WHAT WILL HAPPEN WHEN…

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- Light falls upon retina will be absorbed by the photosensitive pigments presented in rods and cones.
- Thus, initiates the photochemical changes.
- Rods and cones respond to the light and transformed the radiant energy to the electrical activity.

TRANSMISSION OF INFORMATION BY:

1. ***Feedforward (centripetal)***

   Information is transmitted from photoreceptor cells to ganglion cells

2. ***Lateral connections***

   By horizontal and amacrine cells

3. ***Feedback (centrifugal) mechanism***

   Information is transmitted from the ganglion cells to photoreceptor by interplexiform cell

Sense of contrast

- Ability of the eye to perceive slight changes in the luminance between regions which are not separated by definitive border

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Color sense

- Ability of the eye to discriminate between different colors excited by light of different wavelenght.
- Cones perform this function by using different photopigments available which are:
  - erythrolabe : absorb red wavelenght
  - chlorolabe: absorb green wavelenght
  - cyanolabe: absorb blue wavelenght

PHOTOCHEMISTRY OF VISION

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Topics to be covered:

VITAMIN A AND VISUAL PIGMENTS

- Dietary sources of retinol
- Absorption and storage
- Transport from liver to eye
- Utilization for synthesis of rhodopsin

VISUAL PIGMENTS

- Rhodopsin
- Cone pigments

LIGHT INDUCE CHANGES

- Rhodopsin bleaching
- Rhodopsin regeneration
- Visual cycle
- Photochemistry of photopic vision

Transport from liver to eye

- Retinol-protein complex enters the circulation and reaches the target tissues where it is utilize
- In the retina, it will attached to a specific receptors present on the basal surface of retinal pigmented epithelium (RPE)
- RBP is left outside
- Retinol is transported by a specific transport protein inside RPE

Utilization of Vitamin A for synthesis of rhodopsin

- Retinol passes through RPE into the outer segments of photoreceptors
- Retinol is oxidized to retinene by retinene reductase
- Retinene then immediately combines with opsin to produce rhodopsin.
- Rhodopsin molecule is then incorporated into the innermost portion of the outer segment of rod

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RHODOPSIN

- Is the photosensitive visual pigment that present in the disc of the rod outer segments
- Consist of a protein opsin and caretenoid called retinal
- Is a membrane bound glyco-lipid which is held in a rigid, highly organized arrangement
- Has a molecular weight of

40 000

- Sensitive to heat and chemical agents that denature the protein.

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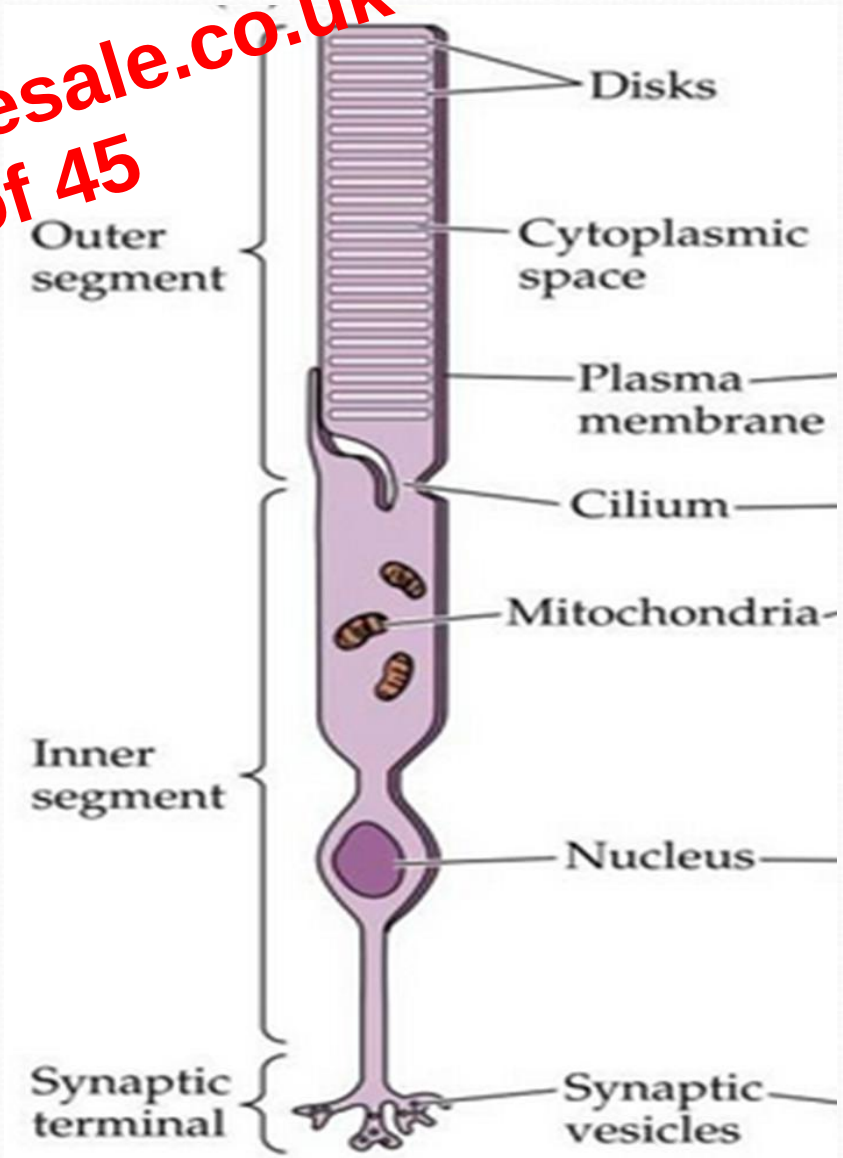

