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A Dog's Nose Can Do More Than Sniff

New research shows that its cool black skin is perfectly designed to detect subtle differences in temperatures.



Dogs' noses can reliably detect temperatures from 5 feet away.

PHOTO: GETTY IMAGES

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How does the world appear to a dog? We all know that they have an astonishing sense of smell, excellent hearing and sharp eyes—enough to build up an extremely detailed map of their surroundings. But recent research suggests that dogs live in an even richer sensory world than we expected. They can directly detect the warmth of a body from several feet away, and they do it with their nose.

For humans, it's tricky to detect something that's only slightly warm without touching it. We have thermal receptors in our skin, but they only detect the temperature of the skin itself. If we touch something cold, our skin cools down, and the receptors report that back to our brain. When we hold our hands out to a fire, our skin absorbs infrared radiation emitted by whatever is burning, which warms our skin up.

And that's the clue. There's a law of physics that says anything with a temperature above absolute zero is always leaking energy in the form of light. The higher its temperature, the more energetic and numerous the leaked photons of light are. Unless the object is extremely hot, 1000°F or more, we can't see that light with our eyes, but it's still there. Our bodies and everything around us are constantly losing and absorbing this infrared radiation, even though we're not aware of it.

The consequence is that the world is flooded with information about temperature, but it's subtle. If you were going to try tapping into that rich data source, you'd want something really good at absorbing light and therefore probably dark. And you'd want it to be cool, because detection is easier if you have a big temperature difference between your sensor and the warm object. You'd want something that looks very much like a dog's nose: black and cold.

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In the past few years, researchers at Lund University in Sweden have published a fascinating set of papers examining this idea. Their results show that, from 5 feet away, dogs can reliably tell the difference between a 4-inch object at body temperature and one at room temperature. The scientists identified a set of nerves in a dog's nose that appear to be responsible. It seems that the cool, black skin on a dog's nose can absorb the tiny amount of infrared light leaking from a warm object, and that the many nerves inside the skin quickly sense that extra energy, signaling to the brain that something warm is nearby.

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Dogs keep their noses cooler than their surroundings at most ambient temperatures, as any dog owner will know. My favorite detail from these papers is that when a dog goes to sleep, its nose warms up to normal body temperature, but within 15 minutes of waking up the nose has cooled back down. No one knows for sure yet, but that looks a lot like a sensor switching

itself off when it's not being used. And the authors deserve credit for coming up with a cast-iron excuse to include a very cute thermal image of a sleeping puppy in a serious scientific publication.

Wild dogs all have black noses. Maybe a dog's wild ancestors were able to hunt small furry mammals by their heat signature; the detector wouldn't need to be highly sophisticated to give a hungry dog an edge. There are plenty of questions still to be answered, but what I love about this research is that even in something a five-year-old child could draw—a dog's black nose—there are still significant scientific discoveries to be made. Maybe we should all spend more time looking at what's right in front of our noses.

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