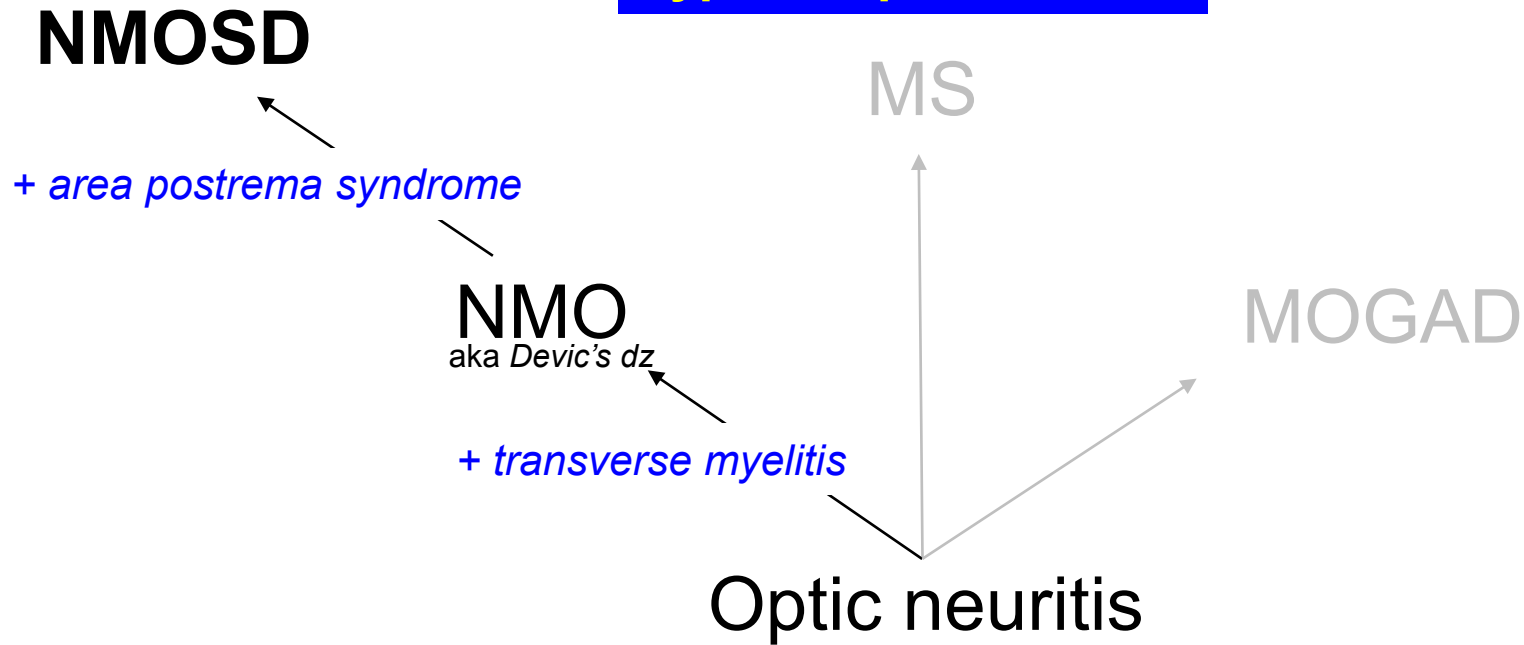


NMOSD
neuritis
Area po

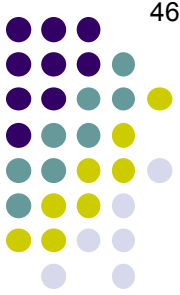
What is
A portion

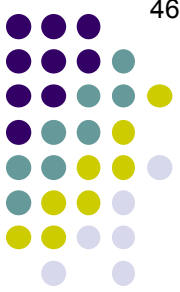
How do
With intr
--Hiccup
--Nause

Typical Optic Neuritis

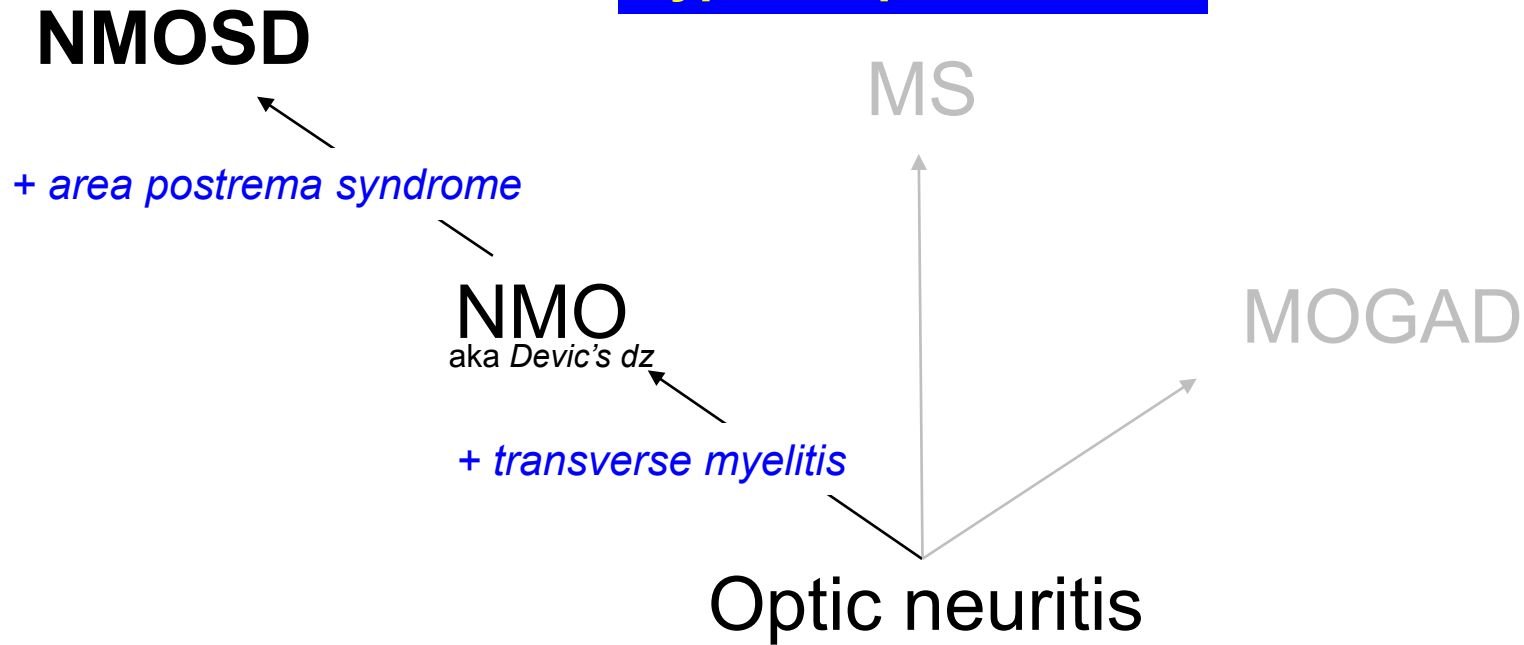


How are NMO and NMOSD treated?





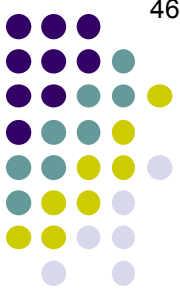
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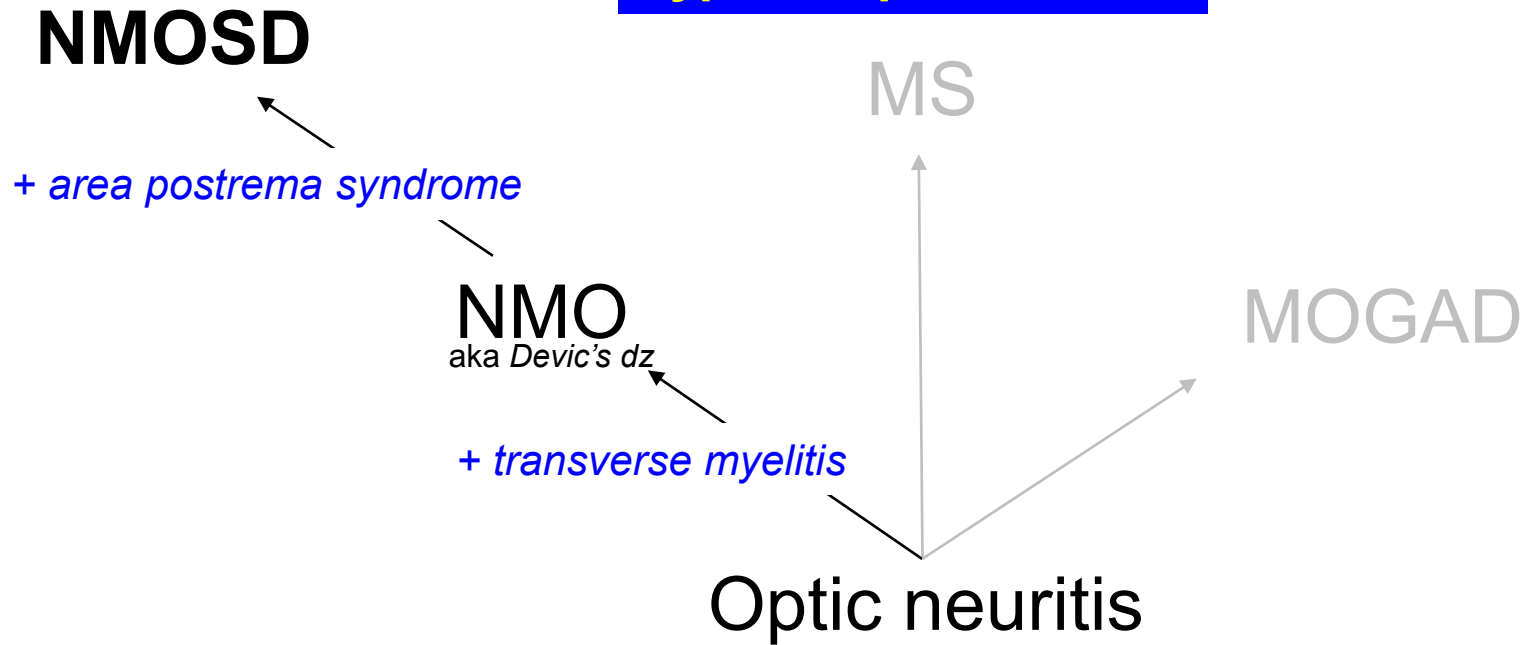
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Acute exacerbations are treated with



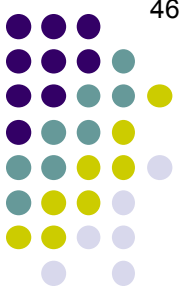


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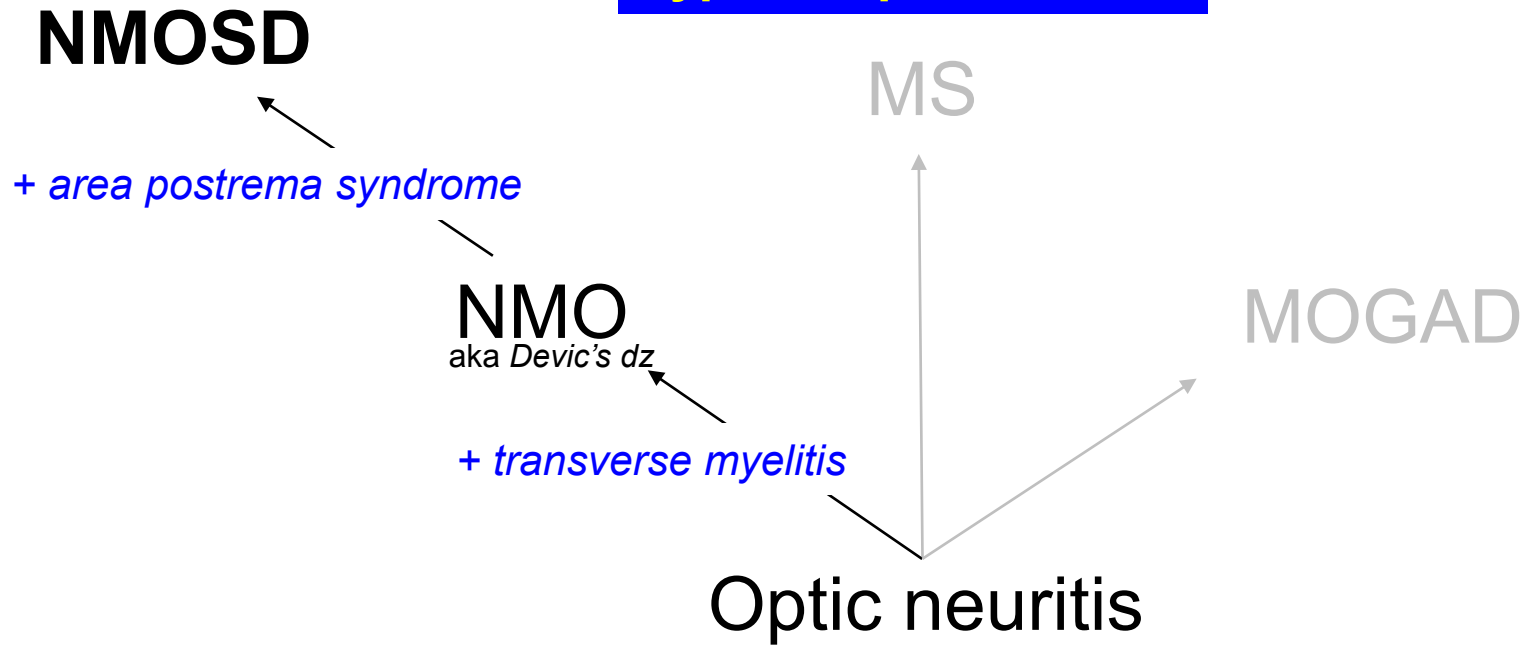


How are NMO and NMOSD treated?

Acute exacerbations are treated with steroids



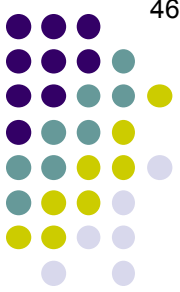
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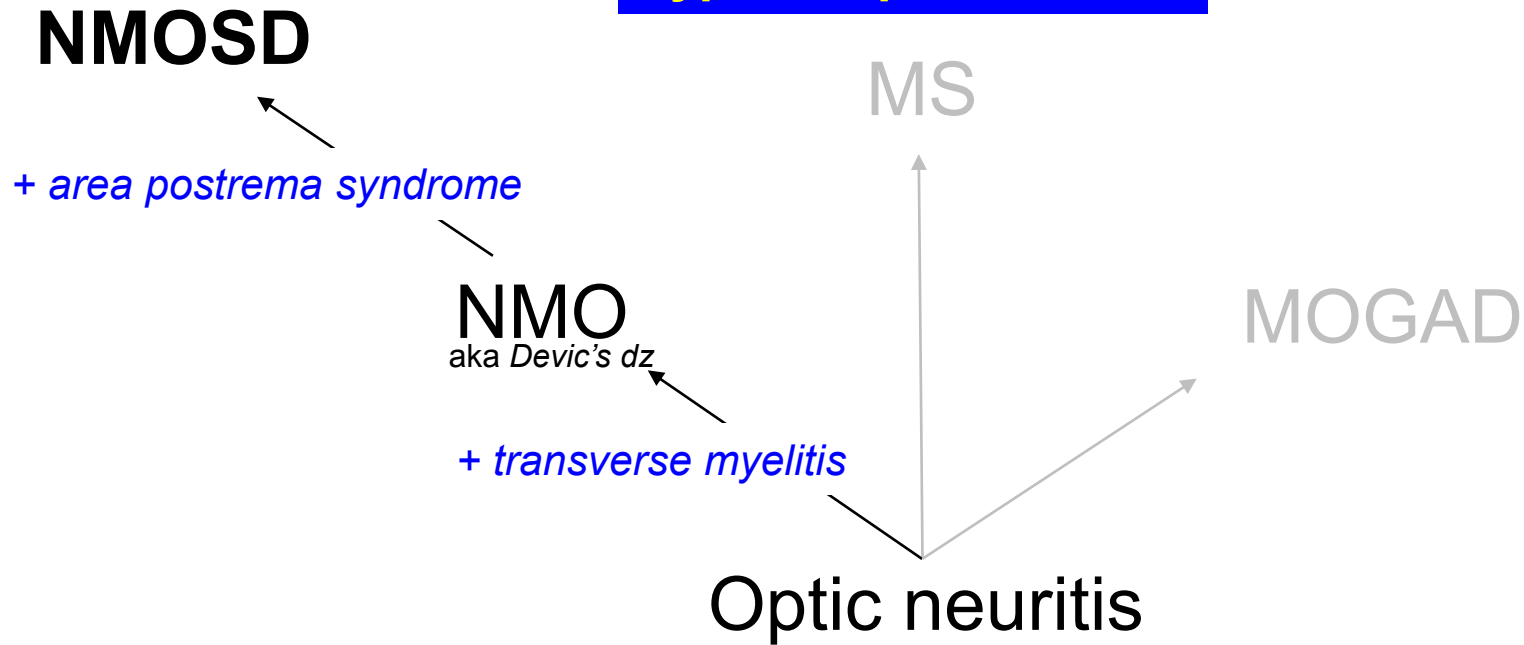
How are NMO and NMOSD treated?

