



## My dog has fur like wolves and wolves can withstand the cold. So why can't my dog stay outside in cold temperatures?

By Wag'N Enterprises, LLC



A comparison of wolf and dog DNA reveals that dogs evolved from gray wolves about 15,000 years ago.\* Scientists arrived at this figure by studying small strands of DNA called Mitochondrial DNA which are inherited down the maternal line largely unchanged. By analyzing the rare mutations in this DNA from over 650 dogs across the world, scientists were able to trace almost every domestic dog to back to three female wolves in East Asia. These long dead animals were the ancestral eve of the dog world. From these first dogs 15,000 years ago selective breeding by man has made them the most diverse species on earth with staggering 400 breeds. No other domesticated animal has achieved such variety of physical form<sup>i</sup>.

\*These numbers are disputed as the Grey wolf's origins have been argued to be more than 300,000 years old.

### Many Types of Wolves

The gray wolf is a member of the Genus *Canis*, which comprises between 7 and 10 species. It is one of six species termed 'wolf', the others being the Red Wolf (*Canis rufus*), the Indian Wolf (*Canis indica*), the Himalayan Wolf (*Canis himalayaensis*), the Eastern Wolf (*Canis lycaon*), and the Ethiopian Wolf (*Canis simensis*), although concerning a couple of these there is still some uncertainty as to whether they should be considered subspecies of *Canis lupus* or species in their own right. Recent genetic research suggests that the Indian Wolf, originally considered only as a subpopulation of the Iranian Wolf (*Canis lupus pallipes*), represents a distinct species (*Canis indica*). Similar results were obtained for the Himalayan Wolf, which is traditionally placed into the Tibetan Wolf (*Canis lupus laniger*).<sup>ii</sup>



Ethiopian Wolf

The difference between the Ethiopian Wolf and the Grey Wolf is quite drastic in more than one way. From the heat of the horn of Africa to Eurasia and North America, these wolves have been argued to have as much in common than chicken and ducks. Animals have adapted to their environment over hundreds if not thousands of years. The Ethiopian wolf would not withstand the same arctic temperatures than the Grey Wolf and vice versa. So why would a domesticated non wild descendant of the Grey Wolf be expected to compare?



Grey Wolf

## Northern Breeds

Northern Breeds closely resemble wolves because their physical and behavioral characteristics are best suited for the harsh climate of the Arctic:

- Thick, waterproof, double coat;
- Bushy tail he can curl around his nose to warm his breath while sleeping;
- Long nose to warm the air before it reaches his lungs;
- Moderate stop to create nasal passages which further warm the air before it is drawn into the lungs;
- A seasonal oil deposit under his eyebrows which moves when he shakes his head and helps to shake off accumulated snow;
- Thickly furred, prick ears to prevent frostbite;
- Long legs to get through accumulated snow;
- Pain tolerance;
- Ability to think for himself in order to survive in a hostile environment;
- Pack mentality that helps hunting & pulling (i.e. community survival);
- Friendliness to strangers (lack of guarding instinct) in a nomadic community where people come and go frequently;
- Howls, to communicate across large distances with the rest of the pack/family; and
- Almond-shaped, obliquely shaped eyes to keep them from freezing in the cold wind.

Most other dog breeds would not survive in the Arctic because they lack most, if not all of these characteristics.<sup>iii</sup>

## How Does The Cold Affect My Dog?

Though many dogs are invigorated by cold temperatures and most sport a thick fur coat for protection against the elements, winter still poses a few hazards. Dogs can succumb to hypothermia, suffer frostbite, or be poisoned by chemicals used to melt ice.

### Hypothermia

Hypothermia is a condition in which a dog's core body temperature falls below normal due to inadequate heat production and/or excessive heat loss.

Dogs involved in winter sports or kept outside become well adjusted to cool environmental temperatures. They burn calories faster and grow thicker coats than dogs that lounge indoors in luxurious warmth. But though acclimatized dogs can stay warmer longer in cold weather, even they can develop hypothermia when exposed to excessively low temperatures for a sufficiently long time.

When a dog's temperature-regulation system senses a drop in core temperature, he starts to shiver. This exaggerated muscle activity produces heat to boost body temperature. In some cases, shivering cannot halt the cooling process. As a dog's core body temperature continues to fall, he'll eventually stop shivering. As soon as he stops generating heat, he gets colder faster. His breathing becomes slow and shallow, and he will become unresponsive.

The most accurate way to tell if your dog is hypo-thermic is to take his rectal temperature (see table at right). If you don't have a thermometer, put your hand against your dog's bare skin in the groin area. Dogs are normally a little warmer than we are, so if your dog feels cold to your touch, he probably has a low body temperature.

Severe hypothermia requires aggressive treatment at a veterinary hospital – warm-water enemas or gastric lavage (warm water circulating in the stomach) to warm his core, heated fluids given intravenously and warm,

oxygenated air administered by face mask.

The prognosis for recovery from hypothermia becomes progressively worse with every degree drop in body temperature.

### Frostbite

Another consequence of exposure to cold, frostbite strikes the extremities, particularly the paws, ears, tail and genitals. When these areas freeze, blood flow is halted and the area subsequently dies – a process called a vascular necrosis.

A frostbitten area is pale, slightly blue and cool to the touch. As thawing begins, the site becomes red, swollen and extremely painful.

Two things can happen to frostbitten tissue as it thaws. It may regain its health as its blood supply returns, or it will never gain its blood supply back. In the latter case, the area dies and sloughs (falls off).

Frostbitten tissue should not be rubbed in an effort to re-warm it because rapid warming (including submersion of the affected part in warm water), causes more cellular death than closely controlled thawing.

