GDF'S ZEKE

DNA Test Report | Test Date: April 9th, 2018 | embk.me/gdfszeke

GENETIC STATS

Wolfiness: 1.1 % **MEDIUM**
Predicted adult weight: **27 lbs**
Genetic age: **7 human years**

TEST DETAILS

Kit number: EM-3438110
Swab number: 31001801035320

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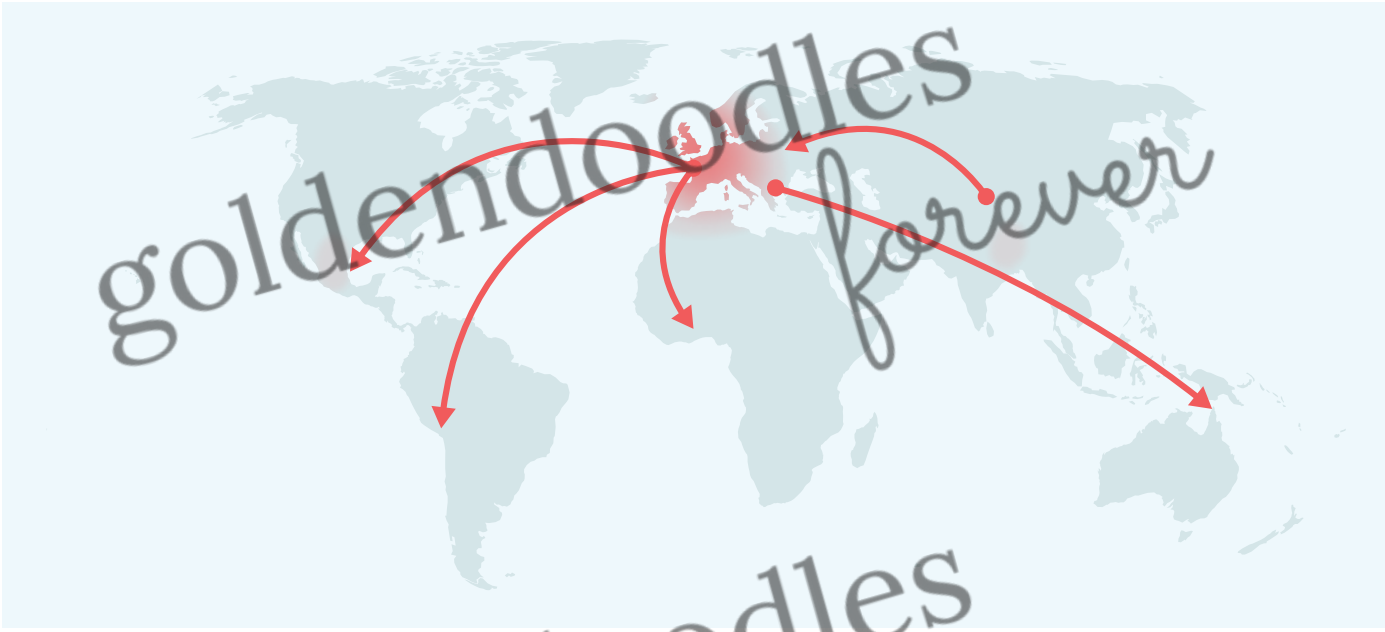
MATERNAL LINE



Through GDF's Zeke'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: B1

B1 is the second most common maternal lineage in breeds of European or American origin. It is the female line of the majority of Golden Retrievers, Basset Hounds, and Shih Tzus, and about half of Beagles, Pekingese and Toy Poodles. This lineage is also somewhat common among village dogs that carry distinct ancestry from these breeds. We know this is a result of B1 dogs being common amongst the European dogs that their conquering owners brought around the world, because nowhere on earth is it a very common lineage in village dogs. It even enables us to trace the path of (human) colonization: Because most Bichons are B1 and Bichons are popular in Spanish culture, B1 is now fairly common among village dogs in Latin America.

HAPLOTYPE: B1b

Part of the large B1 haplogroup, we see this haplotype in village dogs across the world, including those from Central America, the Middle East, South Asia, and the French Polynesian Islands. Among the 31 breed dogs we see it in, we see it in Poodles, Otterhounds, and Labrador Retrievers. It is also our most commonly-sampled Golden Retriever haplotype!

