# Carlisle's Genetic Report

VERSION 4.0

basepaws

Summary Page

# Breeds Group

## Western 100%

| | |
|---|---|
| Maine Coon | 100% |
| Broadly Western | 0% |
| Ragdoll | 0% |
| Russian Blue | 0% |
| Norwegian Forest Cat | 0% |
| Siberian | 0% |
| American Shorthair | 0% |
| Abyssinian | 0% |
| Turkish Van | 0% |
| Turkish Angora | 0% |

## Eastern 0%

| | |
|---|---|
| Broadly Eastern | 0% |
| Oriental | 0% |
| Peterbald | 0% |
| Burmese | 0% |
| Birman | 0% |
| Thai | 0% |

## Persian 0%

| | |
|---|---|
| Broadly Persian | 0% |
| Persian | 0% |
| Exotic Shorthair | 0% |
| British Shorthair | 0% |
| Himalayan | 0% |

## Exotic 0%

| | |
|---|---|
| Broadly Exotic | 0% |
| Bengal | 0% |
| Savannah | 0% |
| Egyptian Mau | 0% |

## Polycat 0%

A domestic polycat is a remarkable result of many generations of mixed breeding between different types of cats, which is why the ancestry and origin of these kitties can be very difficult to determine.



NAME
Carlisle

AGE:
1

GENDER:
male

REPORT DATE:
08-25-2026

PARENT NAME:
Jennifer Oneill

PRIMARY VET HOSPITAL:

# Oral Health Report

**Risk score legend**

| 0-3.3 LOW RISK | 3.4-6.6 MEDIUM RISK | 6.7-10 HIGH RISK |
|---|---|---|

### CARLISLE'S RISK OF PERIODONTAL DISEASE

Periodontal disease affects the tissues surrounding the teeth. Initial stages are classified as gingivitis, while advanced stages are known as periodontitis.

**RISK:**
- ○ HIGH
- ◉ MEDIUM
- ○ LOW

**Risk score**
6.48

### CARLISLE'S RISK OF TOOTH RESORPTION

Tooth resorption, also known as feline odontoclastic resorptive lesion (FORL), is characterized by progressive dentin erosion.

**RISK:**
- ◉ HIGH
- ○ MEDIUM
- ○ LOW

**Risk score**
7.63

### CARLISLE'S RISK OF BAD BREATH

When bad breath is a persistent problem for a cat, this could be indicative of more serious oral health or general health issues.

**RISK:**
- ◉ HIGH
- ○ MEDIUM
- ○ LOW

**Risk score**
8.38

# Health Markers

**CLEAR**
Your cat is negative for genetic markers associated with this number of diseases:
43

**CARRIER**
Your cat is not at risk, but carries genetic markers associated with this number of diseases:
0

**AT RISK**
Your cat is positive for genetic markers that increase their risk for developing this number of diseases:
0

**AT HIGH RISK**
Your cat's genotype puts them at high risk for developing this number of diseases:
0

**LIKELY BLOOD TYPE:**
(based on genotype)
A

# Trait Markers

| LIKELY TO HAVE | NOT LIKELY TO HAVE | CARRIER |
|---|---|---|
| 2 | 19 | 1 |

# History of cat domestication and breeding

The history of cat domestication differs from other companion animals. While dogs have undergone thousands of years of selective breeding for specific traits, cats have not.
Agricultural settlements, which required the storage of crop harvests, directly influenced the expansion of rodent populations. Cats were attracted to the bounty of prey that resulted, and a mutually beneficial relationship began. Cats helped humans with rodent control, and humans helped cats by providing shelter and additional food. In rather unique fashion, cats self-domesticated by choosing to live near or with humans.
Cats are born with natural instincts and highly effective prey-catching skills, so humans didn't need to selectively breed them for certain traits to, say, make them better hunters. It was more advantageous to let them run wild across farmland to hunt as they pleased. Throughout much of history, cats roamed freely and as a result were free to reproduce on their own terms.
In the 19th century, humans began to intervene with selective breeding, yet the primary focus was on aesthetic traits such as eye color or coat pattern. It is these aesthetic traits that largely distinguish the modern-day cat breeds we now know as "purebred" or "pedigree". The extremely short timeline of human-driven selective cat breeding has yet to overcome the much longer history of cats reproducing freely. Therefore, modern-day cats rarely have ancestors of a defined breed, and the feline genetic code has remained exceptionally diverse even within established pedigree breeds.

Unlike dog or human ancestry tests, we cannot assume that your cat was descended from a mixture of purebred lines since purebreds are so new. Instead, we find parts of your cat's genome that are similar to the genomes of modern-day purebred cats in our reference panel.

Basepaws continues to gather more purebred cat data to further narrow down the parts of the feline genome that are responsible for certain traits among different breeds.

Based on an analysis of the purebred cat genomes in our reference panel, the most common modern-day cat breeds fall into four main groups: Western, Eastern, Persian, and Exotic.

**WESTERN BREEDS**

- ragdoll
- russian blue
- norwegian forest cat
- siberian
- american shorthair
- maine coon
- abyssinian
- turkish van
- turkish angora

**EASTERN BREEDS**

- oriental
- peterbald
- burmese
- birman
- thai

**PERSIAN BREEDS**

- persian
- exotic shorthair
- british shorthair
- himalayan

**EXOTIC BREEDS**

- bengal
- savannah
- egyptian mau

The Exotic group contains some hybrid cats, which are the result of crossing a domestic cat with a wildcat. Bengals are a cross between Asian leopard cats and domestic cats, while Savannahs are a cross between servals and domestic cats.

We extracted Carlisle's DNA from the sample that you sent us, ran quality checks on the material, and performed low-coverage whole genome sequencing (WGS). This was followed by a process of bioinformatic imputation to fill in missing pieces of information. Next, we compared your cat's genome to those of the purebred cats in our reference database.

We assigned Carlisle to the breed group with which their genome shares the most similarity. Each subsequent breed group listed is based on the next highest level of shared genomic similarity. We also provide the percentage of similarity that your cat's genome shares with individual breeds that fall within each of the four breed groups.

# Breed Analysis

We analyzed your cat's genome and compared it to the genomes of purebred cats in our reference panel. There are 21 popular purebred breeds represented in our panel, categorized into the four main breed groups. Below is the percentage breakdown of the genomic similarity that your cat shares with each purebred breed associated with a main breed group.



## Western 100%

Despite its name, this breed group contains breeds with diverse geographic origins, spanning Turkey, Russia, Europe, and the Americas.

| 100% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
|---|---|---|---|---|---|---|---|---|---|
| Maine Coon | Broadly Western | Ragdoll | Russian Blue | Norwegian Forest Cat | Siberian | American Shorthair | Abyssinian | Turkish Van | Turkish Angora |

## Eastern 0%

Eastern breeds form their own tight, genetically distinct group. The origins of the breeds in this group can be traced back to Asian countries, with Southeast Asia playing a prominent role.

| 0% | 0% | 0% | 0% | 0% | 0% |
|---|---|---|---|---|---|
| Broadly Eastern | Oriental | Peterbald | Burmese | Birman | Thai |

## Domestic Polycat 0%

A domestic polycat is the remarkable result of many generations of mixed breeding (the opposite of selective breeding) between different types of cats, which is why the ancestry and origin of these kitties can be very difficult to determine.

## Persian 0%

The Persian breed is among the oldest in the world. The Persian breed group contains breeds that are derived from the Persian breed.

| 0% | 0% | 0% | 0% | 0% |
|---|---|---|---|---|
| Broadly Persian | Persian | Exotic Shorthair | British Shorthair | Himalayan |

## Exotic 0%

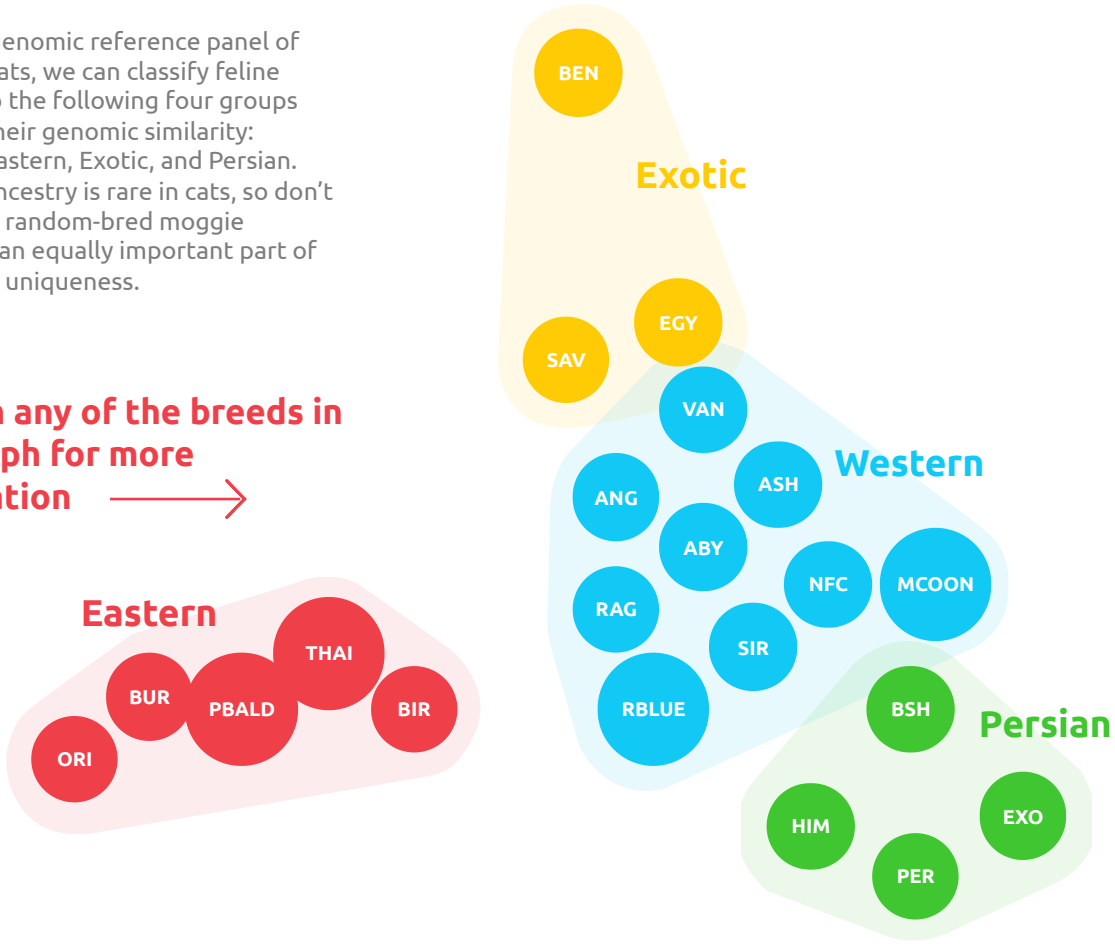
The Exotic breed group contains Egyptian Mau and hybrid cats, which are the result of crossing domestic cats with certain wildcats. These cats often have a high degree of genetic separation from other breeds.

| 0% | 0% | 0% | 0% |
|---|---|---|---|
| Broadly Exotic | Bengal | Savannah | Egyptian Mau |

## Feline Breeds

Using our genomic reference panel of purebred cats, we can classify feline breeds into the following four groups based on their genomic similarity: Western, Eastern, Exotic, and Persian. Pedigree ancestry is rare in cats, so don't forget that random-bred moggie heritage is an equally important part of your kitty's uniqueness.

**Click on any of the breeds in this graph for more information**




### Western

| Russian Blue | Ragdoll | American Shorthair | Siberian | Norwegian Forest Cat | Maine Coon | Abyssinian | Turkish Van | Turkish Angora |
|---|---|---|---|---|---|---|---|---|

### Eastern

| Oriental Shorthair | Peterbald | Burmese | Birman | Siamese |
|---|---|---|---|---|

### Persian

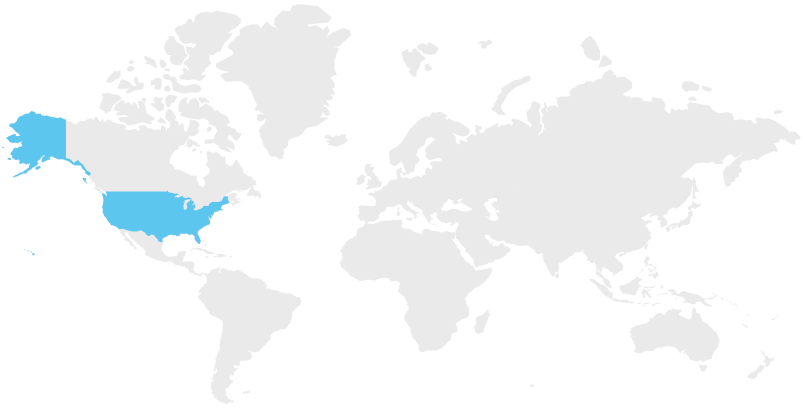
| Persian | Exotic Shorthair | British Shorthair | Himalayan |
|---|---|---|---|

### Exotic

| Savannah | Bengal | Egyptian Mau |
|---|---|---|

# Ragdoll





**Origin**
USA

**Related Breeds**
Persian, Siamese

**Alternate Names**
None

**Personality**
Calm, docile, lap cat

**Avg. Male Weight**
10-15

**Avg. Female Weight**
10-15

## General Overview

The Ragdoll is considered one of the world's largest cat breeds, along with the Maine Coon, with an average weight that ranges from 10 to 15 pounds. These friendly felines are semi-longhaired, blue-eyed, colorpoint cats that come in in a variety of coat pattern, color, and colorpoint combinations. The four patterns include bi-color, van, mitted, and colorpoint. These patterns come in blue, seal, chocolate, lilac, cream, and red colors and colorpoint can be solid, lynx, tortie, or a combination of tortie and lynx called "torbie".

