

Color Blindness

Overview

Color blindness may be a hereditary condition or caused by disease of the **optic nerve** or **retina**. Acquired color vision problems only affect the eye with the disease and may become progressively worse over time. Patients with a color vision defect caused by disease usually have trouble discriminating blues and yellows.

Inherited color blindness is most common, affects both eyes, and does not worsen over time. This type is found in about 8% of males and 0.4% of females. These color problems are linked to the X chromosome and are almost always passed from a mother to her son.

Color blindness may be partial (affecting only some colors), or complete (affecting all colors). Complete color blindness is very rare. Those who are completely color blind often have other serious eye problems as well.

Photoreceptors called cones allow us to appreciate color. These are concentrated in the very center of the retina and contain three photosensitive pigments: red, green and blue. Those with defective color vision have a deficiency or absence in one or more of these pigments. Those with normal color vision are referred to as trichromats. People with a deficiency in one of the pigments are called anomalous trichromats (the most common type of color vision problem.) A dichromat has a complete absence in one cone pigment.

Signs and Symptoms

The symptoms of color blindness are dependent on several factors, such as whether the problem is congenital, acquired, partial, or complete.

- Difficulty distinguishing reds and greens (most common)
- Difficulty distinguishing blues and greens (less common)

The symptoms of more serious inherited color vision problems and some types acquired problems may include:

- Objects appear as various shades of gray (this occurs with complete color blindness and is very rare)
- Reduced vision
- Nystagmus

Detection and Diagnosis

Color vision deficiency is most commonly detected with special colored charts called the Ishihara Test Plates. On each plate is a number composed of colored dots. While holding the chart under good lighting, the patient is asked to identify the number. Once the color defect is identified, more detailed color vision tests may be performed.

Treatment

There is no treatment or cure for color blindness. Those with mild color deficiencies learn to associate colors with certain objects and are usually able to identify color as everyone else. However, they are unable to appreciate color in the same way as those with normal color vision.