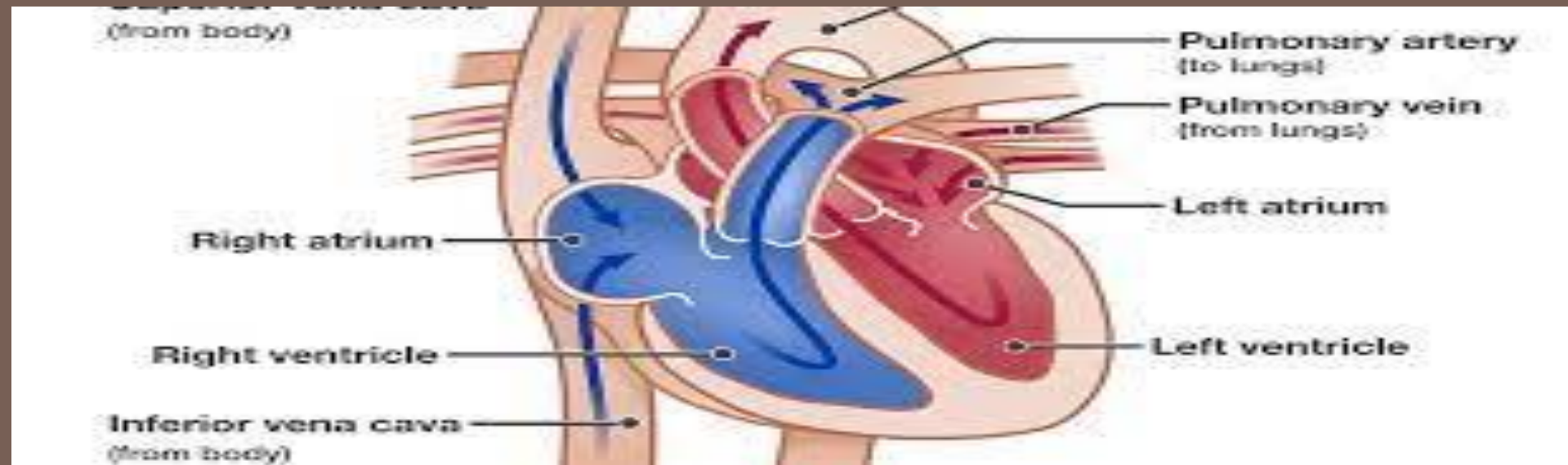


CIRCULATORY SYSTEM



Key terms

Circulatory system:-

The body system responsible for carrying blood, nutrients, and waste throughout the body

. Cardiac :-

Related to the heart

circulatory system

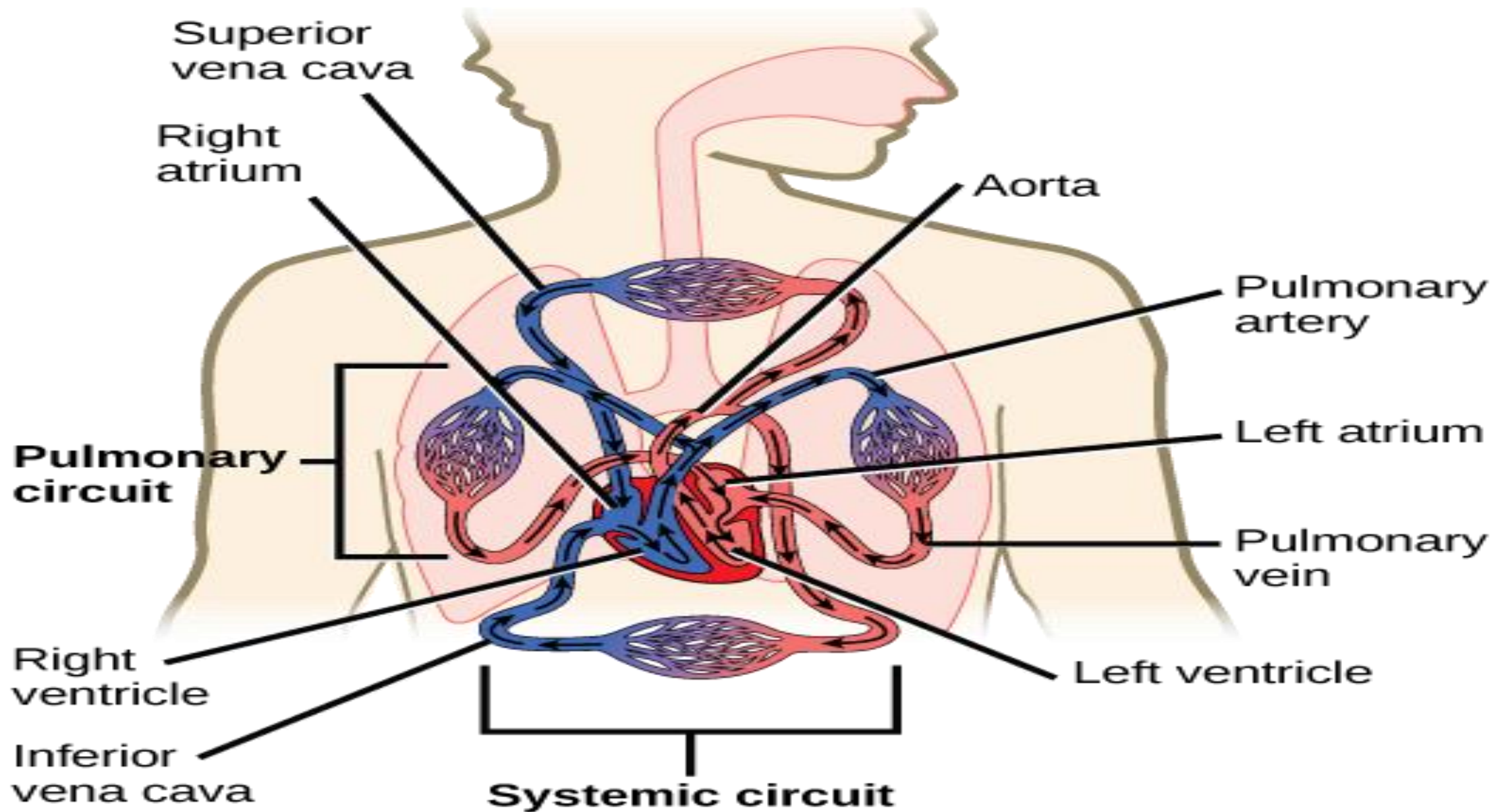
The circulatory system is a network consisting of blood, blood vessels, and the heart. This network supplies tissues in the body with oxygen and other nutrients, transports hormones, and removes unnecessary waste products

heart

The heart is made of specialized cardiac muscle tissue that allows it to □
act as a pump within the circulatory system The human heart is
divided into four chambers. There are one atrium and one ventricle on
each side of the heart. The atria receive blood and the ventricles pump
blood.

human circulatory system consists of circuits

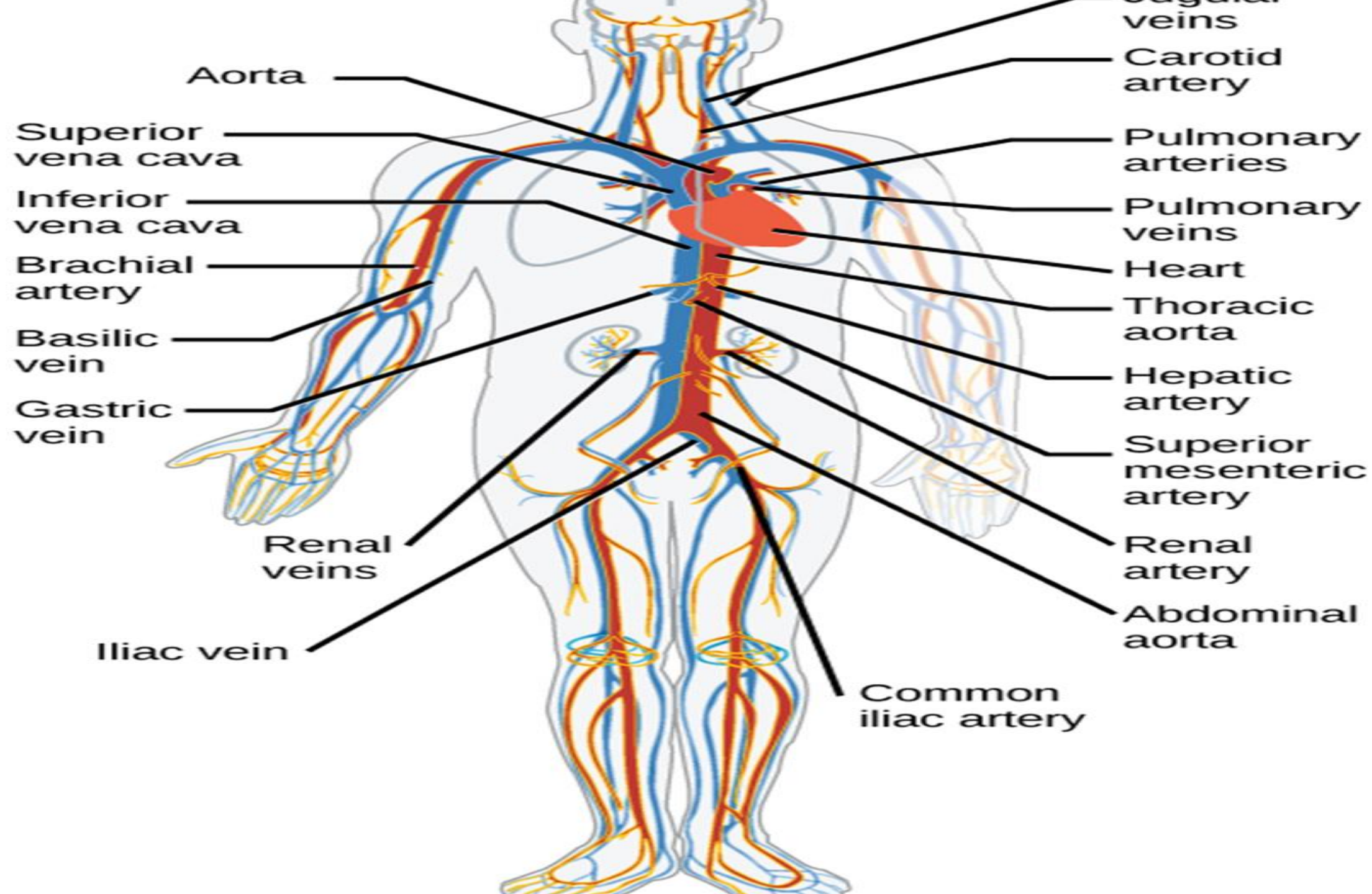
- - ---The pulmonary circuit provides blood flow between the heart and lungs. □
- ---The systemic circuit allows blood to flow to and from the rest of the body. □
- ---The coronary circuit strictly provides blood to the heart □