Acute exacerbations are treated with steroids—

dose, and duration



Typical Optic Neuritis

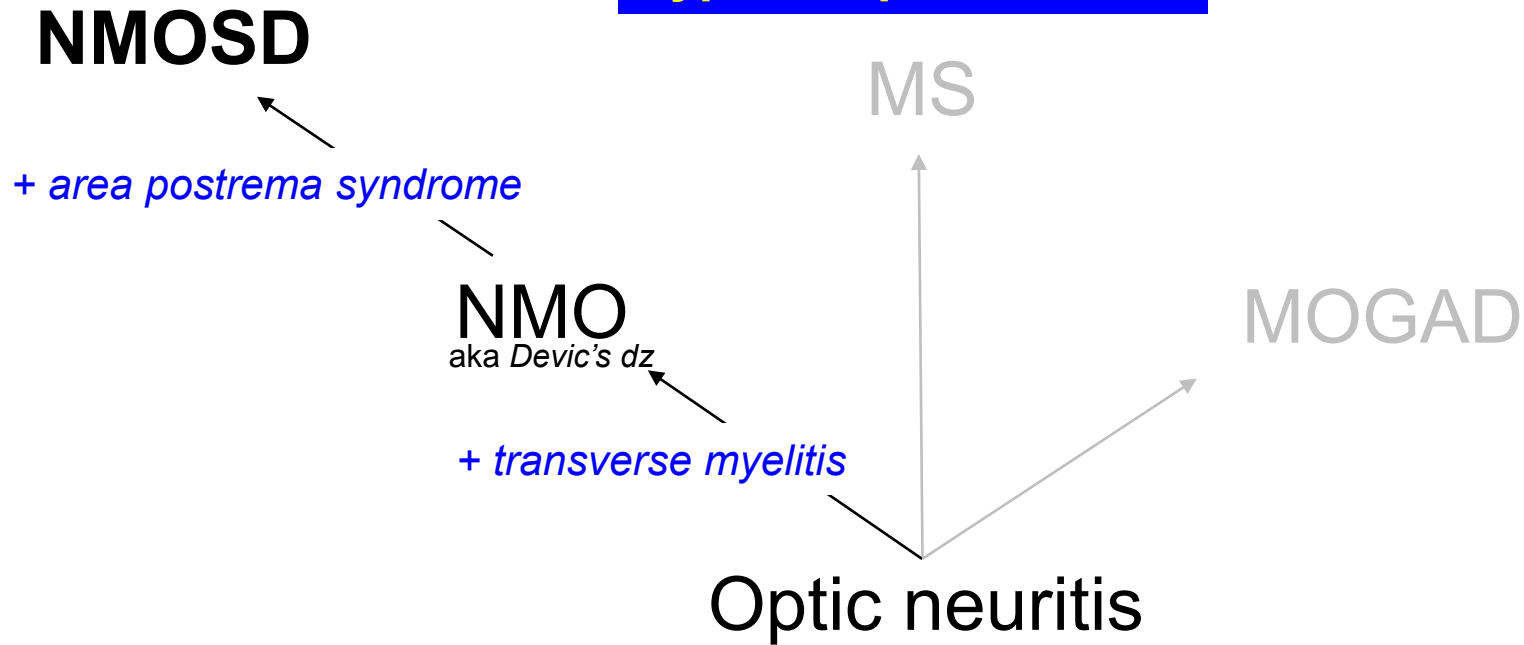


How are NMO and NMOSD treated?

Acute exacerbations are treated with steroids—1 g/d for 3-5 days

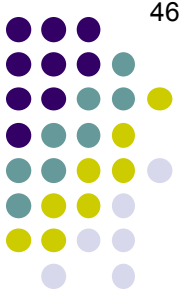


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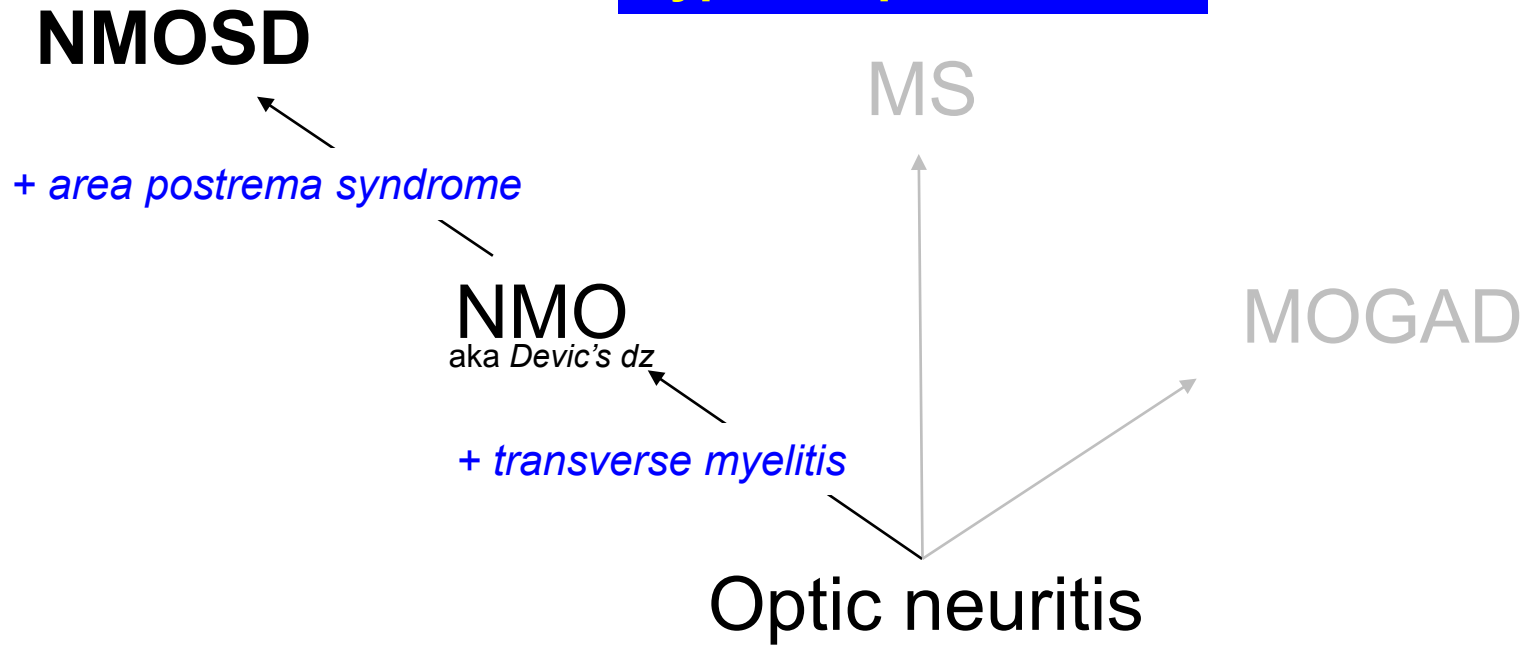


How are NMO and NMOSD treated?

Acute exacerbations are treated with steroids—1 g/d for 3-5 days. If ineffective, and/or should be considered.

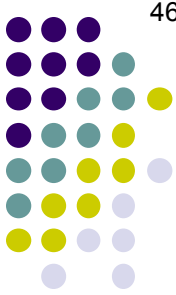


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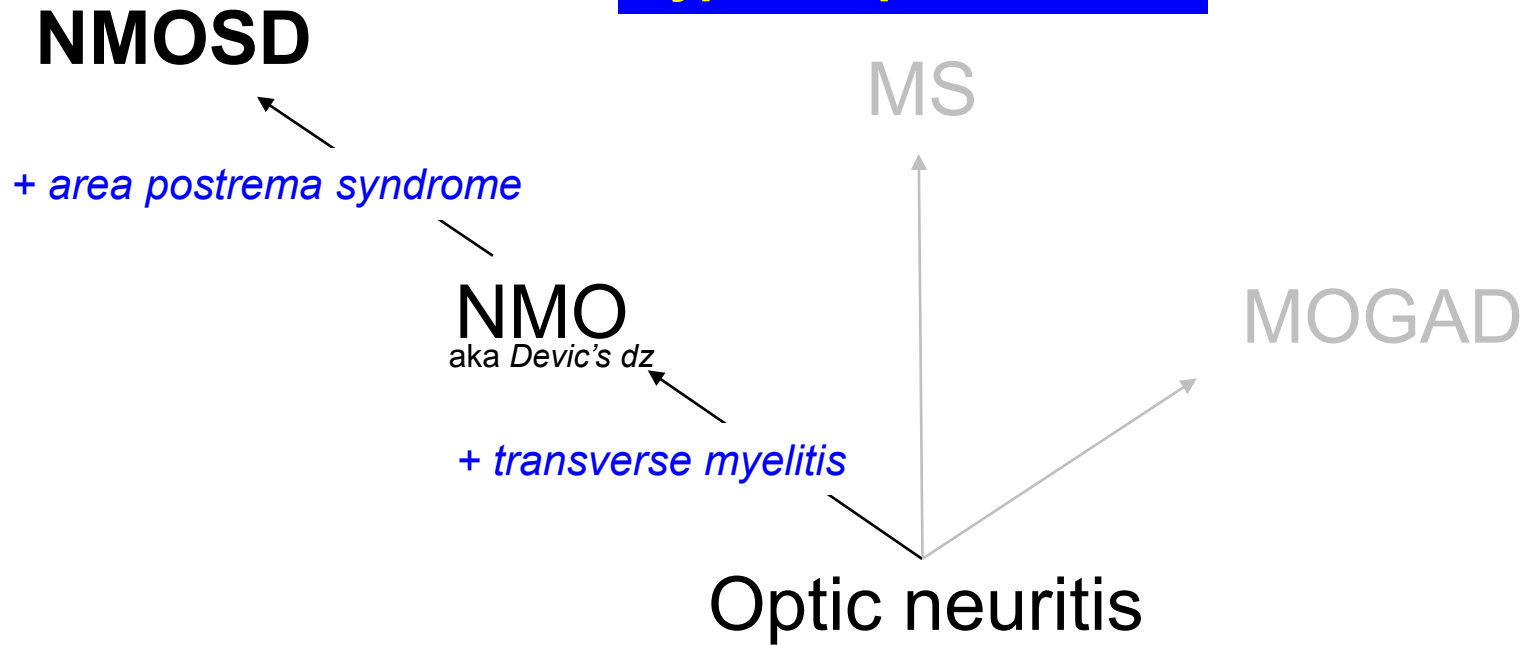


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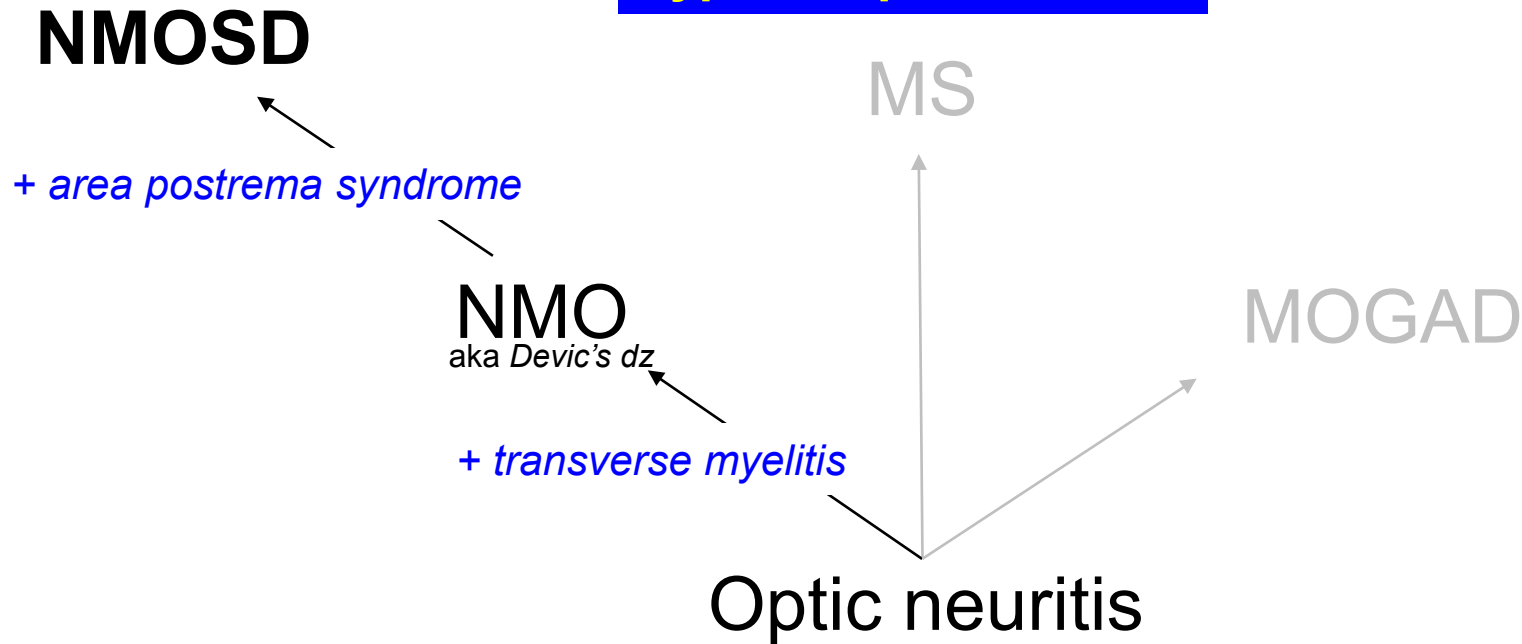
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What class of medicine has been shown to reduce the risk of recurrence?



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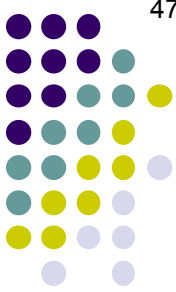


How are NMO and NMOSD treated?

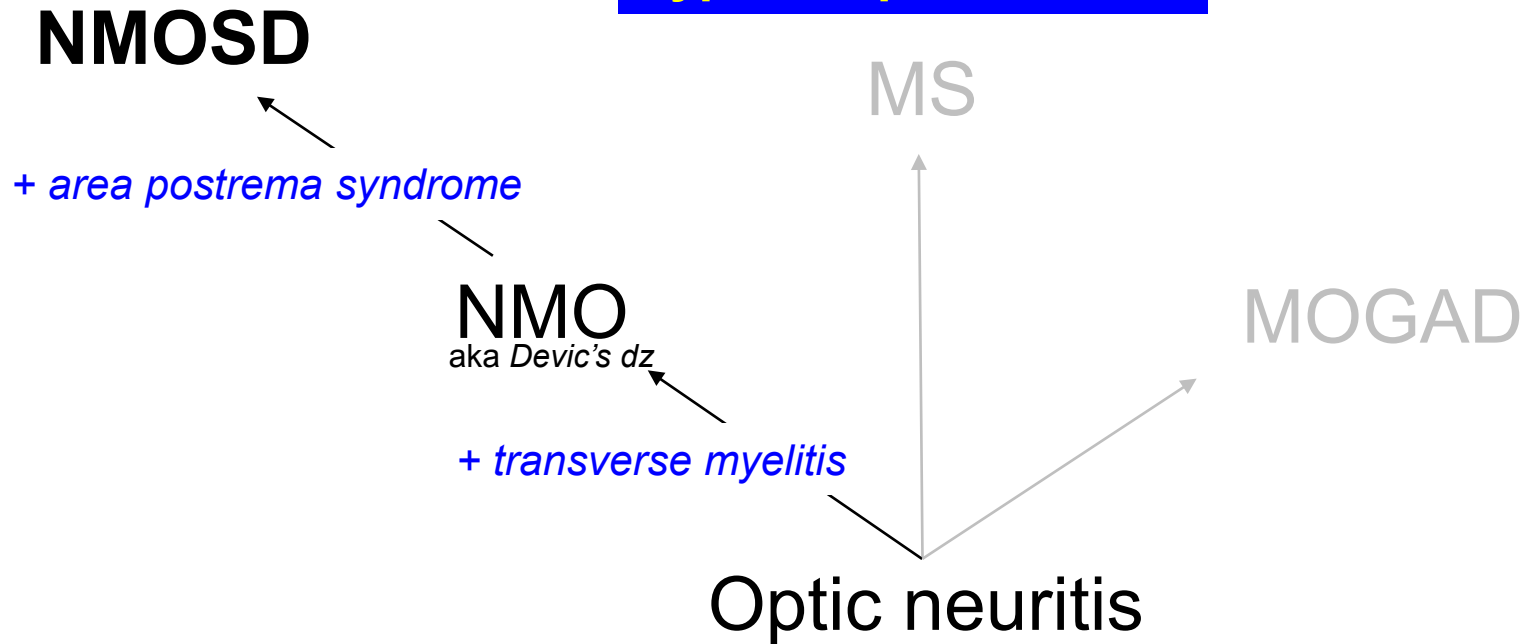
Acute exacerbations are treated with steroids—1 g/d for 3-5 days. If ineffective, plasma exchange and/or IVIG should be considered.