### Cold feet

It isn't just frostbite that threatens canine feet. When your dog walks in snow, the warmth of his body melts snow, which clings to his feet. Water on the foot-hair refreezes, allowing more snow to accumulate. Snowballs can become large enough to make walking difficult.

### Chemicals

The chemicals in de-icers also pose a hazard to canine feet. Sodium chloride (salt), magnesium chloride, potassium chloride, calcium salts and occasionally urea can be very irritating to foot skin.

Besides contact irritation, these products can cause salivation and stomach upset if your dog licks his paws. If he consumes a large quantity, nervous symptoms may develop, as well as lung and heart abnormalities, and even death in extreme cases.

You can avoid this hazard by wiping your dog's feet with a damp towel or bathing them after exposure. If your dog must walk over de-icers, apply a thin layer of non-stick cooking spray to his feet, to help prevent the product from adhering. Boots are a great way to protect your dog's paws – if he'll tolerate them. Prevention is the best approach. If you have icy areas, spread sand or cat litter to improve traction.

There is a multitude of ways to protect your dog from the effects of winter weather, but the simplest approach is to go outside with him. If you see him shivering, running to the door or wanting to be held, he is telling you that he's too cold.

Hypothermia and frostbite are two potential problems your dog can suffer from in winter. Both occur when your dog has been exposed to the cold for too long, and whilst hypothermia and frostbite are treatable but may leave lasting tissue damage if the symptoms are not spotted and treated promptly.

Which dogs are most susceptible?

- \* Short haired dogs;
- \* Small dogs;
- \* Wet dogs;
- \* Dogs sensitive to cold weather; and
- \* Dogs that are outside for long periods of time who do not have access to warm and dry shelter.<sup>iv</sup>

## Differences Between The Grey Wolf & The Domestic Dog's Ability to Withstand The Cold

Both wolf and dog embryo develop paws that are paddle shaped and webbed with ridges. As they develop they change. Wolf paws retain slight webbing between the toes helping them spread the load over difficult ground especially over snow. Most dogs have lost their webbing as domestic dogs simply don't need it. Wolves have coarse hair on their paws and blunt claws to grip slippery surfaces. They even have special blood vessels to prevent the paw pads from freezing.<sup>v</sup> These vessels are NOT present in most dog breeds!

Many dog breed have been bred to maintain the webbed paw characteristics. You will notice that most of these breeds fall either under sporting or working groups. Some examples include the Chesapeake Bay Retriever, Chinook, Field Spaniel, German Shorthaired Pointer, German Wirehaired Pointer, Irish Water Spaniel, Labrador Retriever, Leonberger, Newfoundland, Nova Scotia Duck Tolling Retriever, Otterhound, Plott Hound, Portuguese Water Dog, Redbone Coonhound, Spanish Water Dog, Weimaraner, Wirehaired Pointing Griffon.

The webbing alone does not however guarantee the presence of the special blood vessels providing them with extra protection against the cold. Webbing has been selected for breeding as it helps working and sporting dogs with weight load distribution and swimming tasks.

The list of small differences between dogs and wolves carries on, from reproduction to communication. For example have you ever wondered why wolves don't bark? They do! But only while they are puppies!

Barking, floppy ears and the smaller size of dogs are a direct result of selective breeding. Early humans chose to breed dogs that have more puppy like features to make them more socially adaptable and less violent. Wolves do not howl until they reach maturity. Barking features were bred into dogs as they are only natural to young wolves! Dogs have no need to howl since their food is handed over to them and the call for the hunt is rendered useless.<sup>vi</sup>

## Conclusion

Your dog is related to its ancestor the wolf. However, through years of tailored breeding by humans, many traits have purposefully been altered to fit our needs. Only a few dog breeds have been bred to sustain arctic temperatures. Additionally, remember that working dogs living in harsh conditions are more likely to have the physical traits allowing them to live and survive in cold temperatures. The Siberian husky born and raised in Florida will not have the same stamina than the working husky from Barnaul Siberia. Biologists believe that changes in both features and behavior may just take a few generations.

Do not assume that because your dog has webbed paws that it therefore also has the special blood vessels helping it keeps its paws from freezing! For its safety assume it does not have it!

Depending on its breed, your dog is differently suited for cold weather. Regardless of breed, make sure to take precautions from both natural and man-made threats to his/her safety. Even if you are not the type to dress your dog, remember that their fur can only do so much to maintain them warm.

DOGS HAVE BEEN BRED FROM WOLVES TO NOT BE LIKE WOLVES. Please do not let 'fur' get in the way of reason. Your Border Collie should NEVER end up frozen to the pavement because you thought fur = fur = fur. It Clearly isn't so!

## References

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- <sup>i</sup> <http://channel.nationalgeographic.com/series/in-the-womb/4046/Overview> - In the Womb: Dogs. Special program airing on the National Geographic Channel. Check your local listings!
- <sup>ii</sup> <http://en.wikipedia.org/wiki/Wolf> - Wikipedia's take on wolves
- <sup>iii</sup> [http://en.wikipedia.org/wiki/Northern\\_Breed\\_Group](http://en.wikipedia.org/wiki/Northern_Breed_Group) - Wikipedia's take on Northern Breeds
- <sup>iv</sup> <http://www.dogtopics.com/163/hypothermia-and-frostbite-in-dogs> Dog Topics -Hypothermia and Frostbite in Dogs
- <sup>v</sup> <http://channel.nationalgeographic.com/series/in-the-womb/4046/Overview> - In the Womb: Dogs. Special program airing on the National Geographic Channel. Check your local listings!
- <sup>vi</sup> <http://channel.nationalgeographic.com/series/in-the-womb/4046/Overview> - In the Womb: Dogs. Special program airing on the National Geographic Channel. Check your local listings!