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Drugs That Grow Hair

Countless medications, nutrients, herbs, and chemicals have been claimed to stop or reverse hair loss, however when tested scientifically in well controlled, double-blind clinical trials, almost none have been proven to be effective. Of course, hundreds of bogus hair loss products continue to make claims about their effectiveness, including presenting bogus “testimonials” by medical doctors and users, “scientific evidence” of effectiveness, and even fake results from “well controlled, double-blind clinical studies.” In the United States alone, hundreds of millions of dollars are wasted each year on “medical” treatments for hair loss products that simply do not work. Bogus hair loss treatments also sell well in Central and South America, in Asia, and Europe.

This chapter reveals the four most effective medications proven scientifically for treating genetic hair loss. All four of these drugs were originally approved by the FDA for treating medical conditions other than hair loss. All can slow the rate of inherited hair loss, and in many cases they can help hair follicles that have recently shut down to begin to grow hair again. Individual results will vary. This chapter also includes a final section on topical treatments.

One medication, Propecia (finasteride), is typically prescribed for men only, due to possible side effects when taken by pregnant women. Another, Rogaine (minoxidil), is useful for treating both men and women. The last two, high-estrogen oral contraceptives and aldactone

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(spironolactone) are generally prescribed for women only, due to the risk of undesirable feminizing side effects in men.

PROPECIA (FINASTERIDE)

The single most effective medication proven to treat genetic pattern hair loss is Propecia. It is prescribed for men with a genetic predisposition to hair loss (male pattern baldness). Propecia is the brand name for the drug finasteride. Finasteride is a prescription medication that was first approved by the United States Food and Drug Administration (U.S. FDA) for treating enlarged prostate glands. To the delight of some patients taking finasteride for enlarged prostate glands, a side effect of this medication was decreased hair loss, and often re-growth of hair recently lost.

In 1998, after years of additional testing as a hair loss treatment, finasteride was also approved in pill form, at a lower dosage, as an anti-baldness treatment. It is sold as a prescription prostate medication in five-milligram tablet form under the brand name Proscar. For treatment of hair loss, it is sold in one-milligram tablets under the brand name Propecia. For treating baldness, the lower dosage is adequate. The hair loss reduction effect of Propecia occurs at a much lower dosage than that needed to treat enlarged prostate glands.

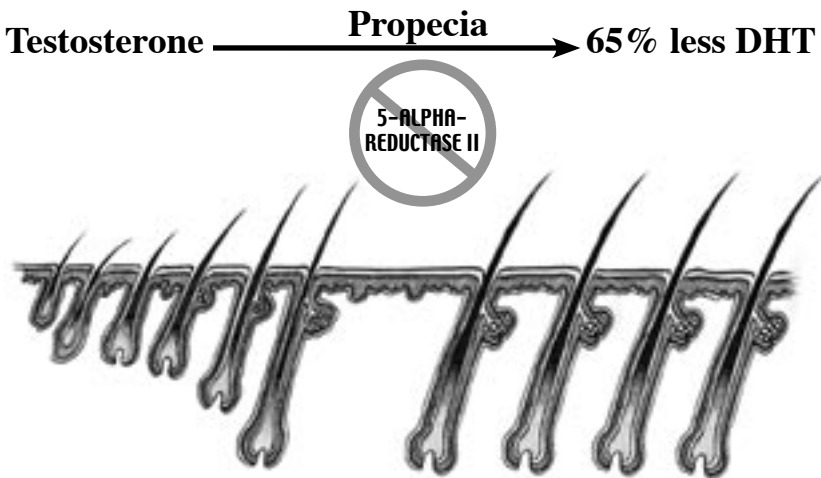


Testosterone $\xrightarrow{\text{5-alpha-reductase Type II}}$ DHT

Without Propecia, testosterone in the blood is converted freely by the enzyme 5-alpha-reductase into a form of testosterone called dihydrotestosterone (DHT).