## Breed History

The Ragdoll is native to the United States. It is said to have originated in California during the 1960s when breeder Ann Baker bred Josephine, a free-roaming domestic white longhaired cat, with other free-roaming cats in her neighborhood. As she continued her breeding program, Ann selected cats with specific aesthetic qualities and temperaments to create what we know today as the Ragdoll. Though there is no way to know, some believe that Josephine may have possibly been a hybrid of a Persian, Birman, or Siamese.

## Genetic predisposition and health

The Ragdoll is a strong, robust breed that can live a long and healthy life when nurtured properly. These cats are, however, at a higher risk for developing feline infectious peritonitis (FIP) and hypertrophic cardiomyopathy (HCM). HCM can be caused by several genetic mutations that have been identified in about 20 percent of Ragdolls.

## Personality

These elegant kitties are easygoing, calm, sweet-natured, and known to enjoy cuddles. They exhibit quirky behaviors such as drinking water from the faucet or going "limp like a ragdoll" when held. They are the ultimate lap cat and their docile manner makes them perfect companions for families with children or other pets.

# Russian Blue





**Origin**
Russia

**Related Breeds**
Russian White, Russian Black

**Alternate Names**
Archangel Blue, Archangel Cat

**Personality**
Curious, social, intelligent

**Avg. Male Weight**
8-15

**Avg. Female Weight**
8-15

## General Overview

Meet the "Doberman Pinscher" of cats. Russian Blues are powerful, agile cats, with a sweet-natured temperament who combine elegance and strength in their own unique way. The breed has a signature grayish-blue coat, broad head, and eyes that are a vivid green. Its beautiful coat shimmers due to the silver-tipped hairs of its short, yet plush fur.

## Breed History

The Russian Blue is a naturally occurring breed thought to have originated in Archangel, Russia. The breed was further refined in Great Britain and Scandinavia, where it may have been introduced by Russian sailors. The Russian Blues found in the U.S. today are a result of crossbreeding the British Russian Blue with the Scandinavian Russian Blue. Russian Whites, Blacks, and Tabbies were all created by crossing Russian Blues with domestic cats. The breed was also used, to an extent, in the development of the Havana Brown and in the refinement of the Nebelung breed.

## Genetic predisposition and health

These moderate-sized cats have little to no predispositions to genetic diseases. However, they do love to eat! Though they are generally playful and energetic, it is important to encourage regular activity and provide a proper diet to help them maintain a healthy weight. Some published studies have recognized the Russian Blue, among several other breeds, to be at a higher risk for diabetes mellitus.

## Personality

Russian Blues are very curious, friendly, and social cats. They may at times seem shy or distant, but it doesn't mean they want to be alone. They can become depressed or anxious if they feel neglected in any way. Blues are very loyal and loving and are said to be highly empathetic and sensitive to human emotions. Due to their high level of intelligence and sensitivity, they tend to remember favorite visitors even if the visits are infrequent.

# Norwegian Forest Cat





**Origin**
Norway

**Related Breeds**
Siberian, Turkish Angora

**Alternate Names**
Norsk Skogkatt, Skaukatt

**Personality**
Social, friendly, explorer

**Avg. Male Weight**
10-16

**Avg. Female Weight**
8-12

## General Overview

Also known as the "mystic wildcat of fairy tales", the semi-longhaired Norwegian Forest Cat breed is believed to be around 1000 to 2000 years old. This breed is frequently mentioned in Norwegian urban myths and folklore and is very popular across much of Northern Europe. These strong and sturdy cats originated in Norway, and are well-suited to brutal winters with insulated, waterproof double coats that feature longer, coarse guard hairs over a dense undercoat. They are further distinguished by their large, almond-shaped eyes, triangle-shaped head and ears, and straight side profile (from their brow ridge to the tip of their nose).

## Breed History

Some believe that the ancestors of this breed include black and white shorthair cats brought from Great Britain and longhaired cats introduced by the Crusaders. Others theorize that their ancestry lies with the Russian Siberian cat and the Turkish Angora. The breed was recognized and registered in Europe in the 1970s, and was accepted for full championship status by the Cat Fanciers' Association in 1993.

## Genetic predisposition and health

Published studies have shown the Norwegian Forest Cat, among several other breeds, to be at a higher risk for diabetes mellitus. In a 2007 study, a complex rearrangement in the gene that codes for the glycogen branching enzyme (GBE1) was identified in some Norwegian Forest Cats. The rearrangement causes glycogen storage disease type IV, characterized by a perinatal hypoglycemic collapse and a late-juvenile-onset neuromuscular degeneration. The breed is also known to suffer from hip dysplasia.

## Personality

Norwegian Forest Cats are highly intelligent and have a sweet, calm temperament. They are social, friendly, and get along well with children and other pets. While they highly appreciate the company of their favorite humans, they do so on their own terms. These kitties love to explore, and their strong claws make them excellent climbers. A scratching post or a tall cat tree will go a long way toward entertaining these beautiful and majestic kitties.

# Siberian





**Origin**
Russia

**Related Breeds**
Norwegian Forest Cat

**Alternate Names**
Siberian Forest Cat, Moscow Semi-Longhair

**Personality**
Social, playful

**Avg. Male Weight**
8-17

**Avg. Female Weight**
8-17

## General Overview

For centuries, the Siberian was a landrace variety of a domestic cat in Russia. Also known as the Siberian Forest Cat or Moscow Semi-Longhair, this cat is Russia's national animal. It is considered an ancient cat and the ancestor of all longhaired modern-day cats. The Siberian has a dense coat that is long and luxurious. It expresses all three natural types of fur: guard hairs, awn hairs, and down hairs. Coat colors can vary from tabby, solid, tortoiseshell, and colorpoint. Siberians have a powerful build. They are strong cats with large, rounded paws who are known to be exceptional jumpers.

## Breed History

The first mention of the breed appeared in Harrison Wier's book entitled, Our Cats and All About Them. Weir was the organizer of the first modern cat show at London's Crystal Palace in 1871. The Siberian has become a highly popular breed, yet kittens are very expensive to obtain and are relatively rare outside of Europe. It wasn't until the 1990s that the breed was introduced to the United States. It was accepted for registration by the Cat Fanciers' Association in 2000 and received championship status in 2006.

## Genetic predisposition and health

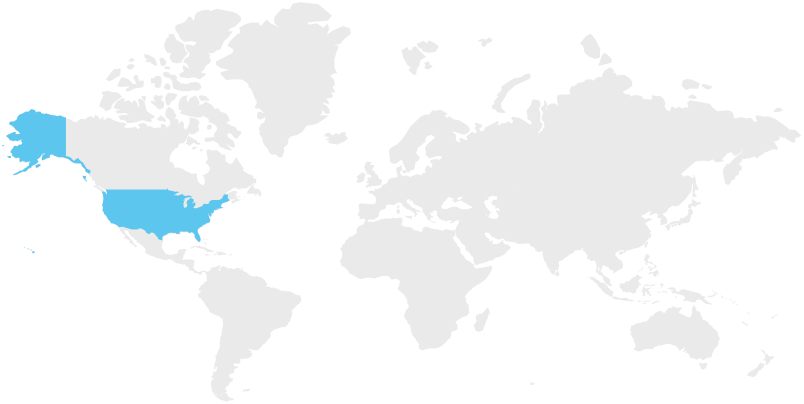
Though no health conditions are proven to be tightly associated with Siberian cats, there are some claims about diseases for which they may be at a higher risk. These include hypertrophic cardiomyopathy (HCM), polycystic kidney disease (PKD), hereditary cancer, feline lower urinary tract disease (FLUTD), and periodontal disease. Siberian cats are considered a somewhat hypoallergenic breed because they produce smaller amounts of FelD1, a primary allergen present on cats and kittens.

## Personality

Siberians are friendly and social cats. They are easygoing and affectionate, getting along well with other animals and with children. The Siberian is brave and independent, yet regularly seeks companionship. It is said that they are empathetic cats with a keen sense of the emotions of others, eagerly offering their company and support in many situations.

# American Shorthair





**Origin**
USA

**Related Breeds**
British Shorthair

**Alternate Names**
None

**Personality**
Outgoing, social, adaptable

**Avg. Male Weight**
10-15

**Avg. Female Weight**
8-12

## General Overview

The American Shorthair has all the characteristics of a skilled hunter. It is a sturdy, powerful, and agile breed that is full of endurance. These beauties are defined by their large heads, powerful jaws, and full cheeks. American Shorthairs have short, dense coats that come in various colors including gold, brown, cameo, calico, and silver tabby. Their eyes are large and distinctive, and range in color from blue and green to copper, hazel, and gold.

## Breed History

The first American Shorthairs were believed to have accompanied European settlers who set their sails for North America. They were brought onboard to protect the ship's cargo from rodents. In 1906, the Cat Fanciers' Association officially recognized the breed, which was at the time called the Domestic Shorthair, as one of its five registered breeds. These hardy companions received their American Shorthair name in 1966 to differentiate them from regular random-bred, domestic shorthair cats.

## Genetic predisposition and health

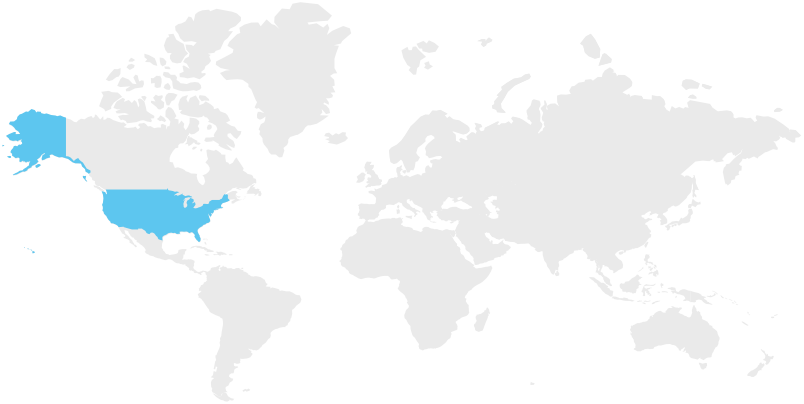
Although the American Shorthair is considered a healthy breed with very few health problems, they can be affected by hypertrophic cardiomyopathy (HCM), the most common form of feline heart disease. They are also prone to inherited craniofacial defects, which can range from mild dermoid cysts to more serious conditions such as cleft palates and crooked jaws (the latter results in the development of misaligned teeth).

## Personality

The American Shorthair is the ideal family cat for its social, easygoing, and affectionate nature. Though not typical lap cats, they will certainly appreciate a spot next to you on the sofa. As a moderately active breed, American Shorthairs are not overly demanding of attention and tend to be good at keeping themselves entertained. When not hunting for insects and other small critters, the American Shorthair is often found spending its time lounging in the sun.

# Maine Coon





**Origin**
USA

**Related Breeds**
Persian, Norwegian Forest Cat

**Alternate Names**
Coon Cat, American Forest Cat

**Personality**
Water lover, obedient, playful

**Avg. Male Weight**
12-15

**Avg. Female Weight**
9-12

## General Overview

Tipping the scales at up to 20 pounds, the Maine Coon is one of the largest breeds. Despite their muscular and heavy-boned bodies, they are known to be quite agile. Maine Coons sport a thick double-layered coat and have bushy tails. They also have the longest whiskers of any other cat breed.

## Breed History

The exact origin of the Maine Coon remains unknown, though many theories exist. One suggests that these elegant longhaired cats accompanied the Vikings from Europe as they journeyed to America. Another is that the Maine Coon was created in the state of Maine and that it is the first, and therefore the oldest, breed native to the United States. It may come as no surprise that the Maine Coon is Maine's official state cat.

## Genetic predisposition and health

This breed is known to be at a higher risk for developing hypertrophic cardiomyopathy (HCM), the most common feline heart condition that is associated with several genetic mutations. In the Maine Coon, an autosomal dominant mutation in the myosin-binding protein C gene has been identified in 33 percent of the breed. HCM is a progressive disease and can result in heart failure, paralysis of the hind legs, and even sudden death. Another genetic mutation frequently found in Maine Coon cats is the "Hemingway" mutation, which can result in the development of an extra toe (sometimes two). This harmless mutation is commonly referred to as polydactylism.

## Personality

A water-loving cat, this gentle giant is adored for its playful nature and dog-like loyalty. The Maine Coon can be rather vocal, expressing a wide range of complex sounds. These cats are generally obedient and possess above average intelligence, which makes them easy to train. It is not uncommon to see a Maine Coon walking on a leash.

# Abyssinian





**Origin**
Asia

**Related Breeds**
Old Egyptian Breeds, Ocicats

**Alternate Names**
None

**Personality**
Active, intelligent, mischievous

**Avg. Male Weight**
7-10

**Avg. Female Weight**
6-8

## General Overview

The "miniature cougar" of the cat world, the Abyssinian is a gorgeous and energetic breed that is said to resemble the wild cats found all over North America. The Abyssinian always has a ticked coat pattern that ranges in color from ruby reds to fawn tones and silvery blues. These cats have expressive wide-set eyes, large ears, and a long, lean body.

## Breed History

The Abyssinian is said to be one of the oldest cat breeds. Recent genetics research offers insight into the possible origin of this breed, tracing it to the coast of the Indian Ocean and areas of Southeast Asia. Based on the genetic markers found in the Abyssinian, it is presumed that cats from both Asia and Europe were used to create the breed we know and love today.

## Genetic predisposition and health

Some published studies reveal the Abyssinian, among several other breeds, to be at a higher risk for diabetes mellitus. Two mutations related to progressive retinal atrophy (PRA) have also been identified in Abyssinian, Somali, and Ocicat breeds. Other health problems associated with the Abyssinian include gingivitis (an early stage of periodontal disease), hypertrophic cardiomyopathy, dilated cardiomyopathy, pyruvate kinase deficiency, psychogenic alopecia (stress-related hair loss), and patellar luxation (trick knee).