What class of medicine has been shown to reduce the risk of recurrence?

Immunosuppressives



Typical Optic Neuritis



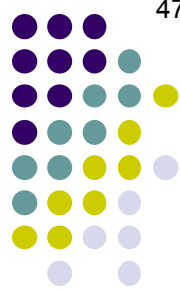
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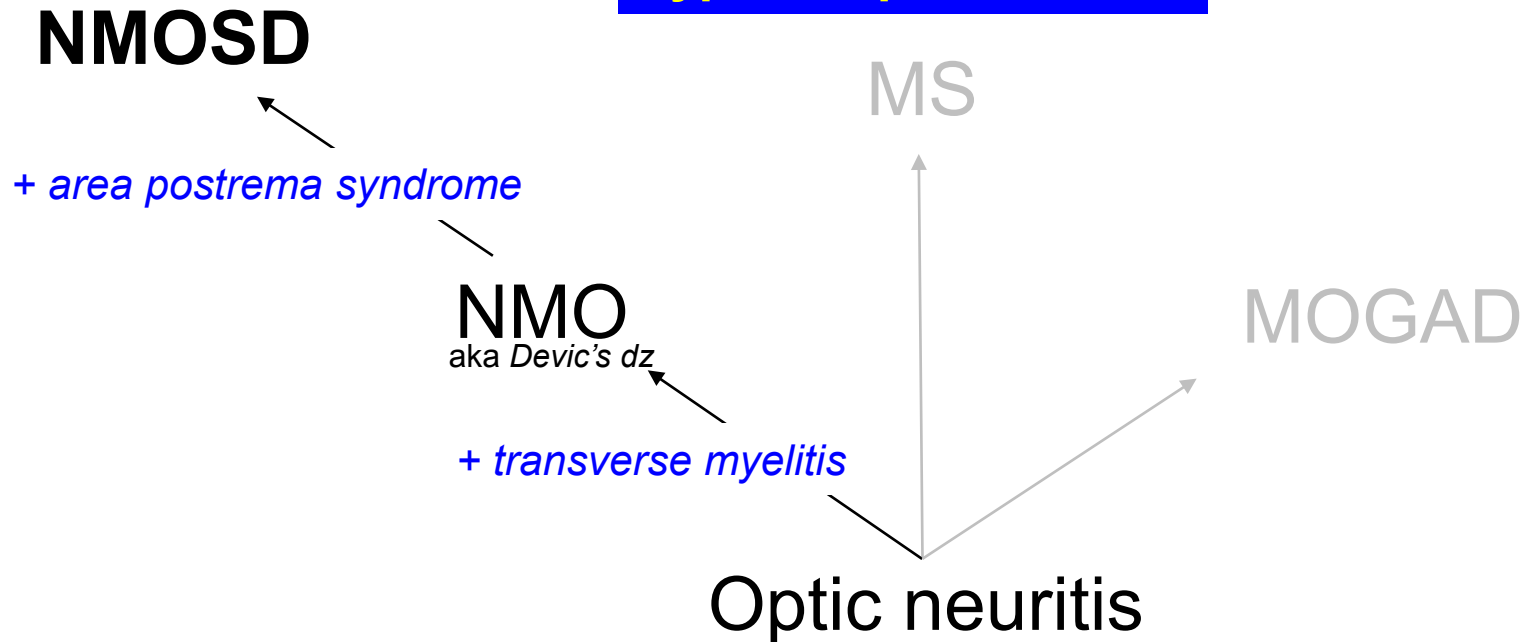
What class of medicine has been shown to reduce the risk of recurrence?

Immunosuppressives

What happens if an NMO(SD) pt is misdiagnosed as having MS and is started on DMT?



Typical Optic Neuritis



How are NMO and NMOSD treated?

Acute exacerbations are treated with steroids—**1 g/d for 3-5 days**. If ineffective, plasma exchange and/or IVIG should be considered.

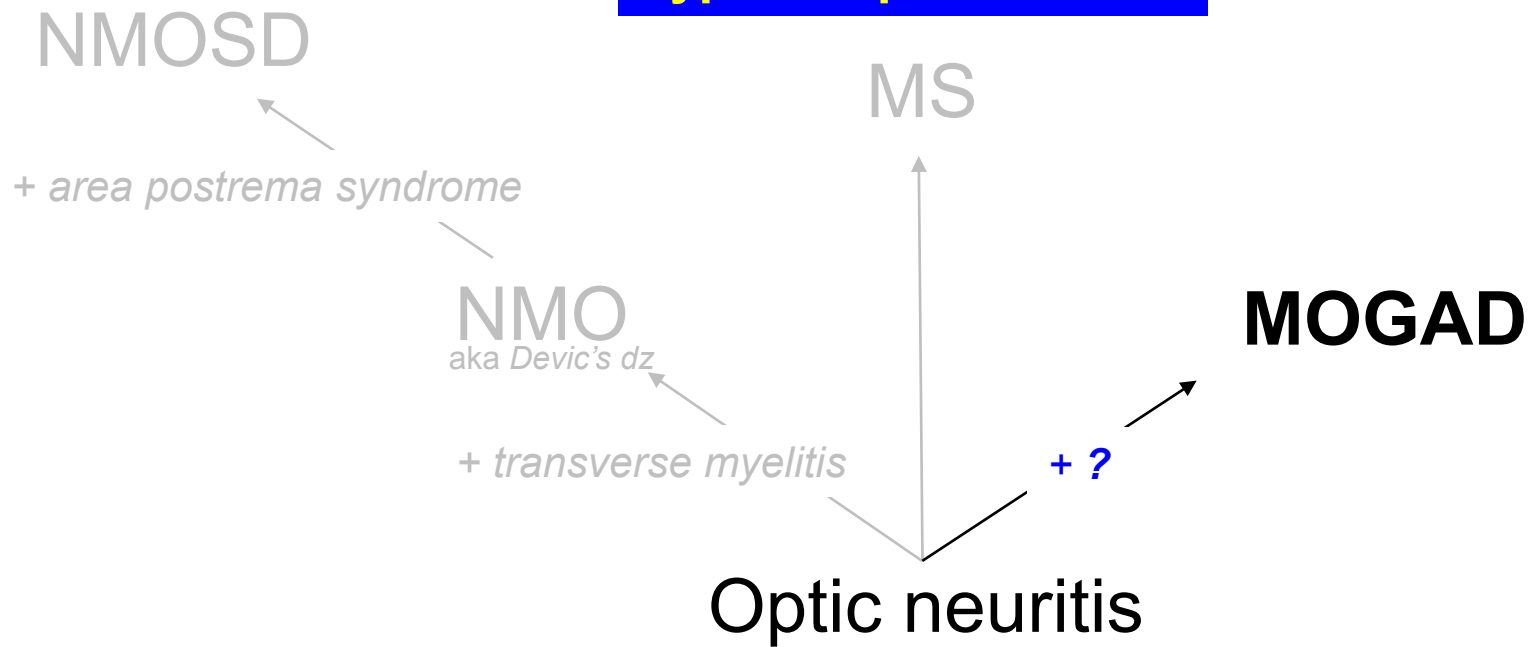
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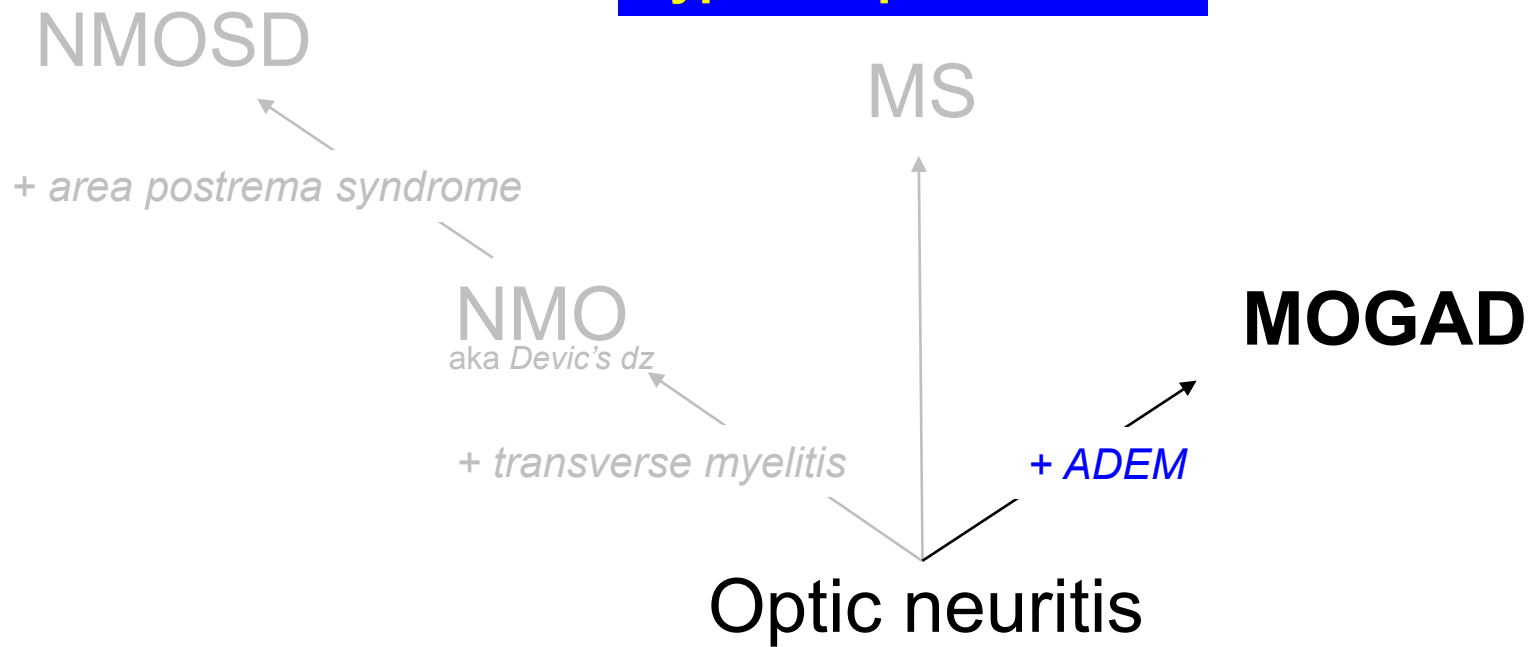
These meds will **increase** the risk of recurrence

Typical Optic Neuritis



MOG involves two separate and specific inflammatory processes. One is optic neuritis. What is the other?

Typical Optic Neuritis



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 Acute disseminated encephalomyelitis (ADEM)

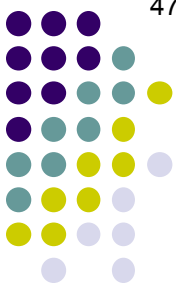
Typical Optic Neuritis

NMOSD

MS

+ area postrema syndrome

In a nutshell, what is ADEM?



MOG *neuritis.*

What is the other?

Acute disseminated encephalomyelitis (**ADEM**)

Typical Optic Neuritis

NMOSD

MS

+ *area postrema syndrome*

In a nutshell, what is ADEM?

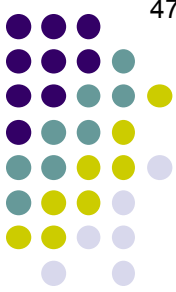
An acute autoimmune demyelinating condition affecting the brain and/or spinal cord

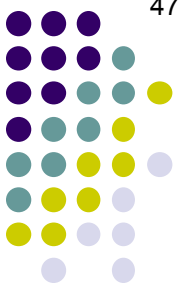
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Typical Optic Neuritis

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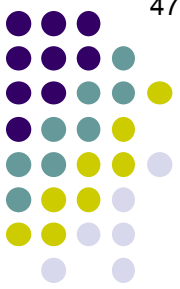
Is it more common in children, or adults?

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Typical Optic Neuritis

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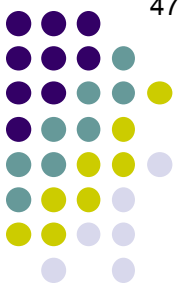
Children

MOG

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Typical Optic Neuritis

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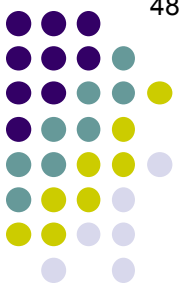
Is there a gender predilection?

MOG

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Typical Optic Neuritis

NMOSD



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M v F

MOG

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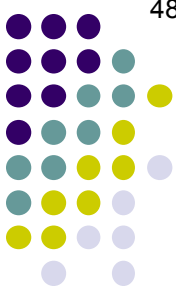
Yes, it is more common in males

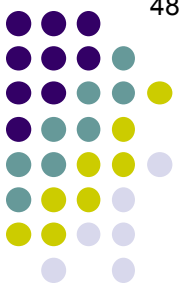
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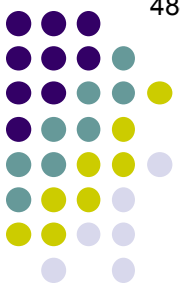
It is more prevalent among people who live closer to v
farther from the equator

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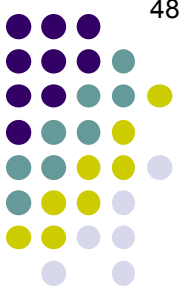
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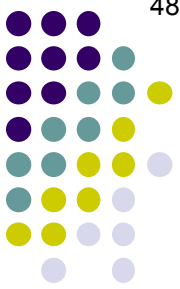
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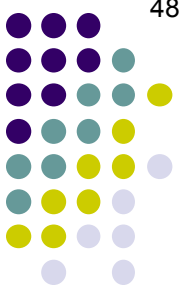
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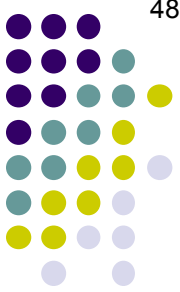
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With multifocal neurologic deficits in concert with encephalopathic signs/symptoms



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--Extremity weakness

--Ataxia



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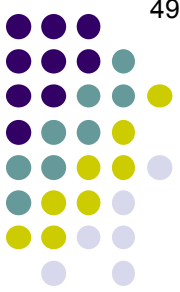
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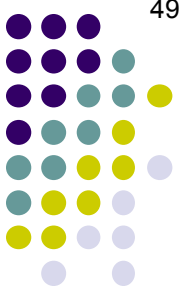
What is the other?

Acute disseminated encephalomyelitis (**ADEM**)

What are the S/S of encephalopathy?

Stupor (or even frank coma); irritability; confusion

encephalopathic signs/symptoms



Typical Optic Neuritis

NMOSD

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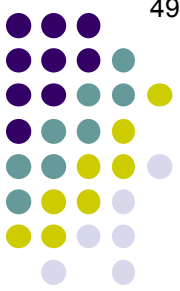
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How does it present radiologically?