Blood and blood vessels

Blood from the heart is pumped throughout the body using blood vessels. Arteries carry blood away from the heart and into capillaries, providing oxygen (and other nutrients) to tissue and cells. Once oxygen is removed, the blood travels back to the lungs, where it is reoxygenated and returned by veins to the heart. □

The main artery of the systemic circuit is the aorta which branches out into other arteries, carrying blood to different parts of the body. □





subconjunctival hemorrhage

subconjunctival hemorrhage



subconjunctival hemorrhage is bleeding from a small blood vessel over the whites of the eye . It results in a red spot in the white of the eye. There is generally little to no pain and vision is not affected. Generally only one eye is affected

Signs and symptoms

A subconjunctival bleeding usually does not result in pain, although occasionally the affected eye may feel dry, rough, or scratchy. □

A subconjunctival bleeding initially appears bright-red underneath the transparent conjunctiva. Later, the bleeding may spread and become green or yellow as the hemoglobin is metabolized. It usually disappears within 2 weeks □

Causes

- It may result from being choked
- Certain infections of the outside of the eye (conjunctivitis) where a virus or a bacteria weaken the walls of small blood vessels under the conjunctiva
- Mask squeeze from diving and not equalizing mask pressure during descent
 - --- eye truma
 - ---- Head injury
 - --- whooping cough or other extreme sneezing or coughing^[6]
 - ----Severe hypertension
 - ----Lasik
- Increased venous pressure (e.g., extreme , vomiting, or coughing) or from straining due to constipation

Diagnosis



Diagnosis is by visual inspection, by noting the typical finding of bright red discoloration confined to the white portion (sclera) of the eye..

Management



A subconjunctival bleeding is typically a self-limiting condition that requires no treatment unless there is evidence of an eye infection or there has been significant eye trauma. artificial tear may be applied four to six times a day if the eye feels dry or scratchy. The elective use of aspirin is typically discouraged.

Prognosis

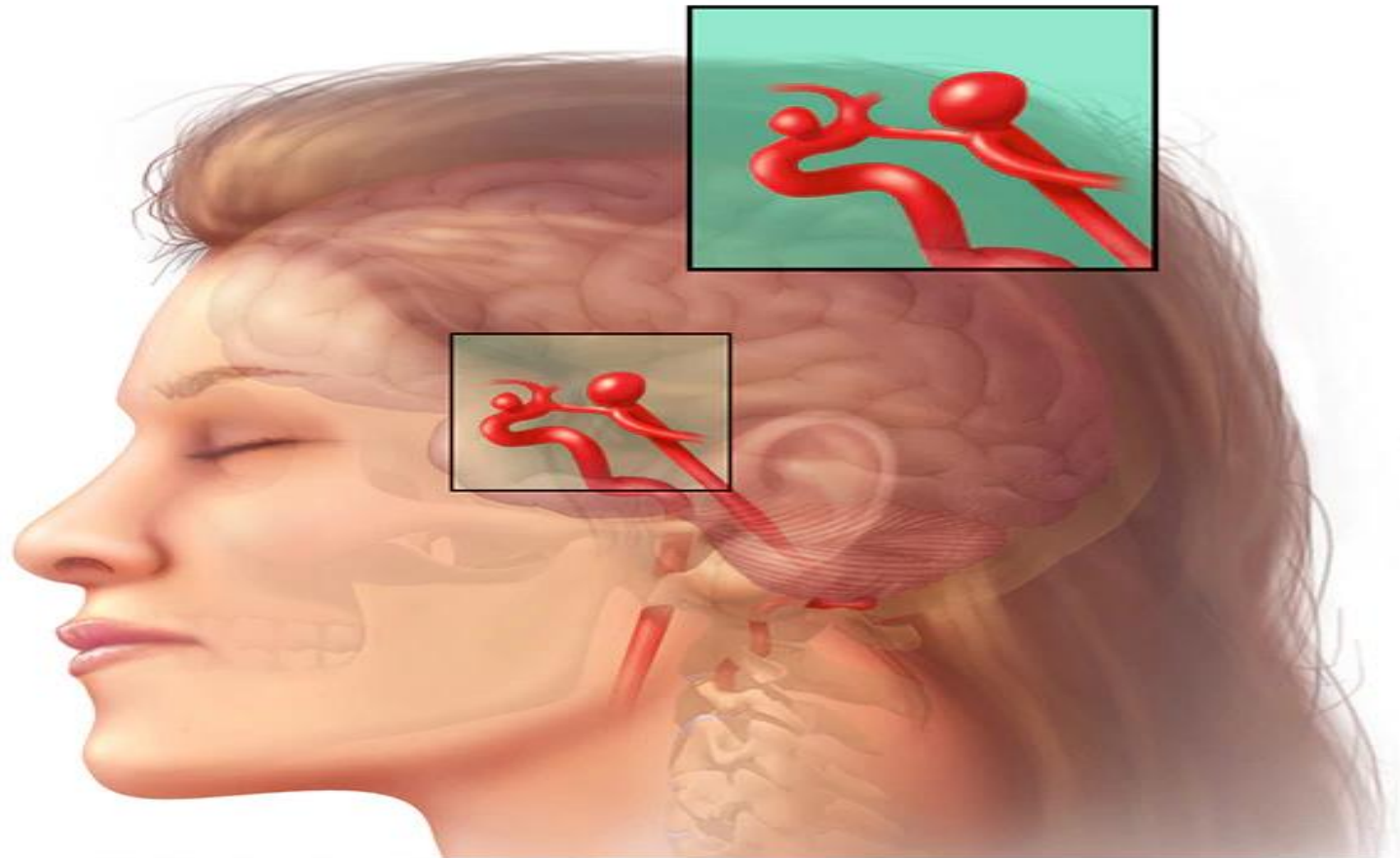


Management



Mangment





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Intracranial aneurysm

Picture show Intracranial aneurysm ,Give signs and symptoms of it ?

Sign and symptom

Sudden severe headache. ☐

Nausea and vomiting. ☐

Vision impairment. ☐

loss of consciousness. ☐



Stroke

An old woman with signs of stroke , give some risk factor of that disease?

Causes



High blood pressure. ☐

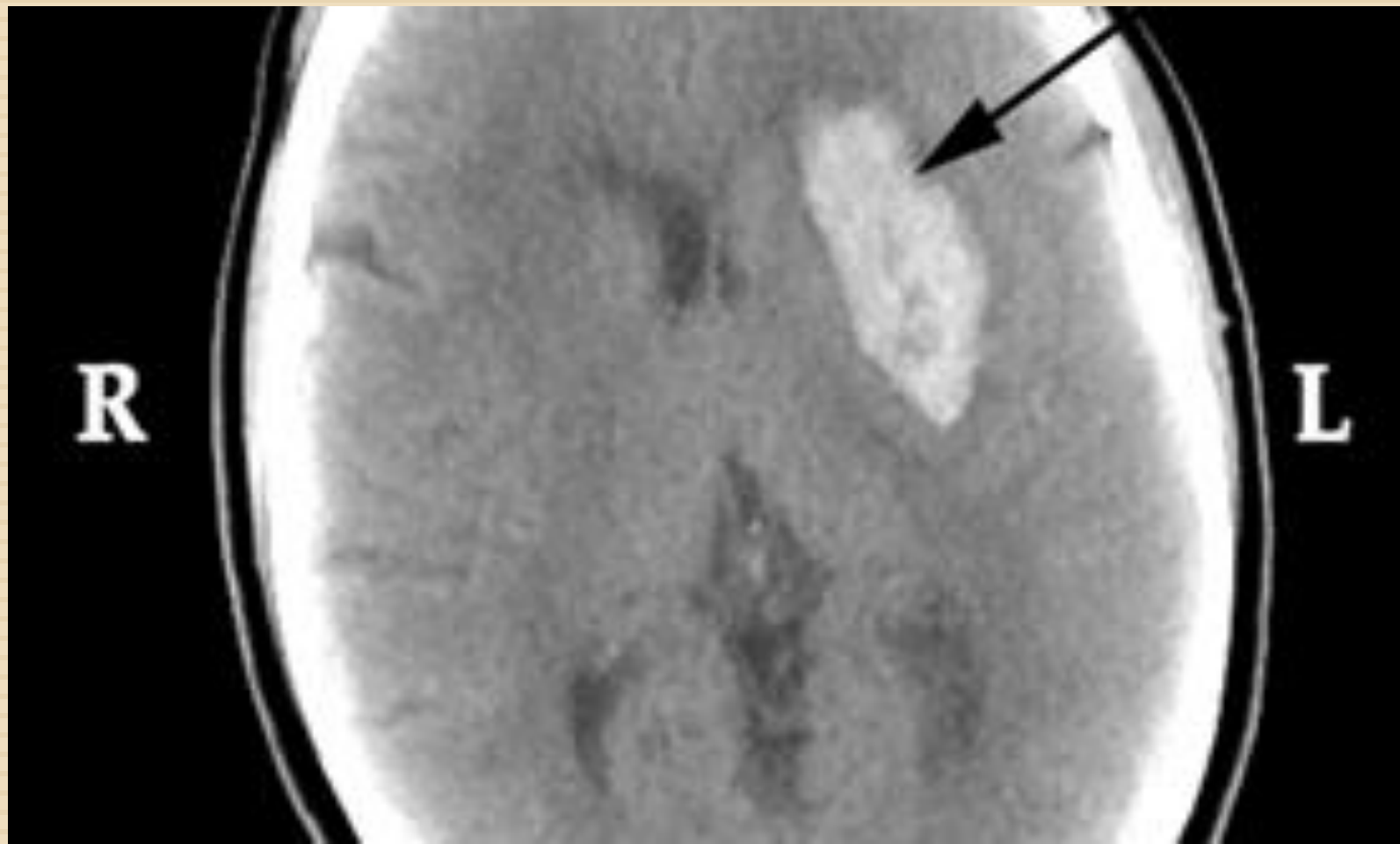
Smoking. ☐

Obesity. ☐

High blood cholesterol. ☐

Diabetes mellitus. ☐

End-stage kidney disease ☐



This is CT scan show sign of stroke ,Give other investigation in diagnosis of stroke??