## Personality

Notorious for their intelligence and agility, the Abyssinian is one of the most outgoing and athletic breeds. These cats are excellent climbers, hunters, and jumpers. They thrive in environments where they can explore, climb high spaces, or simply enjoy good mischievous play with their humans and fellow cat friends. Though they aren't known as lap cats or big cuddlers, they love spending time with their human family and may suffer from depression without regular attention and affection.

# Turkish Van





**Origin**
Turkey

**Related Breeds**
Persian

**Alternate Names**
Turkish Vankedisi

**Personality**
Water lover, energetic, vocal

**Avg. Male Weight**
10-12

**Avg. Female Weight**
7-10

## General Overview

With a striking wisp of color atop its head and a tail painted to match, this mostly white cat is one of the rarest in the world! These complementary fur decorations are known as the "Van Pattern". The Turkish Van has two coat lengths, depending on the season. As you might imagine, its winter coat is longer and thicker than its shorter, less dense summer coat. The Turkish Van commonly sports different eye colors, typically where one is blue and the other a shade of amber, a trait called heterochromia that is commonly associated with the breed.

## Breed History

The Turkish Van is also considered one of the oldest breeds in the world and its history dates back to between 6,000 and 3,000 BC. The modern history of the Van can be traced to Sonia Halliday and Laura Lushington. They were two British photographers on assignment in 1955 to capture images of Lake Van, the largest body of water in Turkey. They were gifted two (unrelated) Turkish Vans after they completed their assignment. Each cat had the "Van pattern" that is now famously associated with the breed. The two cats were mated and served as the base-lineage for Turkish Van cats in England. The Turkish Van was officially introduced in the United States in 1982.

## Genetic predisposition and health

The KIT gene is associated with the white coat of the Turkish Van and seems to be linked to hearing ability. White cats with blue eyes or with heterochromia experience a higher incidence of deafness. The KIT gene can disrupt melanocyte migration into one or both eyes and can sometimes cause degradation of the cochlea, which results in irreversible deafness in one or both ears. Other genetic conditions found in the Turkish Van include hereditary ataxia and hypertrophic cardiomyopathy.

## Personality

Turkish Van cats are extremely intelligent and highly trainable. They make excellent companions due to their friendly, sociable nature but they typically do not like being held and carried. They do best in households where they are the only pet, though can get along with other cats as well as dogs if they are introduced properly (and slowly). They are athletic, lively cats who enjoy jumping and playing games, but they are not known for their agility and grace. They lovers of water as well as swimming.

# Turkish Angora





**Origin**
Turkey

**Related Breeds**
Persian

**Alternate Names**
Angora Cat, Ankara Cat

**Personality**
Active, stubborn

**Avg. Male Weight**
12+

**Avg. Female Weight**
8-12

## General Overview

The Turkish Angora is an ancient, natural breed from Turkey. It is thought that this breed is the true origin of the mutation for white coat color and long hair in domestic cats. Turkish Angoras have silky long coats, and they carry themselves with agility and grace. They have small, round heads and pointed, wide-set ears. The eyes are almond-shaped and come in a variety of colors, and heterochromia is not uncommon. Known primarily for displaying a shimmery white coat, they can also exhibit tabby coats (brown or white), black with a chocolate brown undercoat, or a range of beautiful smoke tones.

## Breed History

This breed has developed through natural selection in regions of Anatolia, Turkey. Cat enthusiasts selected the Turkish Angora for its luxurious coat to refine the Persian breed. The Angora made its way into the U.S. and Canada in the 1960s. The Cat Fanciers' Association in the U.S. officially recognized the breed in 1963, accepting only white Angoras until 1978. Today, cat registries across the United States recognize a range of Turkish Angora coat colors and patterns.

## Genetic predisposition and health

Turkish Angoras, particularly those with white coats and blue eyes, have a higher risk of congenital deafness due to a mutation in the KIT gene. This can lead to louder than normal vocalization as hearing loss progresses. Compared to other breeds, Turkish Angora kittens also have a higher likelihood of developing heterochromia. This breed may be at a higher risk of developing congenital ataxia, which is a fatal disease that causes uncoordinated movement and shaking. They may also be at a higher risk for hypertrophic cardiomyopathy.

## Personality

Turkish Angoras are affectionate and highly intelligent. They are very curious and enjoy being involved in your daily activities. Though they get along well with children and other pets, they tend to form a strong bond with one person in the family and can become very protective of them. They do not like to be left alone and can become easily stressed if they are on their own for long periods of time. Turkish Angoras love to play and enjoy climbing and spending time on high perches.

# Oriental





**Origin**
UK

**Related Breeds**
Siamese

**Alternate Names**
Oriental

**Personality**
Energetic, vocal, attention-seeking

**Avg. Male Weight**
7-10

**Avg. Female Weight**
5-8

## General Overview

A close relative of the Siamese, the Oriental Shorthair maintains the same head and body type of its parent breed, but sports various coat colors and patterns including smoke, shaded, tortoiseshell, tabby, and bicolor. In fact, over 750 color and pattern combinations are possible under the Cat Fanciers' Association conformation rules. Oriental Shorthairs are lean, muscular, and agile with very large ears that are pointed like the modern Siamese. In contrast to the deep blue eye color of the Siamese, the Oriental Shorthair has almond-shaped eyes that come in beautiful shades of green. The Oriental Longhair, which simply carries a pair of recessive long hair genes, is a variety of this breed.

## Breed History

It is believed that the Oriental Shorthair has its foundation in the Siamese breed. The Siamese are the royal cats of Thailand (previously Siam), that were first brought to England in the 1800s. During World War II, many breeding programs were devastated, and the Siamese was crossbred with Russian Blues, British Shorthairs, Abyssinians, and Domestic Shorthairs to expand the gene pool. Kittens born with Siamese points were rotated back into Siamese breeding programs, while the non-pointed kittens became the basis for the Oriental Shorthair breed.

## Genetic predisposition and health

Since it is derived from the Siamese, the Oriental Shorthair is at a higher risk for developing health problems such as neoplastic and gastrointestinal disorders, crossed eyes, lung infections, feline OCD, vestibular disease, Feline Hyperesthesia Syndrome, and diabetes mellitus. Siamese-derived breeds are also noted to have higher mortality rates compared to other cat breeds. However, Oriental Shorthairs are noted for their longer lifespan, often living 15 years or more.

## Personality

The Oriental Shorthair is said to closely resemble the Siamese in personality. They are agile and athletic and known as highly skilled jumpers. They are playful and social cats who also love to snuggle and take naps on your lap. They are quite vocal and aren't shy about demanding the attention they so rightfully deserve. They are known to do well with other cat and dog friends, as they desire a lot of stimulation and companionship.

# Peterbald





**Origin**
Russia

**Related Breeds**
Don Hairless, Oriental Shorthair

**Alternate Names**
None

**Personality**
Affectionate, peaceful

**Avg. Male Weight**
8-10

**Avg. Female Weight**
6-8

## General Overview

The Peterbald is a cat breed that originated in St. Petersburg, Russia. These unusual kitties are carriers of a hair-losing mutation which results in them having either a bald, flocked, velour, brush (unique to this breed), or straight coat that can come in a variety of colors and patterns. Peterbald cats can be born hairless, or born with a coat where hair length and texture changes over time. In physical appearance they are said to closely resemble the Oriental Shorthair, with a slim and muscular body, almond-shaped eyes, and large, pointed ears.

## Breed History

In 1994, Olga S. Mironova conducted experimental breeding between a male Don Sphynx (Donskoy) and a female Oriental Shorthair. The first two litters produced four Peterbald kittens. These four kittens are considered the founders of the breed.

## Genetic predisposition and health

Though all cats face a certain risk of developing health issues that may be genetically inherited, there are currently no known genetic health conditions tightly associated with this particular breed.

## Personality

Peterbalds are sweet and affectionate little cats. Famous for their dog-like loyalty toward their favorite humans, they will often follow you around the house to be near you as much as possible. Their energetic and curious nature is complemented by their peaceful and docile demeanor, which makes them well-suited to households with children and other pets.

# Burmese





**Origin**
Thailand

**Related Breeds**
Siamese, Burmese

**Alternate Names**
None

**Personality**
Attention seeking, playful

**Avg. Male Weight**
8-12

**Avg. Female Weight**
6-10

## General Overview

Burmese cats originated in Thailand. They have an elegant appearance despite their compact, muscular build. Their coats are short, dense, and glossy and come in champagne, platinum, and sable colors.

## Breed History

The Burmese breed we know today originated in the United States during the 1930s. Dr. Joseph Thompson brought a small brown female cat from Burma (now Myanmar) back to his home of San Francisco, CA. He named her Wong Mau and bred her to Siamese cats. Geneticists believe that the Burmese shares a unique genetic trait with the Siamese—a mutation in tyrosinase, which is an enzyme involved in the production of melanin. The mutated version of this enzyme is heat sensitive and fails to work at normal body temperatures. It tends to activate only in cooler areas of the skin (< 91F), which is why we see the cooler parts of the cat's body, such as the extremities, face, and tip of the tail expressing a darker pigmentation than the rest of the torso.

## Genetic predisposition and health

The Burmese is a fairly healthy and robust cat breed, with an average lifespan of 10 to 17 years. Some published studies recognize the breed, among several others, to be at a higher risk for diabetes mellitus. Hypokalemia, a genetic disease characterized by low levels of potassium in blood plasma, has also been linked to the Burmese breed.

## Personality

The Burmese are people-oriented and affectionate, making excellent pets in households with families. They are known for their dog-like loyalty and tend to form strong bonds with their favorite humans. A Burmese cat will genuinely enjoy being a part of your daily activities and is not considered an independent companion. They tend to cling and dislike being left alone for extended periods of time.

# Birman





**Origin**
Myanmar

**Related Breeds**
Siamese

**Alternate Names**
Sacred Cat of Burma

**Personality**
Docile, patient, affectionate

**Avg. Male Weight**
9-15

**Avg. Female Weight**
6-10

## General Overview

The Birman, also called the "Sacred Cat of Burma", is a strikingly beautiful longhaired cat. They are distinguished by their soft and silky coat, deep blue eyes, and contrasting white "gloves" on their paws, which are a trademark of the breed. Their coats are said to be easier to maintain than other longhaired breeds with brushing just a few times a week instead of daily. This is because they lack the dense undercoats characteristic of other longhaired cats that contribute to mats and tangles.

## Breed History

The exact history of this breed is unknown, though it may have originated in the city of Burma some 100 or more years ago. According to folklore, the remarkable beauty of the breed was said to be the work of divine intervention by a "blue-eyed goddess". The breed was nearly lost after World War II, with only two surviving cats. To restore the breed, these cats were outcrossed with longhaired Persians and Siamese. First brought to the United States in 1959, Birmans were recognized by the Cat Fanciers' Association (CFA) in 1967. The CFA states that most modern-day Birmans in the U.S. can be traced to England, France, Australia, and Germany.

## Genetic predisposition and health

The Birman is at an increased risk for early renal failure, congenital cataracts, feline infectious peritonitis, and hemophilia B. This breed is also at a higher risk for hypertrophic cardiomyopathy (HCM), the most common feline heart disease.

## Personality

The Birman is a docile, smart, and extremely sweet-natured cat. These gentle felines get along well with young children and other pets, making them excellent family companions. They are affectionate and always eager to be near their favorite humans. Unlike their close relative, the Siamese, Birman cats are generally quiet, though may on occasion greet you with a very soft meow. These kitties require love and attention to thrive and do not like to be left alone for very long.

# Thai





**Origin**
Thailand

**Related Breeds**
Oriental Cats

**Alternate Names**
Traditional Siamese

**Personality**
Active, intelligent, vocal

**Avg. Male Weight**
8-12

**Avg. Female Weight**
6-10

## General Overview

Who is considered royalty in the world of cats? The Thai Siamese of course! Also called the Siamese, this feline's charm and striking appearance helped it earn a royal status and keep it for centuries. One recognizable display is a high contrast colorpoint coat pattern with dark fur near or on the face and ears, as well as their legs and tails. However, there are four possible color combinations that include chocolate point, seal point, blue point, and lilac point. The Siamese is an outgoing, chatty breed that is famous for its remarkable blue eyes, noticeably large ears, and its sleek and muscular body. These cats adore love and affection, and in return provide loyal companionship.

## Breed History

Originating from Thailand (formerly known as Siam), it is believed that the breed then made its way to Europe in 1884. British Consul-General Edward Blencowe Gould brought a breeding pair of cats from Bangkok which he gifted to his sister, Lilian. Cat fanciers increasingly imported cats from Thailand, gradually forming the foundational breeding pool for the Siamese in England. In 1878, the first Siamese cat was supposedly given to Lucy Webb Hayes, First Lady and wife of President Rutherford B. Hayes, by U.S. Consul David Stickles.

## Genetic predisposition and health

Siamese and Siamese-derived breeds have higher mortality and morbidity rates in comparison to other cat breeds. The Siamese is known to be at a higher risk for neoplastic and gastrointestinal diseases. The pointed pattern observed in Siamese cats is a form of partial albinism, caused by a mutation in tyrosinase. This mutation is linked to abnormal neurological connections between the eyes and the brain and can result in crossed eyes. They are also prone to lung infections, feline OCD, vestibular disease, and Feline Hyperesthesia Syndrome. Some published studies indicate that Siamese cats are at a higher risk for diabetes mellitus.

## Personality

Siamese are very affectionate and intelligent cats, with a distinctly outgoing nature. They seek and enjoy the company of humans as well as other cats. They tend to strongly bond with one person in the family. These kitties are very vocal and will often demand your attention with a loud, low-pitched persistent voice that has been nicknamed "Meezer".

