

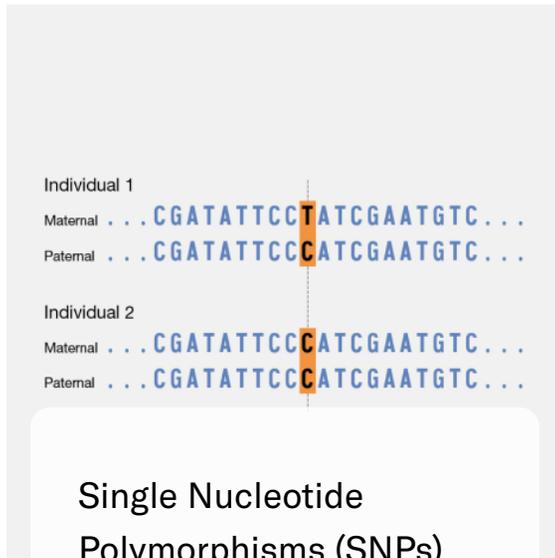


What are genetic hair traits?



Beauty genomics is a captivating area of research that includes how our genes impact the health of our hair. It seeks to unveil how our unique genetic makeup influences our hair's response to various treatments, hair care products, and dietary factors tailored to our specific hair needs. By unraveling these genetic connections, beauty professionals can design personalized plans that enhance our hair's appearance, support its health, and promote long-lasting beauty.

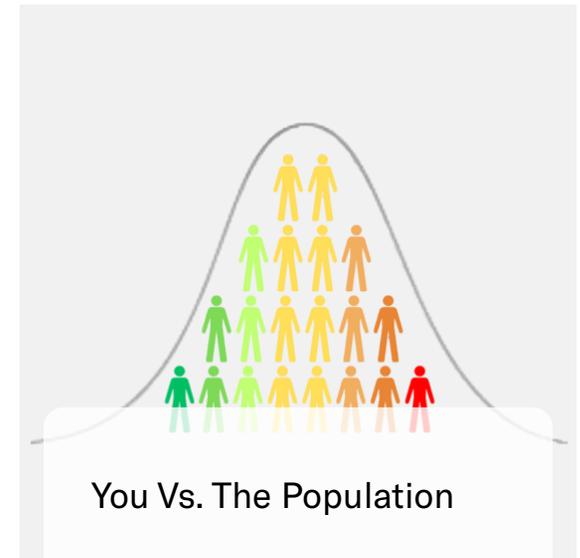
LifeNome's Genomic Process



SNPs are a type of genetic variation that occurs when a single nucleotide (A, T, C, or G) in the DNA sequence is different between individuals in a population. SNPs are the most common type of genetic variation in the human genome.



SNPs can be used as genetic markers to identify and study the relationship between genetic variation and traits or diseases. This association can be established by analyzing large datasets of genetic and phenotypic information from individuals with and without the trait of interest.



Your likelihood of trait expression is the cumulative effect of multiple genetic and non-genetic factors compared to the average risk in the population. Combining polygenic risk assessment with population nutritional assessment can provide valuable insights into the genetic and environmental factors that contribute to nutritional health.

SNP Image Source: <https://www.genome.gov/genetics-glossary/Single-Nucleotide-Polymorphisms>

How to read your reports

Trait Name:

Name of the Genetic Trait

Assessment:

The assessment shows the genetic predisposition likelihood for this trait. A Low assessment means you are unlikely to have a predisposition for this trait. A Moderate assessment means you have a somewhat higher than average predisposition likelihood for this trait. A High assessment means you have a significantly higher likelihood of this trait than the average person in the reference population.

The screenshot shows a report page for the trait 'Scalp Barrier Function'. The page has a purple header with the trait name. Below the header is a paragraph of text explaining the trait. Underneath is a summary box with four metrics: 'Your Genetic Risk: High', 'Your Rank: 70th Percentile', '8 / 13 Predisposing Variations', and '100% Coverage'. Below this is a section titled 'Your Recommendations' with three numbered items. At the bottom right of the page, it says 'Page:8 of 66'.