Diagnoses

CT scan. ☐

MRI . ☐

Doppler ultrasound. ☐

Blood test . ☐



Hydrocephalus

Picture show Hydrocephalus in a child , Give definition of this disease?

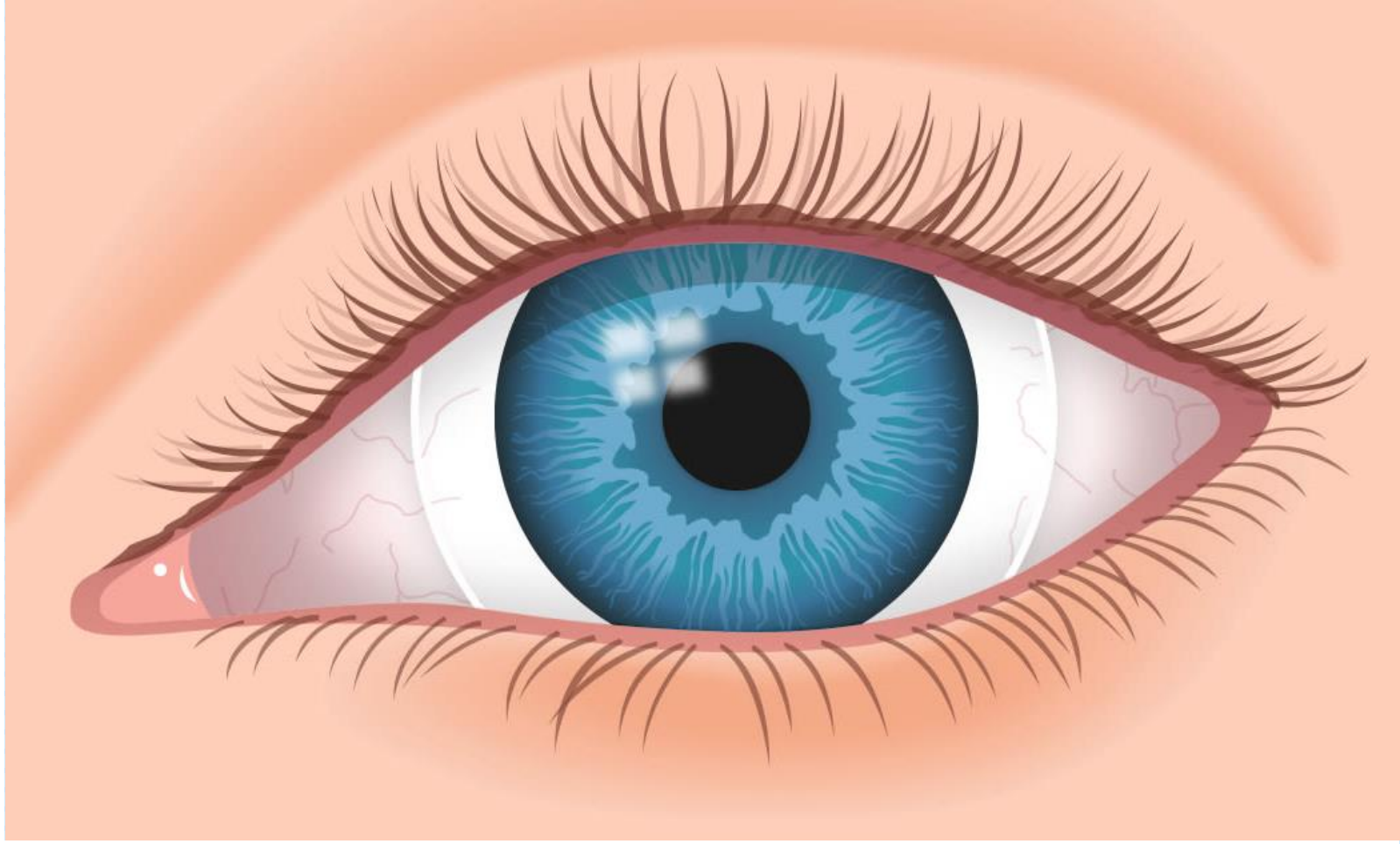
Hydrocephalus



Hydrocephalus is a condition in which an accumulation of (CSF) occurs within the brain. □



Downward pointing of the eyes (sunset eye).
What's the eye sign in this child with hydrocephalus called ?




Diabetes mellitus

Diabetes mellitus



- . Diabetes mellitus, commonly known as diabetes, is a metabolic disease that causes high blood sugar. The hormone insulin moves sugar from the blood into your cells to be stored or used for energy. With diabetes, your body either doesn't make enough insulin or can't effectively use the insulin it does make




Untreated high blood sugar from diabetes can damage your nerves, eyes, kidneys, and other organs.

TPES OF DM :-

- 1-Type 1 diabetes is an autoimmune disease. The immune system attacks and destroys cells in the pancreas, where insulin is made. It's unclear what causes this attack. About 10 percent of people with diabetes have this type.
- 2-Type 2 diabetes occurs when your body becomes resistant to insulin, and sugar builds up in your blood.

3-Prediabetes occurs when your blood sugar • is higher than normal, but it's not high enough for a diagnosis of type 2 diabetes.

4-Gestational diabetes is high blood sugar during pregnancy. Insulin-blocking hormones produced by the placenta cause this type of diabetes.



A rare condition called diabetes insipidus is not related to diabetes mellitus, although it has a similar name. It's a different condition in which your kidneys remove too much fluid from your body.

General symptoms



- increased hunger •
- increased thirst •
- weight loss •
- frequent urination •
- blurry vision •
- extreme fatigue •
- sores that don't heal •

Symptoms of type 1 diabetes can include

- extreme hunger •
- increased thirst •
- unintentional weight loss •
- frequent urination •
- blurry vision •
- tiredness •

Symptoms of type 2 diabetes can include

- increased hunger •
- increased thirst •
- increased urination •
- blurry vision •
- tiredness •
- sores that are slow to heal •

RISK FACTOR

- overweight •
- age 45 or older •
- have a parent or sibling with the condition •
- physically Inactive •
- had gestational diabetes •
- high blood pressure, high cholesterol, or high triglycerides •



Diabetic retinopathy

Diabetic retinopathy

- . Diabetic retinopathy is a diabetes complication that affects eyes. It's caused by damage to the blood vessels of the light-sensitive tissue at the back of the eye (retina). At first, diabetic retinopathy may cause no symptoms or only mild vision problems. Eventually, it can cause blindness. □

Causes

Over time, too much sugar in your blood can □ lead to the blockage of the tiny blood vessels that nourish the retina, cutting off its blood supply. As a result, the eye attempts to grow new blood vessels. But these new blood vessels don't develop properly and can leak easily.

There are two types of diabetic retinopathy: □

Symptoms

IT might GO SILENT in the early stages of diabetic retinopathy. As the condition progresses, diabetic retinopathy symptoms may include: □

- Spots or dark strings floating in your vision (floaters) •
- Blurred vision •
- Fluctuating vision •
- Impaired color vision •
- Dark or empty areas in your vision •
- Vision loss •

Diabetic retinopathy usually affects both eyes. □

TYPES OF DRP

--Early diabetic retinopathy ☐

--Advanced diabetic retinopathy. ☐

Early diabetic retinopathy

In this more common form — called non proliferative diabetic retinopathy (NPDR) — new blood vessels aren't growing (proliferating). •

When you have NPDR, the walls of the blood vessels in your retina weaken. Tiny bulges (microaneurysms) protrude from the vessel walls of the smaller vessels, sometimes leaking fluid and blood into the retina.. •



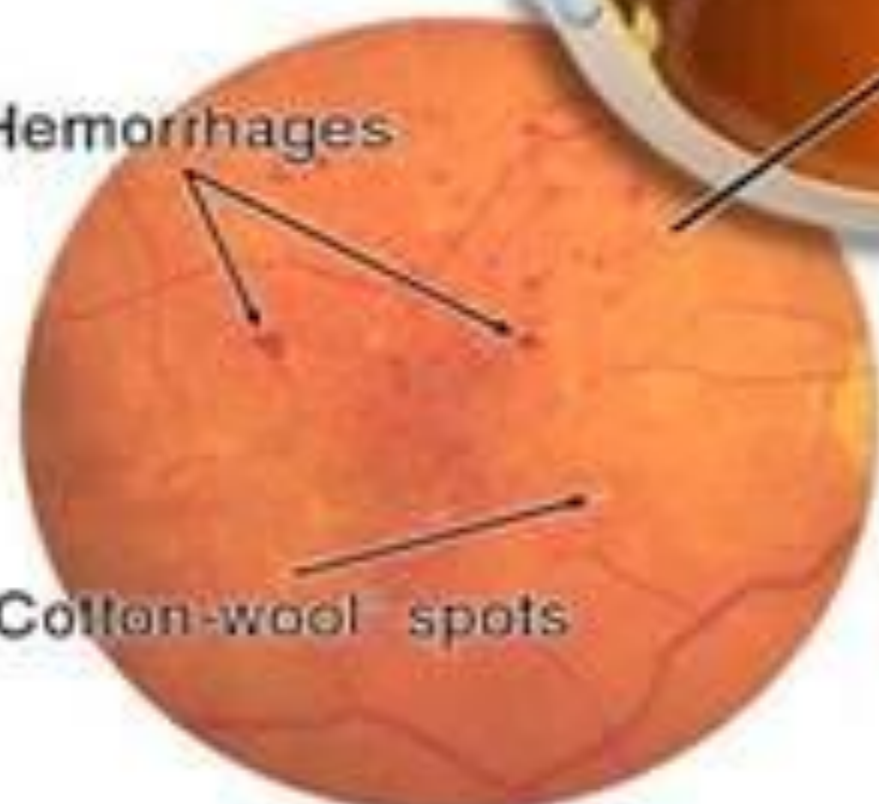
Hemorrhages

"Cotton-wool spots

**Background
Diabetic Retinopathy**

Neovascularization

**Proliferative
Diabetic Retinopathy**



Early diabetic retinopathy

Larger retinal vessels can begin to dilate and become irregular in diameter, as well. NPDR can progress from mild to severe, as more blood vessels become blocked. •