# Persian





**Origin**
Iran

**Related Breeds**
Western European Cat

**Alternate Names**
Persian Longhair, Shiraz

**Personality**
Calm, restful

**Avg. Male Weight**
9-14

**Avg. Female Weight**
7-11

## General Overview

The Persian cat is considered the "glamor puss" of the cat world. It is one of the world's most popular breeds, with an exceptionally beautiful coat, adorably chubby cheeks, expressive eyes, and an affectionate personality. The modern-day breed comes in two types: show and traditional. The show Persian is characterized by certain exaggerated features, while the traditional Persian, or the "Doll Face", is the original version of the breed without exaggerated features. However, both have long and flowing coats that come in a rich array of colors and patterns.

## Breed History

Little is known about the history of this breed. Legend has it that the breed was introduced in Europe in the 1620s by Pietro Della Valle from Italy, who received the cat as a souvenir from Persia. At its height, Persian encompassed the areas of modern-day Iran, Egypt, Turkey, and parts of Afghanistan and Pakistan. These longhaired cats were considered precious cargo, traveling among the caravans that moved jewels and rare spices westward from Persia. Breeding of Persians likely began in Italy and France, with the practice quickly spreading to the rest of Europe. By the early 1900s, the Persian was introduced to the United States where it also gained enormous popularity.

## Genetic predisposition and health

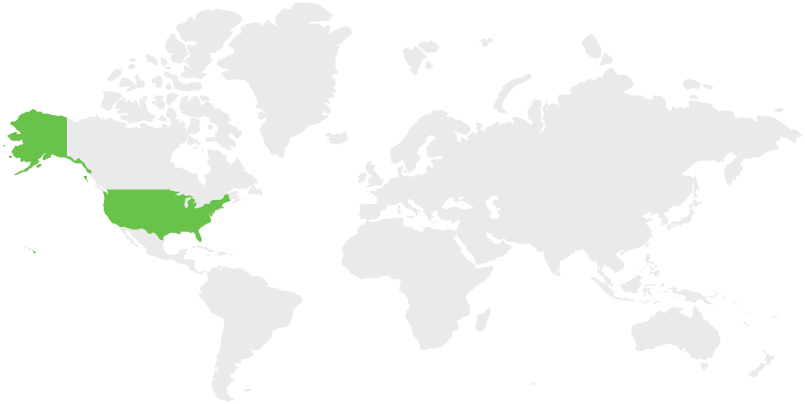
Persians are associated with a range of health issues. They are a brachycephalic breed, and as such they can suffer from obstructed airways, tooth misalignment and crowding, tear duct blockages, and heart problems. Persians are also at a high risk for polycystic kidney disease, hypertrophic cardiomyopathy, progressive retinal atrophy, and feline lower urinary tract disease (FLUTD).

## Personality

Persians are gentle, friendly, and affectionate. These delightful creatures are not as active as other feline breeds. They would rather spend their time lounging in their favorite spot on the sofa. They don't require as much space for activity, so are well-suited apartments and smaller living spaces. Their long and luxurious coats require daily grooming to prevent knots and tangles, as well as to provide protection against troublesome hairballs.

# Exotic Shorthair





**Origin**
USA

**Related Breeds**
Persian, American Shorthair

**Alternate Names**
Shorthaired Persian

**Personality**
Active, gentle, lap cat

**Avg. Male Weight**
7-14

**Avg. Female Weight**
6-10

## General Overview

The Exotic Shorthair was created to be a shorthaired version of the Persian cat. Except for the fur, it meets all the breed standards designed for its Persian parent breed. These cats are medium-sized, with a broad, oval head and a short, "pushed in" muzzle. Their coat is short, yet slightly longer than lengths generally seen in other shorthaired cats. They come in all colors and patterns.

## Breed History

The history of the Exotic Shorthair dates back about 50 years. American Shorthair (ASH) breeders decided, in secret, to improve the body type of the ASH by introducing the Persian into the bloodline. This new crossbreed gained unexpected attention, which eventually resulted in the creation of a brand-new breed standard. However, the secrecy behind this ASH breeder effort resulted in the disqualification of ASH crossbreds from the show ring. In 1966, the Cat Fanciers' Association officially recognized the new ASH crossbreed as the name Exotic Shorthair. Further outcrossing with other breeds occurred until this was banned in 1987, after which the Exotic Shorthair could only be bred with the Persian.

## Genetic predisposition and health

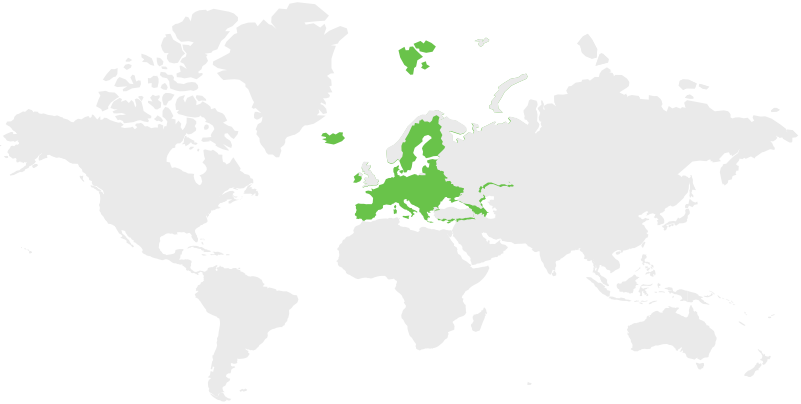
Like the Persian, Himalayan, and Burmese, the Exotic Shorthair is a brachycephalic breed. Brachycephaly in cats is a trait of skull bones shortened in length, which gives the face and nose a pushed in appearance. Health problems associated with this condition include brachycephalic airway obstructive syndrome, tooth misalignment, tooth crowding, tear duct issues, and heart problems. The breed is also known to have an increased risk for calcium oxalate urolithiasis, dystocia, and polycystic kidney disease.

## Personality

The Exotic Shorthair is a very gentle and calm kitty. Its personality reflects the best traits of its parent breeds. They are often playful and energetic like the American Shorthair, yet despite their active nature, they are well-suited for a life in the apartment. They have the affectionate and loyal qualities of the Persian, which they often display as purrfectly loving lap cats.

# British Shorthair





**Origin**
Europe

**Related Breeds**
Persian, Siamese, Russian Blue

**Alternate Names**
The British

**Personality**
Laid back, quiet, patient

**Avg. Male Weight**
12-18

**Avg. Female Weight**
9-15

## General Overview

The British Shorthair is a version of the traditional British domestic cat. They are big, solid cats with chunky bodies, strong legs, broad heads, and large piercing eyes. The most common coat color seen in this breed is the "British Blue", though the breed includes a wide range of coat colors and patterns that complement their rich, dense coats.

## Breed History

The British Shorthair is considered one of the oldest cat breeds. It was first introduced to Great Britain (now the United Kingdom) by the Romans and is thought to share common ancestry with native wild cats of Britain. Food shortages during World Wars I and II brought the breed close to extinction. To increase their numbers and promote genetic diversity, breeders began outcrossing them with Persians, Russian Blues, and Burmese.

## Genetic predisposition and health

Recent genetic evidence suggests that the British Shorthair is genetically predisposed to various inherited diseases such as polycystic kidney disease, which is a condition characterized by renal cysts that can lead to kidney failure. They are also known to be at a higher risk for hypertrophic cardiomyopathy (HCM), the most common form of feline heart disease. In a 2011 Danish study of more than 329 British Shorthairs, 20.4 percent of males and 2.1 percent of females had HCM. The breed is also prone to obesity, so it is important to ensure a proper diet and promote regular activity.

## Personality

This dignified breed is famous for its easygoing and patient nature. While very affectionate, British Shorthairs aren't known as lap cats and do not tend to enjoy being picked up or carried around. The British Shorthair is sweet-natured and can make a great companion for anyone seeking a low-maintenance cat.

# Himalayan





**Origin**
UK

**Related Breeds**
Persian, Siamese

**Alternate Names**
Colorpoint Persian

**Personality**
Gentle, affectionate, quiet

**Avg. Male Weight**
9-14

**Avg. Female Weight**
7-11

## General Overview

A medium-sized breed of cat, the Himalayan is a friendly companion prized for its long, silky-soft coat. They are also referred to as the "colorpoint Persian", with points that may exhibit tabby, lynx, or tortoiseshell patterns in a range of colors including lilac, seal, blue, chocolate, flame, and cream.

## Breed History

In the 1950s, early breeding programs involved crossing Persian cats with Siamese cats. Marguerita Goforth is credited as the person who helped perfect the modern-day Himalayan breed that we know today. The Himalayan inherited its luxurious coat from the Persian and its deep blue eyes and colorpoint features from the Siamese. Their long fur requires daily grooming and care to prevent matting, tangles, and hairballs. The Cat Fanciers' Association accepted the Himalayan breed in 1957. Some cat registries consider the Himalayan as simply a color variation of the Persian, rather than a separate breed of its own.

## Genetic predisposition and health

Though many Himalayans tend to enjoy longer lives with few health problems, their close relation to the Persian does put them at a higher risk for polycystic kidney disease and progressive retinal atrophy. They also share the flat-faced (brachycephalic) features of the Persian, which can prevent proper tear drainage or increase the potential for breathing issues. Himalayans are also prone to obesity, so adequate playtime and a proper diet are important for keeping them at a healthy weight.

## Personality

Himalayans are gentle, affectionate, and highly intelligent. They are known as lap cats, are easygoing and calm, and rarely vocalize. They can do well in apartments and other smaller spaces, and they get along best with other animals if they are introduced when young. They tend to bond strongly with one person in their human family and love to be near them as much as possible.

# Bengal





**Origin**
USA

**Related Breeds**
Asian Leopard Cat, Egyptian Mau

**Alternate Names**
None

**Personality**
Active, energetic, playful

**Avg. Male Weight**
10-18

**Avg. Female Weight**
6-12

## General Overview

Often referred to as the "Miniature Leopard" of the domestic cats, the Bengal is a unique breed designed to resemble exotic wild cats such as Ocelots, Margays, and Clouded Leopards. Bengals are characterized by a lean and muscular body, broad head, relatively short ears, and a long, muscular neck. They have coat patterns that are spotted/rosetted or marbled that can be any shade of orange-brown, light brown, or silver. Spots and rosettes are vivid and contrasted, and often multicolored. Many Bengals have fur that beautifully sparkles when the light catches the tips of their coat hairs.

## Breed History

Bengals arrived on the scene in California in 1963, as a result of selectively breeding hybrids of the Asian leopard cat with the domestic cat. The goal was to create an aesthetically beautiful cat that was also friendly, exhibiting the vivid, contrasting coat qualities of the leopard cat and the docile temperament of the domestic cat.

## Genetic predisposition and health

Bengals are known to be affected by several genetic diseases, such as Bengal Progressive Retinal Atrophy (or PRA-b). This is a group of diseases characterized by progressive, bilateral retinal degeneration. The breed is also susceptible to erythrocyte pyruvate kinase deficiency (PK-Def), an inherited metabolic disorder characterized by disrupted survival of the red blood cells, and to hypertrophic cardiomyopathy (HCM), the most common form of feline heart disease.

## Personality

If you're looking for an active playmate with lots of purrrsonality, then a Bengal is the cat for you! Bengals are friendly and devoted companions with exceptional curiosity, energy, and agility. They exhibit confidence and flare while constantly on the move. Bengals are highly intelligent. They are known for their love of playing games of fetch and are very fond of playing in water.

# Savannah





**Origin**
USA

**Related Breeds**
African Serval

**Alternate Names**
None

**Personality**
Loyal, athletic, intelligent

**Avg. Male Weight**
12-25

**Avg. Female Weight**
12-25

## General Overview

The Savannah cat is an elegant cross between an African Serval cat and a domestic cat. Savannah cats are lean and tall, but their size greatly depends on a hybrid's sex and generation. First generations are usually larger, weighing around 8 to 20 pounds, while later generations (F3 and onward) tend to be smaller. The Savannah breed is distinguished by a few prominent features inherited from their wild ancestors. These include an exceptionally long body, ears that are tall and cupped, puffy noses, and hooded eyes. Their coats are short and dense. The International Cat Association (TICA) accepts only spotted coat patterns that are brown, silver, or black smoke in color because these are the only patterns found in the African Serval. However, non-standard colors and patterns occur as well, such as marble, rosette, pointed, cinnamon, and chocolate.

## Breed History

The first-born Savannah kitten is associated with Judee Frank, who cared for a male African Serval cat named Ernie. Judee had a Siamese cat who gave birth to a kitten in 1986, which she realized had been sired by Ernie. The Savannah breed was first presented to TICA board in 1996, and was accepted in 2001. In earlier years, hybrids were outcrossed with other domestic cats to supplement genetic diversity. TICA currently accepts outcrosses with the Egyptian Mau, Ocicat, Oriental Shorthair, and Domestic Shorthair. Outcrosses with the Bengal and Maine Coon are not permitted.

## Genetic predisposition and health

Though all cats face a certain risk of developing genetically inherited health issues, there are currently no known genetic health conditions tightly associated with this particular breed.

## Personality

Savannah cats have a calm demeanor and are known for their friendliness and loyalty. They exhibit above average intelligence and are highly trainable for activities such as walking on a leash. Their athleticism and agility will be on full display during activities and games that involve jumping or climbing.

# Egyptian Mau





**Origin**
Egypt

**Related Breeds**
Turkish Cats, Russian Blue, Korat

**Alternate Names**
The Mau

**Personality**
Water lover, adventurous, energetic

**Avg. Male Weight**
10-14

**Avg. Female Weight**
6-10

## General Overview

The Egyptian Mau is one of the few naturally-spotted domestic cat breeds. The breed conformation is described by The Cornell Book of Cats as "a balance between the compactness of a Burmese and the slim elegance of a Siamese". The naturally occurring coat colors of the Mau include silver, bronze, smoke, and black. Black and dilute Maus are not eligible for showing. Around 7,000 Egyptian Mau cats are registered with the Cat Fanciers' Association, signaling that the breed is considered rare by today's standards.

