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science.

WHY YOU GO gray

GRAY HAIR: IT'S BOUND TO HAPPEN TO ALL OF US. THE ONLY REAL VARIABLES IN THE EQUATION ARE WHEN IT WILL HAPPEN AND HOW DARK OR LIGHT OUR GRAYS WILL BE.

ANDREAS KUEHN/GETTY IMAGES

Color Theory

We're all born with our hair a certain color, which can become lighter or darker (most hair tends to get darker) throughout our lives. The colors we have in our hair are produced by melanocytes, which physically make the pigment that give hair its natural color. The amount of melanin in it and how concentrated it is determines whether our hair is light or dark—more eumelanin (black and brown pigment) results in darker hair and more pheomelanin (red and yellow pigment) generates hair that's light or red in color.

Fade to Gray

Over time, the amount of melanin in your hair begins to diminish. "At a certain point in life, the production of it stops altogether," says Spring House, PA, dermatologist Margo Weishar, MD. The cause of the break in the production of pigment can stem from a multitude of different factors. Age is a culprit of gray hair, as is stress, some autoimmune diseases like vitiligo and alopecia areata, smoking, vitamin B deficiency, thyroid issues, hormonal shifts, and even a buildup of oxidative stress in the follicles.

Nyack, NY, dermatologist Wendy Epstein, MD, explains that the melanocytes in hair have a lifespan that is perfectly in sync with the lifecycle of the hair on your scalp. "As hair goes into the resting phase of the hair growth cycle, the melanocytes lose the enzyme that makes melanin and the melanocytes die in the last phase of hair growth. When your hair starts to grow again, new melanocytes start to migrate from the outer part of the hair downward to reproduce melanin," she says. Over time, the melanin-producing cells become permanently damaged and can't make any more pigment and the hair starts to slowly become gray, silver or white (the color you see depends on the number of pigmented hairs versus unpigmented hairs). According to Dr. Epstein, "When you first start to notice a few gray or silver strands, there is still some dark pigment being made. Over time, the melanocytes slow down in production and eventually stop making pigment entirely. When there is no melanin in the hair at all, it becomes white in color." Gray hair also has a different texture than pigmented hair due to the cuticle being less smooth—a rough cuticle has a wiry texture. There's no way, just yet, to get the reservoir of melanin restored to the hair once it runs out or dies. "Maybe in the future, but for now, all we have are different methods to cover up our grays," adds Dr. Epstein.