Nerve fibers in the retina may begin to swell. Sometimes the central part of the retina (macula) begins to swell (macular edema), a condition that requires treatment. •

Advanced diabetic retinopathy

Diabetic retinopathy can progress to this more severe type, known as proliferative diabetic retinopathy. In this type, damaged blood vessels close off, causing the growth of new, abnormal blood vessels in the retina, and can leak into the clear, jelly-like substance that fills the center of your eye (vitreous). □

Advanced diabetic retinopathy

Eventually, scar tissue stimulated by the growth of new blood vessels may cause the retina to detach from the back of your eye. If the new blood vessels interfere with the normal flow of fluid out of the eye, pressure may build up in the eyeball. This can damage the nerve that carries images from your eye to your brain (optic nerve), resulting in glaucoma. □

Complications

Diabetic retinopathy involves the abnormal growth of blood vessels in the retina. Complications can lead to serious vision problems:

Vitreous hemorrhage ☐

Retinal detachment ☐

GLUCOMA ☐

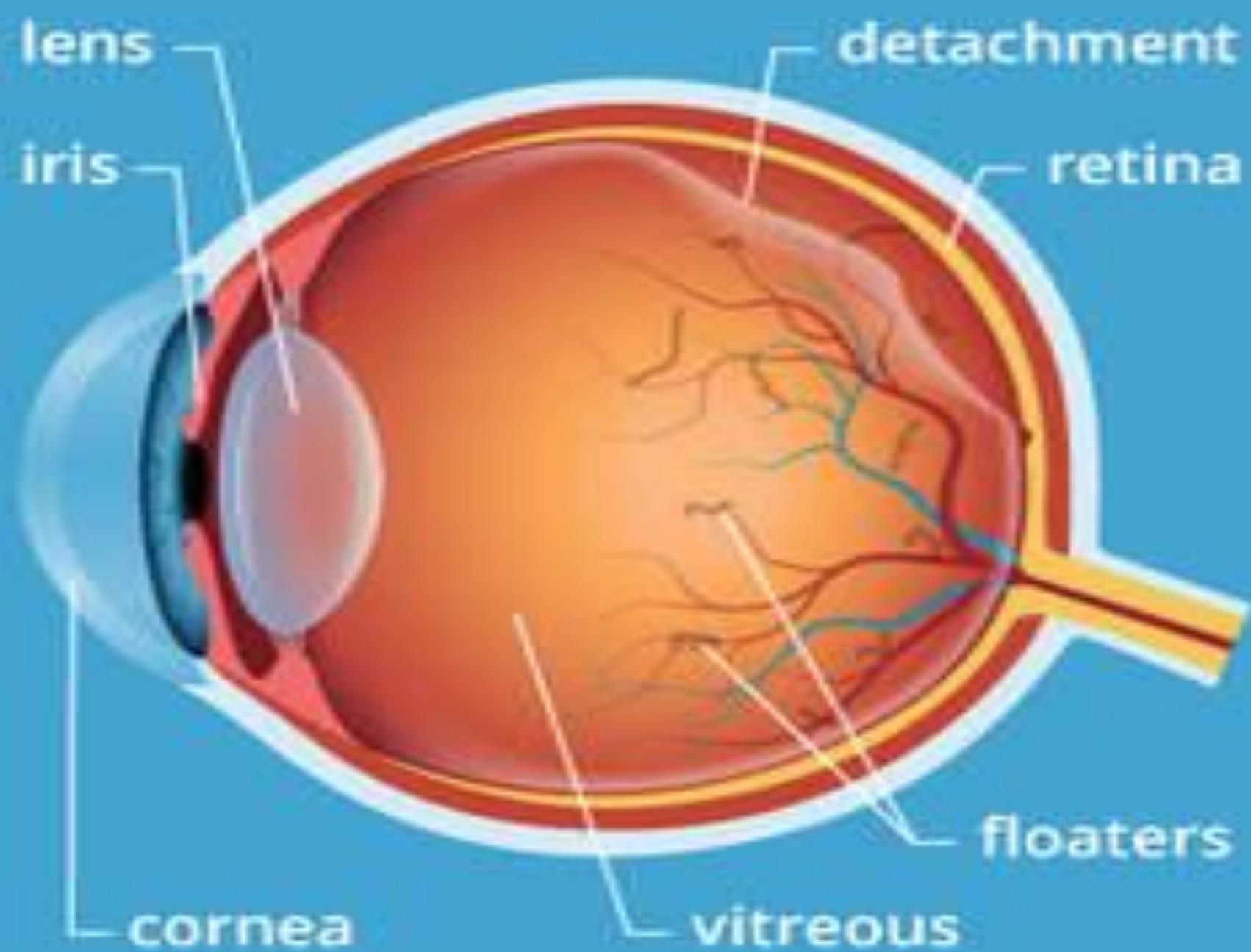
BLINDNEES ☐

Vitreous hemorrhage

The new blood vessels may bleed into the clear, jelly-like substance that fills the center of your eye. If the amount of bleeding is small, you might see only a few dark spots (floaters). In more-severe cases, blood can fill the vitreous cavity and completely block your vision. □

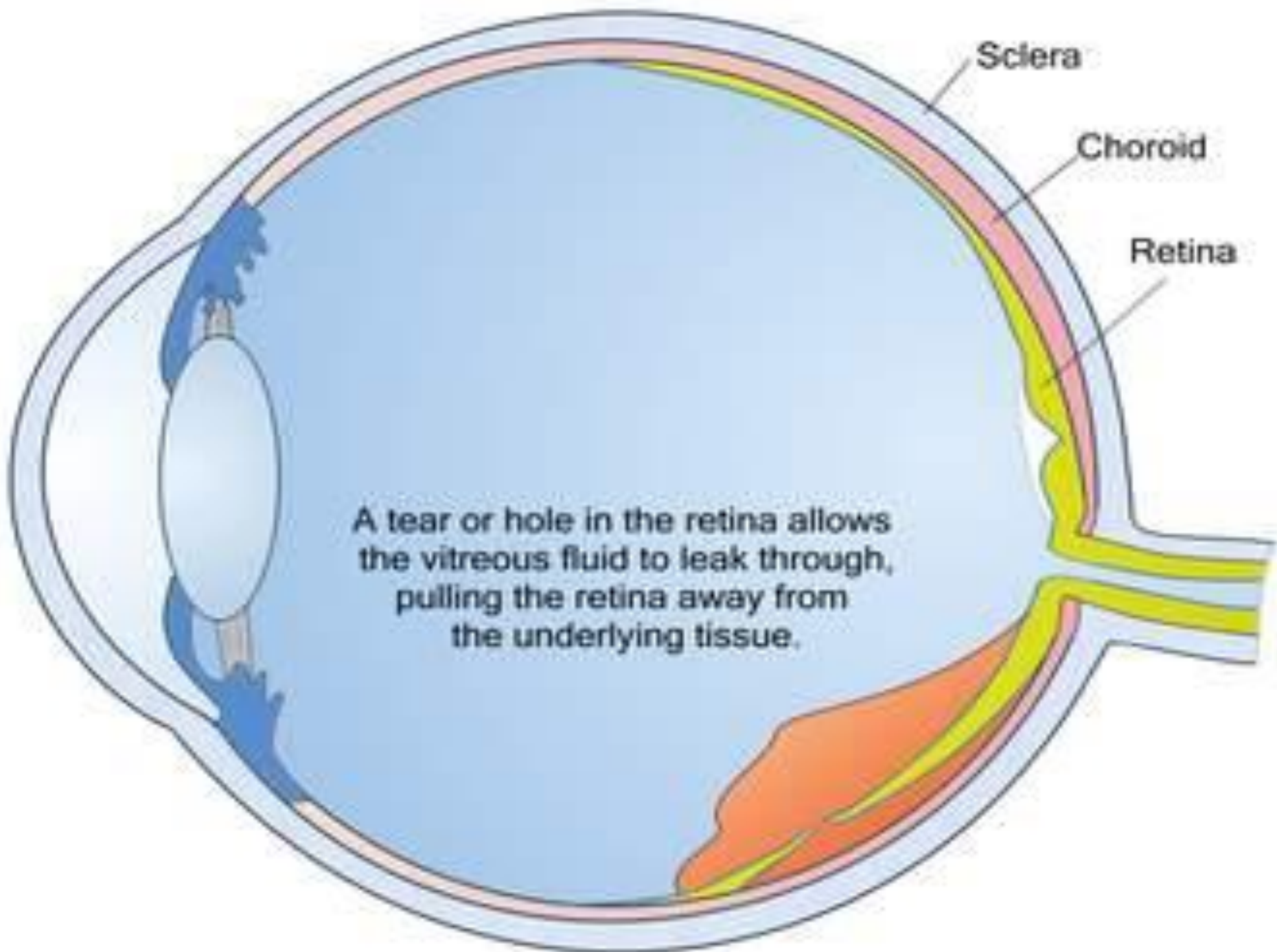
Vitreous hemorrhage

Vitreous hemorrhage by itself usually doesn't cause permanent vision loss. The blood often clears from the eye within a few weeks or months. Unless your retina is damaged, your vision may return to its previous clarity. □



Retinal detachment

The abnormal blood vessels associated with diabetic retinopathy stimulate the growth of scar tissue, which can pull the retina away from the back of the eye. This may cause spots floating in your vision, flashes of light or severe vision loss. □



Glaucoma

New blood vessels may grow in the front part of your eye and interfere with the normal flow of fluid out of the eye, causing pressure in the eye to build up (glaucoma). This pressure can damage the nerve that carries images from your eye to your brain (optic nerve). □

Blindness

Eventually, diabetic retinopathy, glaucoma or □
both can lead to complete vision loss.



