

Can Dogs Be Used to Detect COVID-19?

The COVID-19 pandemic has completely changed the way the human world functions. Though we may have claimed to whole-heartedly embrace the 'New Normal', the road ahead appears far from smooth. Restaurants may have opened, people are welcoming each other into their homes, public functions with limited attendance have resumed; but each time we step out to enjoy any of these experiences, there is always some amount of anxiety hidden in our minds.

The fear felt by us is perhaps more pronounced, due to the ability of individuals to remain completely asymptomatic, even after being infected by COVID-19. How can we then definitively say if the people we are meeting or dining with are COVID-positive or not? What if this one experience we have chosen to enjoy, puts us and our family at risk of contracting COVID-19?

There are no guarantees in life, however, researchers can explore ways to make outdoor experiences both safer and stress-free for individuals by designing rapid, cheap and sensitive screening tests that can be performed on individuals before they enter public spaces. At present, the COVID-19 RT-PCR test is the most sensitive test available for diagnosing COVID-19. However, its disadvantages include its high cost and slow laboratory processing times. To counter the same, scientists across the world are designing rapid antigen tests that can give accurate results within a few minutes.

But is there an alternative approach available to us? Can we draw inspiration from the animal world?

The Use of Dogs in the Detection of Human Disease

Dogs have long been defined by the acute sense of smell they possess compared to any other species. Their superior olfactory abilities are due to the presence of more than 200 million scent receptors in their body. In contrast, humans possess only 5 million scent receptors.



Image source: Photo by Vlad Chețan from Pexels

Also, a dog's sense of smell is 10,000 times more accurate than ours. The human race has already exploited this unique canine quality and trained dogs to use their olfactory senses for hunting, detecting drugs, explosives, forensic material and even to detect diseases. Yes, you read that right! The olfactory ability of dogs has already been tested in high-quality trials to detect health conditions like cancer, diabetes, malaria, Parkinson's disease, migraine, etc.

How Does it Work?

The medical conditions mentioned above cause the release of pathogen-specific odours due to the generation of certain volatile organic compounds (VOC) in the diseased individual. Dogs can be trained to smell and identify these VOCs and thus, detect the presence of disease.

Can Dogs be Used to Detect the Presence of COVID-19 in Individuals?

In the last few months, research is being conducted at a few centres across the world to test the ability of dogs to detect COVID-19 in individuals by sniffing either their nasopharyngeal/ tracheobronchial secretions or sweat secreted by glands in the axillary region. Studies have shown that SARS CoV-2 infected individuals' release a specific VOC odour, which dogs could be possibly trained to detect. Two high-quality trials testing the same have already been published in journals.

While one trial was conducted by using nasopharyngeal secretions collected from both COVID positive and negative individuals, the other was conducted using sweat secretions. In both studies, the dogs and their handlers were given a period of 2 weeks to train themselves to detect COVID-19 based on the odour being released from positive samples.

Post the training period, the dogs and their trainers were individually asked to enter a room in which both COVID-19 positive and negative samples were kept. The results showed that they were able to identify COVID-19 with high sensitivity and specificity.

This makes you wonder that if a few studies have shown that

dogs can accurately identify COVID-19 samples, why has this not yet been implemented in practice? Imagine if one could place them at airports, at the entrance to malls and restaurants, public functions, and so on, would it make it easier to prevent the spread of this condition?

A few negatives, that need to be explored...

Well, there are a few riders to the use of dogs for detecting COVID-19. For one, scientists are still identifying the exact compound released in COVID-19, the odour of which dogs can detect. Identification of this compound will help train dogs better and lead to increased sensitivity in detection.

