Peters Anomaly

An abnormality of cell migration
A

- Peters Anomaly
  - An abnormality of **neural-crest** cell migration
Q

- Peters Anomaly
  - An abnormality of neural-crest cell migration

*What are neural crest cells?*
What are neural crest cells?
A special subpopulation of neuroectodermal cells that migrate across the embryo and deposit themselves at a wide variety of locations, eventually differentiating into many distinct tissues.
Peters Anomaly

An abnormality of neural-crest cell migration

What are neural crest cells?
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What is the term for a condition arising from the abnormal migration or differentiation of neural-crest cells?
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  - An abnormality of **neural-crest cell** migration

*What are neural crest cells?*
A special subpopulation of neuroectodermal cells that migrate across the embryo and deposit themselves at a wide variety of locations, eventually differentiating into many distinct tissues

*What is the term for a condition arising from the abnormal migration or differentiation of neural-crest cells?*
A neurocristopathy
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What is the term for a condition arising from the abnormal migration or differentiation of neural-crest cells?
A neurocristopathy.

Neural-crest-cell migration concerning the anterior segment occurs in three ‘waves.’
Which wave involves which future structure?
First wave
Second wave
Third wave
Peters Anomaly

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A neurocristopathy

Neural-crest-cell migration concerning the anterior segment occurs in three ‘waves.’
Which wave involves which future structure?
First wave ➔ Corneal endothelium
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Third wave ➔
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*What are* neural crest cells?  
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*What is the term for a condition arising from the abnormal migration or differentiation of neural-crest cells?*  
A neurocristopathy

*Neural-crist-cell migration concerning the anterior segment occurs in three ‘waves.’  
Which wave involves which future structure?*  
**First wave** → Corneal endothelium  
**Second wave** → Iris stroma  
**Third wave** → Corneal stroma (keratocytes)
Peters Anomaly

- An abnormality of neural-crest cell migration
- A form of type of condition (three words)
A

- **Peters Anomaly**
  - An abnormality of **neural-crest** cell migration
  - A form of **anterior segment dysgenesis**
Q

- Peters Anomaly
  - An abnormality of neural-crest cell migration
  - A form of **anterior segment dysgenesis**
Peters Anomaly
- An abnormality of neural-crest cell migration
- A form of anterior segment dysgenesis

Anterior segment dysgenesis

A very basic anatomic distinction

Peripheral  Central
Peters Anomaly

- An abnormality of neural-crest cell migration
- A form of anterior segment dysgenesis

Anterior segment dysgenesis

Peripheral

Central

Two classic peripheral dysgeneses
A

- Peters Anomaly
  - An abnormality of neural-crest cell migration
  - A form of anterior segment dysgenesis

Anterior segment dysgenesis

- Peripheral
  - Posterior embryotoxon
  - Two classic peripheral dysgeneses

- Central
  - Axenfeld-Rieger anomaly/syndrome
Peters Anomaly

- An abnormality of neural-crest cell migration
- A form of anterior segment dysgenesis

**Anterior segment dysgenesis**

- **Peripheral**
  - Posterior embryotoxon
  - Axenfeld-Rieger anomaly/syndrome

- **Central**
  - Two classic central dysgeneses
  - ?
  - ?
A

- **Peters Anomaly**
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  - A form of **anterior segment dysgenesis**

**Anterior segment dysgenesis**

- **Peripheral**
  - Posterior embryotoxon
  - Axenfeld-Rieger anomaly/syndrome

- **Central**
  - Posterior keratoconus
  - Two classic central dysgeneses **Peters anomaly**
Q

- **Peters Anomaly**
  - An abnormality of **neural-crest** cell migration
  - A form of **anterior segment dysgenesis**
  - Hallmarks:
    1) A central corneal opacity
Peters Anomaly

- An abnormality of neural-crest cell migration
- A form of *anterior segment dysgenesis*
- Hallmarks:
  1) A central corneal opacity
Peters Anomaly