Hypertension

Hypertension

- . Hypertension, also known as high or raised blood pressure, **is a condition in which the blood vessels have persistently raised pressure.** Blood is carried from the heart to all parts of the body in the vessels. Each time the heart beats, it pumps blood into the vessels. Blood pressure is created by the force of blood pushing against the walls of blood vessels (arteries) as it is pumped by the heart. The higher the pressure, the harder the heart has to pump. .

CLASSIFICATION

High blood pressure is classified as ☐
primary (essential) hypertension or secondary hypertension. ☐

⌈ About 90–95% of cases are primary, defined as high blood pressure due to nonspecific lifestyle and genetic factors. Lifestyle factors that increase the risk include excess salt in the diet, excess body weight, smoking, and alcohol use. ☐

The remaining 5–10% of cases are categorized as ☐
secondary high blood pressure, defined as high blood pressure due to an identifiable cause, such as chronic kidney disease, narrowing of the kidney arteries, an endocrine disorder, or the use of birth control pills.

CLASSIFICATION

- Blood pressure is classified by two measurements, the systolic and diastolic pressures, which are the maximum and minimum pressures, respectively.
- For most adults, normal blood pressure at rest is within the range of 100–130 millimeters mercury (mmHg) systolic and 60–80 mmHg diastolic. For most adults, high blood pressure is present if the resting blood pressure is persistently at or above 130/80 or 140/90 mmHg.
- . Ambulatory blood pressure monitoring over a 24-hour period appears more accurate than office-based blood pressure measurement.

HYPERTENTION

Lifestyle changes and medications can lower blood pressure and decrease the risk of health complications. Lifestyle changes include weight loss, physical exercise, decreased salt intake, reducing alcohol intake, and a healthy diet. If lifestyle changes are not sufficient then blood pressure medications are used. Up to three medications taken concurrently can control blood pressure in 90% of people.

HYPERTENTION

The treatment of moderately high arterial blood pressure (defined as $>160/100$ mmHg) with medications is associated with an improved life expectancy. The effect of treatment of blood pressure between $130/80$ mmHg and $160/100$ mmHg is less clear, with some reviews finding benefit and others finding unclear benefit. High blood pressure affects between 16 and 37% of the population globally

Signs and symptoms

Hypertension is rarely accompanied by symptoms, and its identification is usually through screening, or when seeking healthcare for an unrelated problem. □

Some people with high blood pressure report headaches (particularly at the back of the head and in the morning), as well as light headedness, vertigo, tinnitus (buzzing or altered vision or fainting episodes). These symptoms, however, might be related to associated anxiety rather than the high blood pressure itself hissing in the ears. □

Signs and symptoms

On physical examination, hypertension may be associated with the presence of changes in the optic fundus seen by ophthalmoscopy. The severity of the changes typical of hypertensive retinopathy is graded from I to IV; grades I and II may be difficult to differentiate. The severity of the retinopathy correlates roughly with the duration or the severity of the hypertension. □



hypertensive retinopathy

1-- Arteriolar changes, •

such as generalized arteriolar narrowing, focal •
arteriolar narrowing, arteriovenous nicking,
changes in the arteriolar wall
(arteriosclerosis).

hypertensive retinopathy

2-- Advanced retinopathy lesions. •

• such as micro aneurysms, blot hemorrhages and/or flame hemorrhages, ischemic changes (e.g. "cotton wool spots"), hard exudates and in severe cases swelling of the optic disc (optic disc edema), a ring of exudates around the retina called a "macular star" and visual acuity loss, typically due to macular involvement.

hypertensive retinopathy

- 3-- Strongly modulated blood flow pulse in central and branch arteries can result from hypertension. Microangiography by laser Doppler imaging may reveal altered hemodynamics non-invasively. •



Macular degeneration

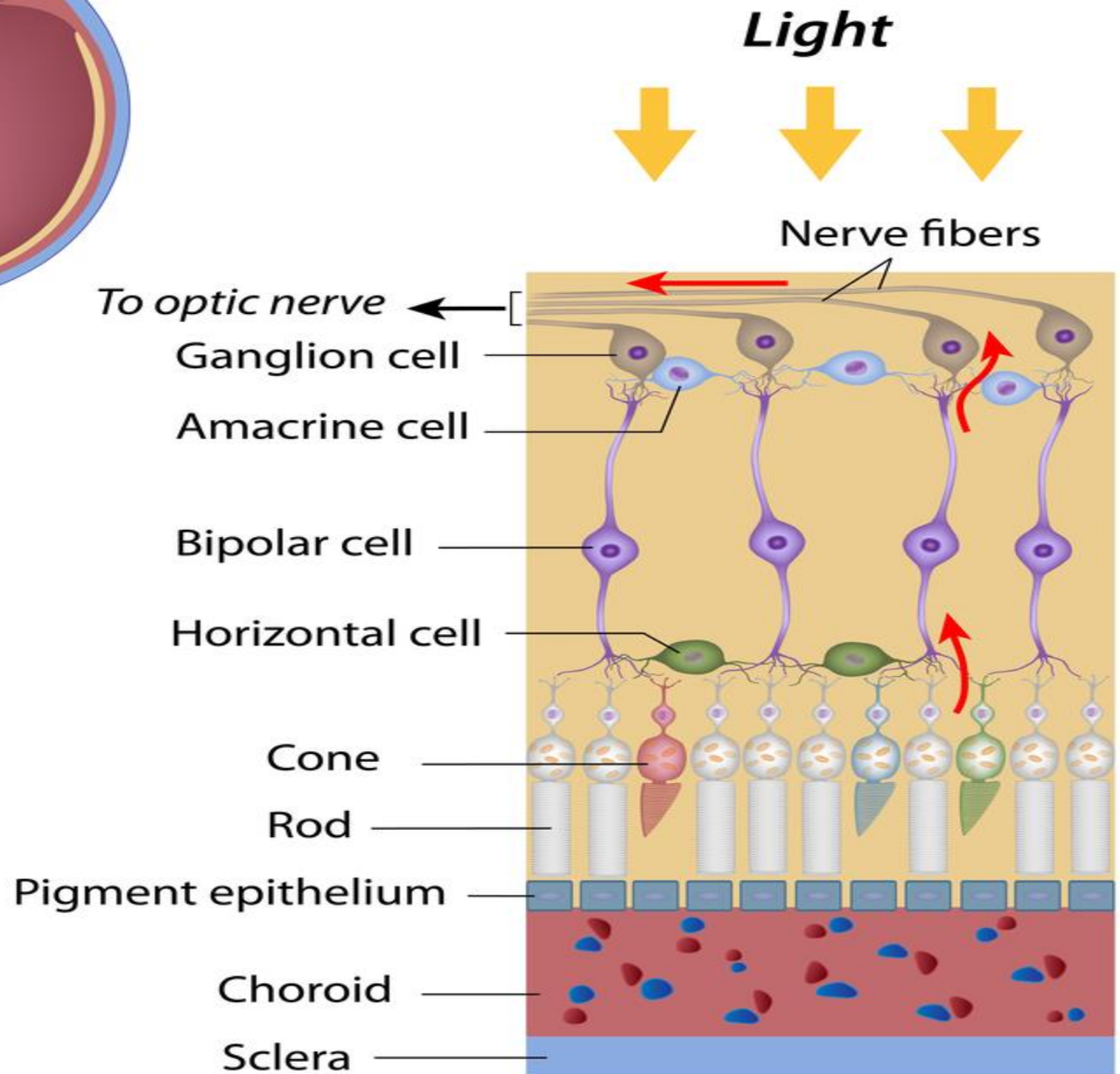
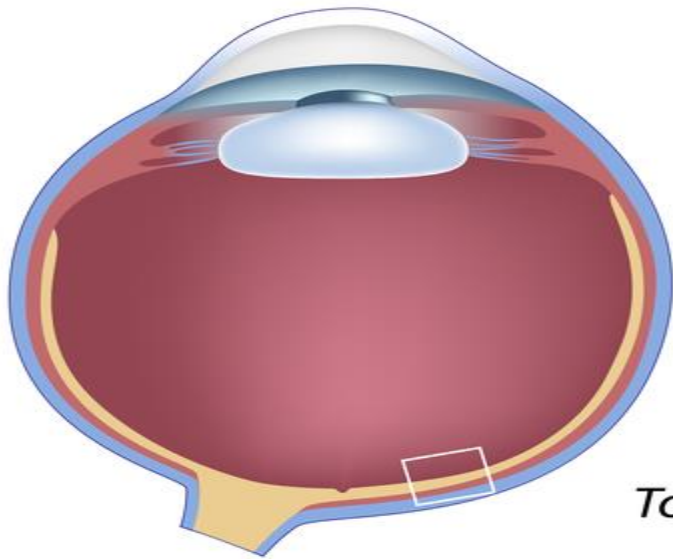
Macular degeneration

, also known as **age-related macular degeneration (AMD or ARMD)**, is a medical condition which may result in blurred or no vision in the center of the visual field. Early on there are often no symptoms. Over time, however, some people experience a gradual worsening of vision that may affect one or both eyes. While it does not result in complete blindness, loss of central vision can make it hard to recognize faces, drive, read, or perform other activities of daily life. visual hallucination may also occur but these do not represent a mental illness.