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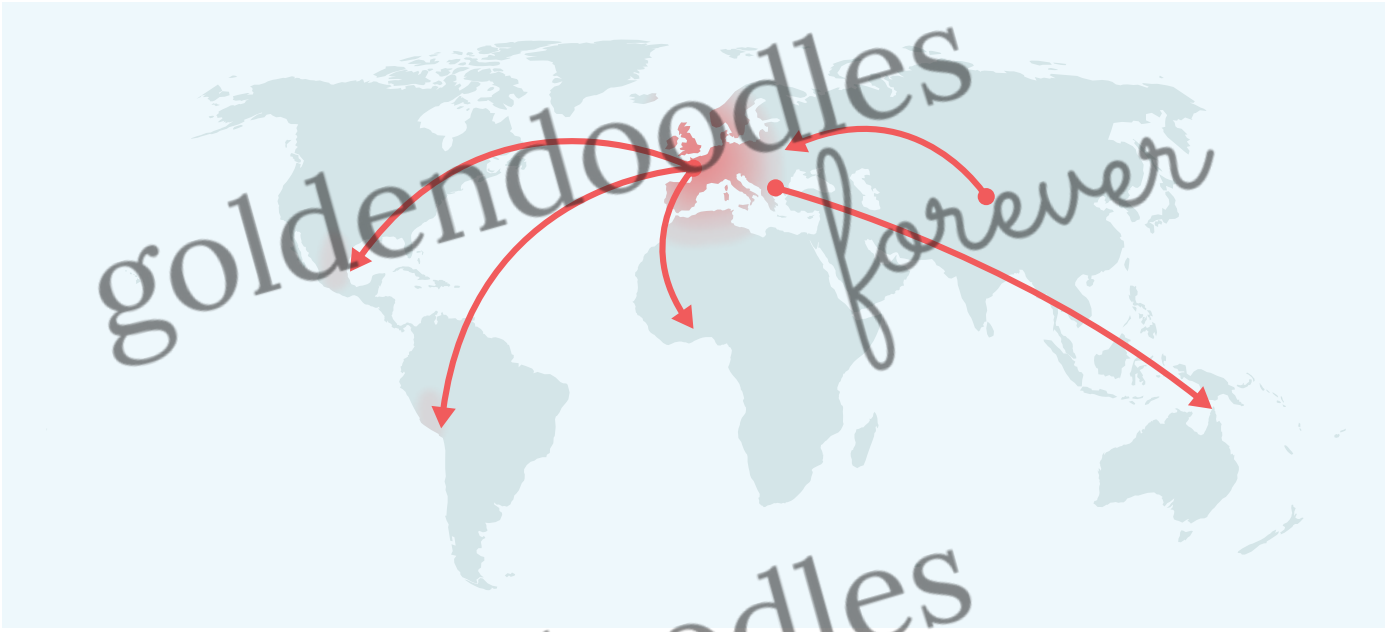
PATERNAL LINE



Through GDF's Zeke'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.1

Part of the large A1a haplogroup, this common haplotype occurs in village dogs all over the world (outside of Asia), with many occurring in Central and South America. We have found this haplotype frequently in Bernese Mountain Dogs, Australian Shepherds, and Boston Terriers.

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TRAITS

Coat Color

E Locus (Mask/Grizzle/Red)	**ee**
K Locus (Dominant Black)	**K^BK^Y**
A Locus (Agouti)	**a^ta^t**
D Locus (Dilute)	**DD**
B Locus (Brown/Chocolate/Liver)	**Bb**

Other Coat Traits

Furnishings / Improper Coat (RSPO2)	**FI**
Long Haircoat (FGF5)	**TT**
Shedding (MC5R)	**CT**
Curly Coat (KRT71)	**CT**

Body Size

Body Size - IGF1	**NI**
Body Size - IGF1R	**AA**
Body Size - STC2	**TT**
Body Size - GHR (E195K)	**AA**
Body Size - GHR (P177L)	**CC**

Other Body Features

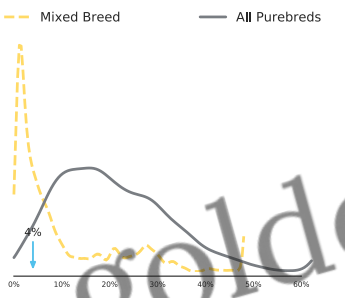
Brachycephaly (BMP3)	**CC**
Natural Bobtail (T)	**CC**
Hind Dewclaws (LMBR1)	**TT**