## Breed History

Controversy still surrounds the history of this breed. Historic evidence has suggested that the Mau is an Egyptian breed, yet DNA studies reveal that the breed we know today is actually mostly of European and North American origin. The first records of the Egyptian Mau come from Egypt, and it is known that the breed was prized by the Pharaohs, but how and when the breed got there has yet to be confirmed. The first Egyptian Mau was brought to the United States in 1956 by a Russian Princess named Nathalie Troubetzkoy.

## Genetic predisposition and health

The Mau is at a higher risk for developing feline urate urolithiasis, a urinary tract condition caused by the crystallization of minerals and compounds such as ammonium and uric acid. This leads to a buildup of stones within the urinary tract, which can be fatal if left untreated. Egyptian Mau cats are fond of very warm temperatures and are more temperature sensitive than other domestic cats. They are also known for their sensitivity to medicines and anesthesia.

## Personality

The Egyptian Mau is an athletic breed that requires an engaging environment. Maus are known lovers of water who are also playful, vocal, and adventurous. They thrive in active environments that enable them to express their natural hunting instincts. They tend to do better in homes with adults and older children.



# Carlisle's genetic health and trait markers

VERSION 4.0

basepaws

# Kitty Genetics 101: Critical Reading

**Genotype is the portion of your cat's genome that encodes the physical expression (phenotype) of a particular trait, such as eye color, coat color, or disease predisposition. Genes comprise the genotype.**

Every gene in your kitty's genome is present in two copies—one inherited from each parent. These two copies can be the same or different. If they are different, we say that the cat has two different alleles (gene variants) and is heterozygous for this gene. Whereas if the two copies of the gene are the same, the cat is homozygous for the gene of interest.

When it comes to the phenotype, alleles can have different contributions. If the two gene alleles are the same, then they will both contribute equally to the phenotype.

If the two alleles are different, then it is the nature of their relationship that determines which allele will contribute to the phenotype. Some alleles are dominant, meaning that they can "hide" other alleles and become the sole contributor to the phenotype. In contrast, the allele that is "hidden" in a heterozygous state is known as a recessive allele. A recessive allele can only contribute to the phenotype when your cat is homozygous for that allele, in other words, there is no dominant allele that can hijack the phenotype expression.

# How Does It All Relate To Disease?

**Genetic disorders are conditions that can be present at birth or develop later in life and are caused by one or more genetic mutations.**
We tested your cat for genetic health markers associated with genetic disorders. Genetic health markers are mutated gene alleles that are associated with an increased likelihood of developing a particular genetic disorder. With the exception of hypertrophic cardiomyopathy (which has more complex genetics) and Haemophilia B (which has an X-linked inheritance pattern), the conditions included in this report have either a dominant or a recessive pattern of inheritance. Diseases with a dominant inheritance pattern means that having only one mutated gene allele will result in the cat developing the disease. For diseases with a recessive inheritance pattern, the cat will develop the disease only if it has two mutated alleles. Having only one mutated recessive allele makes the cat a disease "carrier", meaning that it will not develop the disease but can pass the mutation to its kittens.

This section of the report details your kitty's results for 115 genetic markers that are associated with 43 diseases. 'Clear' status indicates that your cat tested negative for all genetic markers associated with a disease. 'Carrier' status means that your cat has one copy of a recessive genetic marker, or that your female cat has one copy of a marker with X-linked inheritance. In either case, this should only be a concern if you plan to breed your cat. 'At risk' and 'At high risk' status means one of three things: (1) your cat has tested positive for a dominant allelic mutation, (2) your cat has two copies of a recessive allelic mutation, or (3) your male cat has one copy of a marker with X-linked inheritance.

If you see either "At risk" or "At high risk", contact your veterinarian.

Please note that Basepaws results should not replace a professional evaluation and clinical diagnosis by a veterinarian. It is also important to understand that a 'Clear' result does not mean that your cat is guaranteed to not develop the disease. It simply means that your cat is negative for the particular mutation(s) that we tested them for. There may be environmental factors and other genetic mutations that are not yet known (i.e., they are not yet included in our test) which could possibly contribute to developing the disease.

## Scientific evidence strength rating system

The genetic markers in this report represent a deep dive into feline genetics research, including the very latest findings. Some research findings are scientifically stronger than others. For example, a study on 100 cats has stronger statistical power, and its conclusions can be interpreted with greater confidence, than a study on fewer than five cats. The Basepaws report includes a five-star rating system that denotes the strength of the scientific research evidence that is available for each genetic marker, and the interpretation of associated results. This system answers the question: 'How strong is the evidence that this marker is associated with this disease or trait?'



Consistent results reported across multiple scientific studies. More than 100 cats across studies confirmed to have the expected correlation between the genetic marker and physical presentation. Multiple scientific tools used to confirm the mechanism behind the mutation. No contradictory results reported in literature.



Results based on one or more studies reporting findings from at least 30 cats, confirming the expected correlation between the genetic marker and physical presentation. Multiple scientific tools used to confirm the mechanism behind the mutation. No contradictory results reported in literature.



Results based on one or more studies reporting findings from at least 10 cats, confirming the expected correlation between the genetic marker and physical presentation. Multiple scientific tools may or may not have been used to confirm the mechanism behind the mutation. No contradictory results reported in literature.



Results based on a study that reports findings from fewer than 10 cats, confirming the expected correlation between the genetic marker and physical presentation. Multiple scientific tools may or may not have been used to confirm the mechanism behind the mutation. Potentially inconclusive inheritance pattern. No contradictory results reported in literature.



Preliminary results to be interpreted with extreme caution. Based on a scientific study that either focuses on a single cat or on a few studies that report contradictory results.

# Health Summary

In this section, you will find a brief description of the genetic diseases for which your cat currently has results. Each of these diseases is represented by at least one known health marker. We also provide details on the genes and genetic mutations included in our test, with our five-star scientific evidence grading system for each marker. This grading system assesses the strength of the evidence that links each marker to each disease, based on the amount and quality of scientific literature available.

**IMPORTANT: Results for some of the 115 health markers we currently test for may not be available in your first report. Your cat's results for these missing markers may be added over the coming weeks or months. Check results often for potential updates on missing markers.**

It's important to share this information with your veterinarian so it can be added to your pet's medical records. If you are a veterinarian, please email vet@basepaws.com or visit basepaws.com/vets.

**Clear**

The cat is negative (has zero copies) for all of the markers for which we tested that are known to be associated with a particular disease. This result, however, should not rule out the need to seek a professional diagnosis by a veterinarian, should the cat develop symptoms of the disease. It is still possible that the cat is positive for markers yet to be discovered that could be associated with the disease, or in some cases, environmental factors could contribute to a cat's potential to develop the disease.

**Carrier**

In most cases, this means that the cat has one copy of an autosomal recessive disease-associated marker (mutated gene allele). As a refresher from the health markers intro section, for diseases with a recessive inheritance pattern, the cat will develop the disease only if it has two mutated alleles (two copies of the marker). Alternatively, the 'Carrier' result may mean that a female cat has one copy of a marker associated with the disease that follows an X-linked inheritance pattern. As a carrier, your cat is not at risk for developing the disease, but its offspring may be at risk.

**At Risk**

The cat has one copy of a marker for a disease where there is a dosage component to disease presentation (e.g., Hypertrophic Cardiomyopathy, Mucopolysaccharidosis VI, Hyperlipoproteinaemia). Gene dosage refers to the number of copies of an allele present in a cat's genome (entire set of genetic instructions stored in their chromosomes). A higher gene dosage results in an increased expression of a disease. This means that having one copy of the disease-associated marker could result in a milder disease presentation, as compared to having two copies where the disease presentation may be more severe.

**At High Risk**

This designation indicates that there is a very strong chance that the cat will develop the disease. It can mean one of four things: (1) the cat has one or two copies of a marker associated with an autosomal dominant disease (a single copy is enough to cause the disease); (2) the cat has two copies of a marker associated with an autosomal recessive disease; (3) the cat has two copies of a marker associated with a disease, where having these two copies results in a more severe disease presentation than if there was only one copy (the gene dosage effect); or (4) a male cat has one copy of a disease with an X-linked (sex-linked and therefore non-autosomal) inheritance pattern, meaning they are affected because they only have a single copy of the X chromosome that carries the mutation.

# Musculoskeletal and connective tissue disorders

## Fibrodysplasia Ossificans

Fibrodysplasia ossificans is a connective tissue disease that results in severe disability. This condition causes muscles, filaments, and tendons to ossify (turn into bony tissues), either spontaneously or post-injury. Due to the formation of a secondary skeleton in place of damaged muscle tissues, the cat's ability to move is progressively hindered.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| ACVR1 | C>T | None | 0 copies | Clear |

## Myotonia Congenita

Myotonia Congenita (MC) is a hereditary neuromuscular disorder characterized by persistent muscle contraction (or delayed relaxation of muscles). The overall prognosis of the disease is poor, and treatment options are scarce.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| CLCN1 | G>T | None | 0 copies | Clear |

## Ehlers-Danlos Syndrome

Ehlers-Danlos syndrome is a genetic disorder of the connective tissue that is associated with defective formation of collagen. The disease causes abnormally extensible skin, hindered wound healing, and hypermobility of joints. Treatment is focused on relieving symptoms and preventing complications.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| COL5A1 | del(C) | None | 0 copies | Clear |

## Vitamin D-deficiency rickets, type IA

Vitamin D-dependent rickets is a disease associated with the softening of bones and an increased rate of bone deformities and fractures.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| CYP27B1 | C>A | None | 0 copies | Clear |
| CYP27B1 | del(C) | None | 0 copies | |

# Musculoskeletal and connective tissue disorders

## Vitamin D-deficiency rickets, type IB

Vitamin D-dependent rickets is a disease associated with the softening of bones and an increased rate of bone deformities and fractures.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| CYP2R1 | del(A) | None | 0 copies | Clear |

## Hypokalemic Periodic Paralysis

Hypokalemic periodic paralysis is a genetic disease of the Burmese and closely related cat breeds that is characterized by low potassium ion (K+) levels in the blood. The condition is marked by either generalized or localized skeletal muscle weakness, often episodic in nature.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| WNK4 | C>T | Burmese | 0 copies | Clear |

# Eye disorders

## Progressive Retinal Atrophy (AIPL1-related)

This progressive retinal atrophy is related to Leber congenital amaurosis—a retinal disease causing severe visual impairment at birth. The disorder is inherited in an autosomal recessive manner, and is associated with the defective functioning of a protein called aryl hydrocarbon receptor-interacting protein-like 1 (AIPL1).

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| AIPL1 | C>T | Persian | 0 copies | Clear |

## Late-Onset Photoreceptor Degeneration (rdAc)

This late-onset type of progressive retinal atrophy (PRA) is caused by an autosomal recessive mutation "rdAc" in the CEP290 gene. The mutation causes progressive degeneration of the retina, slowly leading to vision loss and blindness.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| CEP290 | A>C | Abyssinian, Somali | 0 copies | Clear |

## Progressive Retinal Atrophy (KIF3B-related)

This progressive retinal atrophy is related to Leber congenital amaurosis—a retinal disease causing severe visual impairment at birth. The disorder is inherited in an autosomal recessive manner, and is associated with the defective functioning of a protein called aryl hydrocarbon receptor-interacting protein-like 1 (AIPL1).

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| KIF3B | C>T | Bengal | 0 copies | Clear |

## Glaucoma

Primary congenital glaucoma is an autosomal recessive disease characterized by high fluid pressure in the eye, which damages the optic nerve and ultimately leads to blindness. Early diagnosis and treatment may slow the progression of the disease.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| LTBP2 | ins(CTC..) | Siamese | 0 copies | Clear |

# Metabolic disorders

## Mucopolysaccharidosis VI

Mucopolysaccharidosis is a metabolic deficiency in the production or functioning of the enzymes required for digestion of glycosaminoglycans (GAGs). Consequently, GAGs start accumulating in the cells, causing progressive cellular damage. The prognosis and life expectancy are variable.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| ARSB | A>G | Birman, Siamese | 0 copies |
| ARSB | C>T | Birman, Siamese | 0 copies |

Clear

## Wilson's Disease

Wilson's Disease is a rare autosomal recessive genetic disorder associated with accumulation of copper in the vital organs, such as the liver and the brain. If left untreated, this can be a lethal disease. Affected cats may show signs of jaundice, lethargy, weight loss, hyperammonemia, and elevated hepatic enzymes.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| ATP7B | C>G | None | 0 copies |

Clear

## Neuronal Ceroid Lipofuscinosis

Neuronal ceroid lipofuscinosis (NCL) is a neurodegenerative lysosomal storage disease. It is characterized by abnormal accumulation of lipopigments in the neurons, liver, spleen, kidneys, and heart. NCL is associated with progressive blindness and neurologic deficits.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| CLN6 | G>A | None | 0 copies |
| MFSD8 | del(T) | None | 0 copies |

Clear

## Dihydropyrimidinuria

Dihydropyrimidinuria is a rare disease associated with a deficiency of the enzyme dihydropyrimidinase. Cats with this disease can suffer from weight loss, vomiting, and lethargy.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| DPYS | C>T | None | 0 copies |

Clear

# Metabolic disorders

## Gangliosidosis, type GM1

Gangliosidosis is a group of lipid storage disorders characterized by the accumulation of gangliosides in neurons. This eventually leads to progressive destruction of the nerve cells in the brain and spinal cord. The disease is not treatable, and typically leads to death within the first year of life.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| GLB1 | C>G | None | 0 copies |

Clear

## Gangliosidosis, type GM2 (variant AB)

Gangliosidosis is a group of lipid storage disorders characterized by the accumulation of gangliosides in neurons. This eventually leads to progressive destruction of the nerve cells in the brain and spinal cord. The disease is not treatable, and typically leads to death within the first year of life.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| GM2A | del(GAC..) | None | 0 copies |

Clear

## Mucopolysaccharidosis VII

Mucopolysaccharidosis is a metabolic deficiency in the production or functioning of the enzymes required for digestion of glycosaminoglycans (GAGs). Consequently, GAGs start accumulating in the cells, causing progressive cellular damage. The prognosis and life expectancy are variable.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| GUSB | G>A | None | 0 copies |
| GUSB | T>G | None | 0 copies |
| GUSB | C>T | None | 0 copies |