Macular degeneration

Macular degeneration typically occurs in older people . Genetic factors and smoking also play a role. It is due to damage to the macula Diagnosis is by a complete eye examination The severity is divided into early, intermediate, and late types. The late type is additionally divided into "dry" and "wet" forms with the dry form making up 90% of cases.

Structure of the Retina



Stages

In AMD there is a progressive accumulation of characteristic yellow deposits, called **drusen** (buildup of extracellular proteins and lipids), in the macula (, between the retinal pigmented epithelium and the underlying choroid. This accumulation is believed to damage the retina over time. Amyloid beta, which builds up in Alzheimer's disease brains, is one of the proteins that accumulate in AMD, which is a reason why AMD is sometimes called "Alzheimer's of the eye" or "Alzheimer's of the retina".¹ AMD can be divided into 3 stages: early, intermediate, and late, based partially on the extent (size and number) of **drusen**.¹ □

Stages

Early AMD] ☐

Early AMD is diagnosed based on the presence of medium-sized drusen, about the width of an average human hair. Early AMD is usually asymptomatic. ☐

Intermediate AMD] ☐

Intermediate AMD is diagnosed by large drusen and/or any retinal pigment abnormalities. Intermediate AMD may cause some vision loss, but, like early AMD, it is usually asymptomatic.¹ ☐

Stages

Late AMD ☐

In late AMD, enough retinal damage occurs that, in ☐
addition to drusen, people will also begin to
experience symptomatic central vision loss. The
damage can either be the development of atrophy
or the onset of neovascular disease. Late AMD is
further divided into two subtypes based on the
types of damage:

Geographic atrophy and Wet AMD (also called ☐
Neovascular AMD)

Stages

Geographic atrophy (also called atrophic AMD) is an advanced form of AMD in which progressive and irreversible loss of retinal cells leads to a loss of visual function. There are multiple layers that make up the retina, and in geographic atrophy, there are three specific layers that undergo atrophy: the choriocapillaris, retinal pigment epithelium, and the overlying photoreceptors

Signs and symptoms

Visual symptoms-

- Slow recovery of visual function after exposure to bright light .
- distored vision
- Visual acuity drastically decreasing
- Blurred vision
- Trouble discerning colors
- flashing lights

Prognoses

Macular degeneration by itself will not lead to total blindness. For that matter, only a small number of people with visual impairment are totally blind. In almost all cases, some vision remains, mainly peripheral. Other complicating conditions may lead to such an acute condition (severe stroke or trauma, untreated glaucoma , etc.), but few macular degeneration patients experience total visual loss.

Management

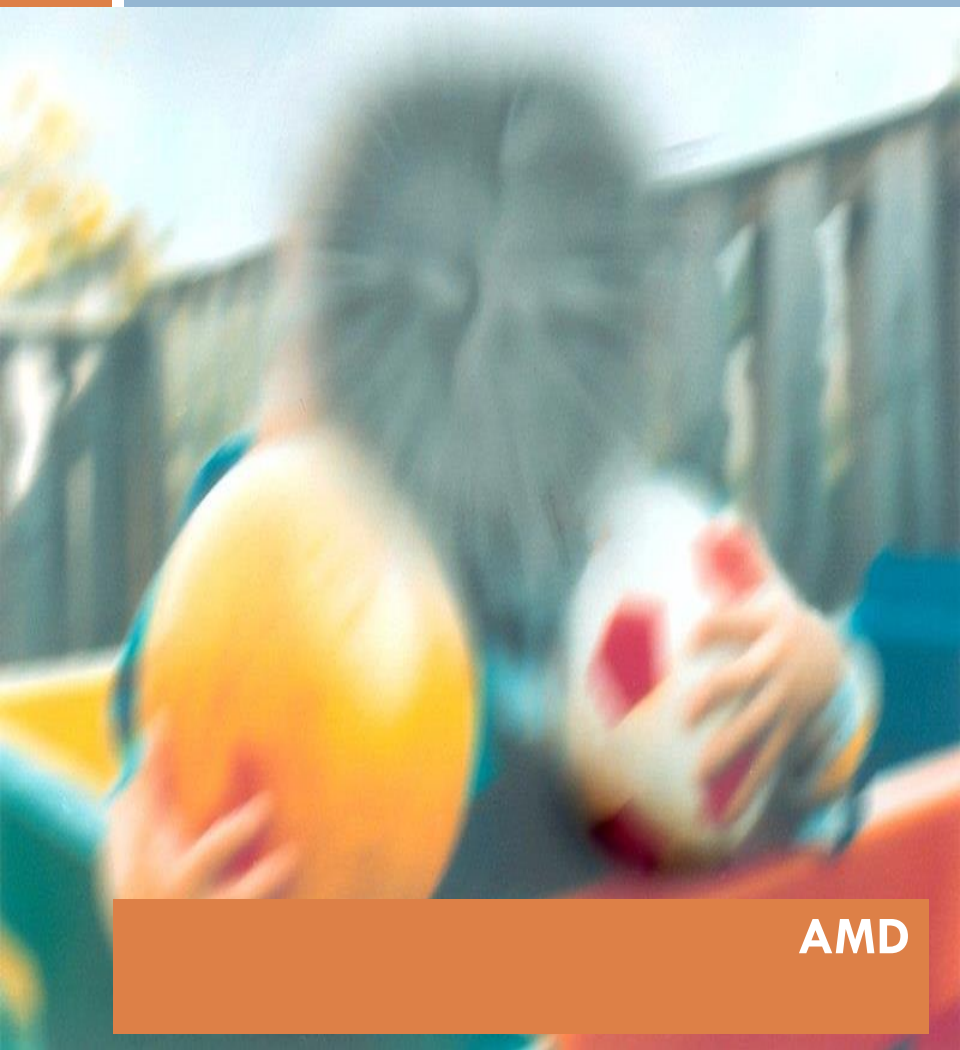


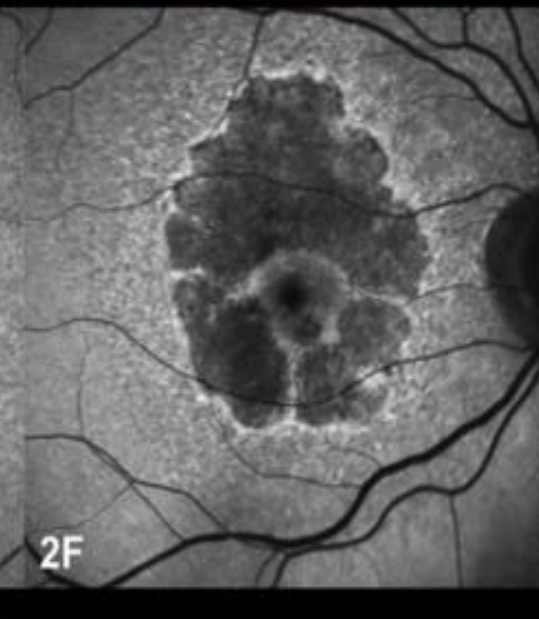
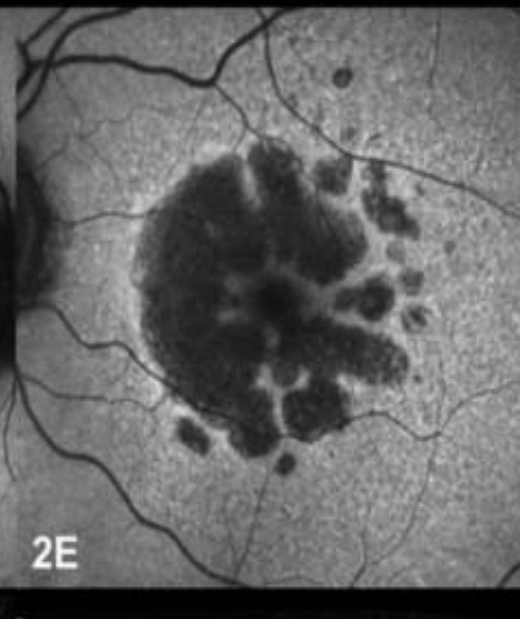
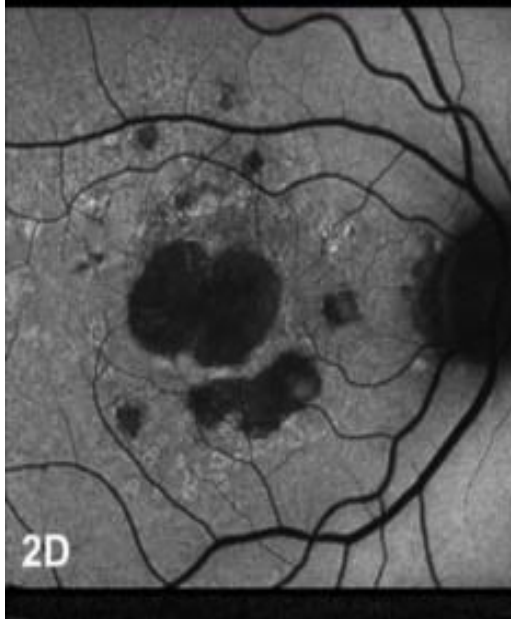
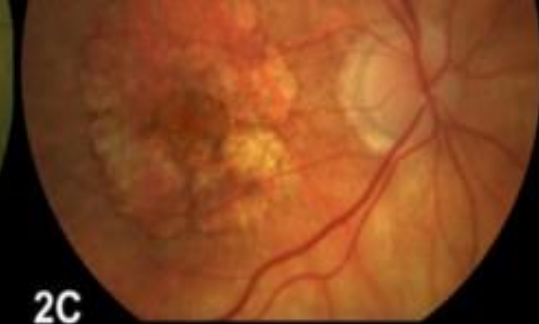
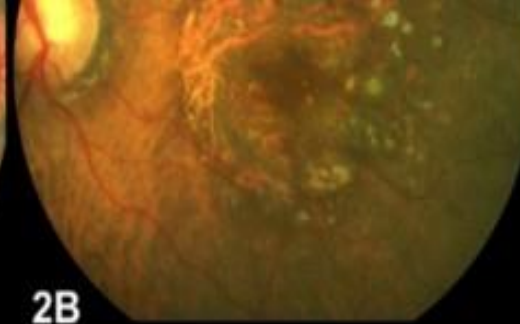
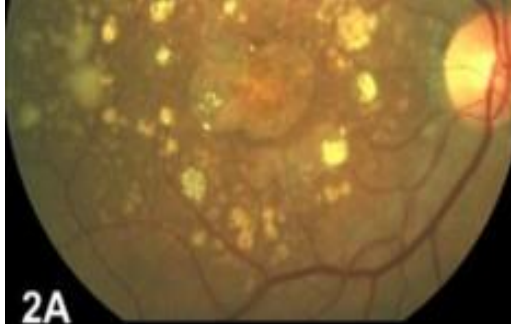
Treatment of AMD varies depending on the category of the disease at the time of diagnosis. In general, treatment is aimed at slowing down the progression of AMD. Early-stage and intermediate-stage AMD is managed by modifying known risk factors such as smoking and atherosclerosis and making dietary modifications.

