

OWNER'S NAME: Marisca Hol

DOG'S NAME: "Weylyn"
Howling by Moonlight Odon Weylyn

TEST DATE: July 30th, 2018

This certifies the authenticity of **Weylyn's** canine genetic background as determined following careful analysis of more than 200,000 genetic markers.

Welcome to the
Embark family!

SAARLOOS WOLFDOG



WOLFINESS **27.8% HIGH**

MATERNAL HAPLOTYPE **E11**

PATERNAL HAPLOTYPE **H1a.15**

Saarloos Wolfdog


Adam Boyko, Ph.D.
CHIEF SCIENCE OFFICER


Ryan Boyko
CHIEF EXECUTIVE OFFICER



"WEYLYN"

HOWLING BY MOONLIGHT ODON WEYLYN



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BREED MIX

 **Saarloos Wolfdog: 100.0%**

GENETIC STATS

Wolfiness: 27.8 % **HIGH**

Predicted adult weight: **79 lbs**

Genetic age: **34 human years**

TEST DETAILS

Kit number: EM-1365665

Swab number: 31001804054415



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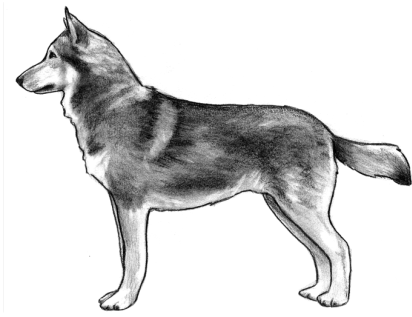


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SAARLOOS WOLFDOG



Fun Fact At the time of his death in the late 1960s, Leendert Saarloos was still the sole overseer of the Sarloos Wolfdog breed.

Sarloos Wolfdogs are a Dutch breed of dog that are actually the result of the careful breeding of wolf/dog hybrids. In fact, they are the breed of dog that, according to a study conducted in 2015, contain the most genetic similarity to wolves. Sarloos Wolfdogs were created by, and subsequently named after, a Dutch man named Leendert Saarloos. In the 1930s, Leendert wanted to create a working dog that was similar to the German Shepherd but that would be more resilient and less domesticated. He decided that the best way to do this was to crossbreed German Shepherds with Grey Wolves, and thus the Sarloos Wolfdog was born. Sarloos Wolfdogs definitely look like wolves. As one can probably imagine, Sarloos Wolfdogs are not an appropriate breed for people who do not have extensive experience as dog owners, especially of large and strong breeds. They are primarily bred as pets, but they certainly aren't the breed for everyone. They are intelligent and need a great deal of early socialization in order to make good companions for the home. They still have a very strong "pack mentality" and will constantly look for guidance and direction from their owners. They will be better behaved and balanced with strong training and early exposure to various settings. While this is true for all breeds, it is especially important for Sarloos Wolfdogs. Sarloos Wolfdogs love other dogs and will actually do better in a multi-dog household. They are good with children provided that they are socialized with them as pups; however, remember that they are large and rambunctious dogs and shouldn't be left unattended with children of any age, especially very young children. Sarloos Wolfdogs will thrive in a suburban or rural home, but they are not well suited to apartment or city living. They need a lot of space to run around and a great deal of physical exercise. If not given proper mental and physical stimulation, they can become bored and destructive—and they can do quite a bit of damage to household items from shoes to couches. They will suffer if left home alone all day, so prospective owners who work long hours should reconsider getting a Sarloos Wolfdog unless they have other dogs at home to keep them company. Sarloos Wolfdogs are still a very rare breed. Because of how few puppies are born each year, they will be harder to find than the average dog and will also likely



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MATERNAL LINE



Through Weylyn's mitochondrial DNA we can trace his mother's ancestry back to where dogs and people first became friends. This map helps you visualize the routes that his ancestors took to your home. Their story is described below the map.

HAPLOGROUP: E

Haplogroup E is a very rare maternal line, present only in one Akita in our database.