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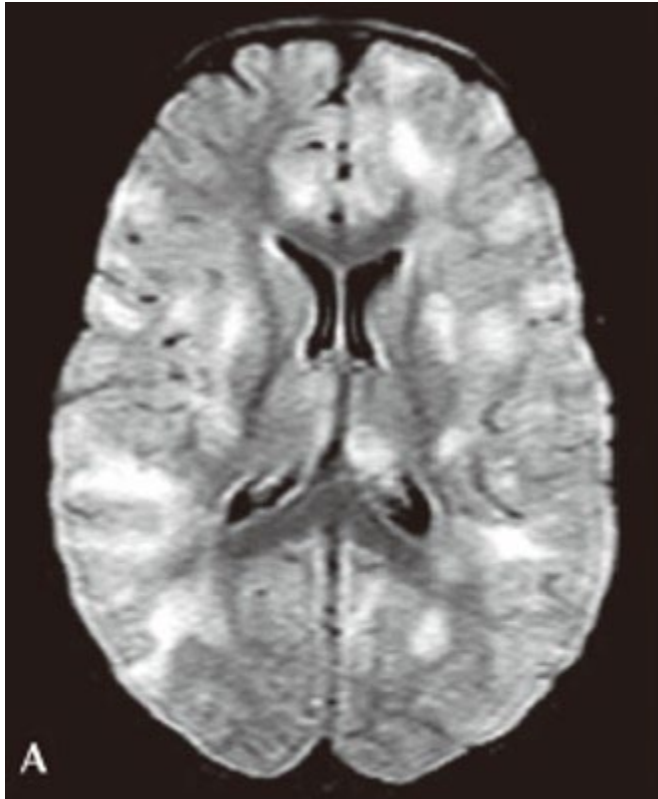
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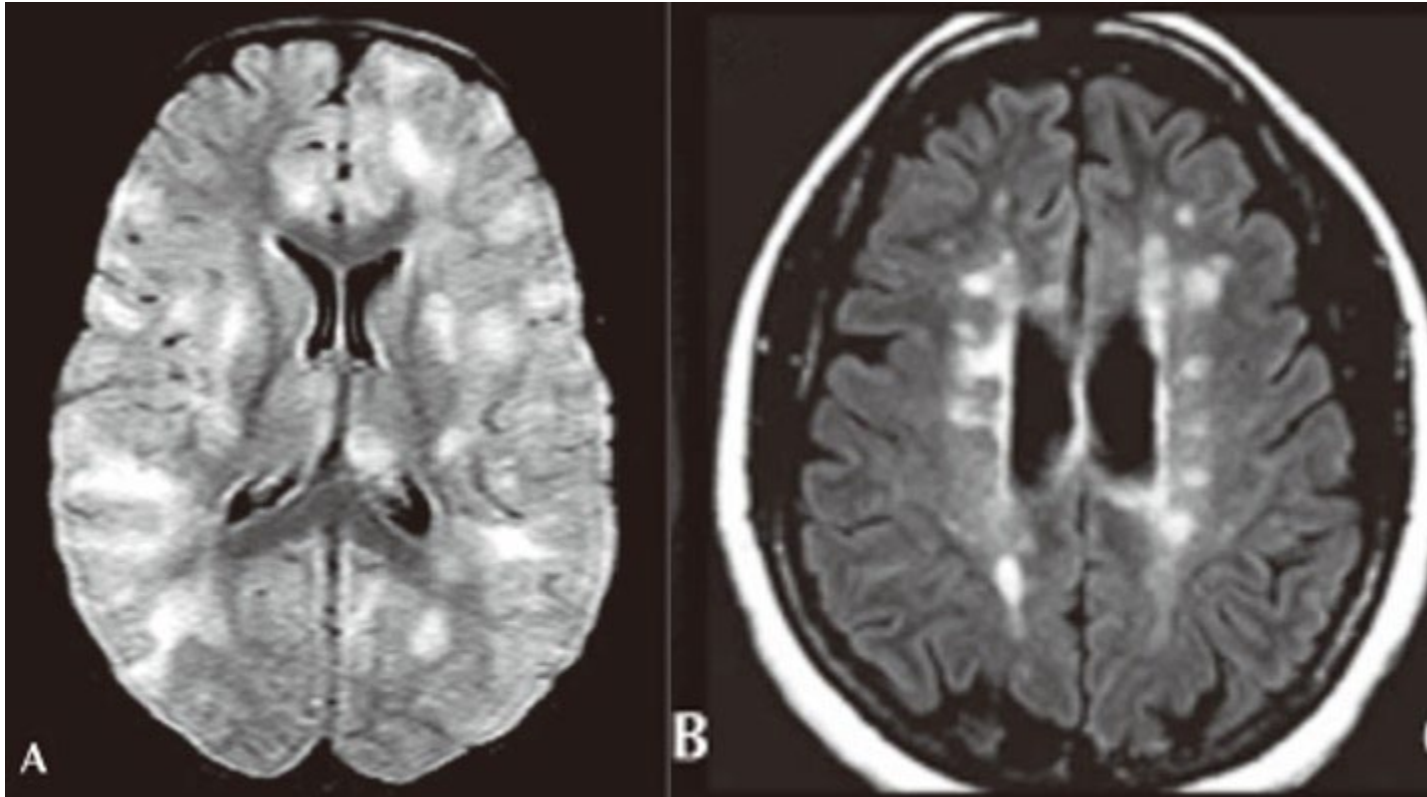
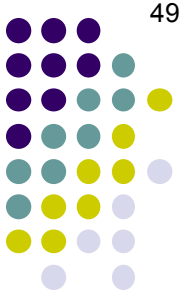
With large, bilateral, diffuse lesions involving both gray and white matter structures including the brainstem

Typical Optic Neuritis



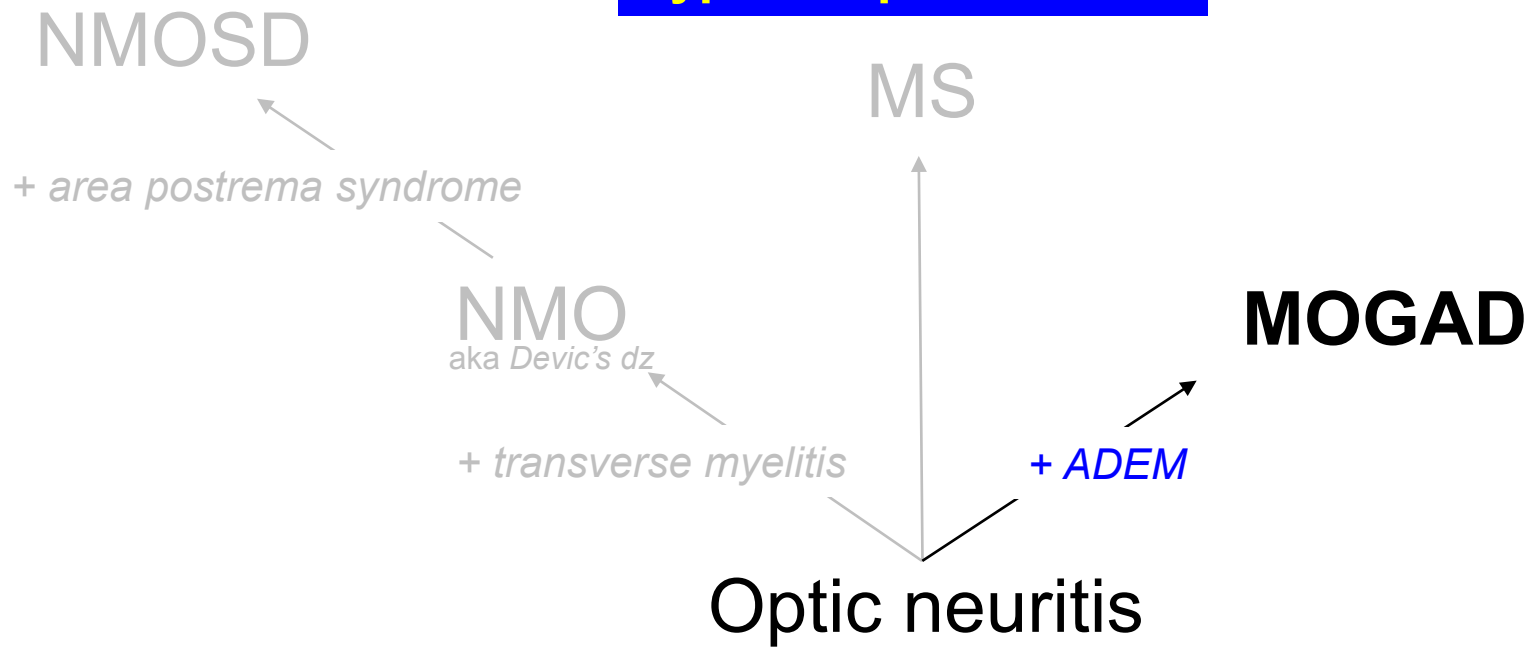
(A) **ADEM**. Axial FLAIR showing bilateral, globular, hyperintense lesions in cortical gray matter (among other locations)

Typical Optic Neuritis



(A) **ADEM**. Axial FLAIR showing bilateral, globular, hyperintense lesions in cortical gray matter (among other locations). (B) For comparison, FLAIR showing Dawson's fingers typical of MS

Typical Optic Neuritis



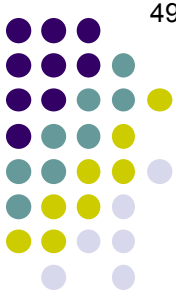
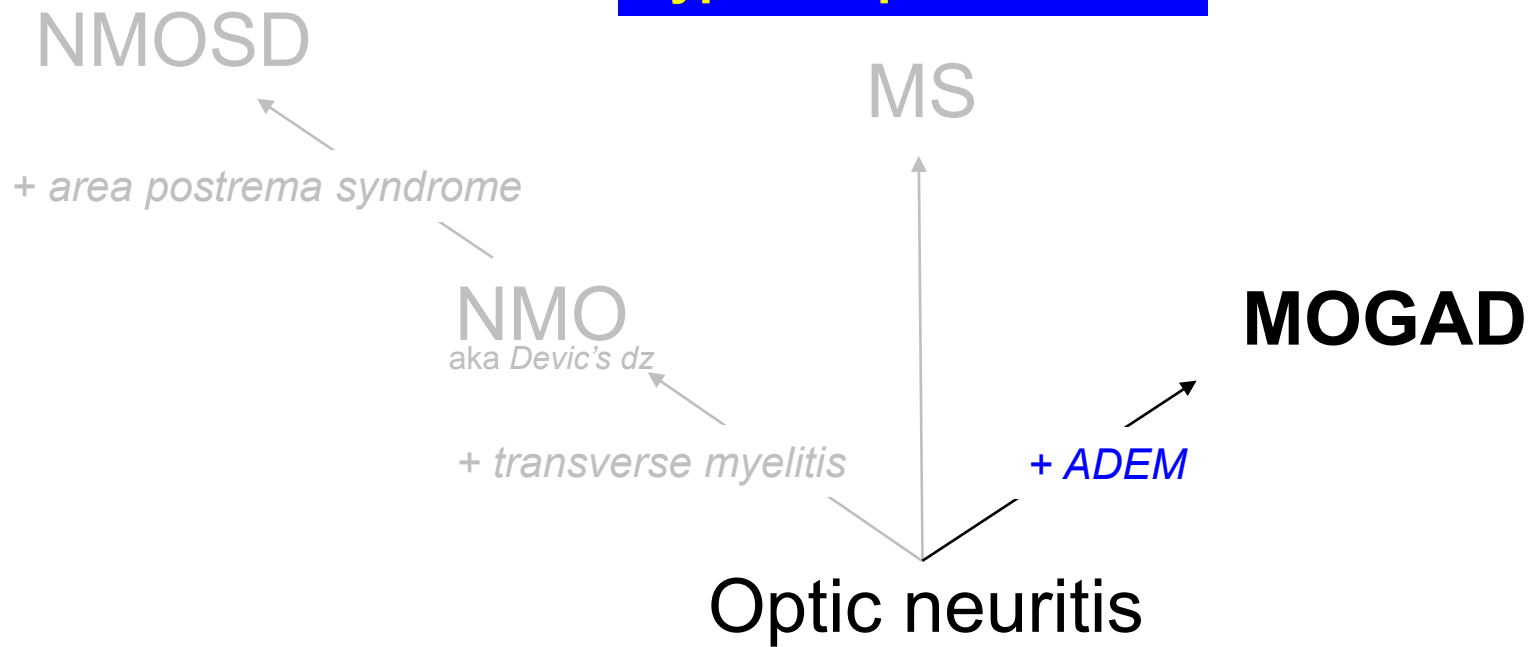
MOG involves two separate and specific inflammatory processes. One is optic neuritis.

What is the other?

Acute disseminated encephalomyelitis (ADEM)

What is the most common presenting sign of MOG?

Typical Optic Neuritis



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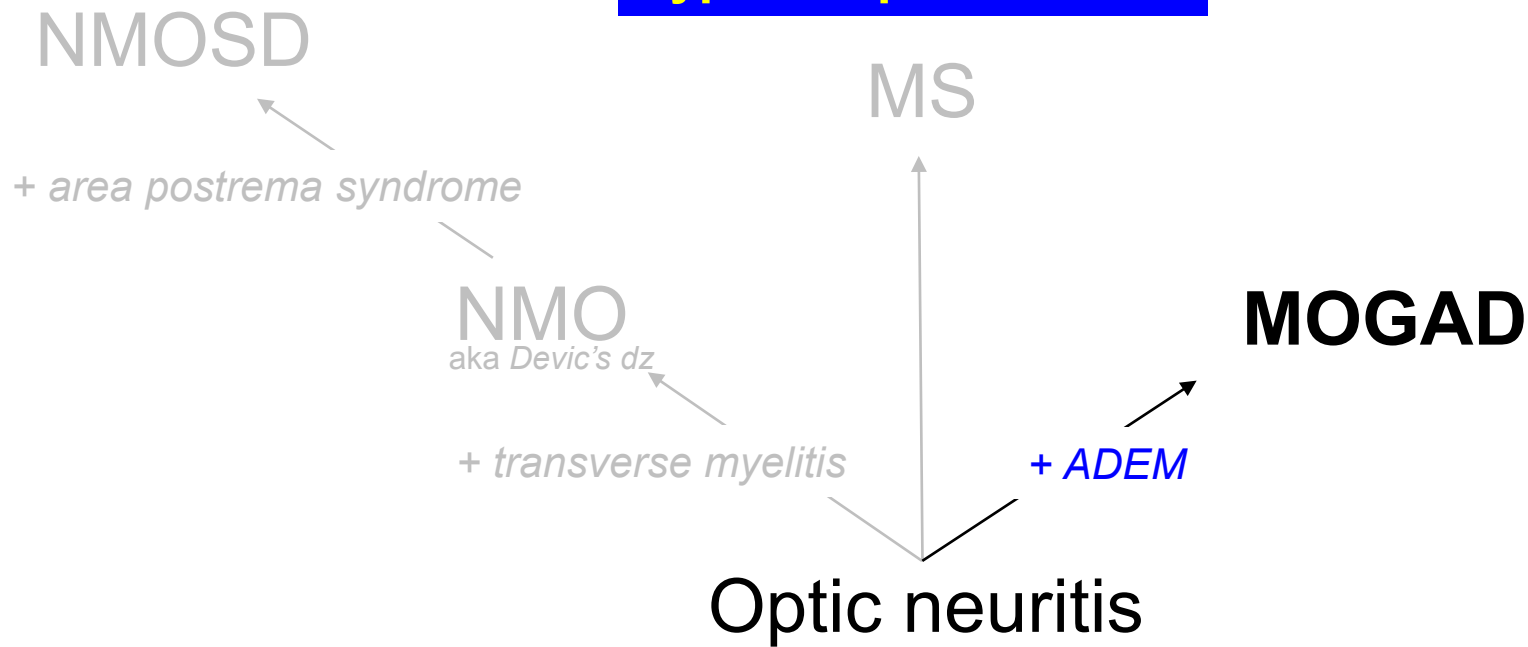
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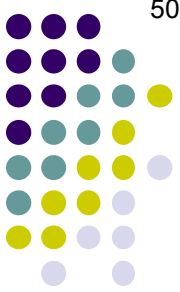
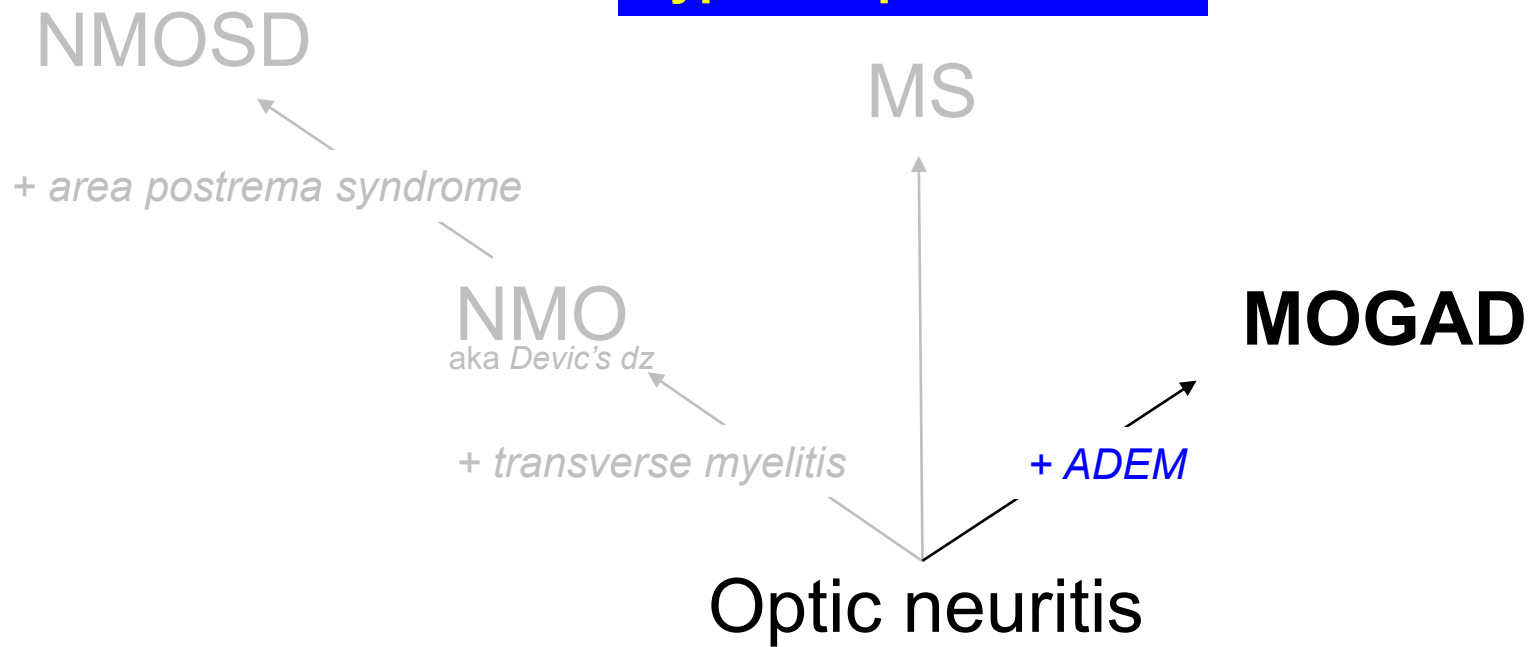
Acute disseminated encephalomyelitis (ADEM)

What is the most

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The ONH in MOG-associated optic neuritis—is it normal-to-mildly edematous, as is typical in typical optic neuritis?

