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[Half of the Women See More Colors Than the Rest of the People Do](#)

Tetrachromacy

Normally, people have three types of cone cells for daylight, for detecting different colors. But some women can see extra colors as they have four types of cone cell receptors. They are called tetrachromats. Compared to them, we all are color blind. The first tetrachromat woman was discovered by researchers at Cambridge University in 1993. This is perhaps the most remarkable human mutation ever detected. The fact that all tetrachromats are female intrigued scientists. Now two scientists, working separately, want to investigate systematically for tetrachromats to clarify more about their existence and how they detect colors. All mammals descended from nocturnal tree dwellers, which were colorblind, but the line of primates had more advantages in developing color vision for finding fruit food. Human color vision is based on three forms of iodopsin (color pigments), each sensitive to a different light wavelength and is found in a different cone type. When a different cone type is stimulated, the brain reads it as a particular color. The three iodopsins respond to red, green and blue; all the other colors are their combinations. Like all pigments, iodopsins are proteins encoded by DNA genes. The genes encoding the "red" and "green" iodopsins are located on the X sex chromosome, while the "blue" iodopsin is on a non-sexual chromosome. That's why color-blindness mostly affects men: 8% of the Caucasian males; while under 0.5 % of Americana women present it. Women have X chromosomes: one from the mother and one the father, while men have just one X chromosome from the mother and an Y sex chromosome from the father (this one does not contain any iodopsin gene). X chromosomes can be a "green" iodopsine or a slightly shifted "green" iodopsine, and a "red" iodopsine and a shifted "red" iodopsine. That's why a woman can carry 5 types of iodopsins: these four plus "blue", while a man just three (a green type, a red one plus blue). A recent paper by Kimberly Jameson, Susan Highnote and Linda Wasserman of the University of California, San Diego, showed that up to 50 % of women carry 4 types of iodopsins and can employ their extra pigments in "contextually rich viewing circumstances". For example, when looking at a rainbow, these females can segment it into about 10 different colors, while trichromat (with three iodopsins) people can see just seven: red, orange, yellow, green, blue, indigo and violet. For tetrachromat women, green was found to be assigned in emerald, jade, verdant, olive, lime, bottle and 34 other shades. Still, the birds' abilities are even superior. Pigeons have five color receptors (and five types of cell receptors) and can process visual information up to 10 times faster than human beings. While we see a smooth TV image in real movement and color, they will see dull flickering lights. Tetrachromats species are encountered among birds, insects, jumping spiders, reptiles, and amphibians, but no mammal is known to possess this. Some of them detect UV light. Color-blindness means the lack of the ability to distinguish a certain color. The term is somewhat of a misnomer, as color perception is diminished, not eliminated. Real color-blindness, wherein a person can distinguish no color at all, requires an impairment of all three types of color receptors, and is found in just 0.003% of the population. Dr. Gabriele Jordan of Cambridge University tested the color perception of 14 women who each had at least one son with the right kind of color-blindness. In a test, the subjects had to manipulate and blend two wavelengths of colored light to produce any hue they liked, and after that, they had to test their own results a second time. With normal tricolor vision, several different combinations would match any given hue, with a tetrachromat the visible match would be much decreased. 2 of the 14 subjects showed exactly the results expected from a tetrachromat. One of the two reported having a different sense of color from the people around her, with a

better color matching and color memory. Some suggest that the tetrachromats are born with four types of cone cells. One research pointed out that 2-3% of the world's women may have the kind of fourth cone that lies between the standard red and green cones. Mutation in iodopsine genes is common in most human populations, and tetrachromacy could be linked to major red-green pigment mutations, linked to "color blindness" (protanomaly or deuteranomaly).