An abnormality of neural-crest cell migration
A form of anterior segment dysgenesis
Hallmarks:
1) A central corneal opacity

What's the classic Peters presentation?
Peters Anomaly

- An abnormality of neural-crest cell migration
- A form of anterior segment dysgenesis
- Hallmarks:
  1) A central corneal opacity

What's the classic Peters presentation? As a cloudy cornea at birth (it's in the STUMPED mnemonic)
Q

- Peters Anomaly
  - An abnormality of neural-crest cell migration
  - A form of anterior segment dysgenesis
  - Hallmarks:
    1) A central corneal opacity

What is the STUMPED mnemonic for a cloudy cornea in an infant?

S: Sclerocornea; Stromal dystrophy (CHSD)
T: Trauma (e.g., forcep injury)
U: Ulcer
M: Mucopolysaccharidosis
P: Peters anomaly
E: Elevated IOP (congenital glaucoma)
D: Dermoid of the cornea

Note: There are two S’s and two E’s

What’s the classic Peters presentation? As a cloudy cornea at birth (it’s in the STUMPED mnemonic)
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- Ulcer
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- Peters anomaly
- Endothelial dystrophy (CHED); Elevated IOP (congenital glaucoma)
- Dermoid of the cornea

Note: There are two S’s and two E’s
**Q**

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  - Hallmarks:
    1) A *central corneal opacity*

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**What’s the classic Peters presentation?**
As a cloudy cornea at birth (it’s in the **STUMPED mnemonic**)

**What is the STUMPED mnemonic for a cloudy cornea in an infant?**
- Sclerocornea
- Stromal dystrophy (**CHSD**)
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- Peters anomaly
- Endothelial dystrophy (**CHED**); Elevated IOP (congenital glaucoma)
- Dermoid of the cornea

*In the present context, what do these acronyms stand for?*
- **CHSD:**
- **CHED:**
A

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    1) A **central corneal opacity**

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As a cloudy cornea at birth (it’s in the STUMPED mnemonic)

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- Sclerocornea; Stromal dystrophy (**CHSD**)
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- Endothelial dystrophy (**CHED**); Elevated IOP (congenital glaucoma)
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**In the present context, what do these acronyms stand for?**

- **CHSD:** Congenital hereditary stromal dystrophy
- **CHED:** Congenital hereditary endothelial dystrophy
Q

• Peters Anomaly
  • An abnormality of neural-crest cell migration
  • A form of anterior segment dysgenesis
  • Hallmarks:
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What’s the classic Peters presentation? As a cloudy cornea at birth (it’s in the STUMPED mnemonic)

How cloudy is cloudy?
Peters Anomaly

- An abnormality of neural-crest cell migration
- A form of anterior segment dysgenesis
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What’s the classic Peters presentation? As a cloudy cornea at birth (it’s in the STUMPED mnemonic)

How cloudy is cloudy? The opacity ranges in severity from a faint haze to an opaque, elevated and vascularized mess
Peters Anomaly

- An abnormality of neural-crest cell migration
- A form of anterior segment dysgenesis
- Hallmarks:
  1) A central corneal opacity
  2) Iris-cornea and/or lens-cornea
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- An abnormality of neural-crest cell migration
- A form of *anterior segment dysgenesis*
- Hallmarks:
  1) A central corneal opacity
  2) Iris-cornea and/or lens-cornea adhesions

Recall the question below...Now you can see how the main hallmarks of Peters anomaly derive from a failure of first-wave migration to properly cleave between the primitive cornea and lens.

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There are two subtypes of Peters—what are they called?

Type 1:
- Iridocorneal adhesions present

Type 2:
- Corneolenticular adhesions present

Which type carries a more ominous ophthalmic prognosis?