Finasteride effectively blocks one form of the 5-alpha-reductase enzyme that converts testosterone into DHT. By blocking the conversion of testosterone into DHT, Propecia prevents the “hair loss message” from getting to hair follicles that are genetically programmed to be sensitive to DHT. This helps stop further hair loss, and in many cases regular Propecia use actually results in significant hair re-growth of recently lost hairs.

Without Propecia, testosterone in the blood is converted freely by the enzyme 5-alpha-reductase into a form of testosterone called dihydrotestosterone (DHT). In men susceptible to pattern hair loss, certain scalp hair follicles are genetically predisposed to respond in a negative ways to elevated levels of DHT in the bloodstream. The most susceptible hair follicles are typically located at the temples, front, and top of the head, but all hair follicles may eventually be influenced to some degree by normal DHT levels. One negative response to DHT is a shortening of the growing phase of the hair follicles, and another is the progressive miniaturization of the hair follicles, which causes miniaturization of the hairs they produce. The end result is shorter and smaller hairs, and fewer and fewer hair follicles producing hairs.



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Propecia blocks a form of 5-alpha-reductase found primarily in the prostate gland, called type-II 5-alpha-reductase, from converting testosterone to DHT. The result is lower levels of DHT in the blood. Over many years, DHT in the bloodstream signals hair follicles to shorten their growing phase and to miniaturize. By reducing the amount of DHT in the blood, Propecia reduces the strength of the DHT hormone message, so many of the follicles that would have quit instead continue to produce new hairs.

Continuous treatment is required to maintain this benefit, as 5-alpha-reductase will continue converting testosterone to DHT if treatment is discontinued. However the benefit of using Propecia for any period of time is still realized; Propecia buys time for men with a genetic predisposition for hair loss. The DHT message to stop growing hair must continue for many years, and often many decades, for DHT-sensitive hair follicles to get the message and stop growing new hairs. If the DHT message is disrupted for a period of time, the clock is stopped. In other words, if a thirty-year-old man who would lose his hair by age sixty uses Propecia for twenty years and then stops, he will delay the age when he would lose his hair to age eighty. The benefit of using Propecia for twenty years is not lost when use is discontinued.

With Propecia use, the rate of hair loss slows, and in many cases stops. In many individuals, some recently miniaturized hair follicles begin to grow back to normal size, and begin to grow normal size hairs again. This results in increased hair. The degree of hair regrowth can vary from no measurable regrowth, to significant regrowth.

Double blind clinical tests have shown that Propecia helps men keep the hair they have. In one two-year study, eighty-three percent of men taking Propecia maintained their hair at the top of their heads (vertex area), compared to twenty-eight percent of men taking a placebo. In the same study, seventeen percent of the men taking Propecia still experienced measurable hair loss, but seventy two percent of the men taking the placebo also experienced additional hair loss. After the first two years, results of the group taking Propecia continued to improve.

In addition to stopping further hair loss, Propecia can also help regrow recently lost hair. In another two-year clinical trial, sixty-six

percent of men taking Propecia had measurable hair regrowth at the vertex, while only seven percent of men taking a placebo had regrowth. In this study, only one percent of men taking Propecia continued to have hair loss at the top of their heads, while thirty-three percent of men taking a placebo showed a decreased hair count in this area.

For many years before it was approved as a hair loss treatment, a level of safety has been established for finasteride, the active ingredient in Propecia. As a prescription drug already approved by the FDA for treating enlarged prostate glands, it has been extensively researched and tested. Based on studies of hormone breakdown products found in the urine, it seems to affect only the 5-alpha-reductase enzyme, and not other hormones in the blood such as testosterone. Propecia is not an antiandrogen. In fact, levels of testosterone in the blood often increase by ten to fifteen percent when taking Propecia.