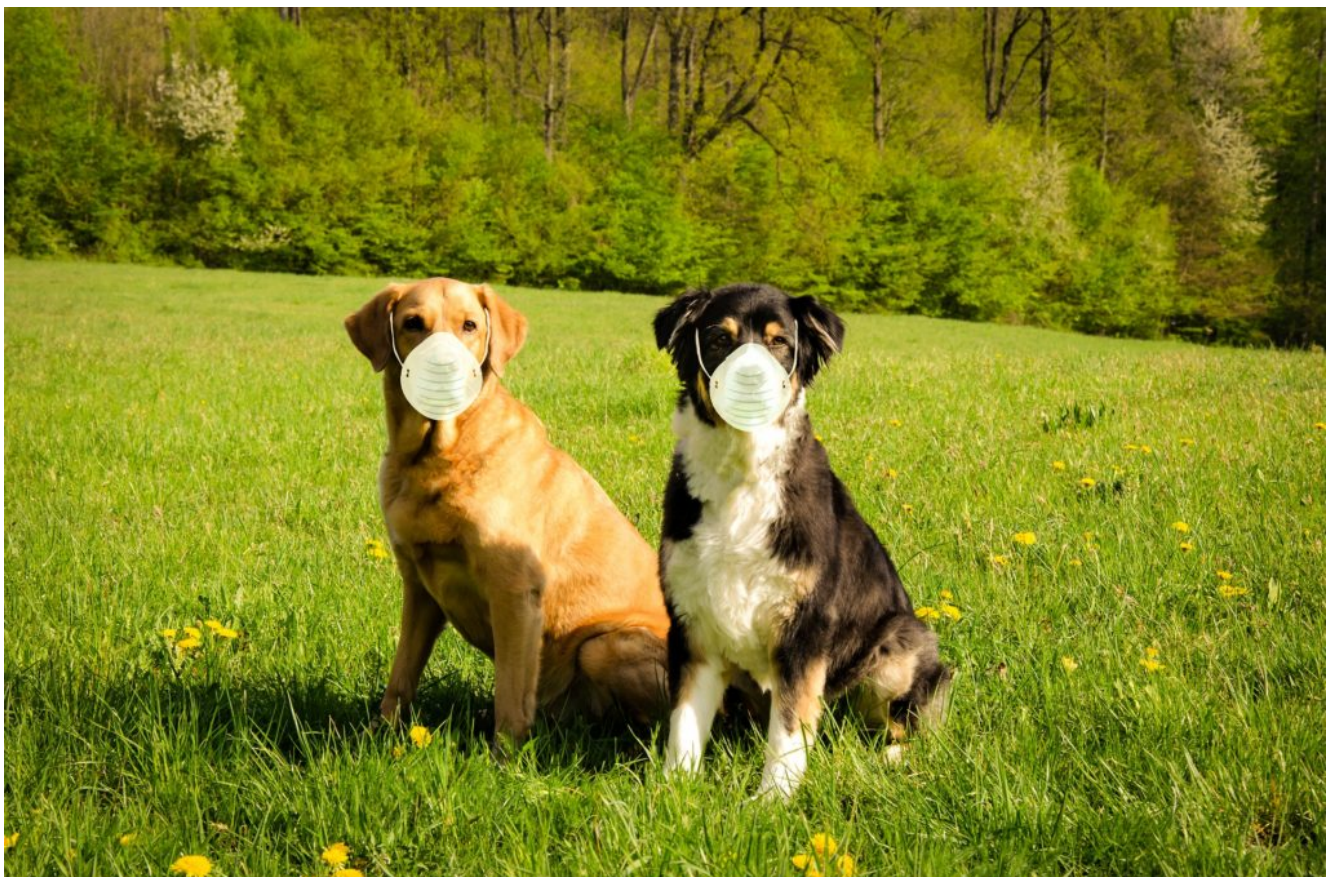


Image Source: Image by Andrea Bohl from Pixabay

Secondly, it is still unclear at present whether COVID-19 can get transmitted to dogs, though the CDC (Centre for Disease Control and Prevention, USA) attests that there is no evidence

that pet animals, and especially dogs, play any significant role in SARS-CoV-2 transmission or spread.

Thus, there is a possibility that if dogs are used for rapid detection of COVID-19, they and their handlers may run a risk of contracting the virus themselves. In one of the studies mentioned above to minimise the risk of the participants contracting COVID-19, the researchers neutralised the positive samples and ensured they no longer remained infective.

However, the question which remains unanswered is, *“Is it possible to do the same within a short interval of times if dogs were used for detection in a field setting and can this possibly be a confounding factor in the accurate detection of COVID-19?”* While the other study did not neutralise the COVID positive samples, they quarantined both the handlers and dogs for a period of 14 days. None of the animal or human participants contracted the virus.

Thus, further studies are needed before one can ascertain if dogs can be used for the rapid screening of COVID-19 patients.

Lastly, scientific evidence aside as an animal lover myself, I want to leave you with a question:

Is it fair to employ animals in this manner, when we humans are running away from this virus?

Do we have a right to make an animal dedicate his life to this cause or to any other we choose for him? The answer may differ for each one of us!

References:

1. <https://www.understandinganimalresearch.org.uk/news/research-medical-benefits/the-science-of-sniffs-disease-smelling-dogs/#:~:text=Dogs%20have%20been%20trained%20to,olfactory%20nerve%20cells%20than%20humans.>

2. Grandjean D, Sarkis R, Lecoq-Julien C, Benard A, Roger V, Levesque E, et al. (2020) Can the detection dog alert on COVID-19 positive persons by sniffing axillary sweat samples? A proof-of-concept study. *PLoS ONE* 15(12):e0243122.
3. Jendrny, P., Schulz, C., Twele, F. et al. Scent dog identification of samples from COVID-19 patients – a pilot study. *BMC Infect Dis* **20**, 536 (2020). <https://doi.org/10.1186/s12879-020-05281-3>

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