Percentile score:

The population percentile shows where your genetic predisposition likelihood for this trait places you compared to the reference population.

Percentile score:

The population percentile shows where your genetic predisposition likelihood for this trait places you compared to the reference population.

Predisposing Variants:

Total predisposing genetic variants show the total number of genetic variants in your DNA sample that affect your predisposition likelihood for the trait.

Coverage:

The coverage reliability score shows what percentage of the target genetic variants for the trait were tested in your DNA sample. Ideally, the number should be closest to 100% to provide the best accuracy. Coverage reliability lower than 65% can mean that your assessment may not be as reliable because not enough genetic variants were present or correctly measured in the tested sample to provide an accurate result.

Recommendations:

Here are some general recommendations based on your assessment. Remember your health care provider's advice always overrules what is written here.

Traits to Prioritize

Here is a summary of your genetically-influenced traits that have a moderate or high likelihood of affecting your haircare choices. Explore the detailed report for each to learn why these traits deserve your attention and how to personalize your haircare choices and lifestyle for the best results.

Hair Dryness

High

Scalp Barrier Function

High

Hair Growth Deficiency

High

Scalp Glycation

Medium

Scalp Antioxidant Deficiency

Medium

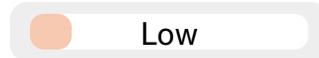
Scalp Sensitivity to Sun

High

Traits without Significant Risk/Advantage

Here is a summary of haircare characteristics we've tested and found no reason to believe your genetics would affect them adversely. Enjoy the peace of mind knowing you don't need to worry about these aspects of your haircare beyond your typical routine.

Hair Propensity for Greying



Scalp Hydration Impairment



Hair Lipids (Fatty Acids Imbalance)



Scalp Irritability



Hair Loss (Alopecia Areata)



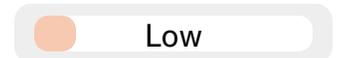
Scalp Pollution Defense Impairment



Hair Thickness



Scalp Thinning (Fragile Skin)



Hair Breakage Potential



Scalp Flakiness (Seborrheic Dermatitis)



Collagen Breakdown for Scalp



Sebum Overproduction



Hair Loss (Alopecia Areata)

Hair loss can have different reasons, some that are genetic and some that have to do with lifestyle and environmental factors. In general, men are more likely to lose their hair than women due to genetic factors, in particular with regards to male pattern baldness. Women's hair loss can also be exacerbated by genetic factors, but can also be due to vitamin deficiencies or underlying health conditions. One of hair loss conditions is alopecia areata that causes hair loss in patches. It is an autoimmune disease with a lifetime risk of over 2%. The cause of this hair loss condition is not yet known but genetic factors contribute to the risk. Almost 40% of people younger than age 30 with alopecia areata have at least one family member who has been diagnosed with the same disorder.

Your Genetic Risk:



Your Rank:

45th Percentile

17/29
Predisposing
Variations

87%
Coverage

Your Recommendations

Hair loss can be caused by poor nutrition. Reducing stress can slow down hair loss. Hair and scalp trauma, such as that caused by overwashing or overdyeing, can cause hair loss.



Hair Growth Deficiency

Hair growth in humans happens in three different phases. The average hair growth speed is around 0.5 inch per month. The anagen phase (also known as the growth phase) can last 24 to 72 months and the actual length of this phase is determined by your genes and determines how long your hair will grow. At any time more than 80% of your hair is in the anagen phase. In the catagen phase which is about 14 days long, the follicles renew themselves and pushes the follicle upward. In the telogen, or resting phase of the hair, the hair follicles remain dormant for 2 to 4 months and upon its completion, the hair is shed in a natural process and a new follicle starts to take shape. Some individuals experience slower hair growth due to their genetic variations in several genes coding for growth factors that tightly control all phases of hair growth.