Performance

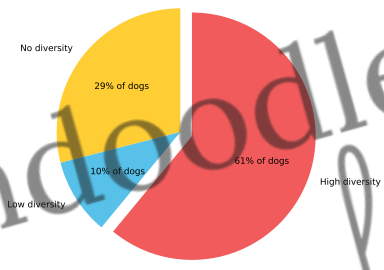
Altitude Adaptation (EPAS1)	**GG**

Genetic Diversity

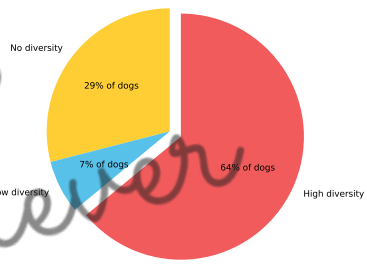
Inbreeding Coefficient **4%**



MHC Class II - DLA DRB1
High Diversity



MHC Class II - DLA DQA1 and DQB1
High Diversity



GDF'S ZEKE

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: Low Normal

GDF's Zeke has one copy of a mutation associated with reduced ALT activity as measured on veterinary blood chemistry panels. Please inform your veterinarian that GDF's Zeke has this genotype, as ALT is often used as an indicator of liver health and GDF's Zeke is likely to have a lower than average resting ALT activity. As such, an increase in GDF's Zeke's ALT activity could be evidence of liver damage, even if it is within normal limits by standard ALT reference ranges.

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! GDF's Zeke did not test positive for any of the genetic diseases that Embark screens for.

0 **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.

Carrier

System: **Ophthalmologic**
Condition: **Progressive Retinal Atrophy (PRA) Progressive rod-cone degeneration (PRCD Exon 1)**

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PROGRESSIVE RETINAL ATROPHY (PRA)

Progressive rod-cone degeneration (PRCD Exon 1)

Carrier

PRCD Exon 1	GG	**GA**	AA
GENE NAME	CLEAR	CARRIER	AT RISK

GDF's Zeke is a carrier for a mutated allele at PRCD. As a carrier, he or she is unlikely to show any signs of disease. If you choose to breed GDF's Zeke, we recommend genotyping any potential mates, and avoiding any matches with other carriers as this could produce puppies at risk for developing PRA.

DESCRIPTION

This retinal disease causes progressive, nonpainful vision loss. The retina contains the cells, photoreceptors, that collect information about light: that is, they are the very beginning of how we see. There are two types of photoreceptors: rods, which gather information about light intensity and are the major contributors to night vision, and cones, which distinguish color and are the major contributors to day vision. In nearly all forms of PRA, the rod cells are affected first, leading to night blindness. They are followed by the cone cells, leading to day blindness. The mechanisms by which the photoreceptors degenerate vary depending on the specific mutation that causes PRA. However, the readout is the same: the dog experiences a slow loss of vision, often leading to complete blindness. PRA is a subtle disease: most owners do not even know that their dog has gone blind--you may notice that your dog is reluctant to go down the stairs, or bumping into door frames or corners, or taking a very long time to fetch a ball or toy. A peek at your dog's eyes in bright light may also reveal a sluggish pupillary constriction, because the retina is no longer telling your pupils that it is letting in too much light. Diagnosis of PRA can be made by your veterinarian, who can examine the retina's appearance with ophthalmoscope, or can query its electrical activity with an electroretinogram. Because of the slow progression of PRA, most dogs adapt very well to their condition and remain comfortable in familiar surroundings like their home, backyard, and daily walk route. Over time, many dogs with PRA can develop cataracts. This is thought to be due to buildup of reactive oxygen species and other toxic metabolites released from the dying retinal cells. This can lead to other ophthalmologic conditions and requires close monitoring in consultation with your veterinarian.

A late-onset form of PRA resulting from a mutation in the PRCD gene has been observed in many breeds and is inherited in an autosomal recessive manner.

More information

To learn more about this condition, you can visit http://www.peteducation.com/article.cfm?c=2+2092&aid=343 (http://www.peteducation.com/article.cfm?c=2+2092&aid=343).

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OTHER CONDITIONS

Good news! GDF's Zeke tested clear for 7 other common genetic diseases that Embark tests for.

- Multidrug Sensitivity (MDR1)
- Primary Lens Luxation (ADAMTS17)
- Degenerative Myelopathy (SOD1A)
- Von Willebrand Disease Type II (VWF Exon 28)
- Hyperuricosuria and Hyperuricemia or Urolithiasis (SLC2A9)
- Dilated Cardiomyopathy (PDK4)
- Exercise-Induced Collapse (DNM1)

GDF'S ZEKE

FULL TEST PANEL

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

GDF's Zeke is also clear of 157 other genetic diseases that Embark tests for.