Management

For intermediate-stage AMD, management also □ includes antioxidant and mineral supplementation.

Advanced-stage AMD is managed based on the presence of choroidal neovascularization (CNV): dry AMD (no CNV present) or wet AMD (CNV present). No effective treatments exist for dry AMD. The CNV present in wet AMD is managed with vascular endothelial growth factor (VEGF) inhibitors.





Retinal layers

Retinal layers



The vertebrate retina has ten distinct layers. From closest to farthest from the vitreous body

Retinal layers

1- Inner limiting membrane □

the boundary between the retina and the vitreous body , formed by astrocytes and the end feet of Müller cells. It is separated from the vitreous humor by a basal lamina. □

Retinal layers

2-Retinal nerve fiber layer □

formed by the expansion of the fibers of □
the optic nerve; it is thickest near the optic
disc, gradually diminishing toward the ora
serrata ..

Retinal layers



3-Ganglion cell layer □

- . is a layer of the retina that consists of retinal ganglion cells and displaced amacrine cells. □



Retinal layers

4-**Inner plexiform layer** □

. is an area of the retina □

that is made up of a dense reticulum of fibril □

□

Retinal layers

5-**Inner nuclear layer** □

- . is made up of a number of closely packed □
cells, of which there are three varieties, viz.:
bipolar cells, horizontal cells, and amacrine
cells.

Retinal layers



6-. Outer plexiform layer □

is a layer of neuronal synapses in the retina . □

Retinal layers



7-. Outer nuclear layer □

Retinal layers



8-. External limiting membrane □

It has a network-like structure and is situated at the bases of the rods and cones.

Retinal layers

9-. Inner segment / outer segment layer □

inner segments and outer segments of rods □
and cones. The outer segments contain a
highly specialized light-sensing apparatus

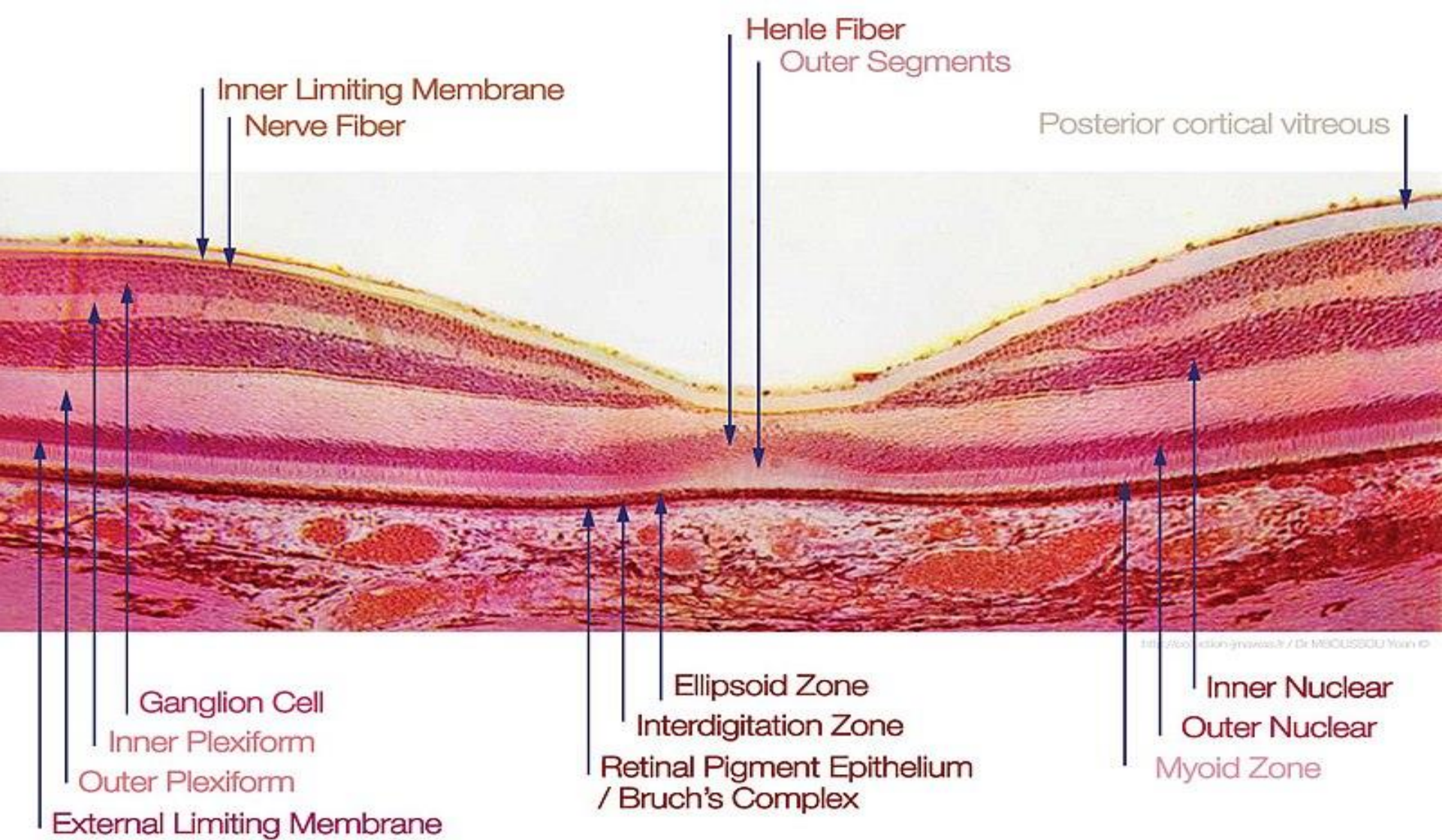
Retinal layers

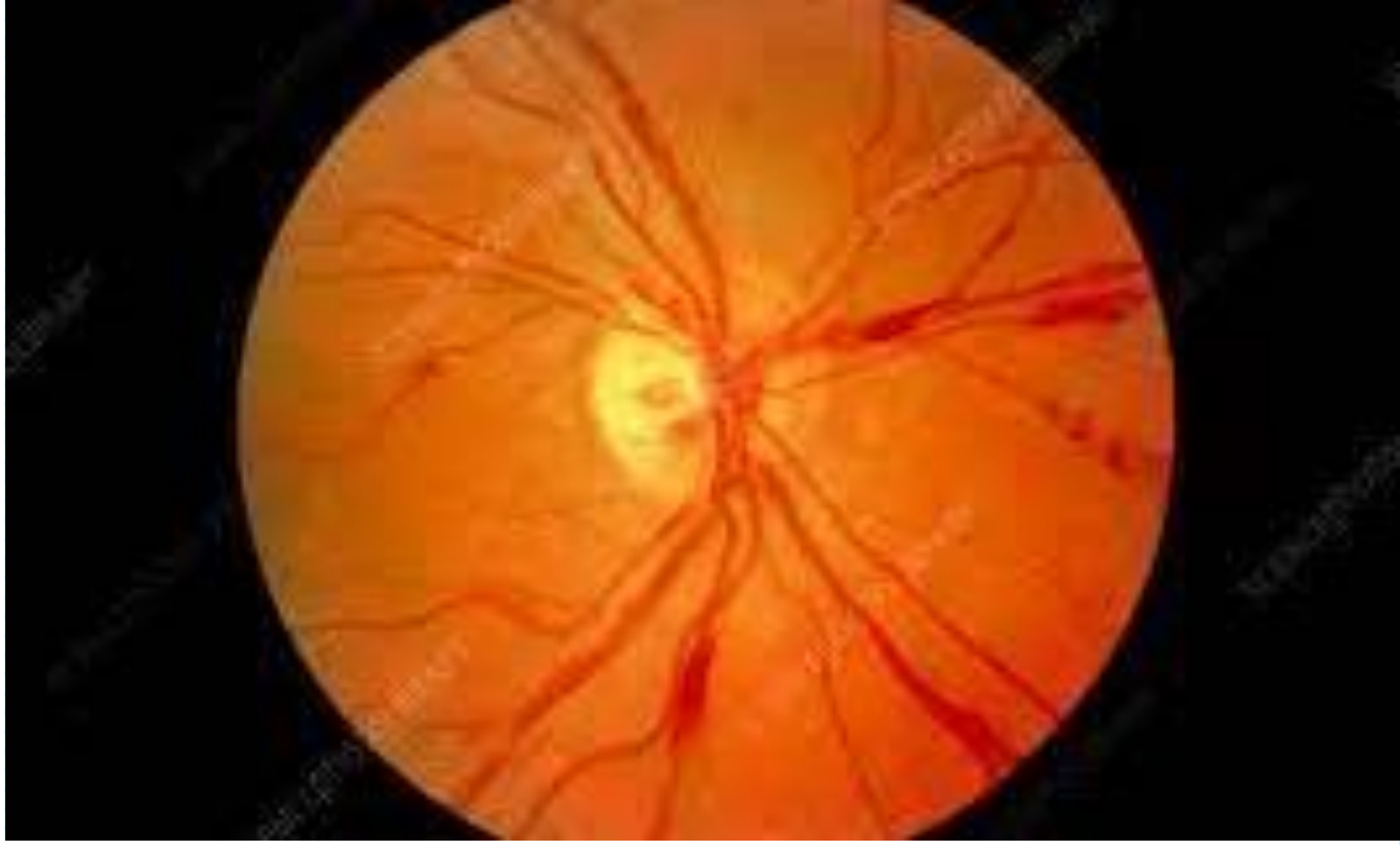
10-Retinal pigment epithelium □

- . is the pigmented cell layer just outside the □
neuro sensory retina that nourishes retinal
visual cells, and is firmly attached to the
underlying choroid and overlying retinal
visual cells