Your Genetic Risk:

High

Your Rank:

95th Percentile

4/6

Predisposing
Variations

85%

Coverage

Your Recommendations

Remove split ends by trimming a quarter inch from the ends of your hair every six to eight weeks to keep your hair healthy. Don't shampoo every time you take a shower, but remember to use conditioner every time your shampoo. Eat a healthy balanced diet rich in protein, iron and vitamin C. Talk to your primary healthcare provider about taking supplements that support hair growth. Avoid frequently dyeing or chemically treating your hair, as it can break down its outer layers and impede its growth. Wear protective hairstyles, such as braids, to keep your hair safe while it grows.



Hair Breakage Potential

Hair breakage potential, or hair fragility is largely determined by keratin which is a major component of your hair as well as skin, and nails. It's a vital protein that helps make up both the internal structure and the outer cuticle of your hair strands. The level of keratin in your hair determines the strength of your hair and its resistance towards breakage. When your hair experiences keratin loss, your hair becomes significantly more susceptible to breakage, and damage. Certain genetic predispositions are associated with keratin II levels imbalance.

Your Genetic Risk:



Your Rank:

25th Percentile

1/10
Predisposing
Variations

83%
Coverage

Your Recommendations

Keratin-infused shampoos and conditioners can increase keratin levels in your hair. Overshampooing can damage your hair. Extensive exposure to chemicals, UV rays, and other natural elements like salt water and wind can also deplete the keratin in your hair.



Hair Propensity for Greying

Hair greying occurs when pigment production slows down for hair follicles or when hydrogen peroxide buildup within the hair goes beyond a certain threshold. What is considered premature greying depends on the ethnicity of individuals. In general, more than 50% of the population experiences significant grey hair by the age of 50. The timing of your hair greying is predominantly determined by your genetics, stress and certain vitamin deficiencies.

Your Genetic Risk:



Your Rank:

60th Percentile

5/5

Predisposing
Variations

83%

Coverage

Your Recommendations

Increasing protein intake can slow down the greying process. Stress can accelerate the greying process. Micronutrients such as biotin, vitamin B12, folic acid, copper, and glutathione are essential in slowing down the greying process.



Hair Dryness

Dry hair lacks the lustre, shine or gleam of normal hair. When your hair is dry, the outer layer breaks down, resulting in the hair being more difficult to comb and the hair may be more fragile than usual. Dry hair can affect men and women of any age, but you're more likely to develop it as you get older. A variety of factors can lead to dry hair, including environmental conditions, hair care habits, and your physical health . Genetics contributes to the risk of dry hair too, specifically variations in several keratin genes (KRT71, KRT74 and KRT25).

Your Genetic Risk:

High

Your Rank:

95th Percentile

8/32
Predisposing
Variations

78%
Coverage

Your Recommendations

Wash your hair less frequently if it starts drying out - overwashing can damage it by stripping it of its natural oils. Additionally, avoid overly-harsh shampoos, which can do the same. If you live in hot or dry climates, pay more attention to the state of your hair. The same applies if you swim often, especially in salty or chlorinated waters. Avoid frequently dyeing or chemically treating your hair, as it can break down its outer layers. Incorporate a nightly stay-on conditioner to rejuvenate your hair. Use a weekly hair mask to nourish and moisturize your hair.



Hair Lipids (Fatty Acids Imbalance)

Healthy hair are protected by hydro-lipid layer that is composed of hydro (water) and lipids (fats). Essential fatty acids play primary roles in the structure of the hydro-lipid layer, contributing to hair's elasticity and aiding ceramides in keeping the cuticle scales attached to the hair shaft, and hair well hydrated. Hair's natural oils are stripped away with age, over-washing, chemical treatments, and over-styling. Additionally, variations in genes involved in lipid metabolism (FADs enzymes and members of ELOVL family) affect the levels of "good oils". People with variations in lipid metabolism genes will have greater benefit from additional fatty acids in their diets, and their hair products and treatments. With proper care this integral part of the hair can be preserved, and replenished.