Typical Optic Neuritis



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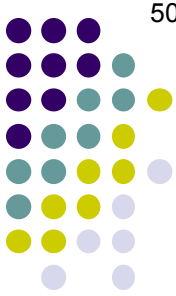
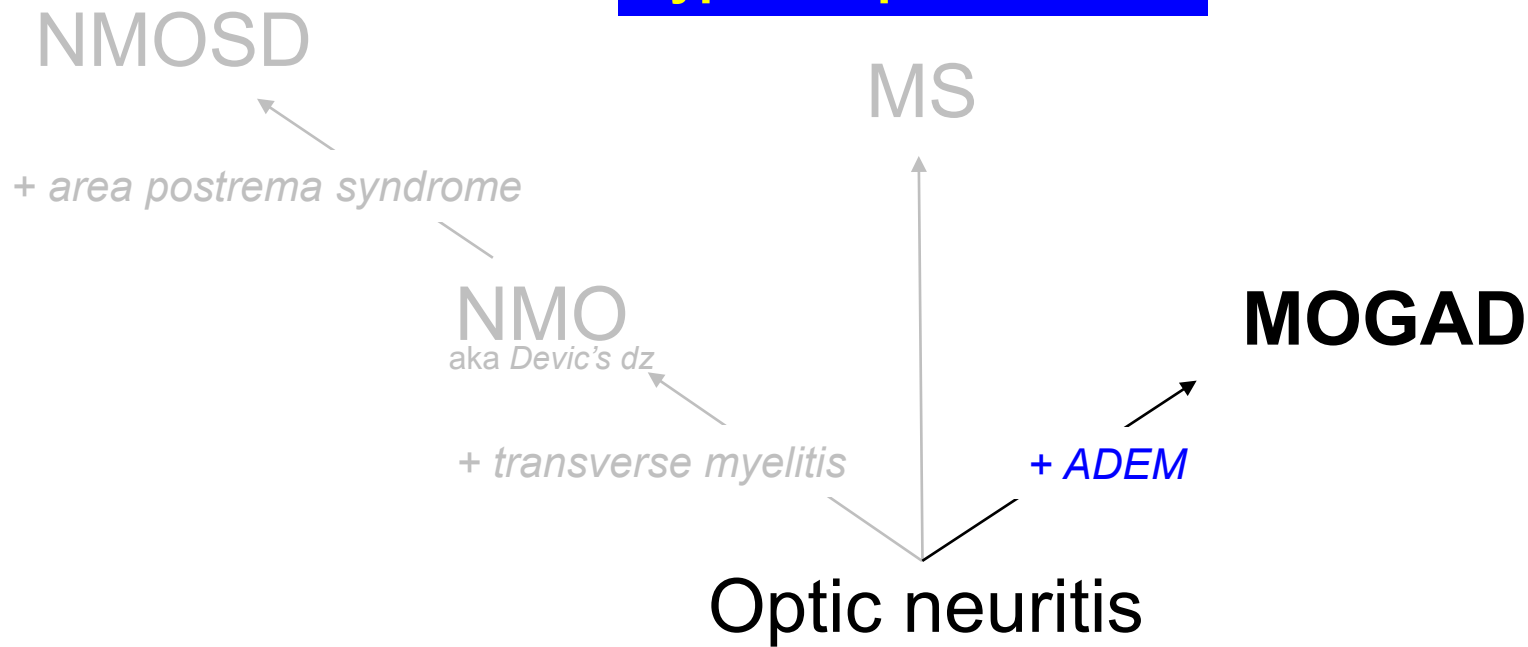
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No, it tends to be much worse

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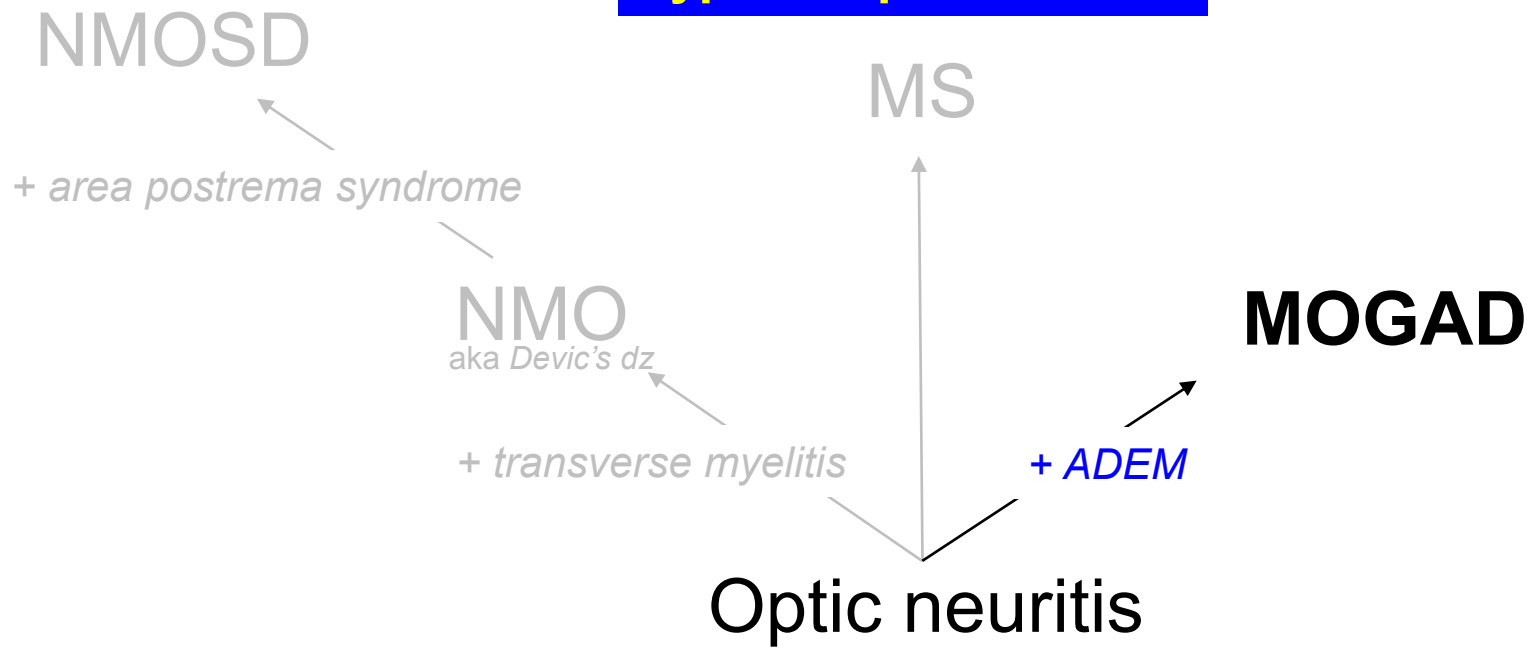
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How does MOG present radiologically?

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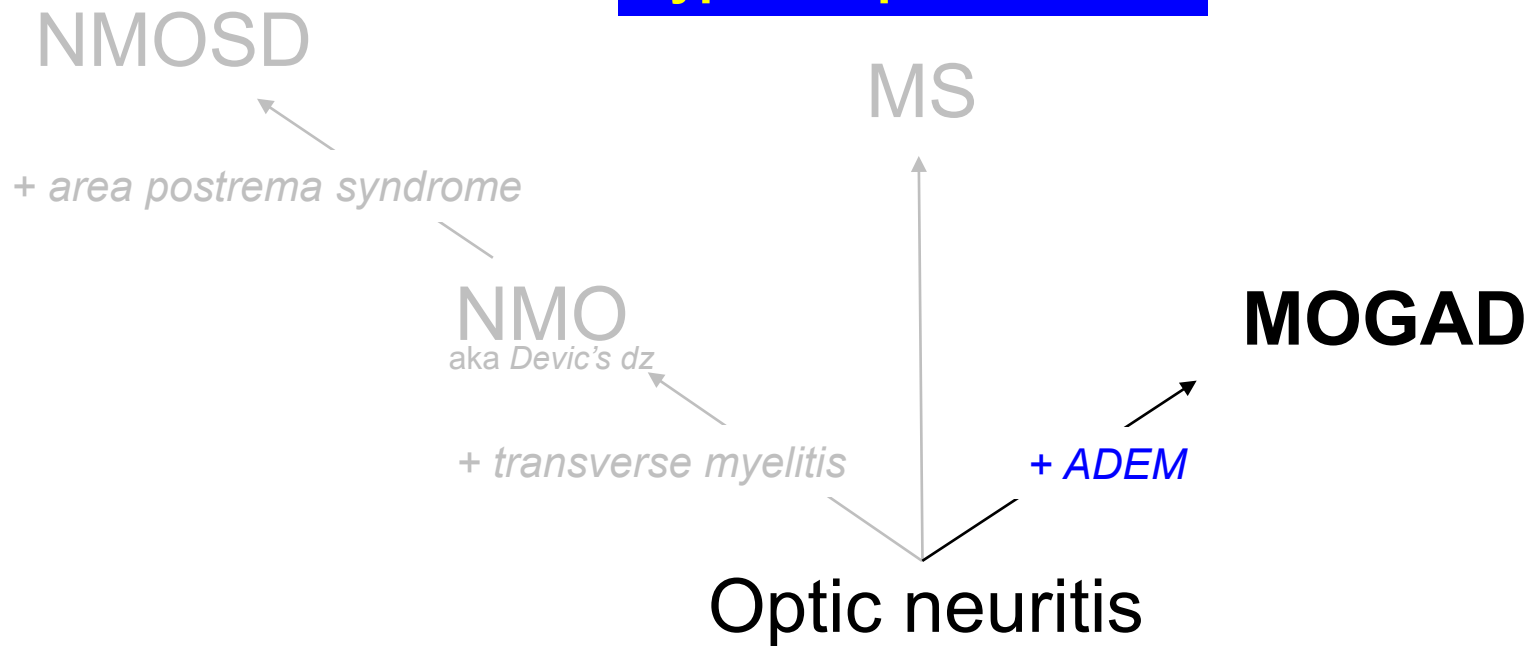
Optic neuritis

How does MOG present radiologically?

Unlike the [location, and tissue type (color)] lesions of MS, MOG presents with [tissue type (color)] lesions

tissue type (color)

Typical Optic Neuritis



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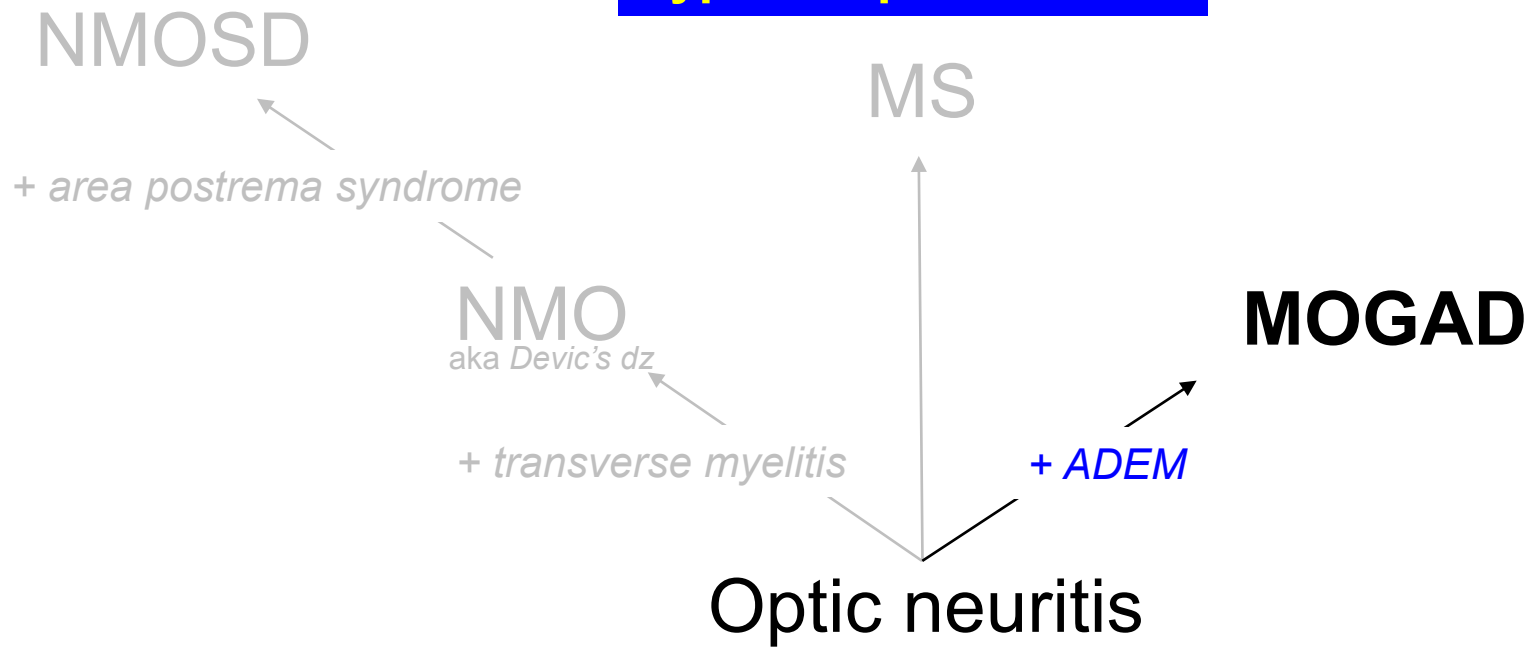
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How does MOG present radiologically?

Unlike the periventricular white-matter lesions of MS, MOG presents with **gray-matter** lesions

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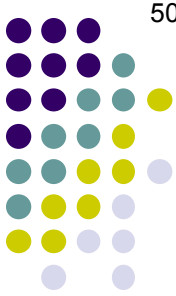
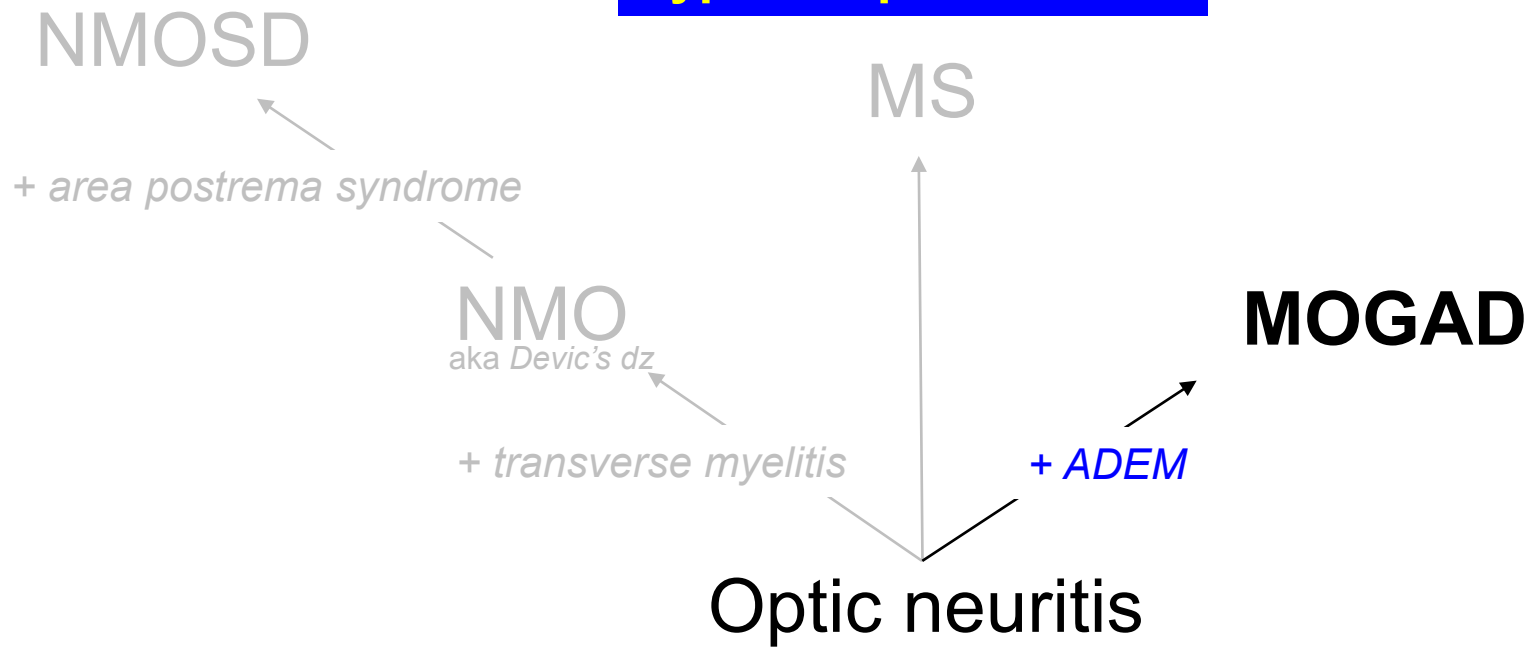
What is the most common presenting sign of MOG?