Finasteride has been shown to be effective at stopping hair loss when taken by mouth in tablet form at much smaller doses than that used to treat enlarged prostate glands. Some possible side effects of finasteride treatment for hair loss may be seen as beneficial, such as possible shrinking of the prostate gland in men susceptible to an enlarged prostate. My personal theory is that taking the lower dosage of finasteride in Propecia early in life may protect men with a genetic predisposition from suffering enlarged prostate glands and prostate cancer as they get older.

A single one milligram Propecia tablet taken daily is the usual prescribed dose for hair loss treatment. Propecia is a treatment, not a cure. This means that a pill must be taken every day for the benefits to continue. When Propecia is discontinued, the hair loss process resumes.

Propecia is for men only, and is not approved by the FDA as a hair loss treatment for women or children. A woman taking finasteride would have only a small decrease DHT levels because most of the effect of finasteride is on type-II 5-alpha-reductase that is primarily made in prostate glands. Women who take finasteride and become pregnant may cause a male fetus to develop ambiguous genitals, and have female characteristics until puberty (at puberty, the child's genitals normalize).

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Propecia treatment may cause a loss of sex drive in one to two percent of patients as a result of reducing levels of DHT circulating in the blood. Treatment with Viagra can be helpful in these cases. Discontinuing Propecia eliminates this possible side effect, if it occurs.

There is also a small risk of reducing the volume of ejaculate if the prostate gland is reduced in size as a result of Propecia treatment. Sperm activity remains normal. Discontinuing Propecia eliminates this possible side effect.

Both of these conditions can affect up to two percent of men in the first month of use, but drop to about a half percent when measured again after two years.

The story of finasteride begins with scientists who were working with a family in the Dominican Republic who had a genetic trait that caused them to give birth to male children with ambiguous genitalia. Female babies were not affected. In many cases it was difficult to determine such an infant's gender by observation alone. At puberty, when hormone levels in these affected individuals increased, these young boys normalized. They eventually had children of their own, and perpetuated the genetic trait.

It was observed that the adult males in this group being studied did not suffer from enlarged prostate glands, never developed prostate cancer, nor did they lose their hair. No male pattern baldness! Genetic research showed that their gene for producing the 5-alpha-reductase enzyme was inactive. With no 5-alpha-reductase enzyme, testosterone in the blood was not readily converted to DHT. The low levels of DHT that resulted prevented their hair follicles from getting the message to have shorter growth cycles and miniaturization.

Scientists figured that if they could create a medication to regulate the activity of 5-alpha-reductase they could accomplish some of the positive effects of this genetic trait, such as prostate gland normalization and, later hair loss prevention.

Merck, the maker of Proscar for the prostate and Propecia for hair loss, has taken the stance that women shouldn't touch the pill or the bottle if they are pregnant, and they should not have sex with men who are taking the medication. The rationale behind this is that

5-alpha-reductase, if inhibited in a developing fetus, might result in a male child with a very small penis. People who are missing the enzyme 5-alpha-reductase type II—and there are families of them—have boys who are born looking like little girls. But at age twelve, the testicles descend and they become men. Given the facts, Merck put a warning on their bottles of Proscar and Propecia. Although this defies logic and may sound ludicrous (even if it was radioactive you'd have a hard time measuring it and a woman would have to have gallons and gallons of semen to absorb enough to measure it), Merck did not want to take the risk. Compare this to the warning on a bottle of Jim Beam. It does not say women should not have sex with drunk men, it says pregnant women should not get drunk. However, no doctor—including me—would tell a male patient it is perfectly safe to use Proscar or Propecia and then have sex with a pregnant wife because a certain number of boys are born with this birth abnormality for unknown reasons and it could be blamed on the drug.

Avodart, dutasteride, was released at the end of 2001 for treatment of benign prostatic hypertrophy. It blocks both Type I and II 5-alpha-reductase and lowers DHT by over ninety-five percent in men, whereas Propecia lowers it only sixty-six percent. Type II is found in the prostate gland and Type I in skin and hair. Women only have type II, therefore women with thinning hair may benefit from Dutasteride. I routinely place my male patients on Dutasteride if they are part of the small group who continue to lose hair while on Propecia.