Your Genetic Risk:



Low

Your Rank:

35th Percentile

2/12
Predisposing
Variations

100%
Coverage

Your Recommendations

Fatty acids can be found in anchovies, herring, mackerel, salmon, sardines, lake trout, and tuna. Nutrients like zinc and vitamins A and E are essential in keeping your hair healthy. Certain stay-on conditioners and shampoos can protect your hydro-lipid layer.



Hair Thickness

Hair thickness refers to the diameter of an individual strand of hair. Hair thickness affects how different haircuts and hairstyles will suit you best. If you have thin hair, you may want for it to look fuller and you have thicker hair you may want to try to leverage it for emphasizing it. In addition, hair care treatments should be different for different hair types. Counter to intuition hair thickness and hair density are not always synonymous. Sometimes curly hair makes your hair looks more dense, but the individual strands of hair are fine. Therefore it helps having extra insights into your hair thickness using a variety of additional information, including your potential genetic predispositions.

Your Genetic Risk:



Your Rank:

60th Percentile

0/1
Predisposing
Variations

50%
Coverage

Your Recommendations

Oil free styling products can add more volume to your hair. Overwashing your hair can damage it, causing it to lose thickness. Overuse of conditioner can weigh hair down and make it appear limp.



Scalp Thinning (Fragile Skin)

While scalp skin is some of the thickest skin of the body, scalp skin becomes thinner and more fragile with aging, and sun exposure. Genetics plays its role in accelerating thinning of the skin. Certain medications, such as long-term use of oral or topical corticosteroids, also can weaken the skin and blood vessels in the skin.

Your Genetic Risk:



Low

Your Rank:

60th Percentile

1/5

Predisposing
Variations

83%

Coverage

Your Recommendations

Prolonged sun exposure can damage your skin. Moisturizing shampoos and conditioners can keep your skin hydrated, making it healthier. Nutrients such as protein, biotin, zinc, B-vitamins and vitamin E are all essential in your skin's maintenance processes.



Scalp Irritability

Scalp irritability (inflammation) is the result of a complex biological process where the cells in the scalp have a hyperactive response to allergens or toxins and produce inflammatory hormones called cytokines and chemokines. Acute inflammation is a signal to the scalp to start the repair process after being exposed to triggering stimulus. When an inflammation is chronic and serves no purpose, it becomes destructive and can damage the scalp. There are a number of stimuli that induce chronic inflammation: overexposure to UV rays, stress, toxins (e.g. pollution, smoking, trauma, alcohol, immune reactions, infections etc.), pathogens, and foreign bodies (dirt and debris). Genetic variations in several pro-inflammatory and anti-inflammatory cytokines genes are associated with higher risks of chronic scalp inflammation.

Your Genetic Risk:



Your Rank:

50th Percentile

3/8

Predisposing
Variations

88%

Coverage

Your Recommendations

Regular exercise can help reduce inflammation and irritability. Oil and dirt can build up on your scalp over time, but can be removed through exfoliation. Staying hydrated will reduce your scalp's irritability.



Scalp Hydration Impairment

Balanced levels of hydration is absolutely fundamental for a healthy scalp. Aquaporin channels, a family of integral cell membrane proteins, play central role in keeping our scalp hydrated by allowing the movement of water and glycerol across the cell membrane. The most abundant (and best studied) aquaporin in the scalp is the AQP3 gene. It transports water, glycerol, and small solutes (urea) across the plasma membrane hence regulating skin hydration, skin barrier recovery, and wound healing. Another group of genes expressed in skin are called claudins. They are tight junction membrane proteins that form paracellular barriers and pores that determine tight junction permeability. Genetic variations in the AQP3 and CLDN1 genes can result in their diminished expression and reduced activity.

Your Genetic Risk:



Your Rank:

45th Percentile

0/2

Predisposing
Variations

66%

Coverage

Your Recommendations

Hair and scalp masks can keep your scalp moisturized. Oil and dirt can build up on your scalp over time, but can be removed through exfoliation. Drinking more water will keep your scalp hydrated.