Optic neuritis

How does MOG present radiologically?

Unlike the periventricular white-matter lesions of MS, MOG presents with **gray-matter** lesions, **as well as diffuse lesions involving the** location

Typical Optic Neuritis



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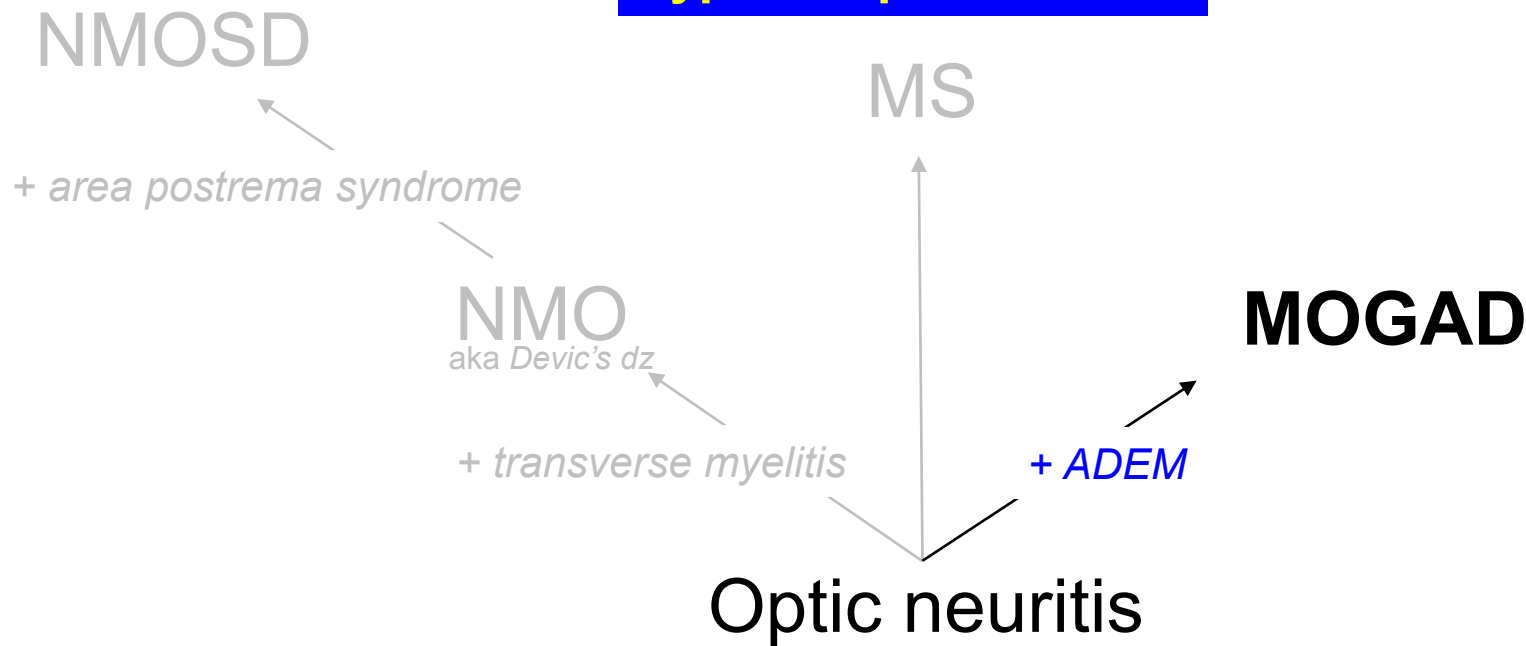
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Unlike the periventricular white-matter lesions of MS, MOG presents with **gray-matter** lesions, **as well as diffuse lesions involving the brainstem**. However, it has no pathognomonic radiographic features, and often cannot be differentiated from ADEM.

Typical Optic Neuritis

NMOSD

+ area postrema syndrome

NMO

aka Devic's dz

MS

MOGAD

Regarding VA loss in MOG—does it tend to be on the mild-to-moderate side a la typical optic neuritis, or severe as in NMO(SD)?

MOG inv

What is th

Acute dis

What is th

Optic neu

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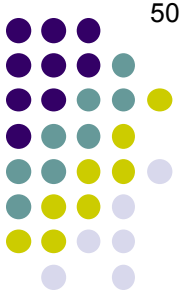
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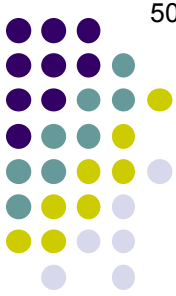
Regarding VA loss in MOG—does it tend to be on the mild-to-moderate side a la typical optic neuritis, or severe as in NMO(SD)?

Severe

Does it exhibit spontaneous recovery a la typical optic neuritis, or nah like NMO(SD)?

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MOGAD

Regarding VA loss in MOG—does it tend to be on the mild-to-moderate side a la typical optic neuritis, or severe as in NMO(SD)?

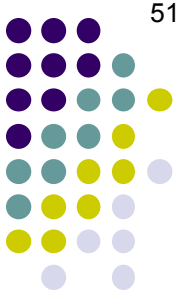
Severe

Does it exhibit spontaneous recovery a la typical optic neuritis, or nah like NMO(SD)?

Spontaneous recovery is the rule

How does MOG present radiologically?

Unlike the periventricular white-matter lesions of MS, MOG presents with **gray-matter** lesions, as well as diffuse lesions involving the brainstem



Typical Optic Neuritis

NMOSD

+ area postrema syndrome

NMO

aka Devic's dz

MS

MOGAD

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How about long-term visual prognosis: good, or nah?

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NMOSD

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NMO

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MOGAD

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How about long-term visual prognosis: good, or nah?

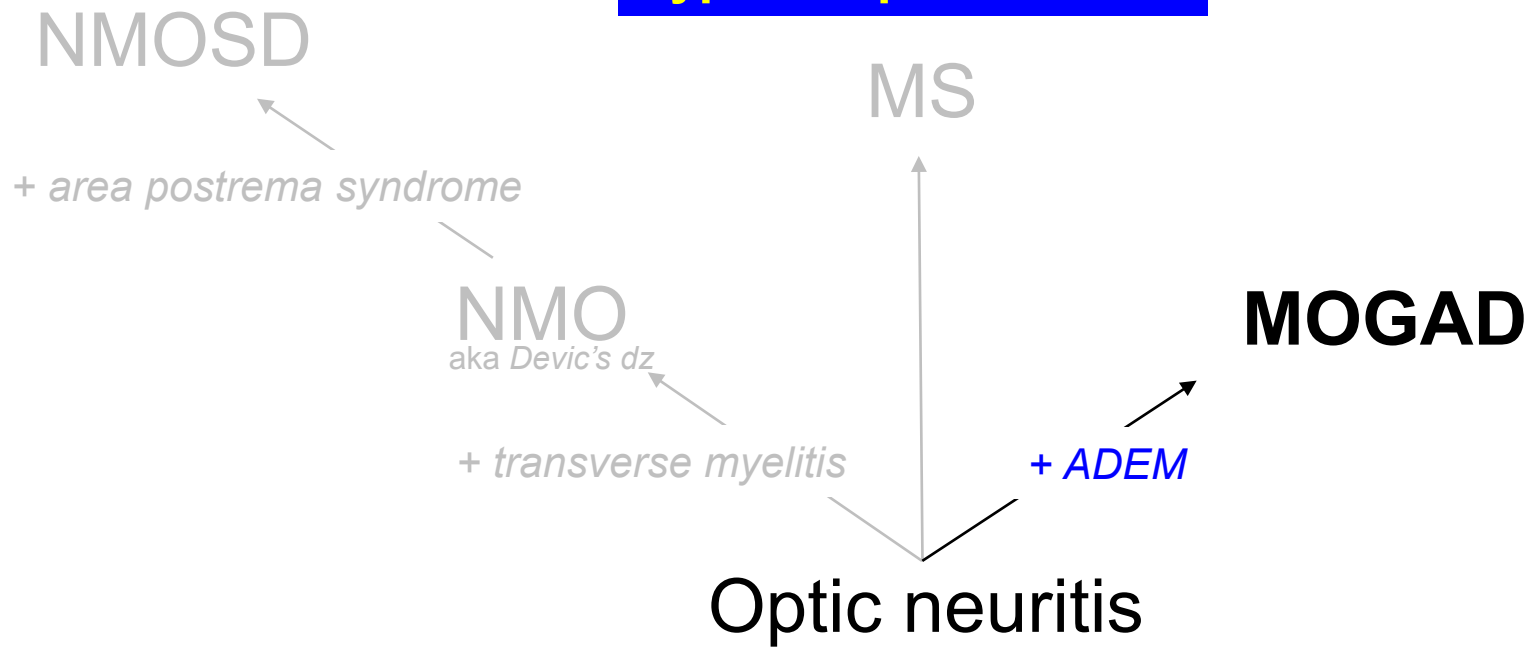
Good

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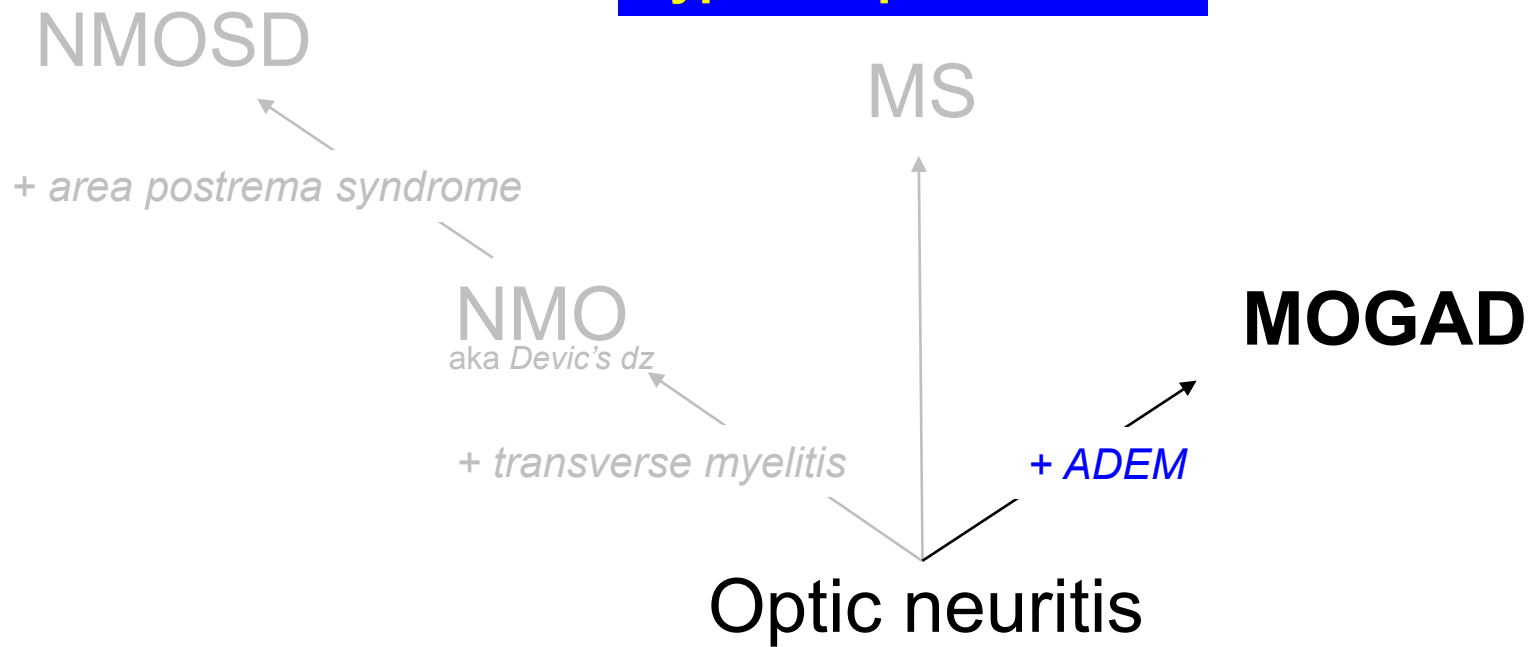


Typical Optic Neuritis



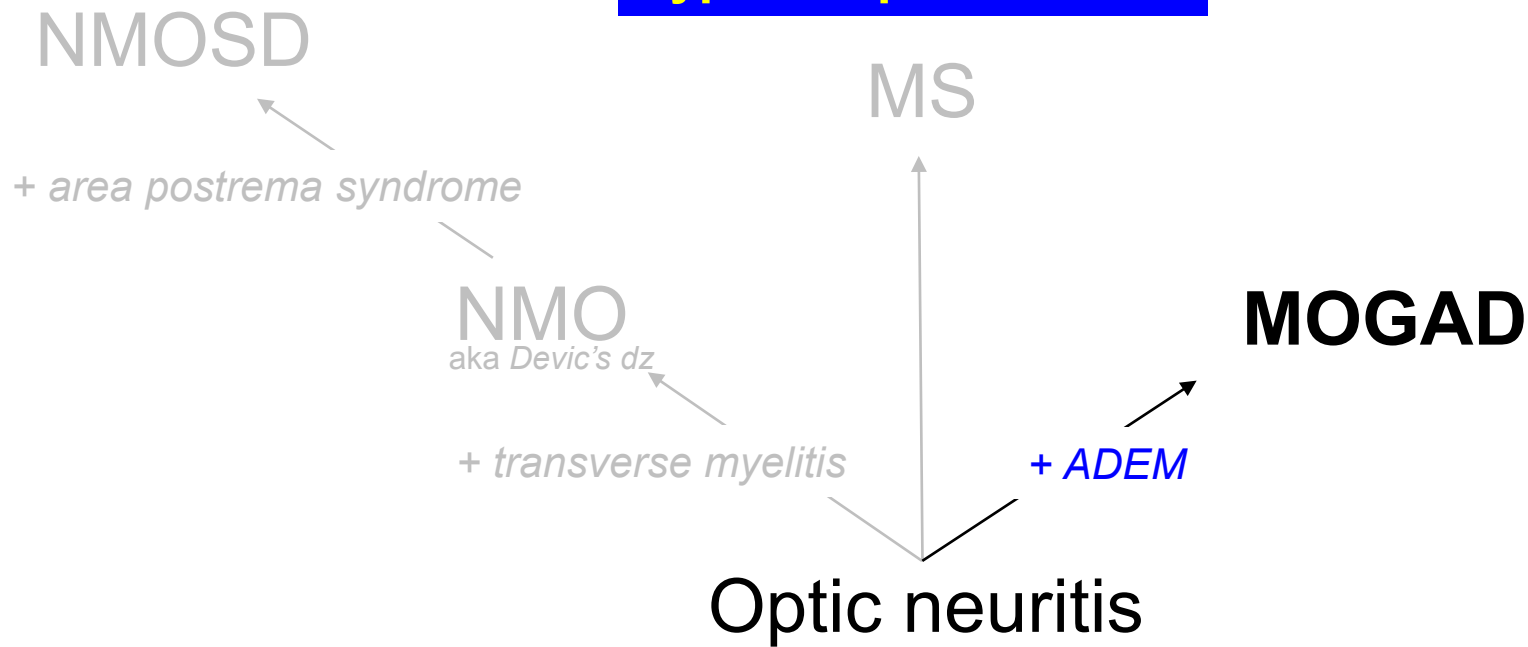
MOG is an antibody-mediated autoimmune condition. What is the target of the antibodies?