Clear

## Gangliosidosis, type GM2 (variant 0)

Gangliosidosis is a group of lipid storage disorders characterized by the accumulation of gangliosides in neurons. This eventually leads to progressive destruction of the nerve cells in the brain and spinal cord. The disease is not treatable, and typically leads to death within the first year of life.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| HEXB | del(TAA..) | Burmese, Korat | 0 copies |
| HEXB | inv(TAC..) | Burmese, Korat | 0 copies |
| HEXB | del(C) | Burmese, Korat | 0 copies |
| HEXB | C>T | Burmese, Korat | 0 copies |

Clear

# Metabolic disorders

## Porphyria, acute intermittent (AIP)

Porphyria is a group of diseases associated with the accumulation of porphyrins. There are two types of porphyria described: acute and congenital. The acute type primarily affects the nervous system. Clinical presentation, severity and prognosis vary.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| HMBS | del(ACA..) | None | 0 copies |
| HMBS | ins(T) | None | 0 copies |
| HMBS | G>A | None | 0 copies |
| HMBS | C>T | None | 0 copies |
| HMBS | G>A | None | 0 copies |
| HMBS | del(GAG) | None | 0 copies |

Clear

## Mucopolysaccharidosis I

Mucopolysaccharidosis is a metabolic deficiency in the production or functioning of the enzymes required for digestion of glycosaminoglycans (GAGs). Consequently, GAGs start accumulating in the cells, causing progressive cellular damage. The prognosis and life expectancy are variable.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| IDUA | del(TCG) | None | 0 copies |
| IDUA | del(GTC) | None | 0 copies |

Clear

## Hyperlipoproteinaemia

Hyperlipoproteinemia is a disease characterized by a deficiency in the digestion of lipids and lipoproteins, mainly cholesterol and triglycerides. Their persistently elevated levels in the blood pose multiple health threats, such as heart disease. Timely diagnosis improves prognosis.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| LPL | C>T | None | 0 copies |

Clear

## Alpha-mannosidosis

Alpha-mannosidosis is a lysosomal storage disorder characterized by the deficiency of the alpha-D-mannosidase enzyme and the progressive accumulation of oligosaccharides in all tissues, consequently leading to cell death. Treatment options are scarce.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| MAN2B1 | del(CTG..) | Persian | 0 copies |

Clear

# Metabolic disorders

## Niemann-Pick disease, type C1

Niemann-Pick disease is a group of autosomal recessive disorders characterized by deficiencies of specific enzymes that are involved in the intracellular transport of lipids. This leads to accumulation of cholesterol in lysosomes, causing neurological deterioration.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| NPC1 | C>G | None | 0 copies |
| NPC1 | T>G | None | 0 copies |

Clear

## Niemann-Pick disease, type C2

Niemann-Pick disease is a group of autosomal recessive disorders characterized by deficiencies of specific enzymes that are involved in the intracellular transport of lipids. This leads to accumulation of cholesterol in lysosomes, causing neurological deterioration.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| NPC2 | C>T | None | 0 copies |

Clear

## Pyruvate Kinase Deficiency

Pyruvate kinase (PK) deficiency is an inherited metabolic disorder characterized by disrupted survival of erythrocytes, leading to anemia, lethargy, weakness, weight loss, abdominal enlargement, and in some cases, jaundice, tachycardia, and muscle wasting. The prognosis and severity are variable.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| PKLR | G>A | Somali, Abyssinian | 0 copies |

Clear

## Niemann-Pick disease, type A

Niemann-Pick disease is a group of autosomal recessive disorders characterized by deficiencies of specific enzymes that are involved in the intracellular transport of lipids. This leads to accumulation of cholesterol in lysosomes, causing neurological deterioration.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| SMPD1 | G>A | None | 0 copies |

Clear

# Metabolic disorders

## Porphyria, congenital erythropoietic (CEP)

Porphyria is a group of diseases associated with the accumulation of porphyrins. There are two types of porphyria described: acute and congenital. The acute type primarily affects the nervous system. Clinical presentation, severity and prognosis vary.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| UROS | G>A | None | 0 copies |
| UROS | C>T | None | 0 copies |

Clear

# Blood disorders

## Methemoglobinemia

Methemoglobinemia is a disease characterized by elevated levels of methemoglobin in the blood. The disease presentation is variable, but usually includes brownish discoloration of mucous membranes and blood with a brownish hue. Complications can involve arrhythmias and seizures.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| CYB5R3 | C>T | None | 0 copies |
| CYB5R3 | C>G | None | 0 copies |

Clear

## Factor XII Deficiency

Factor XII deficiency, or Hageman deficiency, is a blood clotting disorder characterized by deficiency in the coagulation factor XII. Luckily, unlike other types of haemophilias, this condition is not severe and prognosis is typically very good.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| F12 | del(C) | None | 0 copies |
| F12 | G>C | None | 0 copies |

Clear

## Haemophilia B

Haemophilia B, also known as Christmas disease, is an X chromosome-linked recessive deficiency of coagulation factor IX. Like other haemophilias, the disorder is characterized by dysfuctional blood coagulation in a case of injury. The prognosis and treatment depend on the severity of the disease.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| F9 | C>T | None | 0 copies |
| F9 | G>A | None | 0 copies |

Clear

## Glanzmann Thrombasthenia

Glanzmann thrombasthenia is a rare genetic coagulation disorder. The disease is caused by a mutation in an integrin gene, resulting in the inability of thrombocytes to clot blood. The severity and presentation of the disease are variable.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| ITGA2B | del(G) | None | 0 copies |

Clear

# Endocrine disorders

## Congenital Adrenal Hyperplasia

Congenital adrenal hyperplasia is an autosomal recessive disease characterized by an inbalance in the production of the adrenal hormones cortisol and aldosterone. The severity of the condition depends on the nature of the deficiency, and common presentations include altered development of primary and secondary sex characteristics.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| CYP11B1 | G>A | None | 0 copies | Clear |

## Hypogonadotropic Hypogonadism

Hypogonadotropic hypogonadism is associated with a gonadotropic releasing hormone (GnRH) deficiency. The presentation of the disease depends on the severity, and affected cats typically suffer from hindered sexual development.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| TAC3 | C>T | None | 0 copies | Clear |

## Hypothyroidism

Hypothyroidism in cats is a rare and complex glandular disorder caused by an under-active thyroid gland. As a result, thyroid hormones triiodothyronine (T3) and thyroxine (T4) are under-produced. If diagnosed correctly and as early as possible, the prognosis and management of the disease can be promising.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| TPO | C>T | None | 0 copies | Clear |

# Autoimmune disorders

## Autoimmune Lymphoproliferative Syndrome

Autoimmune Lymphoproliferative Syndrome (ALPS) is a lethal disease, distinguished by massive enlargement of lymphatic nodes and the spleen, caused by the accumulation of lymphocytes.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| FASLG | ★★★☆☆ ins(A) | British Shorthair | 0 copies | Clear |

## Leukocyte Adhesion Deficiency

Leukocyte adhesion deficiency (LAD) is an immunodeficiency disorder associated with poorly-functioning neutrophils. Consequently, affected cats are highly susceptible to recurrent infections. LAD is a serious disorder, and if left untreated, affected kittens rarely reach adulthood.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| ITGB2 | ★☆☆☆☆ del(GCC..) | None | 0 copies | Clear |

# Renal disorders

## Primary Hyperoxaluria

Primary hyperoxaluria is a severe, autosomal recessive disorder associated with an elevated deposition and excretion of oxalates. This leads to formation of renal and bladder oxalate stones, and eventually, kidney damage and failure. Therapy is restricted to the treatment of symptoms.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| GRHPR | G>A | None | 0 copies | Clear |

## Polycystic Kidney Disease

Polycystic kidney disease (PKD) is an autosomal dominant genetic disease characterized by the formation of small fluid-filled cysts in the kidneys, which leads to kidney damage and failure. The disease is progressive and irreversible, but early diagnosis can significantly improve prognosis.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| PKD1 | C>A | Persian | 0 copies | Clear |

## Cystinuria, type IA

Cystinuria is an inherited metabolic disease characterized by defective amino acid reabsorption, leading to the formation of cystine stones in the kidneys, ureter and bladder, and eventually, to urinary obstruction. There are no available treatments for this condition.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| SLC3A1 | C>T | None | 0 copies | Clear |

## Cystinuria, type B

Cystinuria is an inherited metabolic disease characterized by defective amino acid reabsorption, leading to the formation of cystine stones in the kidneys, ureter and bladder, and eventually, to urinary obstruction. There are no available treatments for this condition.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| SLC7A9 | C>T | None | 0 copies | |
| SLC7A9 | G>A | None | 0 copies | |
| SLC7A9 | G>A | None | 0 copies | Clear |
| SLC7A9 | A>G | None | 0 copies | |
| SLC7A9 | T>A | None | 0 copies | |

# Skin disorders

## Epidermolysis Bullosa Simplex

Epidermolysis bullosa simplex (EBS) is a genetic disease associated with highly fragile skin and mucous membranes, due to mutations in genes associated with cytoskeletal cell functions. Common issues include blistering and wounding of the skin, ulcer formation on mucous membranes, and nail deformities in response to mild traumas.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| KRT14 | G>A | None | 0 copies | Clear |

## Inflammatory Linear Verrucous Epidermal Nevus

Inflammatory Linear Verrucous Epidermal Nevus (ILVEN) is an inherited disease characterized by skin overgrowth and the formation of pigmented, itchy cutaneous lesions. These wart-like lesions are called epidermal nevi, and affected areas are prone to inflammation. Due to the rarity of this disease in cats, there is no established treatment protocol.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| NSDHL | A>G | None | 0 copies | Clear |

# Cardiovascular disorders

## Hypertrophic Cardiomyopathy

Hypertrophic cardiomyopathy (HCM) is the most common feline heart disease, and it is characterized by tachycardia and the thickening of the heart's muscular walls. The severity of the disease is variable, but if diagnosed early, different treatment options are available.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| MYBPC3 | G>A | Ragdoll | 0 copies |
| MYBPC3 | C>G | Maine Coon | 0 copies |
| MYH7 | C>T | None | 0 copies |

Clear

# Blood type and transfusion risk

Only one blood type system has been established in domestic cats: the AB system. There are three feline blood types: A, B, and AB. There is a fourth blood type, MiK, that has also been identified, but not much is known other than the fact that it is very rare and occurs in less than 1 percent of cats.

The genetics behind feline blood types is rather complicated. There is scientific literature on seven different markers that may play a role in determining a cat's blood type. However, only four of them are considered the most reliable and consistent predictors and these four are the markers for which we screen in this test. They are all mutations in the Cytidine monophospho-N-acetylneuraminic acid hydroxylase (CMAH) gene.

**IMPORTANT: Due to the imperfect relationship between genetics and blood type, we strongly recommend performing a serological blood typing test with your veterinarian, especially if blood type information is needed for making any medical decisions.**

**Blood Group A**

Most cats of European or American descent have blood type A. This is considered the most prevalent feline blood type, with more than 70 percent of cats estimated to have blood type A.

**Blood Group B**

The prevalence of blood type B varies widely depending on the cat's pedigree. This blood type is rarely seen in Maine Coons and Norwegian Forest Cats, and more frequently seen in the British Shorthair and Exotic and rexoid breeds.

**Blood Group AB**

Blood type AB is extremely rare, with an estimated prevalence across pedigreed and non-pedigreed cats of less than 1 percent.

## Likely blood type based on genotype

| Gene | Mutation | Status |
|---|---|---|
| CMAH | G>T | 0 |
| CMAH | T>A | 0 |
| CMAH | C>T | 0 |
| CMAH | del(T) | 0 |

Blood type A

## Blood transfusion risk

It is recommended that the blood types of both the donor and the recipient are established before a transfusion. Cats with blood type A should only receive blood from cats of the same blood type. Transfusion from type B donors to type A recipients does not work efficiently and may be accompanied by mild incompatibility symptoms such as restlessness, tachycardia, and tachypnea.

Medium

# Traits

This section presents your cat's results for a variety of genetic markers associated with physical traits that can be seen. Additionally, we screened your cat for an important trait that can't be seen with the naked eye: resistance to Feline Immunodeficiency Virus (FIV).

For many traits in this section, there are multiple known variants associated with each trait. We included our five-star scientific evidence grading system for each marker which assesses the strength of evidence linking each marker to each trait, based on the amount and quality of scientific literature available. In rare cases, it is possible that your cat is positive for a marker but does not exhibit the physical trait associated with it due to complex genetic or epigenetic interactions that may not be well understood. Epigenetic interactions include behavior and environment, which can cause changes that affect the way your cat's genes work but are reversible and do not change your cat's DNA sequence.

It is also possible that your cat does exhibit a physical trait but has tested negative for all known markers associated with the trait. This means is that, in your cat's case, the specific physical presentation may have different underlying genetics to what is currently known in the scientific literature. If this is the case, think of it as part of why your cat is so special and let us know (email us at meow@basepaws.com) about them, as they could potentially help contribute to the advancement of feline genetics research!

**IMPORTANT: Results for some of the 50 trait markers we currently test for may not be available in your first report. Your cat's results for these missing markers may be added in the coming weeks or months. Check results often for potential updates on missing markers.**

**Carrier**

The cat has one copy of a marker associated with a specific physical trait; however, it is unlikely to be physically exhibiting this trait. This could be because the trait has an autosomal recessive pattern of inheritance (needs two copies to present physically) or because the physical presentation of the trait is associated with a specific combination of markers, of which your cat only has one.

**Likely to Have**

The cat is positive for a marker (or markers) linked to a specific trait and is likely to exhibit this trait. This could be a result of the cat having one copy of a trait marker with an autosomal dominant pattern of inheritance, or the cat having two copies of a marker with an autosomal recessive pattern of inheritance. Alternatively, your cat could have the specific allelic series (combination of markers) that is likely to result in a specific trait.