Scalp Sensitivity to Sun

Sun protection should not just stop at the hairline. Your scalp - though it may be covered by hair - and your hair are both at risk of UVA/UVB damage. Humans vary over 1000-fold in their sensitivity to the harmful effects of ultraviolet radiation. Skin sensitivity to sun have high genetic heritability. Several large-scale studies identified genetic variations that affect skin sensitivity and tendency to get sun burns. The main determinants of sensitivity to sun are skin pigmentation genes (ASIP, TYR, MC1R, and OCA2) that are also associated with poor tanning. In addition, skin DNA repair genes are strongly associated with tendency to sun burns, and increased risk of melanoma. Interestingly, the DNA repair genes (NTM, ERCC1) have no association in either direction with tanning ability.

Your Genetic Risk:

High

Your Rank:

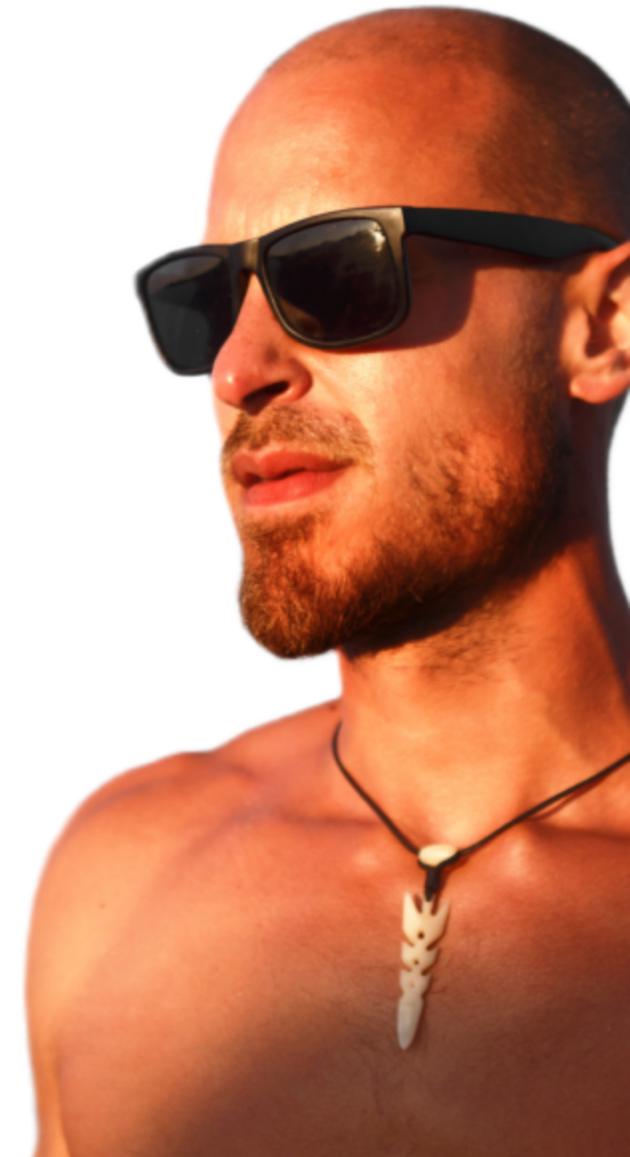
95th Percentile

8/18
Predisposing
Variations

100%
Coverage

Your Recommendations

Use a moisturizer with an SPF of at least 40 when you're going out, and reapply it every two hours. Rub it into your scalp, and not just your face, to limit damage done to your scalp. Bring an umbrella if you're going to be out in the sun: it'll block UV rays and slow down the photoaging process. Wear a wide-brimmed hat if you're going to be out when the sun is strongest. You can also use oils and products that contain fatty acids, as they help with dryness caused by sun exposure. Visit your dermatologist regularly for checkups.



Collagen Breakdown for Scalp

Collagen is a natural amino acid that is the most abundant protein. It helps support and strengthen bones, teeth, tendons, skin, and internal organs, and can also be used for hair growth. Collagen greatly helps in hair growth and hair regeneration. It possesses antioxidant properties and fights the production of free radicals. Collagen can also improve the overall volume of your hair by increasing the diameter of each individual hair, thereby giving your hair a fuller appearance. Collagen levels decrease as the levels of enzymes responsible for collagen breakdown (MMPs) increase with normal aging, and exposure to environmental factors (UV radiation) and irritation (chlorine in swimming pools). In addition, genetic variants increase activity of MMPs contributing to accelerated loss of collagen.