Typical Optic Neuritis



MOG is an antibody-mediated autoimmune condition. What is the target of the antibodies?
 It's all there in the name—a glycoprotein on myelin oligodendrocytes

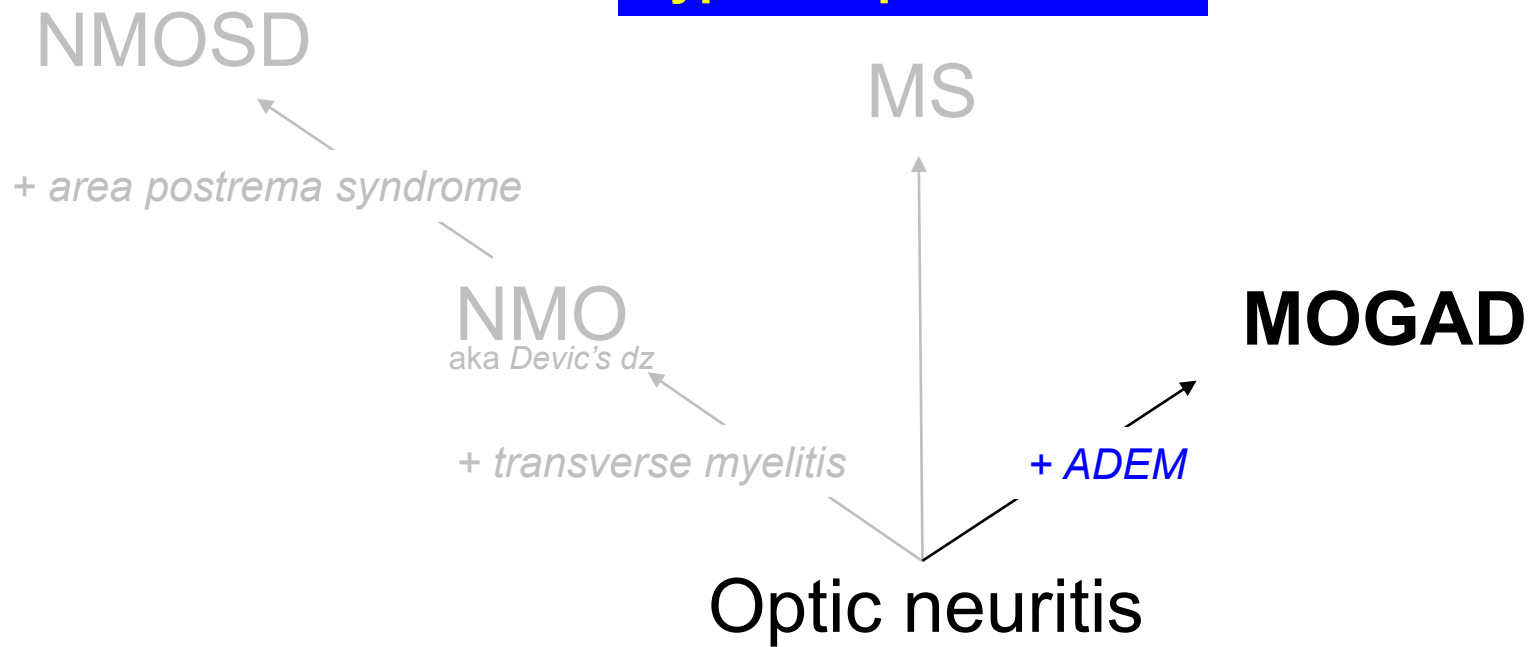
Typical Optic Neuritis



MOG is an antibody-mediated autoimmune condition. What is the target of the antibodies?
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What does this protein do?

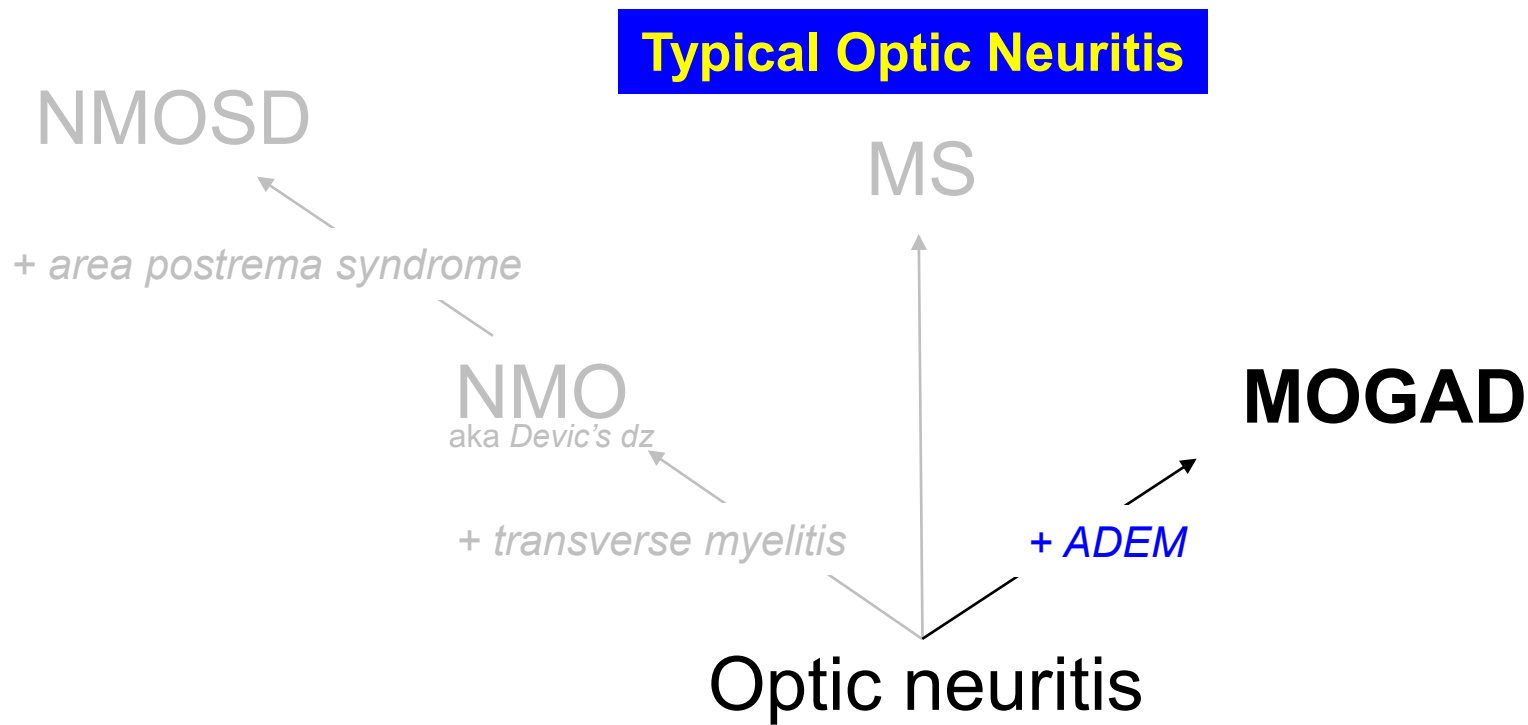
Typical Optic Neuritis



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At the time of this writing, this has yet to be elucidated. But whatever the protein does, it is mission-critical to maintaining oligodendrocyte viability

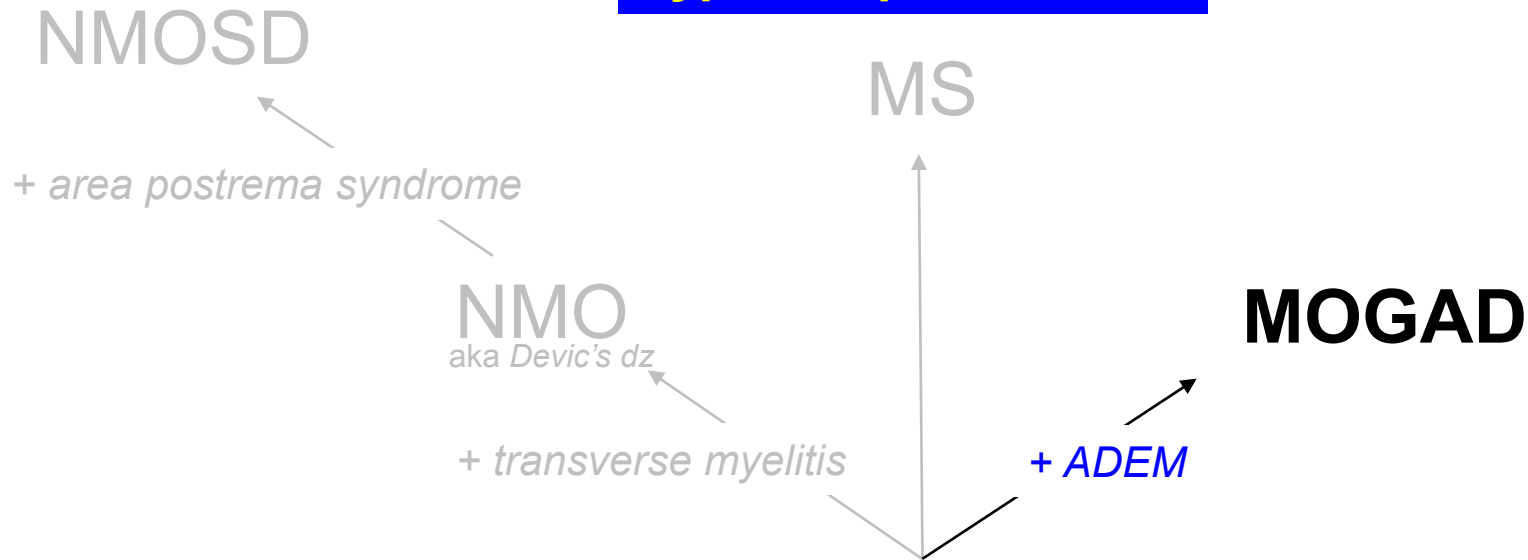


MOG is an antibody-mediated autoimmune condition. What is the target of the antibodies?
It's all there in the name—a glycoprotein on myelin oligodendrocytes

What does this protein do?

At the time of this writing, this has yet to be elucidated. But whatever the protein does, it is mission-critical to maintaining oligodendrocyte viability, **because like NMO (and typical optic neuritis), MOG is a demyelinating dz.**

Typical Optic Neuritis



Typical
(demyelinating *but*

Not idiopathic
or MS-related

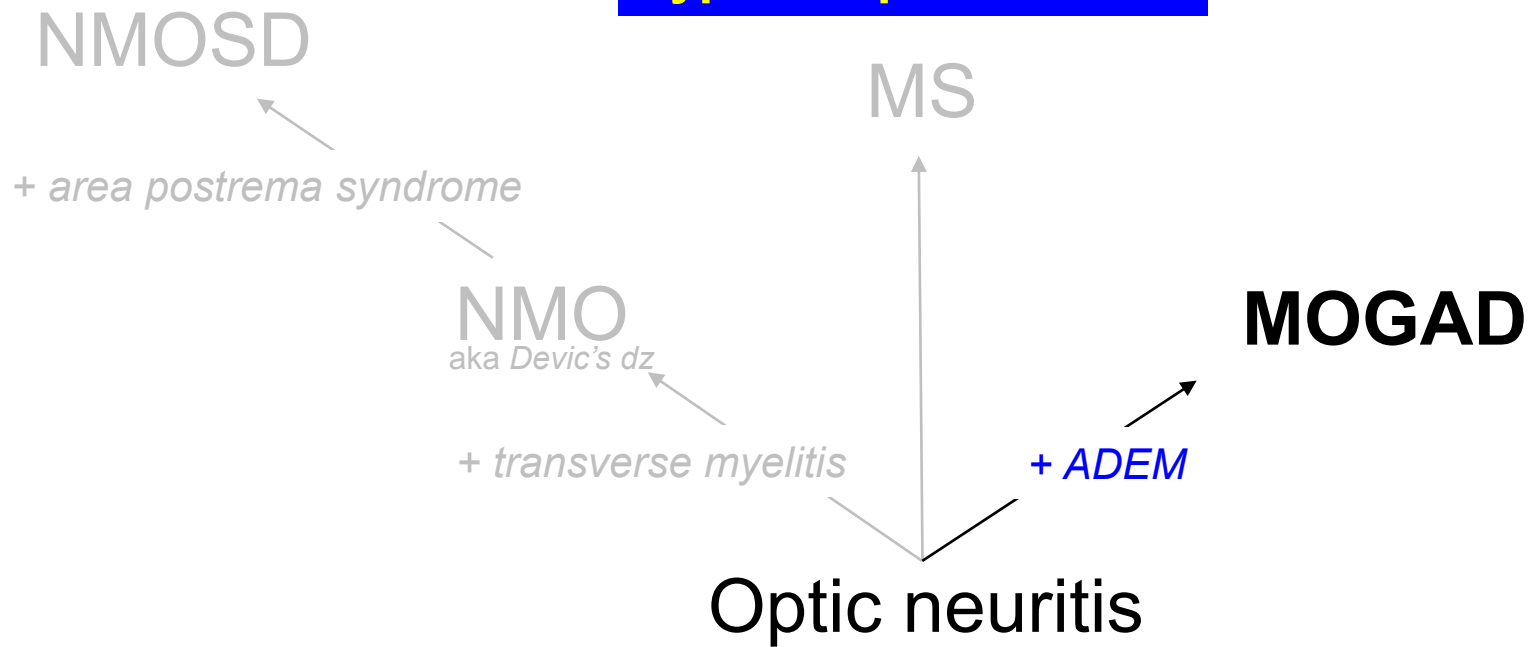
autoimmune condition. What is the target of the antibodies?
protein on myelin oligodendrocytes

MOG
It's all

What
At the

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neuritis), **MOG is a demyelinating dz.**

Typical Optic Neuritis



MOG is an **antibody-mediated** autoimmune condition. What is the target of the antibodies?

What is the target of the antibodies? oligodendrocytes

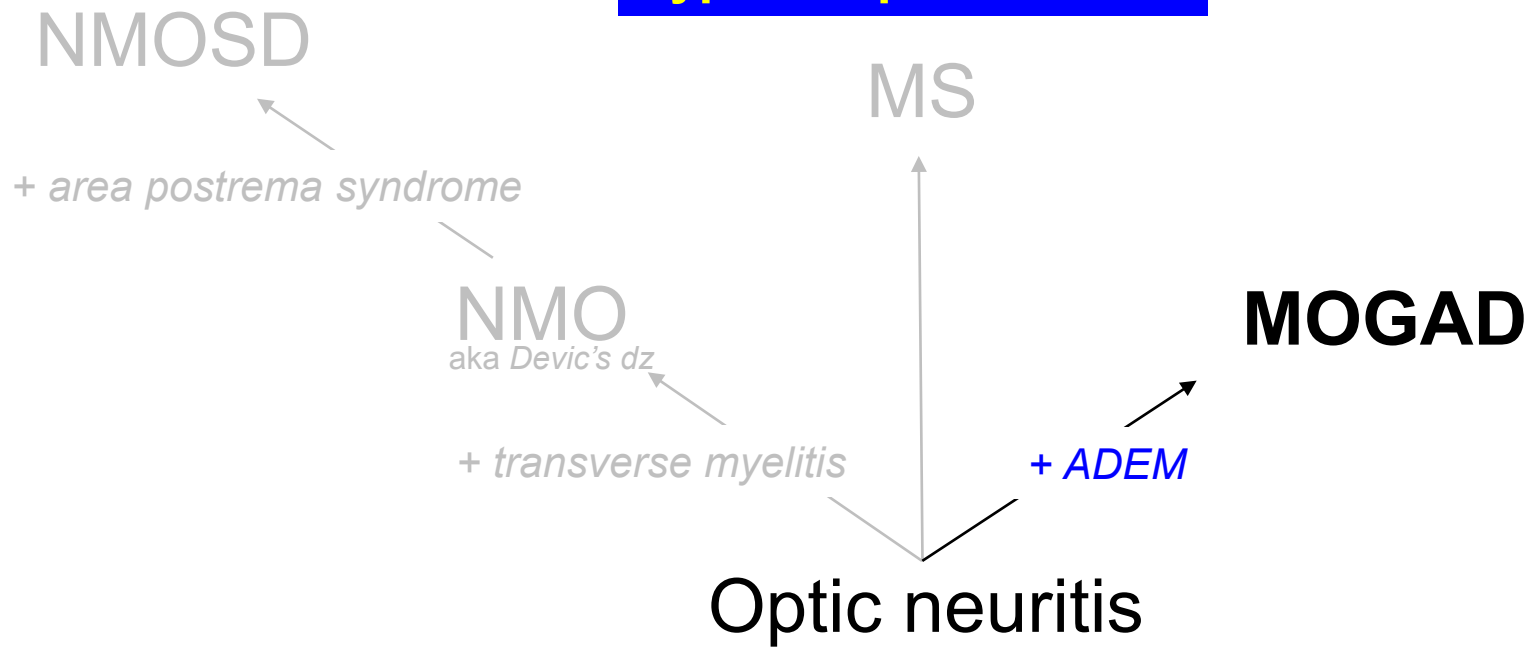
Is lab testing available to detect these antibodies?

Yes, and they form part of the diagnostic criteria for MOG

What does this protein do?

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Typical Optic Neuritis



MOG is an **antibody-mediated** autoimmune condition. What is the target of the antibodies?

What is the target of the antibodies? oligodendrocytes

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Yes, and they form part of the diagnostic criteria for MOG

What does this protein do?

At the time of this writing, this has yet to be elucidated. But whatever the protein does, it is mission-critical to maintaining oligodendrocyte viability, because like NMO (and typical optic neuritis), MOG is a demyelinating dz.



