Biology 14 Eyes Cheat Sheet

by kkkklui via cheatography.com/153917/cs/34754/

Human eye

Eyebrows	prevent sweat from running into the eyes
Eyelash	traps dust and prevent it from running into the eyes
Eyelid	protect eyes from dirt and strong light
	spread tears over eye surface when blinking
Tear gland	produces tears (sodium, chloride..) kills bacteria
Tear duct	drains tear into nasal cavity

Process of seeing

1	light rays from object enters the eye
	refracted and focused onto retina
by	cornea, aqueous humour, lens , vitreous humour
cornea	most of the refraction
lens	fine focusing
2	real and inverted image formed on retina
3	photoreceptors stimulated by light generate nerve impulse
	nerve impulse travel along optic nerve to visual centre
4	visual centre in cerebrum interpret nerve impulse as an upright image of object

structure

Orbit	socket in the skull
	attached by 3 pairs of eye muscles
3 eye muscles	allow eyeball to rotate in different direction
Conjun-ctiva	transparent membrane
	keeps front of eyes lubricated and moist

Types of photoreceptors

Rod cells	Cone cells
more numerous	less numerous
sensitive to low light intensity	sensitive to high light intensity
important for dim light vision	important for bright light vision
black and white vision	color vision (red, green, blue)

DIstribution of photoreceptors on retina

Rod cells	periphery of the retina
	none at yellow spot and blind spot
Cone cells	concentrated at yellow spot
	a few present on periphery of retina

Functions

Sclera	tough white coat
	protects inner structure
	maintain shape of eyeball
	surface for the attachment of eye muscle
Cornea	transparent layer of tissue
	allows light to enter the eye
	a curved surface to help refract and focus light on retina
	no capillaries since it obtains nutrients from aqueous humour
Choroid	middle layer of eyeball
	contains black pigment that absorbs light
	pigment reduces reflection of light within the eye and helps form sharp images
	rich in capillaries as it supplies nutrients to sclera and retina
Iris	continuous with the choroid

Functions (cont)

	made up of muscles which controls the size of pupil to regulate the amount of light entering the eyes
	contains pigment that determine the colour of iris
Pupil	an opening at centre of the iris
	allows light to enter the eyes
	size is controlled by iris
Retina	innermost layer of eyeball
	contains many photor-eceptors and nerve fibres
	photoreceptors : rod or cone cells
Optic nerves	nerve fibres in retina grouped
	transmits nerve impulses from photor-eceptors to cerebrum of brain
Yellow spot	high density of cone cells
	no rod cells
Blind spot	no photoreceptors
Lens	transparent , elastic , biconvex
	refracts and focuses light on retina

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Functions (cont)

	thickness adjusted by ciliary body
	living cells with no nuclei
	no capillaries as it obtains nutrients from aqueous humour
Suspensory ligament	connected to ciliary body
Ciliary body	contains ciliary muscles
	controls tension of suspeonsory ligaments
	controls thickness of lens
Aqueous humour	watery fluid produced by ciliary body between cornea and lens
	supplies nutrients and o2 to cornea and lens by diffusion
Vitreous humour	jelly like fluid between lens and retina
Both	refracts lights on retina
	maintain shape of eyeball

Drawing ray diagrams

Light rays (distant)	parallel
Light rays (near)	come from the same point of object
Reminders	add arrows
	dotted lines behind retina

Seeing in dim light

Circular muscles of iris	relaxes
Radial muscles	contracts
Pupil	dilates
Result	more light enters eyes
Importance	allow photorece-ptors to be stimulated so a clear image forms

Seeing in bright light

Circular muscles of iris	contracts
Radial muscles	relaxes
Pupil	constricts
Result	less light to enter eye
Importance	prevent photor-eceptors from being damaged by bright light

Near objects

Ciliary muscles	contract
Tension	reduced
Suspensory ligaments	slackened
Lens	thicker (more convex)
	refracts more light
Eye strains	ciliary muscles contracting for a long time

Distant objects

Ciliary muscles	relaxes
Tension	increases
Suspensory ligaments	tightened
Lens	thinner (less convex)
	refracts light less

Short sighted

Vision problem	cannot see distant object clearly
Cause	lens too thick
	eyeball too long
Image	formed in front of retina
Correction	concave lenses (diverges light)

Long sighted

Vision problem	cannot see near objects clearly
Cause	lens too thin
	eyeball too short
Image	formed behind the retina
Correction	convex lens (converge light)

Color blindness

Problem	cannot distinguish colors
Cause	deficiency of one or more cone cells
Correction	no cure
	wear lenses

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