Your Genetic Risk:



Your Rank:

25th Percentile

0/3

Predisposing
Variations

75%

Coverage

Your Recommendations

Collagen-rich foods include bone broth, fish, eggs, and garlic. Environmental factors (such as smoking and chlorinated water) can accelerate collagen breakdown. Haircare products enriched with polyphenols, carotenoids, or flavonoids can slow down collagen breakdown.



Scalp Glycation

Our bodies use glucose as its main source of fuel. If glucose is not metabolized properly, it can bind to hair and skin collagen and elastin fibers forming abnormal cross-links. This leads to structural and functional tissue impairment which produces advanced glycation products (AGEs). This process, called glycation, causes damage and inflammation (at cellular level) resulting from an overload of processed sugary foods. The scalp, and therefore the hair follicles, are susceptible to the deleterious effects of glycation.

Your Genetic Risk:

Medium

Your Rank:

85th Percentile

3/7

Predisposing
Variations

100%

Coverage

Your Recommendations

Consider using haircare products infused with anti-glycation agents, such as green tea, blueberries or pomegranate. Try to include more complex carbs (such as those found in peas, beans, whole grains, and vegetables) in your diet. Think about consuming a diet rich in polyphenols (found in nuts, berries etc) and antioxidants (found in fruits, green leafy vegetables etc) to promote healthy blood sugar. Try to monitor your sugar (refined or unrefined) intake. Consider taking plant-based glycation inhibitors or reversing agents, such as salacia, fenugreek, cinnamon, turmeric, ginseng, gymnema, banaba, or kudzu.



Scalp Pollution Defense Impairment

Air pollution is the cause of increased signs of aging, inflammation and dull hair. The Chinese Dermatologist Association has found that those living in highly polluted areas (i.e. big cities) age 10 times faster than those who live in the countryside. Two important enzymes, EPHX1 and NQO1, protect our bodies from systemic absorption of highly reactive foreign chemicals (epoxides and quinones) from within the epidermis (most superficial layer of our skin). Genetic variants in the EPHX1 gene cause epoxide hydrolase deficiency while SNPs in the NQO1 gene slow down production of ubiquinol. Individuals who have reduced levels of these two enzymes have significantly diminished defense from environmental toxins.

Your Genetic Risk:



Your Rank:

45th Percentile

1/5
Predisposing
Variations

100%
Coverage

Your Recommendations

Washing your hair and scalp can remove harmful toxins and microbes. Growing indoor plants can clear the air of environmental pollutants. A high-quality air purifier can do wonders for keeping your skin healthy.



Scalp Antioxidant Deficiency

A balance between free radicals and intrinsic antioxidants is necessary for proper general physiological functioning and for the maintenance of youthful and healthy hair and skin. Increased amounts of free radicals contribute to a dangerous chain of reactions that target tissues and organs in the body, including hair and skin. This can trigger many chronic and late-onset diseases while also leading to premature aging by damaging the skin's proteins and lipids. To prevent such an occurrence, a master regulator gene, NRF2 (NF-E2-Related Factor 2), prompts the activation of SOD2/CAT(enzyme/protein) when it is triggered by oxidative stress and electrophiles. Genetic variations in NRF2, SOD2, and CAT can result in reduced antioxidant activities which then increases risk of damage to the skin's lipids and proteins.

Your Genetic Risk:

Medium

Your Rank:

75th Percentile

3/7

Predisposing
Variations

100%

Coverage

Your Recommendations

Try using hair care products that are infused with natural antioxidants (vitamin C, carotene, vitamin E) that boost your intrinsic antioxidant capacity. Consider including more antioxidant-rich foods in your diet such as blueberries, red berries, dark green leafy vegetables, sweet potatoes, oranges, nuts, whole grains, and green tea. Using more spices when you cook can help you get more antioxidants. Try to avoid areas high in pollution, which may cause oxidative stress or free radical damage - ultimately leading to fragile, unhealthy hair. Consider taking supplements that target antioxidant imbalances in your hair.