Typical Optic Neuritis

NMOSD

NMO
aka Devic's dz

MOGAD

Optic Neuritis

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

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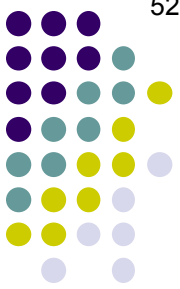
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Typical Optic Neuritis

NMOSD

NMO
aka Devic's dz

MOGAD

Optic Neuritis

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

- laterality presentation

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Typical Optic Neuritis

NMOSD

NMO
aka Devic's dz

MOGAD

Optic Neuritis

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

--Bilateral presentation

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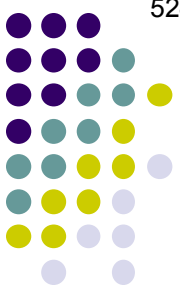
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Typical Optic Neuritis

NMOSD

NMO

aka Devic's dz

MOGAD

Optic Neuritis

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

--Bilateral presentation

--severity vision loss

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Typical Optic Neuritis

NMOSD

NMO

aka Devic's dz

MOGAD

Optic Neuritis

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

- Bilateral presentation
- Severe vision loss
- ?
- ?
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Typical Optic Neuritis

NMOSD

NMO
aka Devic's dz

MOGAD

Optic Neuritis



To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

- Bilateral presentation
- Severe vision loss
- chronicity episodes

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Typical Optic Neuritis

NMOSD



NMO
aka *Devic's dz*

MOGAD

Optic Neuritis

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

- Bilateral presentation
- Severe vision loss
- Recurrent episodes

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Typical Optic Neuritis

NMOSD

NMO

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MOGAD

Optic Neuritis

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

- Bilateral presentation
- Severe vision loss
- Recurrent episodes
- two words ON enhancement

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Typical Optic Neuritis

NMOSD

NMO
aka Devic's dz

MOGAD

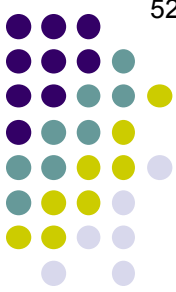
Optic Neuritis

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

- Bilateral presentation
- Severe vision loss
- Recurrent episodes
- Longitudinally extensive ON enhancement

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Typical Optic Neuritis

NMOSD

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aka Devic's dz

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Optic Neuritis



To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

- Bilateral presentation
- Severe vision loss
- Recurrent episodes
- Longitudinally extensive ON enhancement
- A lack of location and tissue type lesions on MRI
- ?

Typical Optic Neuritis

NMOSD

NMO

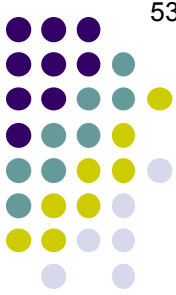
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MOGAD

Optic Neuritis

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- Bilateral presentation
- Severe vision loss
- Recurrent episodes
- Longitudinally extensive ON enhancement
- A lack of periventricular white matter lesions on MRI
- ?



Typical Optic Neuritis

NMOSD

NMO

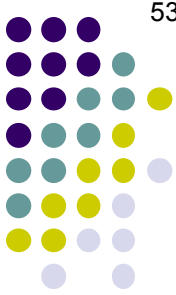
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- Bilateral presentation
- Severe vision loss
- Recurrent episodes
- Longitudinally extensive ON enhancement
- A lack of periventricular white matter lesions on MRI
- A lack of two words in the CSF



Typical Optic Neuritis

NMOSD

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MOGAD

Optic Neuritis

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

- Bilateral presentation
- Severe vision loss
- Recurrent episodes
- Longitudinally extensive ON enhancement
- A lack of periventricular white matter lesions on MRI
- A lack of oligoclonal bands in the CSF





Typical Optic Neuritis

NMOSD

NMO

aka Devic's dz

These findings push you **away** from MOG and **towards** NMO(SD):

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Optic Neuritis

MOGAD

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- Severe vision loss
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Typical Optic Neuritis

NMOSD

NMO
aka *Devic's dz*

These findings push you **away** from MOG and **towards** NMO(SD):

--MRI brain



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Optic Neuritis

MOGAD

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- Severe vision loss
- Recurrent episodes
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Typical Optic Neuritis

NMOSD

NMO

aka Devic's dz

These findings push you **away** from MOG and **towards** NMO(SD):

--MRI brain unremarkable

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Optic Neuritis

MOGAD

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

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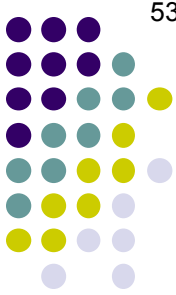
--Severe vision loss

--Recurrent episodes

--Longitudinally extensive ON enhancement

--A lack of periventricular white matter lesions on MRI

--A lack of oligoclonal bands in the CSF



Typical Optic Neuritis

NMOSD

NMO

aka *Devic's dz*

These findings push you **away** from MOG and **towards** NMO(SD):

--MRI brain unremarkable

--No spontaneous

three words

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Optic Neuritis

MOGAD

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

--Bilateral presentation

--Severe vision loss

--Recurrent episodes

--Longitudinally extensive ON enhancement

--A lack of periventricular white matter lesions on MRI

--A lack of oligoclonal bands in the CSF



Typical Optic Neuritis

NMOSD

NMO

aka Devic's dz

These findings push you **away** from MOG and **towards** NMO(SD):

- MRI brain unremarkable
- No spontaneous VA recovery

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Optic Neuritis

MOGAD

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

- Bilateral presentation
- Severe vision loss
- Recurrent episodes
- Longitudinally extensive ON enhancement
- A lack of periventricular white matter lesions on MRI
- A lack of oligoclonal bands in the CSF



Typical Optic Neuritis

NMOSD

NMO

aka Devic's dz

These findings push you **away** from MOG and **towards** NMO(SD):

- MRI brain unremarkable
- No spontaneous VA recovery
- No pain with

two words

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Optic Neuritis

MOGAD

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

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- Longitudinally extensive ON enhancement
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Typical Optic Neuritis

NMOSD

NMO

aka Devic's dz

These findings push you **away** from MOG and **towards** NMO(SD):

- MRI brain unremarkable
- No spontaneous VA recovery
- No pain with eye movements
- ?
- ?
- ?

Optic Neuritis

MOGAD

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- Recurrent episodes
- Longitudinally extensive ON enhancement
- A lack of periventricular white matter lesions on MRI
- A lack of oligoclonal bands in the CSF



Typical Optic Neuritis

NMOSD

NMO

aka Devic's dz

These findings push you **away** from MOG and **towards** NMO(SD):

- MRI brain unremarkable
- No spontaneous VA recovery
- No pain with eye movements
- Hx two words
- ?
- ?

Optic Neuritis

MOGAD

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

- Bilateral presentation
- Severe vision loss
- Recurrent episodes
- Longitudinally extensive ON enhancement
- A lack of periventricular white matter lesions on MRI
- A lack of oligoclonal bands in the CSF



Typical Optic Neuritis

NMOSD

NMO

aka Devic's dz

These findings push you **away** from MOG and **towards** NMO(SD):

- MRI brain unremarkable
- No spontaneous VA recovery
- No pain with eye movements
- Hx transverse myelitis
- ?
- ?

Optic Neuritis

MOGAD

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

- Bilateral presentation
- Severe vision loss
- Recurrent episodes
- Longitudinally extensive ON enhancement
- A lack of periventricular white matter lesions on MRI
- A lack of oligoclonal bands in the CSF



Typical Optic Neuritis

NMOSD

NMO

aka Devic's dz

These findings push you **away** from MOG and **towards** NMO(SD):

- MRI brain unremarkable
- No spontaneous VA recovery
- No pain with eye movements
- Hx transverse myelitis
- Hx two words syndrome
- ?

Optic Neuritis

MOGAD

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

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- Severe vision loss
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- Longitudinally extensive ON enhancement
- A lack of periventricular white matter lesions on MRI
- A lack of oligoclonal bands in the CSF



Typical Optic Neuritis

NMOSD

NMO

aka Devic's dz

These findings push you **away** from MOG and **towards** NMO(SD):

- MRI brain unremarkable
- No spontaneous VA recovery
- No pain with eye movements
- Hx transverse myelitis
- Hx area postrema syndrome
- ?

Optic Neuritis

MOGAD

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

- Bilateral presentation
- Severe vision loss
- Recurrent episodes
- Longitudinally extensive ON enhancement
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- A lack of oligoclonal bands in the CSF



Typical Optic Neuritis

NMOSD

NMO
aka *Devic's dz*

These findings push you **away** from MOG and **towards** NMO(SD):

- MRI brain unremarkable
- No spontaneous VA recovery
- No pain with eye movements
- Hx transverse myelitis
- Hx area postrema syndrome
- Poor two words

Optic Neuritis

MOGAD

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

- Bilateral presentation
- Severe vision loss
- Recurrent episodes
- Longitudinally extensive ON enhancement
- A lack of periventricular white matter lesions on MRI
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Typical Optic Neuritis

NMOSD

NMO

aka Devic's dz

These findings push you **away** from MOG and **towards** NMO(SD):

- MRI brain unremarkable
- No spontaneous VA recovery
- No pain with eye movements
- Hx transverse myelitis
- Hx area postrema syndrome
- Poor visual outcome

Optic Neuritis

MOGAD

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- Bilateral presentation
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- Recurrent episodes
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Typical Optic Neuritis

NMOSD

NMO

aka Devic's dz

These findings push you **away** from MOG and **towards** NMO(SD):

- MRI brain unremarkable
- No spontaneous VA recovery
- No pain with eye movements
- Hx transverse myelitis
- Hx area postrema syndrome
- Poor visual outcome

Optic Neuritis

MOGAD

Warning: Don't misinterpret the meaning of this list! If a listed characteristic is present, it greatly increases the likelihood of NMO(SD) over the other two entities. But if the characteristic is **not** present, this shouldn't be taken to *exclude* NMO(SD).

--A lack of oligoclonal bands in the CSF

No question—proceed when ready

Typical Optic Neuritis

NMOSD

NMO

aka Devic's dz

These findings push you **away** from MOG and **towards** NMO(SD):

- MRI brain unremarkable
- No spontaneous VA recovery
- No pain with eye movements
- Hx transverse myelitis
- Hx area postrema syndrome
- Poor visual outcome

Optic Neuritis

MOGAD

Warning: Don't misinterpret the meaning of this list! If a listed characteristic is present, it greatly increases the likelihood of NMO(SD) over the other two entities. But if the characteristic is **not** present, this shouldn't be taken to *exclude* NMO(SD). Consider pain with eye movements—a sizeable minority (~ %) of NMO(SD) optic neuritis pts c/o such pain. It's just that of the three, NMO(SD) is vastly more likely than the others to present w/o pain.

--A lack of oligoclonal bands in the CSF



Typical Optic Neuritis

NMOSD

NMO

aka Devic's dz

These findings push you **away** from MOG and **towards** NMO(SD):

- MRI brain unremarkable
- No spontaneous VA recovery
- No pain with eye movements
- Hx transverse myelitis
- Hx area postrema syndrome
- Poor visual outcome

Optic Neuritis

MOGAD

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--A lack of oligoclonal bands in the CSF



Typical Optic Neuritis

NMOSD

NMO

aka Devic's dz

These findings push you **away** from MOG and **towards** NMO(SD):

- MRI brain unremarkable
- No spontaneous VA recovery
- No pain with eye movements
- Hx transverse myelitis
- Hx area postrema syndrome
- Poor visual outcome

Optic Neuritis

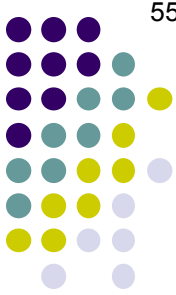
MOGAD

Warning: Don't misinterpret the meaning of this list! If a listed characteristic is present, it greatly increases the likelihood of NMO(SD) over the other two entities. But if the characteristic is **not** present, this shouldn't be taken to *exclude* NMO(SD). Consider pain with eye movements—a sizeable minority (~ 1/3) of NMO(SD) optic neuritis pts c/o such pain. It's just that of the three, NMO(SD) is vastly more likely than the others to present w/o pain. So interpret the *presence* of a listed characteristic as strongly indicative of NMO(SD), but interpret the *absence* of one much more circumspectly in that regard. (The same caution will be true regarding the items on the MOG list you are about to encounter.)

--A lack of oligoclonal bands in the CSF

No question—proceed when ready

Typical Optic Neuritis



NMO(SD)

MS

NMO
aka NMOSIS

MOGAD

Optic Neuritis

These findings push you **away** from MOG and **towards** NMO(SD):

- MRI brain unremarkable
- No spontaneous VA recovery
- No pain with eye movements
- Hx transverse myelitis
- Hx area postrema syndrome
- Poor visual outcome

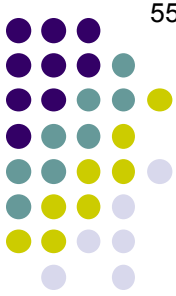
These findings push you **away** from NMO(SD) and **towards** MOG:

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- ?
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- ?
- ?

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

- Bilateral presentation
- Severe vision loss
- Recurrent episodes
- Longitudinally extensive ON enhancement
- A lack of periventricular white matter lesions on MRI
- A lack of oligoclonal bands in the CSF

Typical Optic Neuritis



NMO(SD)

MS

NMO
aka NMOSIS

MOGAD

Optic Neuritis

These findings push you **away** from MOG and **towards** NMO(SD):

- MRI brain unremarkable
- No spontaneous VA recovery
- No pain with eye movements
- Hx transverse myelitis
- Hx area postrema syndrome
- Poor visual outcome

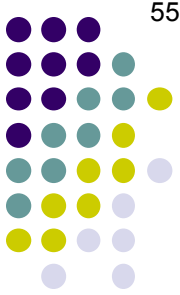
These findings push you **away** from NMO(SD) and **towards** MOG:

- MRI brain with two words changes
- ?
- ?
- ?
- ?

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

- Bilateral presentation
- Severe vision loss
- Recurrent episodes
- Longitudinally extensive ON enhancement
- A lack of periventricular white matter lesions on MRI
- A lack of oligoclonal bands in the CSF

Typical Optic Neuritis



NMO(SD)

MS

NMO
aka NMOSD

MOGAD

Optic Neuritis

These findings push you **away** from MOG and **towards** NMO(SD):

- MRI brain unremarkable
- No spontaneous VA recovery
- No pain with eye movements
- Hx transverse myelitis
- Hx area postrema syndrome
- Poor visual outcome

These findings push you **away** from NMO(SD) and **towards** MOG:

- MRI brain with gray-matter changes
- ?
- ?
- ?
- ?

To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

- Bilateral presentation
- Severe vision loss
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- Longitudinally extensive ON enhancement
- A lack of periventricular white matter lesions on MRI
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Typical Optic Neuritis

NMO(SD)

MS

NMO
aka NMOSIS

MOGAD

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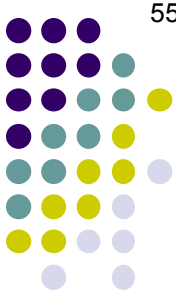
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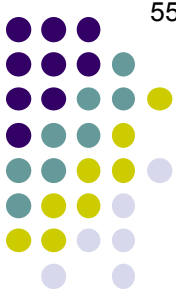
- MRI brain with gray-matter changes
- two words on MRI
- ?
- ?
- ?

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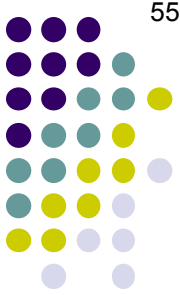
These findings push you **away** from NMO(SD) and **towards** MOG:

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- ?
- ?
- ?

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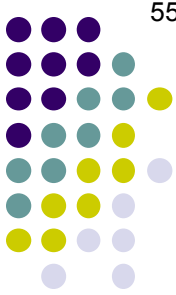
These findings push you **away** from NMO(SD) and **towards** MOG:

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- Hx abb.
- ?
- ?

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- Hx ADEM
- ?
- ?

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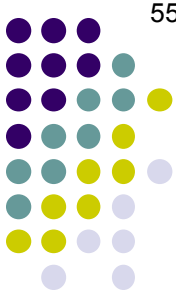
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These findings push you **away** from NMO(SD) and **towards** MOG:

- MRI brain with gray-matter changes
- Perineural enhancement on MRI
- Hx ADEM
-  disc edema
- ?

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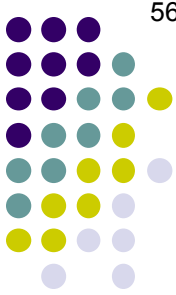
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- ?

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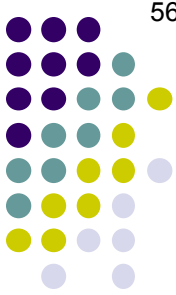
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- Severe disc edema
-  responsive/dependence

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These findings push you **away** from NMO(SD) and **towards** MOG:

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- Perineural enhancement on MRI
- Hx ADEM
- Severe disc edema
- Steroid responsive/dependence

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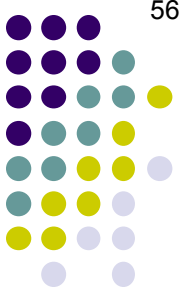
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Optic neuritis



(Warning: Soapbox speech ahead)

Can typical optic neuritis present bilaterally? **Yes**. Can it be chronic? **Yes**. But you (speaking to errbody who isn't a fellowship-trained neuro-oph) shouldn't make that call, because such cases are zebras, if not unicorns.

No question

Typical Optic Neuritis

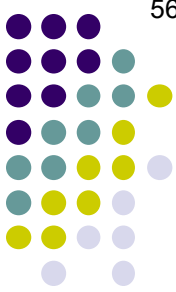
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Can typical optic neuritis present bilaterally? **Yes**. Can it be chronic? **Yes**. But you (speaking to errbody who isn't a fellowship-trained neuro-oph) shouldn't make that call, because such cases are zebras, if not unicorns.

So don't select 'bilateral typical optic neuritis' or 'chronic typical optic neuritis' as answers on the OKAP or WQEs, don't utter those words when taking the Boards, and most importantly, don't write them on a pt's chart until and unless Neuro-Oph has written them **first**.

No question