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Anti-fungal effect of saliva on black fungus

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Letter to the Editor

There are various components in saliva, including proteins, peptides, hormones, and antibodies, which are secreted by parotid, submandibular, sublingual, and other minor salivary glands. In addition, parotid and submandibular glands secrete histatin peptides, which were first discovered in 1988. They have antimicrobial and anti-fungal effects. Different histatin peptides were recognized in saliva, the most common of which are histadin-1, histadin-3, and histadin-5. Histatin peptides proved effective against Candida albicans [1,2].

The other components of saliva, namely cathelcidin (LL-37), lactoferrin, lysozyme, mucins, peroxidase, salivary agglutinin (gp340, DMBT1), sIgA, SLPI, α,β defensins, and calprotectin (calgranulin) have shown antibacterial and antiviral effects. In addition, gp340 proved to be effective against HIV-1 and influenza. Also, two main antibodies, IgA and IgG, are known to play a protective role against influenza viruses. IgG antibodies have been reported to be an important component of defence against COVID-19 [1,3]. Hence, saliva is considered as the body's first line of defence against various infections.

First detected in China, in December 2019, SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus type 2) is still a threat to global health after two years of battling against it [1]. Although various vaccines have been developed and satisfactory results of phase III trials have been achieved, novel variants of SARS-CoV-2 with a large number of mutations constantly challenge the efficacy of the vaccines [4].

Black fungus, known as mucormycosis, is caused by fungus spores. An increasing number of fungal infections i.e., black fungus appear in elderly patients with comorbidities, uncontrolled diabetes, cancer patients or people with HIV, immune dysfunction, patients using high dosages of steroids, and patients with COVID-19 who require nasal prongs or ventilator support. Black fungus symptoms vary depending on the place of fungus growth in the body. The common symptoms that appear in the orofacial region particularly in the case of discovered COVID-19 are asymmetrical swelling on the face, tooth mobility, discoloration in oral tissues, halitosis, and numbness in the oral cavity. In addition, the general symptoms of black fungus are as follows; fever, coughing, headache, diarrhea, gastrointestinal bleeding, shortness of breath, hearing loss or decreased hearing sensitivity, and discoloration of the skin. In some cases, it can even be fatal if the fungus attacks the heart or brain [5-7].

In the current COVID-19 pandemic, rapid diagnosis and treatment of mucormycosis is of significant importance. Black fungus can be treated with anti-fungal drugs, such as Posaconazole, Amphotericin B, and Isavuconazol to decrease or stop the spread of the fungus; surgical treatment (aggressive surgical debridement of the infected area) is also used in severe cases. Moreover, the following guidelines can help reduce the spread of black fungus: masks should be disinfected regularly and not used for weeks; keeping good oral hygiene i.e., brushing and gargling with mouthwashes as well as the disinfection of toothbrush should also be a priority; in the case of diabetic and steroid-using patients, blood glucose (glycemia) should be monitored regularly; immunosuppressive medication should be reduced or discontinued; finally, nasal prongs or oxygen masks need to be disinfected during oxygen therapy, particularly in COVID-19 cases [5-7].

It is a controversial statement that black fungus is the dark side of COVID-19. Regardless of the possible dangers of COVID-19 infection, fungus can also be life-threatening if it affects the sinuses, brain and lungs, and if not diagnosed at an early stage, the disease can be fatal [8]. As mentioned earlier in this letter, histatin peptides have anti-fungal effect. In the case that black fungus contaminates saliva, they might be able to neutralize or eliminate black fungus in the early stages. However, the efficacy of saliva against black fungus has not yet been proven experimentally and thus, it is just a hypothesis, so clinical studies are required to examine the anti-fungal effect of saliva on black fungus.

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