

Scent dog identification of SARS-CoV-2-infections – double blind studies

Esther Schalke

Summary:

The COVID-19 pandemic has spread across the globe. Testing remains one of the strategies to contain the spread. Scent dogs are capable of detecting disease-specific volatile organic compounds emanated from infected body cells and could support current testing strategies.

Methods/Results:

In a pilot study ten dogs were trained to detect SARS-CoV-2 infections in inactivated saliva samples. They were able to discriminate between samples from SARS-CoV-2 infected patients and negative controls. The subsequent transfer performance for the recognition of non-inactivated samples and detection accuracy were tested different non-inactivated body fluids (saliva, urine, sweat) in a randomised, double-blind study. Dogs were tested on a total of 5242 randomised samples. Dogs detected non-inactivated saliva samples with an average sensitivity of 84% and specificity of 95%. In the comparison between the three body fluids, sensitivity and specificity were 95% and 98% for urine, 91% and 94% for sweat, 82%, and 96% for saliva. A third study evaluated the dogs' ability to distinguish SARS-CoV-2 from other viral infections. Nasopharyngeal swab samples and cell culture samples from 15 viruses were presented in a randomized, double-blind study. Dogs were either trained with SARS-CoV-2 positive saliva samples (scenario I) or supernatant from cell cultures (scenario II and III). In scenario I dogs detected positive with a mean sensitivity of 73.8% and a specificity of 95.5%. In test scenario II and III cells infected with SARS-CoV-2, cells infected with other coronaviruses and non-infected cells were presented. Dogs achieved mean sensitivities of 61.2% (scenario II) and 75.8% (scenario III). The specificities were 90.9% (scenario II) and 90.2% (scenario III).

Conclusions

Dogs were able to transfer the conditioned scent detection of inactivated saliva samples to non-inactivated saliva, urine and sweat samples.

In the three other test scenarios the mean specificities were above 90% which indicates that dogs can distinguish SARS-CoV-2-infections from other viral infections. However, compared to earlier studies our scent dogs achieved lower diagnostic sensitivities. Detection dogs may provide a reliable screening method for SARS-CoV-2 infections.