HAPLOTYPE: E11

The E haplogroup in general is not common. It has been found in dogs with some level of background mixing with its wolf-like ancestors.



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PATERNAL LINE



Through Weylyn's Y chromosome we can trace his father's ancestry back to where dogs and people first became friends. This map helps you visualize the routes that his ancestors took to your home. Their story is described below the map.

HAPLOGROUP: A1a

Some of the wolves that became the original dogs in Central Asia around 15,000 years ago came from this long and distinguished line of male dogs. After domestication, they followed their humans from Asia to Europe and then didn't stop there. They took root in Europe, eventually becoming the dogs that founded the Vizsla breed 1,000 years ago. The Vizsla is a Central European hunting dog, and all male Vizslas descend from this line. During the Age of Exploration, like their owners, these pooches went by the philosophy, "Have sail, will travel!" From the windy plains of Patagonia to the snug and homey towns of the American Midwest, the beaches of a Pacific paradise, and the broad expanse of the Australian outback, these dogs followed their masters to the outposts of empires. Whether through good fortune or superior genetics, dogs from the A1a lineage traveled the globe and took root across the world. Now you find village dogs from this line frolicking on Polynesian beaches, hanging out in villages across the Americas, and scavenging throughout Old World settlements.

HAPLOTYPE: H1a.15

Part of the large A1a haplogroup, this haplotype is found in village dogs from across the globe (outside of Asia). As for breeds, it is primarily seen in German Shepherds, Labrador Retrievers, Nova Scotia Duck Tolling Retriever. It is by far the most common haplotype in German Shepherds.



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TRAITS

Coat Color

E Locus (Mask, Grizzle, Recessive Red)	EE
K Locus (Dominant Black)	k^Yk^Y
A Locus (Agouti, Sable)	a^wa^t
D Locus (Dilute, Blue, Fawn)	DD
B Locus (Brown, Chocolate, Liver, Red)	Bb

Other Coat Traits

Furnishings / Improper Coat (RSPO2)	II
Long Haircoat (FGF5)	GG
Shedding (MC5R)	CC
Curly Coat (KRT71)	CC

Body Size

Body Size - IGF1	NN
Body Size - IGF1R	GG
Body Size - STC2	TT
Body Size - GHR (E195K)	GG
Body Size - GHR (P177L)	CC

Other Body Features

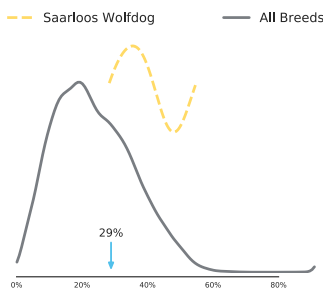
Brachycephaly (BMP3)	CC
Natural Bobtail (T)	CC
Hind Dewclaws (LMBR1)	CC

Performance

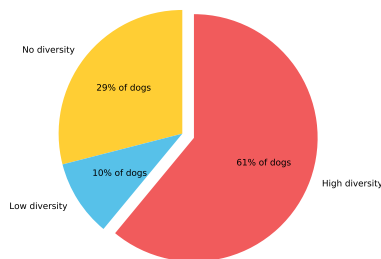
Altitude Adaptation (EPAS1)	GG
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Genetic Diversity

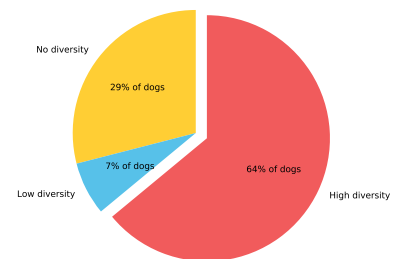
Inbreeding Coefficient **29%**



MHC Class II - DLA DRB1
High Diversity



MHC Class II - DLA DQA1 and DQB1
High Diversity





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CLINICAL TRAITS

These clinical genetic traits can inform clinical decisions and diagnoses. These traits do not predict a disease state or increased risk for disease. We currently assess one clinical trait: Alanine Aminotransferase Activity.