Dutasteride is currently being studied for hair loss, but results have not yet been published.

ROGAINE (MINOXIDIL)

After years of testing and clinical trials, in 1988, Rogaine topical lotion became the first medication approved by the FDA for treating genetic hair loss. The medication is a colorless and odorless liquid applied to the scalp. Rogaine is the brand name for the drug minoxidil when used as a hair loss treatment in lotion form. Before 1988, minoxidil had already been FDA approved in pill form as a prescription medication for treating high blood pressure. The brand name for minoxidil pills is Loniten.

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Research on minoxidil's potential as an anti-baldness medication started after some Loniten patients noticed substantial new hair growth, a condition doctors call hypertrichosis. Usually the new hair growth was on the head and was desirable, but in some cases it also occurred on the arms, back, chest, and other areas. So researchers worked on a lotion form of the medication that could be applied to the scalp or face to direct new hair growth only where it was wanted.

Starting in 1988, Rogaine lotion was available only by prescription, and only in a two percent concentration. In 1995, the FDA decided minoxidil lotion was adequately safe for use without a prescription and Rogaine was soon available over-the-counter in pharmacies and grocery stores. Generic versions of Rogaine became available when the patent on minoxidil expired, and the range of concentrations increased up to five percent. Most people using minoxidil lotion choose the five percent strength lotion, because it produces slightly faster results than the two percent concentration.

Researchers are not certain exactly how minoxidil works to stop hair loss or increase hair growth. It is known that it does not affect DHT levels in the blood. Minoxidil is a vasodilator, meaning it helps blood vessels enlarge. Other vasodilators, however, do not stop hair loss or increase hair growth.

Minoxidil lotion seems to work only on active hair follicles still capable of producing some hair, even if the hair produced is just "peach fuzz." One symptom of people with genetic pattern hair loss is the progressive miniaturization of hair follicles at the end of each growth cycle, resulting in finer and finer hairs being produced.

Minoxidil seems to reduce the rate of hair follicle miniaturization, and can cause hair follicles that formerly produced full-size hairs, but have recently become miniaturized, to increase in size and begin to grow full size hairs again. Also, the enlarged follicles seem to remain in the anagen, or growth stage for a longer period. A longer growth period results in the production of longer hairs, and a look of more hair. Minoxidil acts as "life support" for hair follicles.

Results with minoxidil vary. For some people, it seems to have no effect at all. For others there is reduced rate of hair loss, but no visible

new hair growth. Some men and women experience minimal new hair growth, but not enough to cover thin hair areas. Others enjoy dense new hair growth with areas that had previously been thin developing hair density similar to areas that were not affected by hair loss.

Clinical studies were run during which some men and women with pattern hair loss applied Rogaine to their scalps, and others with pattern hair loss applied a placebo: the same mixture of water, alcohol, and propylene glycol used in Rogaine, but without the minoxidil. The men and women selected for the study had thin hair or baldness on the top of their heads, where minoxidil is most effective at promoting hair regrowth. The effectiveness of the minoxidil treatment was compared to the placebo lotion. The results of clinical studies involving thousands of men and women have shown Rogaine is able to produce a statistically significant increase in hair regrowth.

Those likely to achieve the best results with Rogaine are in the early stages of pattern hair loss. On the average, younger people get better results than older people. Those with thinning or baldness on the top of their heads generally get better results than those with hair loss at the hairline. People with diffuse hair loss, especially women, tend to get better results than those with clear bald spots. Those with smaller bald spots usually show more regrowth than those with large bald spots.