Scalp Barrier Function

Our scalp barrier serves a crucial, protective function for the skin by preventing entry of harmful microbes, toxins, and allergens while maintaining proper skin hydration. The scalp barrier function is performed primarily in the outermost layer of the epidermis called the Stratum Corneum (SC). Genetic variations in the Flaggirin (FLG) gene may cause skin barrier defects increasing its permeability, and causing skin sensitivity and irritation. In up to 10% persons of European ancestry, parts of the FLG gene are deleted. As a result, this has strongly predisposes those people to eczema, asthma, and allergies to various ingredients in hair and scalp products, or susceptibility to dandruff. People with a permeable skin/scalp barrier are also three times more likely to suffer from a peanut allergy.

Your Genetic Risk:

High

Your Rank:

95th Percentile

3/3

Predisposing
Variations

75%

Coverage

Your Recommendations

Make sure to use high-quality sulfate-free shampoo and moisturizing conditioner, which can reduce damage to the scalp's barrier. Apply a hair oil or melted coconut oil to your hair as a pre-shower treatment - leaving it on for a few hours or overnight. Exfoliate weekly using proper techniques to remove oil and dirt, which can build up on your scalp over time. Stay hydrated by drinking four to six cups of water a day to. If you're experiencing scalp irritation, evaluate the hair products that you have been using. If you're experiencing regular scalp irritation, visit a dermatologist.



Scalp Flakiness (Seborrheic Dermatitis)

The scalp is constantly shedding skin cells in its natural lifecycle. Excessive scalp flaking can lead to patches, red skin and dandruff. Dandruff is usually not a serious scalp condition but can be aesthetically unpleasant. It is relatively common and it depends genetic, environmental as well as lifestyle factors (hormonal changes, stress, illness, and diet). It is the result of a scalp fungus called pityrosporum, which is present on almost all of our scalps but can overgrow to result in dandruffs. Some people appear to be more susceptible to dandruff and new research confirms that such vulnerability could be due to their own genetic makeup.

Your Genetic Risk:



Low

Your Rank:

75th Percentile

6/11

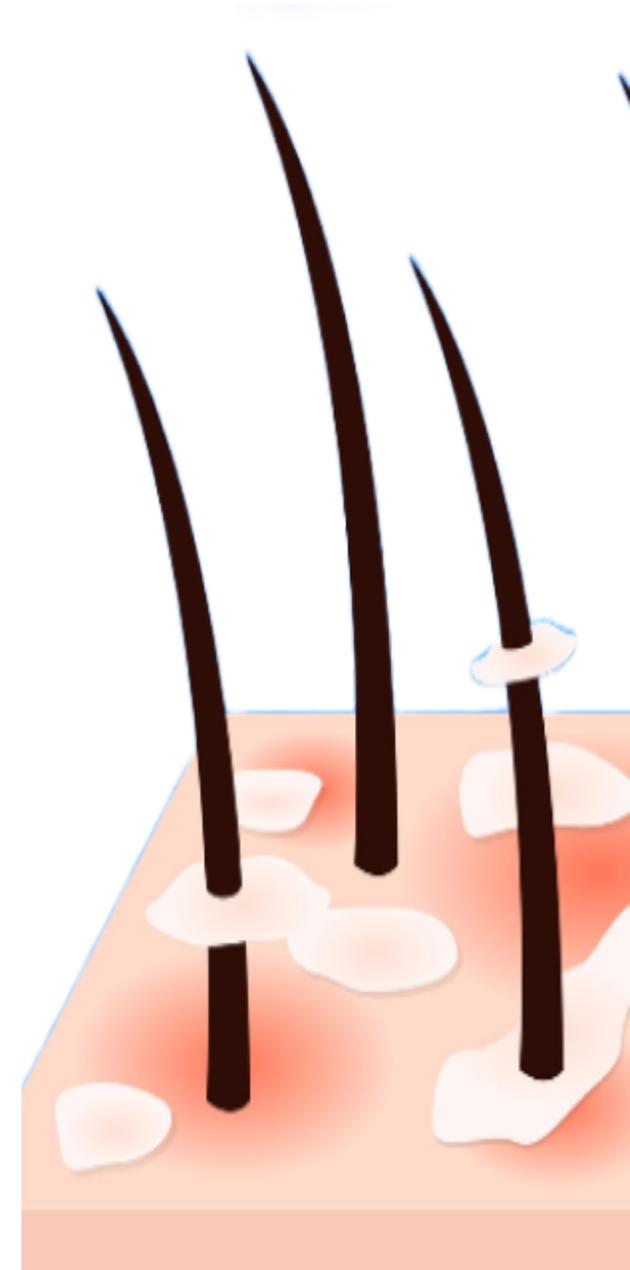
Predisposing
Variations

100%

Coverage

Your Recommendations

Consumption of too many dairy products, fatty, salty or sugary foods has been linked to increased dandruff. Stress and hormonal changes can lead to more dandruff. Products that eliminate dandruff flakes are more effective with regular use.



Sebum Overproduction

Sebum overproduction can be caused by an excess of a hormone called dihydrotestosterone (DHT). DHT is a metabolite of testosterone, and is responsible for triggering sebaceous glands to overproduce sebum. Several genetic variants associated with levels of DHT have been identified in large genome-wide association studies.

Your Genetic Risk:



Your Rank:

70th Percentile

3/5
Predisposing
Variations

100%
Coverage

Your Recommendations

Products with salicylic acid can help with removing excess sebum. It's best to avoid shampooing the ends of your hair - instead, try starting at your scalp and working your way down. Overwashing your hair can cause it to produce excess oils.



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Privacy Policy

LifeNome abides by the Genetic Information Nondiscrimination Act, or GINA, a U.S. federal legislation with bipartisan support that protects Americans from discrimination with respect to health insurance and employment decisions on the basis of genetic information. GINA has passed through Congress and was signed into law by the President on May 21, 2008. As a result, American insurance companies and health plans (including both group and individual insurers, as well as federally-regulated plans) will be prohibited from: looking at your predictive genetic information or genetic services before you enroll; “requesting or requiring” that you or your family members take a genetic test; restricting enrollment based on genetic information; or changing your premiums based on genetic information. GINA also prohibits U.S. employers (including employment agencies, labor organizations, and training programs) from: discriminating against whom they hire or how much they pay on the basis of genetic information; “requesting or requiring” that you or your family members take a genetic test; or disclosing your genetic information in their possession except under specific and specially controlled circumstances. We also abide by COPPA which applies to the online collection of personal information from children under 13. The new rules spell out what a Website operator must include in a privacy policy, when and how to seek verifiable consent from a parent and what responsibilities an

operator has to protect children’s privacy and safety online.

Data Usage and Storage

At LifeNome, you control your data and profile and can delete your data and profile at any time. This will erase your raw genetic data from our databases. The well-being reports generated will be kept for your future reference. LifeNome does not share any personally identifiable genetic information with any other third party entities. You understand that LifeNome may use your genotype and phenotype data as part of an aggregate and anonymous research analysis to improve its genomics algorithm.

Data Security

LifeNome takes the security of your data seriously. We use state-of-the-art security measures and encryption technologies to safeguard your personal information. You will be responsible for safeguarding your login information and should not share your authentication information to any third party. Please notify us of any unauthorized use of your password.

Statement of Limitations

LifeNome provides non-disease wellness information only. The information provided by LifeNome does not constitute medical advice and

is provided solely as complementary insight to assist you, your nutritionist, fitness instructor, and/or health-care provider in making more personalized decisions for your well-being. Genetic predispositions do not mean a condition is actually present. Many environmental and behavioral factors impact the actual presence of a condition.

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