PHYSIOLOGICAL ACTIVITIES IN RETINAL CELLS

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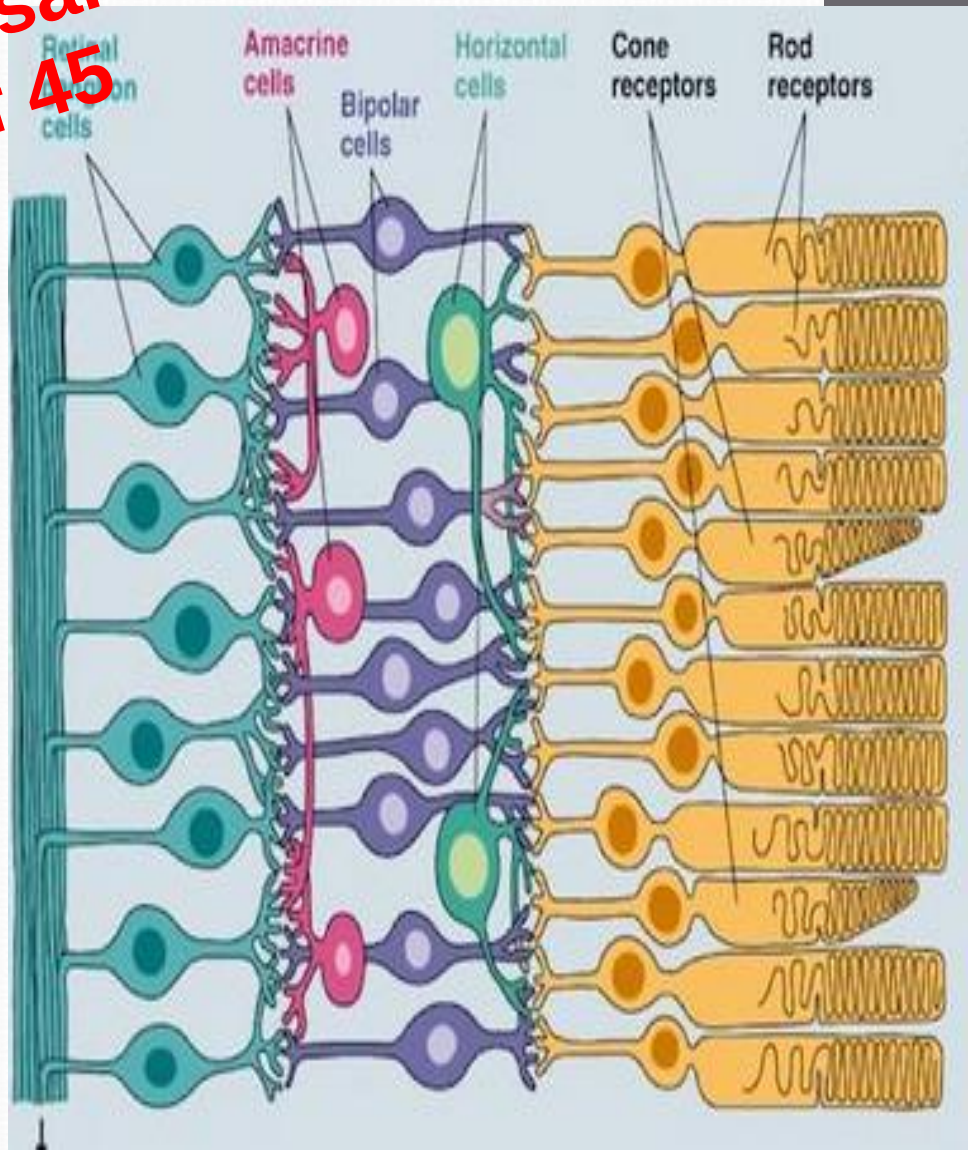
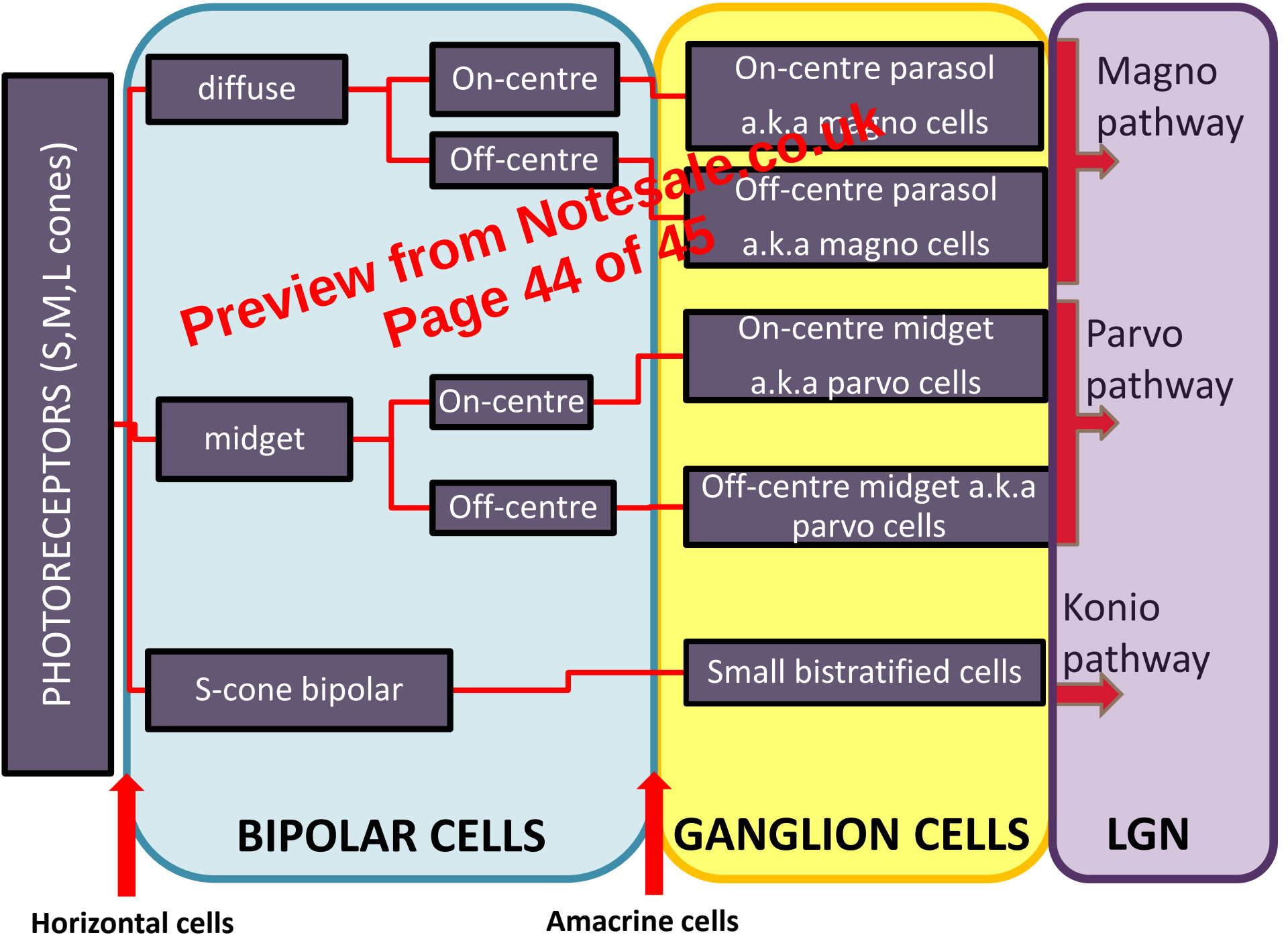
HORIZONTAL CELLS

- Transmit signals horizontally in the Outer Plexiform Layers from rods and cones to the bipolar cells
- Main function is to enhance visual contrast by causing **lateral inhibition**
- Consist of 2 classes :
  - H1: receive input primarily from the M and L cones and little input from S-cone
  - H2:shows strong connectivity with S-cone but also receive input from M- and L-cone





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