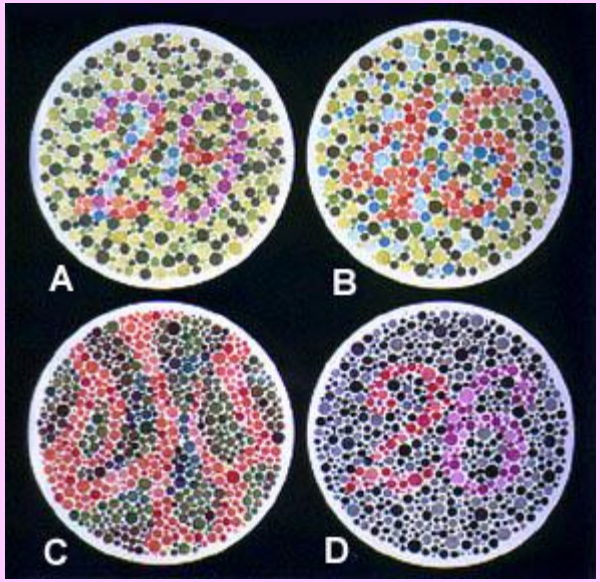
Autosomes vs. sex chromosomes

- Of the 23 pairs of chromosomes, 22 pairs are homologous (**autosomes**).
- Autosomes are non-sex chromosomes that are the same number and kind between sexes.

- **<u>Sex chromosomes</u>** (23rd pair) determine if the individual is male or female.
- Human female=XX; human male=XY.
- Males produce X-containing and Y-containing gametes; therefore males determine the sex of offspring.

Sex Linked Traits

- Traits that are expressed by alleles carried on one of the two sex chromosomes.



X-Linked Recessive Disorders

- The X chromosome carries a number of genes that are vital to proper growth.
- The Y chromosome carries a few genes (gonads).

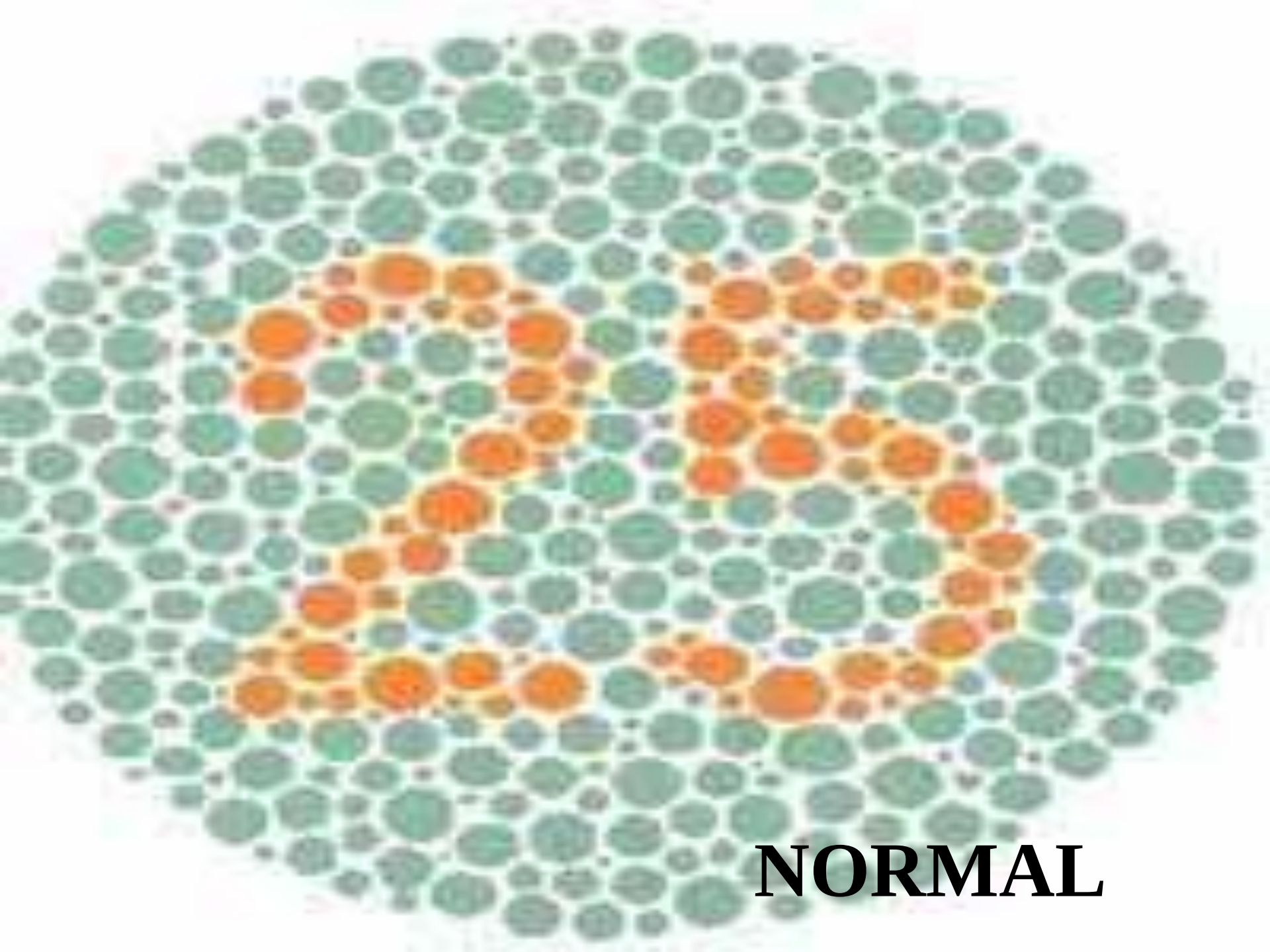
- Recessive alleles located in the X chromosome are expressed more often in males than in females.
- In a male (XY) only the X chromosome must carry it to show the disease. (X^hY)
- In females (XX), both X chromosomes must have the recessive allele. (X^hX^h)