Type 2
Peters Anomaly

- An abnormality of neural-crest cell migration
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There are two subtypes of Peters—what are they called? They are called ‘Type 1 and Type 2’
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How do they differ clinically?
Type 1: Iris-corneal adhesions present
Type 2: Corneolenticular adhesions present

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Central

Peters anomaly

Type 1

Type 2
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Peters anomaly

Two subtypes

Type 1

Type 2
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Peters Anomaly

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- A form of anterior segment dysgenesis

Hallmarks:
1) A central corneal opacity
2) Iris-cornea and/or lens-cornea adhesions
3) Anterior
Peters Anomaly

- An abnormality of neural-crest cell migration
- A form of anterior segment dysgenesis
- Hallmarks:
  1. A central corneal opacity
  2. Iris-cornea and/or lens-cornea adhesions
  3. Anterior cataract
Q

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  - Hallmarks:
    1) A central corneal opacity
    2) Iris-cornea and/or lens-cornea adhesions
    3) **Anterior cataract**

Which specific types of anterior cataract?
Peters Anomaly

- An abnormality of neural-crest cell migration
- A form of anterior segment dysgenesis
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  1) A central corneal opacity
  2) Iris-cornea and/or lens-cornea adhesions
  3) Anterior cataract

Which specific types of anterior cataract?
Anterior cortical, and anterior polar
Peters Anomaly

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- Hallmarks:
  1) A central corneal opacity
  2) Iris-cornea and/or lens-cornea adhesions
  3) Anterior cataract
  4) Misshapen lens
A

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    3) Anterior cataract
    4) Misshapen lens
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Hallmarks:
1) A central corneal opacity
2) Iris-cornea and/or lens-cornea adhesions
3) Anterior cataract
4) Misshapen lens

If the ‘misshapen’ lens were smaller and rounder than normal, what particular condition would that evoke? Microspherophakia

Is microspherophakia associated with Peters anomaly?
Yes (although only “occasionally” per the BCSC Lens book)
A

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Microspherophakia
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  1. A central corneal opacity
  2. Iris-cornea and/or lens-cornea adhesions
  3. Anterior cataract
  4. Misshapen lens
- Usually, usually
Peters Anomaly

- An abnormality of neural-crest cell migration
- A form of anterior segment dysgenesis

Hallmarks:
1) A central corneal opacity
2) Iris-cornea and/or lens-cornea adhesions
3) Anterior cataract
4) Misshapen lens

Usually bilateral, usually sporadic
Peters Anomaly

- An abnormality of neural-crest cell migration
- A form of anterior segment dysgenesis

Hallmarks:
1) A central corneal opacity
2) Iris-cornea and/or lens-cornea adhesions
3) Anterior cataract
4) Misshapen lens

- Usually bilateral, usually sporadic

Bilateral cases → do this, doc
**Peters Anomaly**

- An abnormality of **neural-crest** cell migration
- A form of **anterior segment dysgenesis**
- Hallmarks:
  1. A central corneal **opacity**
  2. Iris-cornea and/or lens-cornea **adhesions**
  3. Anterior **cataract**
  4. **Misshapen** lens
- Usually **bilateral**, usually **sporadic**
  - Bilateral cases → **complete genetic workup**
Peters Anomaly

- An abnormality of neural-crest cell migration
- A form of anterior segment dysgenesis
- Hallmarks:
  1) A central corneal opacity
  2) Iris-cornea and/or lens-cornea adhesions
  3) Anterior cataract
  4) Misshapen lens
- Usually bilateral, usually sporadic
  - Bilateral cases → complete genetic workup
- Peters-plus syndrome: Peters anomaly + short, short, abnormal including and abnormalities
Peters Anomaly

- An abnormality of neural-crest cell migration
- A form of anterior segment dysgenesis

Hallmarks:
1) A central corneal opacity
2) Iris-cornea and/or lens-cornea adhesions
3) Anterior cataract
4) Misshapen lens

- Usually bilateral, usually sporadic
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Peters-plus syndrome: Peters anomaly + short stature, short digits, abnormal facies including cleft lip/palate and external ear abnormalities