Minoxidil lotion is applied on the scalp two times each day. The lotion form of the drug causes the hair-growing effect to take place on the scalp only, and not on other parts of the body. There is no effect on blood pressure when applied as directed. Rogaine is a treatment, not a cure. This means that the lotion must be applied to the scalp twice a day for the benefits to continue. Skipping a day or two occasionally is not likely to cause any measurable difference in the effectiveness of minoxidil treatment. After several months of discontinued use, however the regrown hairs are likely to be shed.

Also, for those who discontinue the minoxidil for a few months the hairs that would have been shed if the minoxidil had not prevented follicle miniaturization will also be lost as those follicles begin to shrink. So both regrown hairs and hairs that would have otherwise been lost if not for the minoxidil use may be shed within just a few months after discontinuing use.

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Minoxidil lotion is safe. When used as directed and applied to the scalp, only very small amounts of it reach the blood. The risk of serious side effects is very small.

Hair transplant patients can use minoxidil. Many surgeons recommend using it within a few weeks after surgery to promote the growth of the transplanted hair follicles. Minoxidil may also help reduce the tendency for mini and micro grafts to temporarily enter the telogen, or rest phase, immediately after being transplanted.

The most common side effect when used as directed is minor scalp irritation. In clinical studies involving 6,000 men and women about seven percent of those using two percent strength Rogaine lotion experienced some degree of scalp itching, inflammation, dryness, or flaking. A smaller percentage of patients experience an increased pulse rate.

Some women using extra strength minoxidil lotion (five percent) experience increased facial hair growth. This side effect tends to diminish after the first few months of treatment, or two percent minoxidil can be used. When treatment is discontinued normal facial hair growth resumes.

Minoxidil treatment does not work on everybody with thinning hair due to inherited pattern hair loss. It is less effective for hair loss at the hairline than on the top of the head. It is less effective on large bald spots than small ones. It is less effective on small bald spots than on diffuse thin areas. It is less effective on long-established shiny bald areas than those with recent hair loss.

Minoxidil takes time to produce results. When two percent minoxidil is used twice daily, a gradual change in appearance occurs in a matter of months; five percent minoxidil produces slightly faster results. Several months are usually required before significant benefit can be seen. The results may improve further over the next several months with continuous twice-daily use. The maximum benefit is usually achieved after about twelve months of minoxidil use, and at that point hair regrowth tends to stabilize.

Some dermatologists prepare custom-blended minoxidil lotion, with added ingredients to reduce the risk of inflammation and increase absorption. One such additive is tretinoin (Retin-A): Tretinoin is a pre-

scription acne medication applied to the skin, and is also well known for helping to reduce facial wrinkles. Minoxidil lotion applied with low concentrations of tretinoin has been shown to promote greater hair growth—and possibly faster results—than minoxidil used alone. Tretinoin may increase the absorption of minoxidil through the skin as well as having additional hair growth promoting effects. In addition to the risks and advantages of minoxidil use, however tretinoin adds additional risk of skin irritation and inflammation.

Another minoxidil lotion additive is betamethasone valerate, a cortisone medication that helps to prevent scalp inflammation. In addition to reducing possible scalp irritation, it may also enhance the hair restoration effect of minoxidil in two ways: first, it helps block the metabolism of testosterone in the cells of the hair follicle where the hormone signal to “stop producing new hairs” takes place. Blocking this signal may keep more hairs growing. Second, betamethasone valerate helps to disperse the white blood cells that are called up to push the hair shaft out. In doing so, the white blood cells scar the hair follicle, reducing to a degree the follicle’s ability to produce new hairs. By reducing scarring, betamethasone valerate may help keep the hair follicles active for more hair growth cycles. Male pattern baldness is a scarring alopecia, and the betamethasone valerate helps reduce scarring of the hair follicle.

Minoxidil lotion can be used at the same time as Propecia pills. The results are better than when either medication used alone.