Alanine Aminotransferase Activity result: Normal

Howling by Moonlight Odon Weylyn has two normal alleles at ALT.

More information on Alanine Aminotransferase Activity:

Known to be highly expressed in liver cells, activity levels of alanine aminotransferase, or ALT, is a common value on most blood chemistry panels and is known to be a sensitive measure of liver health. Dogs with two ancestral G alleles show "normal" activity. Dogs that have one or two copies of the derived A allele may have lower resting levels of ALT activity, known as "low normal". If your dog's result is "low normal" then when a blood chemistry panel is being interpreted the values that you and your veterinarian consider "normal" may need to be adjusted. Please note that neither a "normal" nor a "low normal" result for this predicts a disease state or increased risk for liver disease. Moreover, this mutation does not associate with increased levels of ALT: If your dog has high ALT levels, please consult your veterinarian.



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HEALTH

Good news! Weylyn did not test positive for any of the genetic diseases that Embark screens for.

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AT RISK

1

CARRIER

CARRIER CONDITIONS

CARRIER status: This indicates the dog has inherited a recessive allele for a genetic trait or mutation. This is not enough to cause symptoms of the disease, but is important to bear in mind if the dog ever has offspring.

D Carrier

System: **Neurologic**

Condition: **Degenerative Myelopathy (SOD1A)**



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DEGENERATIVE MYELOPATHY

(SOD1A)

Carrier



SOD1

GENE NAME

GG

CLEAR

GA

CARRIER

AA

AT RISK

Howling by Moonlight Odon Weylyn is a carrier for a mutation in the SOD1 gene. While he or she is unlikely to exhibit signs of disease, as a carrier, he or she will pass the mutation on to the next generation. If you choose to breed Howling by Moonlight Odon Weylyn, we highly recommend testing any potential mates for this mutation. Breeding to another carrier is not recommended as this will produce a number of affected puppies.

DESCRIPTION

A disease of mature dogs, this is a progressive degenerative disorder of the spinal cord that can cause muscle wasting and gait abnormalities. Affected dogs do not usually show signs until they are at least eight years old, where the first signs of neural degeneration appears in the nerves that innervate the hind limbs. You may notice your dog scuffing the tops of his or her hind paws, or walking with a hesitant, exaggerated gait. In advanced cases, lower motor neurons are also affected leading to weakness or near-paralysis of all four legs and widespread muscle wasting. Given the advanced age at the time of onset, the treatment for DM is aimed towards making your dog comfortable in his or her old age and include lifestyle changes and physical therapy. All known predisposing mutations for DM lie in the SOD1 gene, and have been identified in many breeds including the Boxer, Pembroke Welsh Corgi, German Shepherd Dog, Rhodesian Ridgeback, Chesapeake Bay Retriever, and Bernese Mountain Dog. SOD1 codes superoxide dismutase, an enzyme important in neutralizing free radicals and reactive oxygen species, both of which are produced as byproduct of cell metabolism. If not neutralized, these are injurious to the cell and will cause premature cell death. The first system to show effects of this is the nervous system given the highly specialized and delicate nature of these cells. Please note that these mutations are reported to have incomplete penetrance: that is, while a dog with two copies of this mutation has a much greater chance of developing DM than a dog with one copy of the mutation, or none at all, other genetic and environmental factors will also contribute to whether your dog develops DM.

More information

To learn more about this condition, you can visit <http://www.caninegeneticdiseases.net/DM/basicDM.htm> (<http://www.caninegeneticdiseases.net/DM/basicDM.htm>).

CITATIONS

Awano et al 2009 (<http://www.ncbi.nlm.nih.gov/pubmed/19188595>), Shelton et al 2012





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OTHER CONDITIONS

Good news! Weylyn tested clear for 1 genetic conditions that are common in his breed.

- Malignant Hyperthermia (RYR1)



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FULL TEST PANEL

To help ensure healthy breeds, every test includes analysis of our full panel of over 160 genetic diseases.

Weylyn is also clear of 163 other genetic diseases that Embark tests for.