Retinal pigment epithelium

single layer of cuboidal epithelial cells (with extrusions not shown in diagram). This layer is closest to the choroid, and provides nourishment and supportive functions to the neural retina, The black pigment melanin in the pigment layer prevents light reflection throughout the globe of the eyeball; this is extremely important for clear vision

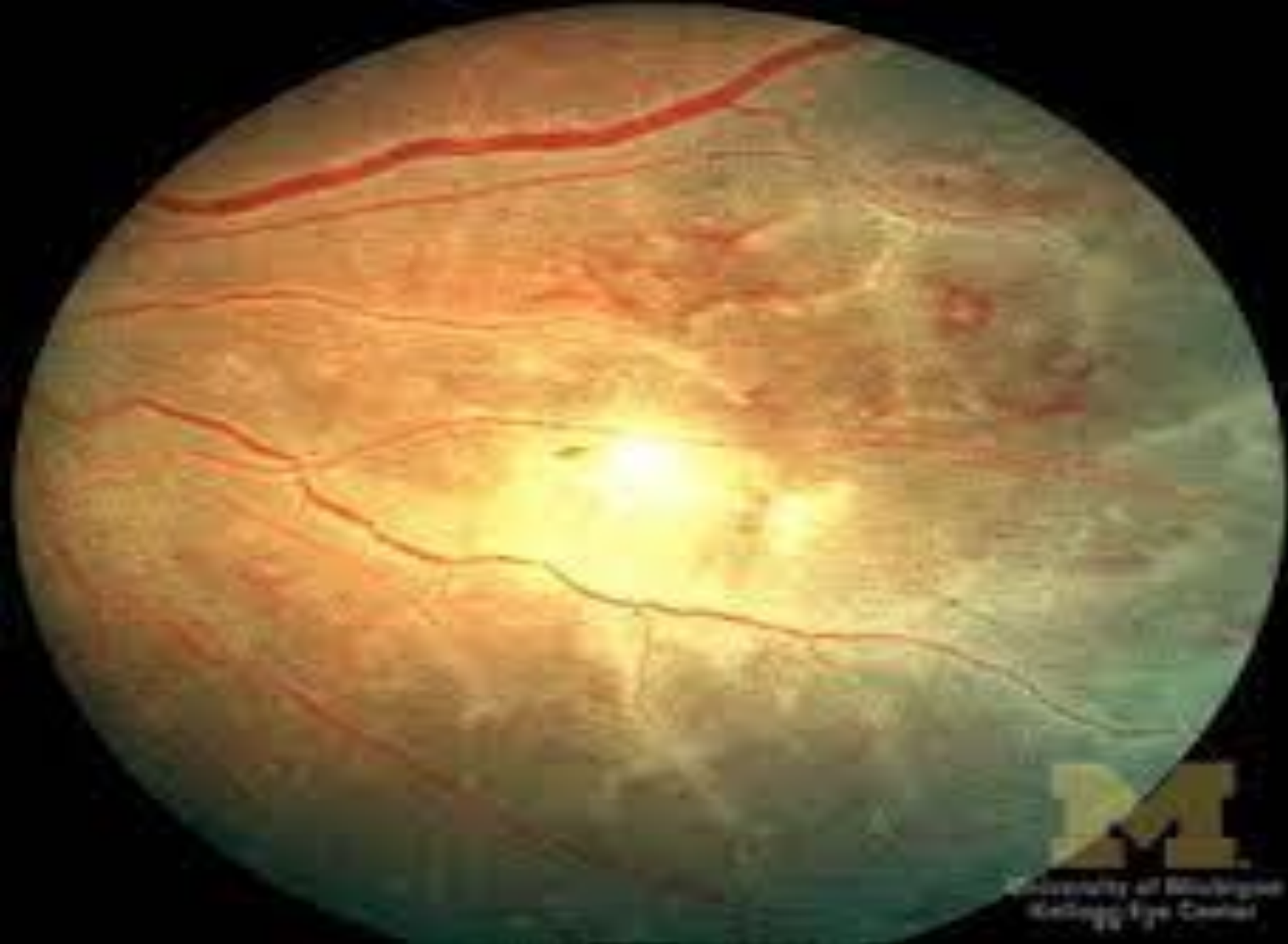




Retinal vasculitis

Retinal vasculitis

is inflammation of the vascular branches of the retinal artery, caused either by primary ocular disease processes, or as a specific presentation of any systemic form of vasculitis such as Behçet's disease, sarcoidosis, multiple sclerosis, or any form of systemic necrotizing vasculitis such as temporal arteritis, polyarteritis nodosa, and granulomatosis with polyangiitis, or due to rheumatoid arthritis



University of Michigan
Kellogg Eye Center

Symptoms

- Retinal vasculitis presents as ☐
- painless, ☐
- decrease of visual acuity (blurry vision), ☐
- visual floaters, ☐
- scotomas (dark spot in vision), ☐
- decreased ability to distinguish colors, ☐
- metamorphopsia (distortion of images such as linear images). ☐

Diseases associated with retinal vasculitis

- Behçet's disease
- Common Variable Immune Deficiency[3]
- Eales disease
- Granulomatosis with polyangiitis
- Idiopathic Retinal Vasculitis Aneurysms and Neuroretinitis
- Lupus erythematosus

Diagnosis

Retinal vasculitis is very rare as the only presenting symptom. Often, there is sufficient systemic evidence to help the physician decide between any one of the aforementioned possible systemic diseases. For those patients who present with only vasculitis of the retinal vessels, great investigative effort (Chest X-ray, blood test, urinary analysis, vascular biopsy, ophthalmology assessment, etc.) should be undertaken to ensure that a systemic disease is not hidden

Findings



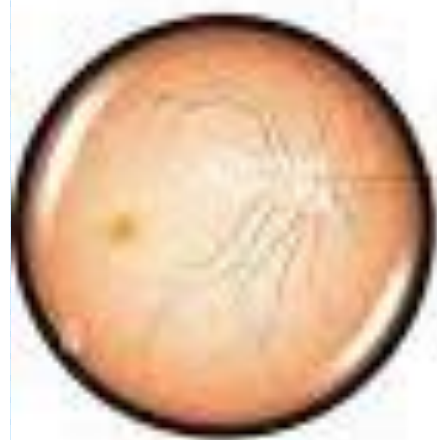
Ophthalmic examination may reveal neovascularization (creation of new vessels in the retina), retinal vessel narrowing, retinal vessel cuffing, retinal hemorrhage, or possible vitritis (inflammation of the vitreous body) or choroiditis (inflammation of the choroid).

Treatment

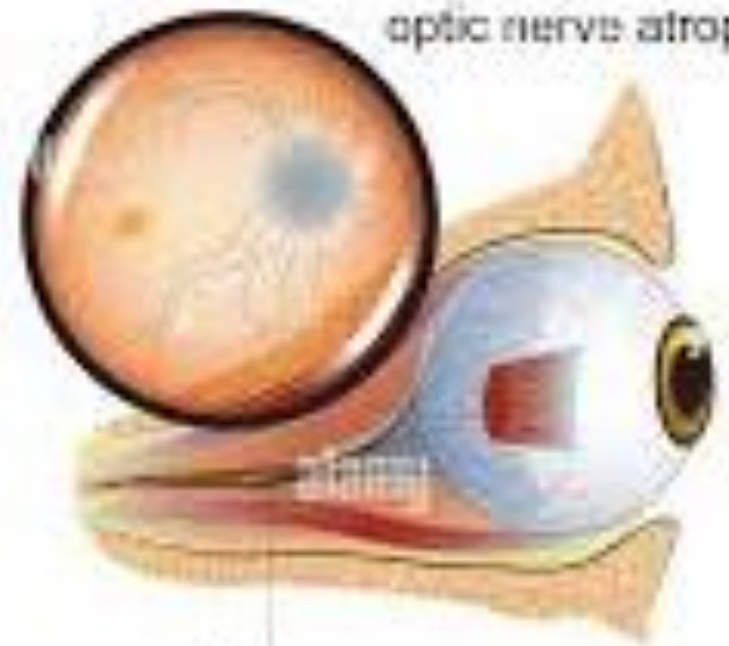


Intravitreal administration of corticosteroid and immunosuppressants in a case non infectious retinal vasculitis ☐

Antimicrobial therapy is required in the case of infectious retinal vasculitis ☐



optic disk



optic nerve atrophy

optic nerve

Optic atrophy

Optic atrophy



Optic atrophy is a condition that affects the optic nerve, which carries impulses from the eye to the brain. (Atrophy means to waste away or deteriorate.) There is no effective treatment for this condition.

Symptoms



Blurred vision.

Difficulties with peripheral (side) vision.

Difficulties with color vision.

A reduction in sharpness of vision

causes optic atrophy

Glaucoma.

Stroke of the optic nerve, known as anterior ischemic optic neuropathy.

A tumor that is pressing on the optic nerve.

Optic neuritis, an inflammation (swelling) of the optic nerve caused by multiple sclerosis.

A hereditary condition in which the person experiences loss of vision first in one eye, and then in the other (known as Leber's hereditary optic neuropathy).

Improper formation of the optic nerve, which is a congenital problem (the person is born with it).