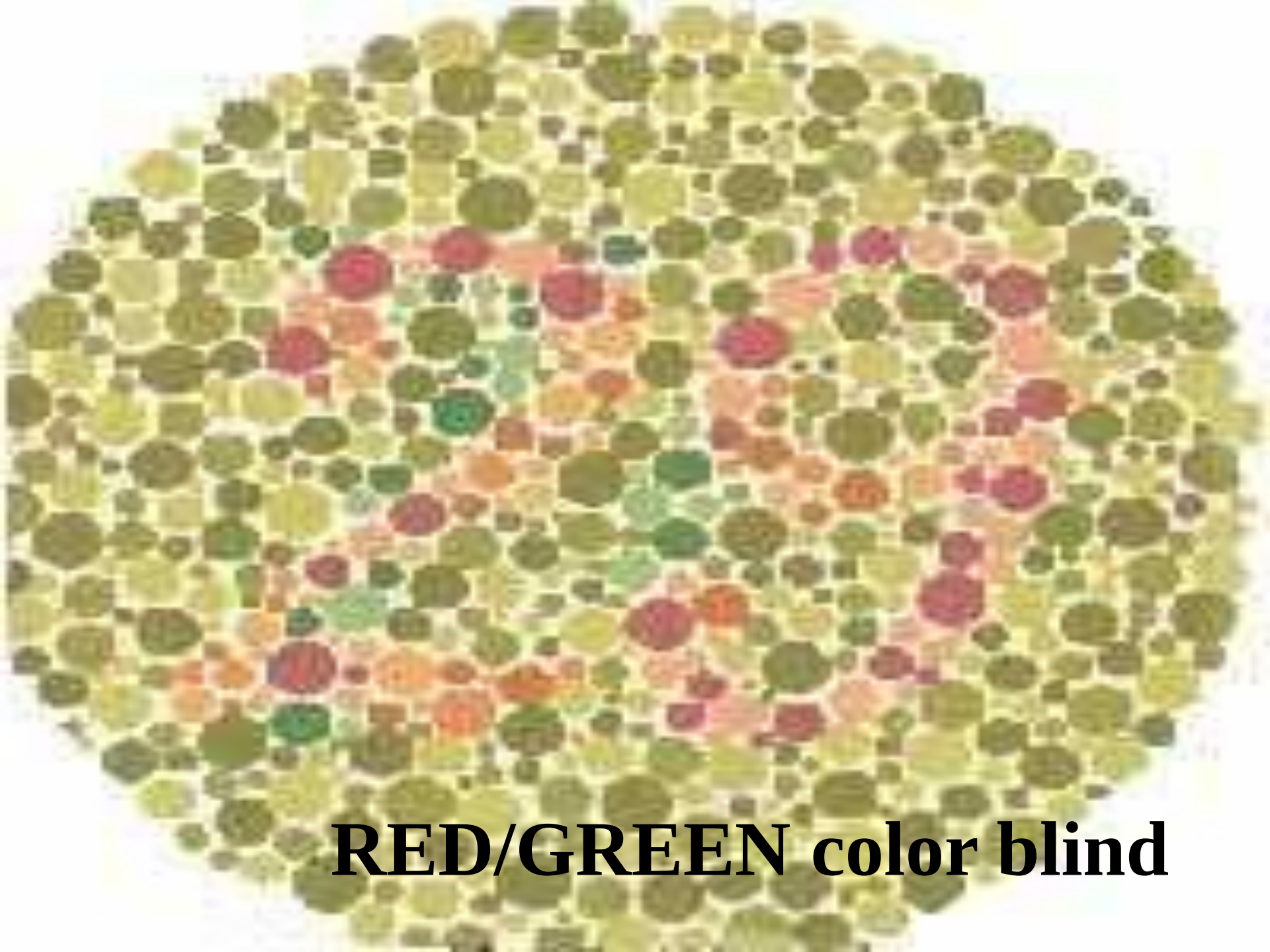
Color blindness:

- a recessive disorder in which the person cannot distinguish certain color.
- About 8% of Caucasian male population, and 1% females

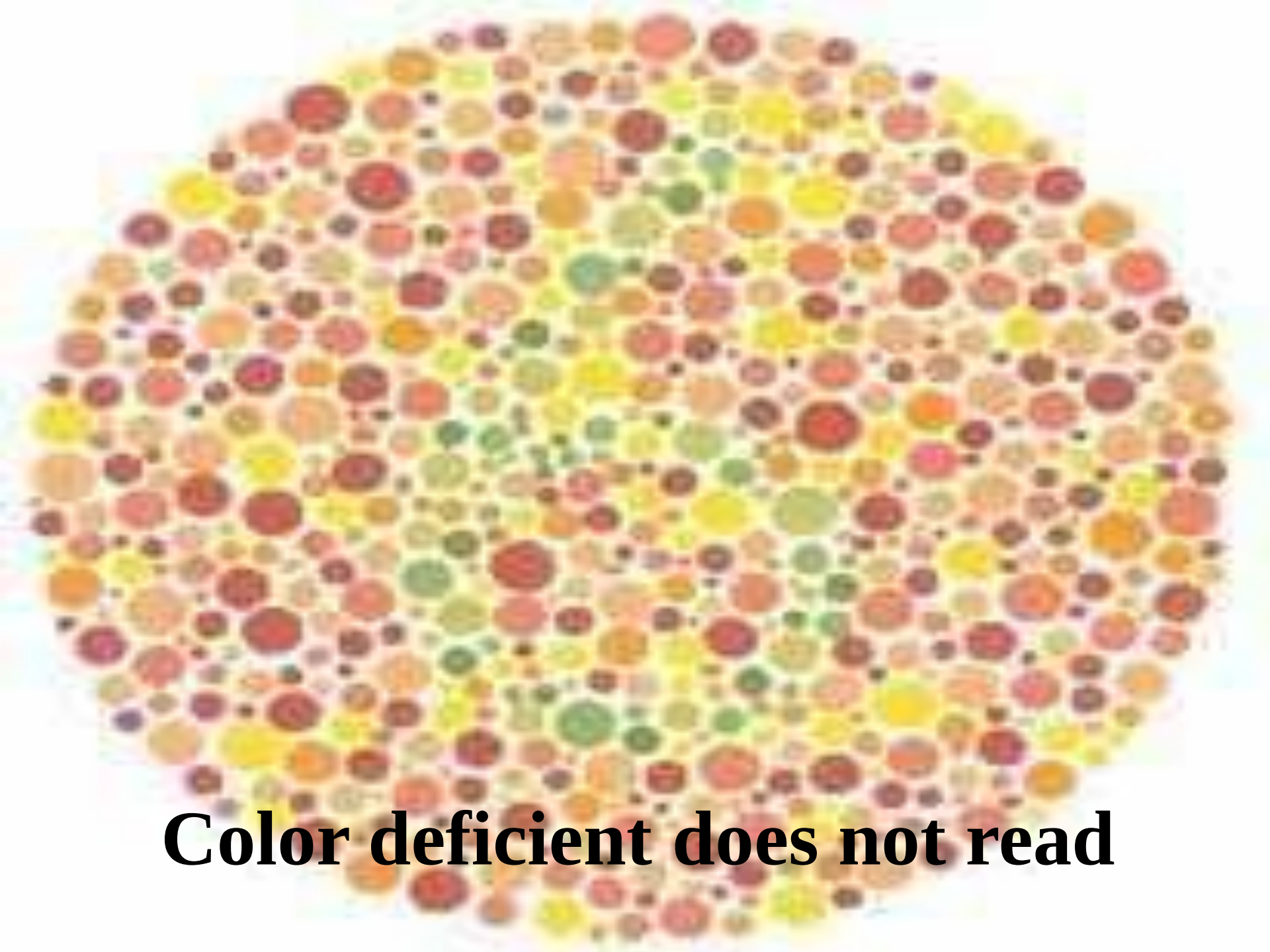
Normal color Vision

Monochromate Vision


NORMAL



RED/GREEN color blind



Color deficient does not read

The world.

How the world looks to a person with a red/green color deficit (deuteranopia).

How the world looks to a person with a blue/yellow color deficit (tritanopia).

Some colorful hats.

As seen by a person with deuteranopia.

As seen by a person with protanopia, another form of red/green deficit.

Hemophilia:

- a recessive disorder on the X chromosome, “bleeder’s disease”)
- These people are missing the protein (AHF) necessary for blood clotting. 1 out of 10,000 males, and 1 out of 100,000,000 females.

Muscular Dystrophy

- causes progressive weakening and loss of skeletal muscle.
- In the US, 1 out of 3,000 males are born with the disease.
- Caused by a defective gene which codes for a muscle protein.