**Not Likely to Have**

Based on the cat's genotype, it is unlikely that it is exhibiting this particular trait.

# Susceptibility to viral infection

## Resistance to FIV

Feline Immunodeficiency Virus (FIV) is a lentivirus affecting from 2.5% to 4.4% cats worldwide, causing a disease similar to human AIDS. A variant of the APOBEC3Z3 gene was demonstrated to suppress the infectivity of FIV, thus making cats that carry this variant more likely to be resistant to infection.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| APOBEC3Z3 | ★☆☆☆☆ GC>AT | None | 0 copies | Not Likely To Have |

# Coat color and pattern

## Black coat color

The gene agouti/ASIP has been implicated in pigmentation, including melanism, in mice and other animals. If a cat carries 2 copies of a particular 2-basepair deletion in the ASIP gene, their coat is likely to be a solid or black color.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| ASIP | del(CA) | None | 2 copies | Likely To Have |

## Charcoal coat color

The charcoal colored coat seen in some Bengal cats is the product of two distinct alleles of the ASIP gene, inherited together. The first allele is the one associated with a solid black coat (melanism) in domestic cats, while the second allele is inherited directly from the Asian leopard cat.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| ASIP | del(CA) | Bengal | 2 copies | |
| ASIP | C>G | Bengal | 0 copies | |
| ASIP | A>G | Bengal | 0 copies | |
| ASIP | C>T | Bengal | 0 copies | |
| ASIP | A>G | Bengal | 0 copies | Not Likely To Have |
| ASIP | T>C | Bengal | 0 copies | |
| ASIP | A>T | Bengal | 0 copies | |
| ASIP | T>C | Bengal | 0 copies | |
| ASIP | G>T | Bengal | 0 copies | |

## Blotched tabby coat color

The tabby coat is characterized by a mix of two features: (1) a light background component where individual hairs have light bands, and (2) a superimposed darker component where hairs have almost no banding. In blotched tabbies, the dark component is expanded into loosely-organized structures, forming wide whorls. The genetic determination of tabby coloration is complicated (and not fully understood), but different mutations in the gene LVRN play a key role in forming the blotched or mackerel tabby coat phenotype.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| LVRN | A>G | None | 0 copies | Not Likely To Have |
| LVRN | G>A | None | 0 copies | |

# Coat color and pattern

## Mackerel tabby coat color

The tabby coat is characterized by a mix of two features: (1) a light background component where individual hairs have light bands, and (2) a superimposed darker component where hairs have almost no banding. In mackerel tabbies, the coat has a striped appearance. The genetic determination of tabby coloration is complicated (and not fully understood), but different mutations in the gene LVRN play a key role in forming the tabby coat phenotype.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| LVRN | A>G | None | 0 copies | Not Likely To Have |

## Amber coat color

The melanocortin 1 receptor gene (MC1R) is responsible for the deposition of pigment in hair. Recessive alleles of this gene produce bright red to yellow coat pigmentation. A mutation described in Norwegian Forest cats is associated with the "amber" red coat. These cats are born a different color, with amber shades developing over time.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| MC1R | G>A | Norwegian Forest Cat | 0 copies | Not Likely To Have |

## Russet coat color

The melanocortin 1 receptor gene (MC1R) is responsible for the deposition of pigment in hair. Recessive alleles of this gene produce bright red to yellow coat pigmentation. A mutation described in Burmese cats produces the "russet" red coat. These cats are born a different color, with red shades developing over time.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| MC1R | del(TCT) | Burmese | 0 copies | Not Likely To Have |

## Copal coat color

The melanocortin 1 receptor gene (MC1R) is responsible for the deposition of pigment in hair. Recessive alleles of this gene produce bright red to yellow coat pigmentation. An MC1R mutation described in Kurilian Bobtail cats is associated with the copal coat color, expressed as warm red at first, followed by a transition to an apricot-like shade during the first year of life.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| MC1R | del(GCG..) | Kurilian Bobtail | 0 copies | Not Likely To Have |

# Coat color and pattern

## Dilute coat color

The dilute coat color phenotype in cats is related to both the eumelanin and phaeomelanin pigment pathways. When two copies of a mutation in the melanophilin gene (MLPH) are inherited, the pigment deposition in hair is affected and the original coat color is altered. For example, black fur becomes gray, and orange will turn cream.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| MLPH | ★★★★☆ del(T) | None | 1 copies |

**Carrier**

## Albinism

Albinism is a phenotype characterized by a lack of pigmentation in hair (appearing as a solid white coat), skin, and eyes. It is associated with a recessive allele of the tyrosinase gene. Albino cats tend to have blue or pink eyes.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| TYR | ★☆☆☆☆ del(G) | None | 0 copies |
| TYR | ★☆☆☆☆ G>A | None | 0 copies |

**Not Likely To Have**

## Siamese coat color

The Siamese 'colorpoint' coat is a form of albinism characterized by darker pigmentation at the extremities of the body (ears, tail, paws). This appearance is due to a temperature-sensitive mutation in the tyrosinase gene, causing pigment to be produced only at the cooler extremities of the body. This coat type is characteristic of Siamese, Birman and Himalayan cats.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| TYR | ★☆☆☆☆ del(G) | Siamese, Birman, Himalayan | 0 copies |
| TYR | ★☆☆☆☆ del(G) | Siamese, Birman, Himalayan | 0 copies |
| TYR | ★☆☆☆☆ G>A | Siamese, Birman, Himalayan | 0 copies |
| TYR | ★☆☆☆☆ G>A | Siamese, Birman, Himalayan | 0 copies |
| TYR | ★☆☆☆☆ C>T | Siamese, Birman, Himalayan | 0 copies |
| TYR | ★☆☆☆☆ C>A | Siamese, Birman, Himalayan | 0 copies |

**Not Likely To Have**

# Coat color and pattern

## Chocolate coat color

Brown coat color variations are caused by various mutations in the gene coding for tyrosinase-related protein-1 (TYRP1). The chocolate coat color is a consequence of inheriting two mutated copies of the TYRP1 gene.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| TYRP1 | G>A | None | 0 copies |
| TYRP1 | C>G | None | 0 copies |

**Not Likely To Have**

## Cinnamon coat color

Brown coat color variations are caused by various mutations in the gene coding for tyrosinase-related protein-1 (TYRP1). The cinnamon (light brown) coat color is a consequence of inheriting two mutated copies of the TYRP1 gene.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| TYRP1 | C>T | None | 0 copies |

**Not Likely To Have**

# Coat length

## Long-haired coat

The long-haired coat can be a typical feature of Maine Coon, Persian, Ragdoll, and Somali cats, as well as of some mixed-breed cats. The long-haired coat phenotype is associated with various mutations in the fibroblast growth factor 5 (FGF5) gene.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| FGF5 | G>T | Maine Coon, Persian, Ragdoll, Somali | 2 copies |
| FGF5 | del(A) | Maine Coon, Persian, Ragdoll, Somali | 0 copies |
| FGF5 | T>G | Maine Coon, Persian, Ragdoll, Somali | 2 copies |
| FGF5 | A>T | Maine Coon, Persian, Ragdoll, Somali | 0 copies |
| FGF5 | ins(A) | Maine Coon, Persian, Ragdoll, Somali | 0 copies |
| FGF5 | G>A | Maine Coon, Persian, Ragdoll, Somali | 0 copies |

**Likely To Have**

# Coat texture

## Hypotrichosis

An autosomal recessive allele of the FOXN1 gene is associated with an almost complete lack of hair (hypotrichosis) and a shortened life expectancy. Most kittens with two mutated FOXN1 gene copies die before their first birthday. This mutation was described in Birman cats.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| FOXN1 | del(ACA..) | Birman | 0 copies | Not Likely To Have |

## Lykoi coat

Lykoi (werewolf) cats have a characteristic form of partial hairlessness (hypotrichia), where there is a significant reduction in the average number of follicles per hair follicle group as compared to domestic shorthair cats. Fur on the limbs is even sparser. The phenotype is associated with a variety of mutations in the HR gene.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| HR | ins(GT) | Lykoi | 0 copies | |
| HR | G>A | Lykoi | 0 copies | |
| HR | C>T | Lykoi | 0 copies | |
| HR | C>T | Lykoi | 0 copies | Not Likely To Have |
| HR | ins(GAC..) | Lykoi | 0 copies | |
| HR | GT>GCA.. | Lykoi | 0 copies | |

## Curly coat

The genetic variations resulting in curly fur are called rex mutations. They can occur in a variety of genes, thus creating various types of curly coats in cats. These mutations cause changes in the hair structure, leading to the curly appearance.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| KRT71 | TCC..>ATC.. | Devon Rex | 0 copies | |
| KRT71 | C>G | Devon Rex | 0 copies | |
| KRT71 | C>T | Devon Rex | 0 copies | Not Likely To Have |
| LPAR6 | del(GTT..) | Cornish Rex, German Rex | 0 copies | |

# Coat texture

## Sphynx Coat

The Sphynx coat type is characterised by a lack of fur, with very fine hairs covering the body, particularly around the nose, tail, and toes. These hairs don't have a well-formed bulb, which makes them easily dislodged. The Sphynx coat is associated with an autosomal recessive allele of the KRT71 gene.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| KRT71 | TCC..>ATC.. | Sphynx, Kohana | 0 copies |
| KRT71 | C>T | Sphynx, Kohana | 0 copies |

**Not Likely To Have**

# Body morphology

## Short and kinked tail

A dominantly inherited mutation in a gene responsible for proper body patterning and segmentation, HES7, is the cause of the short tail phenotype characteristic of the Japanese Bobtail breed.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| HES7 | A>G | Japanese Bobtail | 0 copies | Not Likely To Have |

## Short tail

A variety of short tail phenotypes are associated with autosomal dominant mutations in the T gene. Some of the breeds among which these mutations can be found are Manx, American Bobtail, and Pixie-Bob.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| T | del(A) | Manx, American Bobtail, Pixie-bob | 0 copies | Not Likely To Have |
| T | del(G) | Manx, American Bobtail, Pixie-bob | 0 copies | |
| T | GGC..>CTG.. | Manx, American Bobtail, Pixie-bob | 0 copies | |
| T | del(G) | Manx, American Bobtail, Pixie-bob | 0 copies | |

## Osteochondrodysplasia

Folded ears are associated with osteochondrodysplasia, a genetic condition affecting cartilage tissues throughout the body. The phenotype is linked to an autosomal dominant allele of a gene named TRPV4. This mutation is specific to the Scottish Fold breed. Affected cats have ears folded forward and down, as well as different degrees of malformation in the distal forelimbs, distal hindlimbs, and tail, as well as progressive joint destruction.

| Gene | Mutation | Seen in | Status | |
|---|---|---|---|---|
| TRPV4 | C>A | None | 0 copies | Not Likely To Have |

# Body morphology

## Polydactyly

Cats have four toes and one dewclaw (thumb) on each front paw, and four toes on each hind paw. Polydactyly is a phenotype characterized by a higher number of toes, either on the outer or inner side of the paw. Any cat may be born polydactyl, but the trait seems to be most common among Maine Coons.

| Gene | Mutation | Seen in | Status |
|---|---|---|---|
| ZRS | C>G | None | 0 copies |
| ZRS | T>C | None | 0 copies |
| ZRS | T>A | None | 0 copies |

**Not Likely To Have**



# Carlisle's Oral Health Report

VERSION 4.0

basepaws

## Oral Health 101

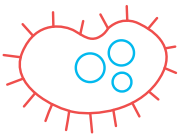


Did you know?

# Dental disease affects 50-90% of cats over the age of four.

Fortunately, most dental diseases are preventable with a good oral healthcare routine and are mostly treatable, if caught early. The microbes in a cat's mouth can inform us of developing oral health issues before they become visible, since they cannot always be seen with the naked eye during routine checkups. By the time disease symptoms present, the condition has usually reached an advanced stage. The Basepaws Oral Health test for cats screens for microbial signatures associated with three of the most common conditions that affect oral health in cats: periodontal disease, tooth resorption, and halitosis (bad breath).

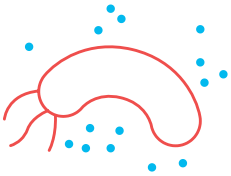
## The oral microbiome



Environmental factors and various food sources make the feline oral cavity a fascinating place, characterized by unique interactions between a cat's mouth and the microbes within it (the oral microbiome). The almost constant exposure to foreign microbial organisms has made the oral microbiome fiercely competitive.

**Once in a while, pathogenic microbes manage to colonize parts of the oral cavity, which can be associated with problems that affect oral health. The microbial composition of a cat's mouth can reveal information about developing oral health and general issues.**

## Can the oral microbiome change?



# YES! The oral microbiome is not static.

Different factors such as diet (dry versus wet food), environment (indoor versus outdoor), supplement intake, medications (particularly antibiotics), and oral healthcare routines can all influence the composition of the oral microbiome.

# This is why testing the oral microbiome early and often is key for optimal oral health!

# Oral Health Summary

**How does this test work?** We used our oral microbiome database of healthy cats and of cats known to be suffering from periodontal disease, tooth resorption, or halitosis to identify a set of predictive microbes whose compositional abundance is associated with each condition. Based on these results, we developed a 0 - 10 risk score system for each condition, where 0 - 3.3 reflects a 'low' risk, 3.4 - 6.6 a 'medium' risk, and 6.7 - 10 a 'high' risk. **The results below show Carlisle's overall risk for each of the three conditions, as well as a breakdown of the proportions of predictive microbes whose compositional abundance in the mouth is associated with high, medium, or low risk for each oral health condition (denoted by the colors red, yellow, and green, respectively).** The purple line and the number next to it indicate your cat's risk score for each condition.

## Risk for periodontal disease

Periodontal disease affects the tissues surrounding the teeth. Initial stages are classified as gingivitis, while advanced cases are known as periodontitis.