HIGH ESTROGEN ORAL CONTRACEPTIVES

Women inherit a tendency for pattern hair loss just as men do. But in women the DHT message is usually blocked by relatively high levels of estrogens circulating in the blood. Estrogen levels begin to decline as women begin perimenopause around age forty, and by age fifty-five to fifty-eight most women are in menopause. While testosterone levels usually decline along with progesterone and estrogen, the DHT message may finally start to get through, and thinning hair can result.

Birth control pills contain a combination of synthetic estrogen and progesterone hormones. Since they were first introduced in 1960, the estrogen component of oral contraceptives has been reduced from

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.150 milligrams per pill to .020-.035 milligrams. A birth control pill with .035 milligrams of estrogen is considered a “high-estrogen” oral contraceptive. And for reference, the estrogen level in oral contraceptives is several times higher than that of most estrogen replacement medications prescribed for certain women after menopause.

Higher estrogen oral contraceptives such as Ortho Tri-Cyclen or Ortho Novum often work well to inhibit production of androgens (including testosterone) by the ovaries and adrenal glands, which results in lower levels of DHT, therefore, and these stops hair thinning.

Management of women’s hormone levels is neither an easy task, nor one where medications are prescribed without careful consideration of the range of benefits and risks.

In addition to reducing androgenetic hair loss, the benefits of taking birth control pills include reduction of the risk of pregnancy, improved skin tone, reduced acne, and for women beginning the first stages of menopause, increased bone mass, decreased occurrence of hot flashes, somewhat tempered mood swings, and reduced irritability.

The risks of taking oral contraceptives include elevated risk of endometrial (uterine) cancer, and, for older women, an increased risk of cardiovascular complications such as heart attacks and strokes. There may also be a slightly elevated risk of breast cancer.

ALDACTONE (SPIRONOLACTONE)

Aldactone is the brand name for spironolactone, a prescription medication used in pill form for treating women with three common problems seen by dermatologists: acne, hirsutism (too much hair, especially on the face), and androgenetic alopecia. The March 2005 *British Journal of Dermatology* reported on a study that showed eighty percent of women receiving oral antiandrogens (spironolactone) could expect to see no progression of their female pattern hair loss, improved chance of stopping their hair loss, or getting some hair back, after taking the medication for a year at 200 milligrams per day.

Spironolactone is for women what Propecia is for men in preventing hair loss with about the same success rate. A potent anti-androgen,

spironolactone binds to DHT receptor sites on hair follicles, thereby blocking DHT from getting its hair loss message to the follicles. This medication is used only for women with androgenetic alopecia (genetic pattern hair loss), because it can produce undesirable side effects in men.

When used as a hair loss treatment, spironolactone is taken as a pill or made into a lotion that is applied directly to the scalp, usually along with minoxidil.

One disadvantage to spironolactone lotion is a disagreeable smell, which is made worse when combined in the same container with Rogaine.

TOPICAL TREATMENTS

A study conducted three years ago using a one percent Zinc Pyrithione ZnP solution daily to the scalp showed that subjects had thicker hair twelve months later. ZnP is the active ingredient in Head and Shoulders shampoo and I advise all my patients with hair loss to use a shampoo with ZnP. Neutrogena makes one called T-Gel Daily with ZnP. The study concluded that Zinc Pyrithione kills bacteria and yeast in the oil glands and hair follicles leading to healthier hairs. Another possibility is that the Zinc itself may inhibit 5-alpha-reductase in the hair follicle.

Last year there was a report of one percent melatonin applied to the scalp of post menopausal women, resulting in thicker hair after twelve months of use. There is no known mechanism for why it works.

Other topical medications that could be incorporated into a topical lotion to block the androgen receptor site are spironolactone, progesterone, zinc salts, azelaic acid, flutamide, dutasteride, and finasteride. Still another study applying a betamethasone valerate (cortisone) solution daily for a year led to thicker hair. Many doctors who specialize in hair loss make up their own prescription blend of a few or most of medications listed above. These medications are often added to a minoxidil solution, and the whole blend can be applied once or twice a day.