**RISK:**

- ○ HIGH
- ◉ MEDIUM
- ○ LOW



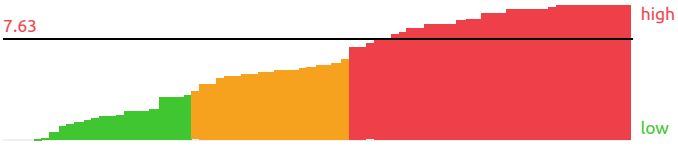

risk scores for 108 predictive microbes

## Risk for tooth resorption

Tooth resorption is a relatively common condition characterized by progressive dentin erosion.

**RISK:**

- ◉ HIGH
- ○ MEDIUM
- ○ LOW




risk scores for 74 predictive microbes

## Risk for bad breath (halitosis)

When bad breath is a persistent problem for a cat, this could be indicative of more serious general health issues.

**RISK:**

- ◉ HIGH
- ○ MEDIUM
- ○ LOW




risk scores for 182 predictive microbes

# What's next?

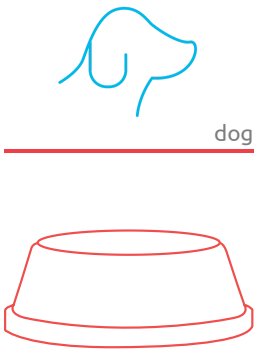
- You are strongly advised to adopt a daily oral healthcare routine for Carlisle
- Consider supplementing Carlisle's routine with products accepted by the Veterinary Oral Health Council
- Schedule an appointment with your veterinarian in the next month

- **NEXT RECOMMENDED oral health test in: 3 months**

# What else does your cat eat?

Do you know everything that goes into your cat's mouth? We analyzed Carlisle's sample for trace DNA from a wide variety of plants and animals to see if there was any evidence of non-microbial organisms.

## Does any of this surprise you?




## Wow, what does this mean?

There are many possible explanations for these results:

- **They may reflect organisms not included in Carlisle's meals that are provided by you**

For example, if Carlisle is an indoor/outdoor cat, these results may include traces of animals, plants, and other things that they find and consume outside, or things that get inside your house from the outside

- **Carlisle could be sampling from your meals when you are not looking or picking up crumbs from the floor**

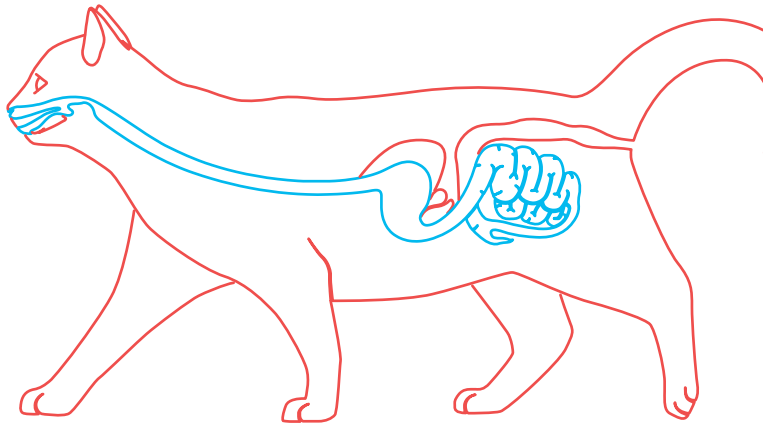
This means that we may have detected an organism that is not a typical part of Carlisle's diet because they ate something without your knowledge right before the sample was collected

## TO DO: Test Carlisle again in 3 months to see if the results have changed

# Health implications

Great news!

**Currently, it is unlikely that your cat's oral health is negatively affecting their general health. Cats with good oral health are less prone to developing chronic kidney disease, diabetes mellitus, cardiovascular problems, and some autoimmune diseases.**



## What can you do?

- It is important to regularly assess a cat's oral health to address emerging issues earlier and minimize chances of negative effects on general health.
- Adopting a thorough and consistent oral healthcare routine at home can significantly reduce the chance of developing dental diseases, which can help reduce the likelihood of developing more serious general health problems.

# Periodontal disease

Periodontal disease (PD) is a group of inflammatory disorders affecting the tissues surrounding the teeth. Periodontal disease is initiated by the buildup of plaque on the surface of the teeth, resulting in inflammation of the gingiva or "gingivitis". Without an effective oral healthcare regimen, inflammation can begin to destroy the structures that support the tooth which leads to periodontitis. Periodontal disease affects up to 80 percent of the adult feline population. This section explains the composition of your cat's oral microbiome as it relates to risk of having periodontal disease.

**Average risk across microbes**




risk scores for 108 predictive microbes

**RISK:** ○ HIGH ◉ MEDIUM ○ LOW

We analyzed Carlisle's oral microbiome to establish the compositional abundance of 110 microbes predictive of periodontal disease. We ranked each microbe's abundance on a scale from 1 to 5, where 1 represents abundance levels close to a healthy control population and 5 represents abundance levels close to cats with periodontal disease. Below are Carlisle's TOP 3 most significant microbes associated with high, medium, and low risk, respectively.

## Currently, Carlisle's abundance levels for 52 out of 108 microbes are consistent with having periodontal disease (48%).

### Top 3 high risk microbes

Mycoplasma felis
Tessaracoccus timonensis
Moraxella cuniculi

### Top 3 medium risk microbes

Streptococcus oralis
Bacteroides uniformis
Neisseria weaveri

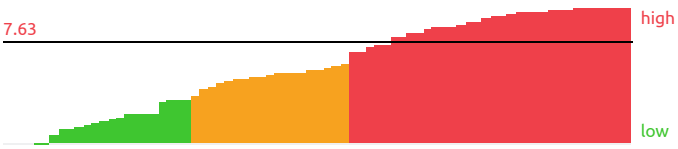
### Top 3 low risk microbes

Bacteroides intestinalis
Salmonella enterica
Bacteroides heparinolyticus

# Tooth resorption

Every tooth is composed of a root canal (containing nerves, blood, and lymphatic vessels) and bony substances called dentin and enamel. When a cat suffers from tooth resorption, the dentin of the affected tooth progressively erodes. Unfortunately, tooth resorption is relatively common, affecting 20-60 percent of all cats and over 70 percent of cats over the age of five. This section explains the composition of your cat's oral microbiome as it relates to risk of having tooth resorption.

**Average risk across microbes**




risk scores for 74 predictive microbes

**RISK:** ◉ HIGH ○ MEDIUM ○ LOW

We analyzed Carlisle's oral microbiome to establish the compositional abundance of 70 microbes predictive of tooth resorption. We ranked each microbe's abundance on a scale from 1 to 5, where 1 represents abundance levels close to a healthy control population and 5 represents abundance levels close to cats with tooth resorption. Below are Carlisle's TOP 3 most significant microbes associated with high, medium, and low risk, respectively.

## Currently, Carlisle's abundance levels for 34 out of 74 microbes are consistent with having tooth resorption (46%).

### Top 3 high risk microbes

Corynebacterium xerosis
Parabacteroides distasonis
Moraxella cuniculi

### Top 3 medium risk microbes

Gemella sp. oral taxon 928
Bacteroides xylanisolvens
Frederiksenia canicola

### Top 3 low risk microbes

Aggregatibacter aphrophilus
Rodentibacter pneumotropicus
Avibacterium paragallinarum

# Bad breath (halitosis)

Occasional bad breath is usually not something you should worry about. However, when bad breath is a persistent problem, it may be indicative of a more serious issue. The most common cause of bad breath is periodontal disease. Different types of bad breath can also indicate general health problems, such as kidney disease, diabetes, and some liver disorders. This section explains the composition of your cat's oral microbiome as it relates to risk of having halitosis.

**Average risk across microbes**




risk scores for 182 predictive microbes

**RISK:** ◉ HIGH ○ MEDIUM ○ LOW

We analyzed Carlisle's oral microbiome to establish the compositional abundance of 138 microbes predictive of bad breath. We ranked each microbe's abundance on a scale from 1 to 5, where 1 represents abundance levels close to a healthy control population and 5 represents abundance levels close to cats with bad breath. Below are Carlisle's TOP 3 most significant microbes associated with high, medium, and low risk, respectively.

## Currently, Carlisle's abundance levels for 128 out of 182 microbes are consistent with having bad breath (70%).

### Top 3 high risk microbes

Mycoplasma arginini
Diaphorobacter sp. JS3050
Cardiobacterium hominis

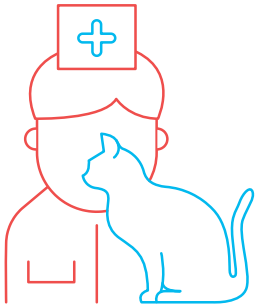
### Top 3 medium risk microbes

Serratia sp. FS14
Diaphorobacter aerolatus
Neisseria bacilliformis

### Top 3 low risk microbes

Treponema brennaborense
Polaromonas naphthalenivorans
Acidovorax sp. HDW3

# Veterinary oral health exam

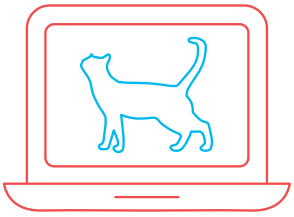


# We have identified some signs of dental disease in your cat's mouth.

We recommend scheduling an appointment with your veterinarian for a general and oral health assessment within the next month. Please be sure to also share this report with your veterinarian by clicking here.

# Have a question for Basepaws?

If you have a question about any part of this report, you can send us an email at: meow@basepaws.com



# Want to discuss your results with other cat parents? Join our Facebook group!

Would you like to tell us more about your cat's oral and general health? Contribute to feline oral health research by filling out this survey.

# Next oral health test recommended in: 3 - 6 months

# Appendix

## Sequencing and analysis methodology

### Most direct-to-consumer microbiome tests use a technique called '16S rRNA gene sequencing'.

This technique can only provide information about the bacteria present in the microbiome. However, it is well known that the microbiome is also composed of viruses, protozoa, fungi, and archaea species, in addition to bacteria. This means that the 16S approach zooms in on just one part of the microbiome, ignoring the rest. Additionally, 16S sequencing does not provide sufficient resolution to reliably and consistently go beyond the genus level of bacterial classification.

Therefore, in most cases, we don't know the exact species of bacteria in the microbiome, making analysis somewhat vague and relying on approximation.

To address these problems, Basepaws uses metagenomic sequencing instead of 16S sequencing. Our method allows us to capture organisms across all domains of life, not restricting us to only bacteria. In addition, we can reliably identify organisms to the species or even the strain level, making our analysis more accurate and improving our confidence in the results. These results paint a richer, unbiased picture of your feline companion's mouth. We used pairwise log ratio transformation to estimate the compositional abundance of microbial species, and Gaussian mixture modeling to determine your cat's risk for periodontal disease, tooth resorption, and bad breath.

## Limitations

### The Basepaws oral microbiome report is based on our ability to identify thousands of microbial species with each test.

Our large oral microbiome reference database allows us to identify a multitude of novel associations between microbes found in the mouth and a variety of diseases, as well as confirm previously reported findings. However, the field of feline oral microbiome science is extremely young and understudied, which is why we report only on conditions and microbes where previous knowledge exists, and/or if we see a particularly strong signal coming through in our data.

As we accumulate more data and conduct more analyses, we will continuously enrich this report to provide even more helpful insights. We want to emphasize that the identification of a certain microbial signature associated with a dental disease does not constitute a diagnosis. Conversely, if a particular microbial signature is not detected, it does not exclude the possibility of an unknown disease-causing pathogen being present, or that a dental disease could be caused by something other than pathogenic microbes. This report does not aim to substitute a diagnosis by a professional.

We hope you enjoyed getting acquainted with the first chapter of your cat's DNA story. The purpose of this report is to help you know your cat better—inside and out—and provide you with actionable knowledge for optimizing your kitty's health and happiness. This is just the beginning, so please stay tuned as there will be more to come. We are committed to improving the lives of cats everywhere and providing resources to pet parents like you so that you can make more empowered decisions for your cat's health and wellness. Together, we can change the future of feline health.

## Visit your veterinarian

Be proactive and have your kitty examined regularly. Annual (semi-annual for older cats) wellness exams and routine lab tests can help veterinarians look for and treat some health conditions before they become life-threatening. Regular wellness visits are especially important for cats, who are excellent at hiding pain and discomfort that could be symptoms of illness.

## Keep your cat at a healthy weight

Obesity is as dangerous for cats as it is for people. It puts them at risk for health problems such as diabetes, high blood pressure, and heart and lung disease. It can even increase their risk of developing cancer. Talk to your veterinarian about what a healthy weight means for your cat.

## Polish those pearly whites

Unlike humans, cats can't brush their teeth. Collaborate with your veterinarian on an oral health plan. The bacteria that collect on your cat's teeth can also enter their bloodstream, contributing to a range of health issues and other systemic diseases.

## Provide clean water daily

If your kitty isn't drinking enough water, they could become dehydrated or develop a urinary tract disease. Always make sure that you provide a constant supply of clean water. If they are finicky about water, try providing an intriguing fountain or feed them wet canned food to add more water to their diet.

## Give your cat mini exams at home

Petting and brushing your cat is about more than minimizing hairballs and showing your kitty love. Regular exams at home help you to notice changes such as lumps, bumps, or growths sooner and get them checked out right away. It's important to look for changes in behavior, stool/urine output and quality, coat condition, and weight. Know what's normal for your sweet kitty, and check them regularly as a part of your at-home health regimen.

## Proper nutrition can increase life expectancy

Aging includes a multitude of factors: environment, breed characteristics, nutrition, and genetics. To help your cat live their best life, they need a high-moisture, species-appropriate diet. How much and how often your cat eats is also important, and you can discuss their diet with your veterinarian. Additional Tips: If you have more than one cat, feed them separately to reduce their stress and monitor their consumption.

# Thank you!
# Stay healthy.

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basepaws