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BRIEF REVIEW

What About Anosmia from COVID-19?

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Olfactory dysfunctions such as anosmia and/or hyposmia are prevalent in about 48% of subjects infected with SARS CoV-2 virus.[1] Anosmia is often the first symptom reported by people with COVID-19 and may occur in the absence of systemic or other upper respiratory manifestations.[2] Altered sense of smell reportedly takes an average of two weeks to regain function.[3] However, it can persist in prolonged symptomatology as a part of the post-acute sequelae of COVID-19.

Post-viral olfactory dysfunction is observed in upper respiratory infections due to coronaviruses, rhinovirus, parainfluenza, and Epstein–Barr virus.[4] These organisms have been isolated from nasal secretions and the olfactory bulb.[5] Most post-viral olfactory disturbances are explained by nasal obstruction or neurogenic invasion. There is rapid trans-neural spread of viruses from the olfactory bulb to parts of the cerebral cortex, basal ganglia, and midbrain.[5] However, these manifestations seem to be different in COVID-19.

Nasal obstruction may not be the cause of dampened sense of smell in COVID-19 since there are many cases of isolated anosmia without upper respiratory symptoms. Involvement of the central nervous system is less perceptible in COVID-19. The transient nature of anosmia and its early recovery make a neuronal pathology an unlikely etiology.[6] Another explanatory theory is that SARS-CoV-2 virus has a similar structure to human olfactory neurons, and cross reactivity due to molecular mimicry leads to mucosal inflammation; often chronic.[7]

Sustentacular olfactory epithelial cells are responsible for maintaining structural and functional integrity of olfactory neurons. These cells have angiotensin-converting enzyme-2 (ACE-2) receptors and spike protein proteases (TMPRSS2).[8] The spike protein of SARS-CoV-2 binds to the receptors on sustentacular cells in the nasal and respiratory epithelium after cleavage by proteases.[8] The most plausible explanation for anosmia is that there is damage to these cells. Also, they recover faster than neurons, which explains the transient nature of the dysfunction.[6]

ACE-2 receptors are also present in the epithelium of the tongue, and this may lead to co-existing disturbances in taste sensation. There are genetic differences in ACE-2 expression, which could lead to varying susceptibility to olfactory and gustatory dysfunction. Higher ACE-2 expression may be one of the predisposing factors for severe COVID-19.[9] Research might reveal whether the same is true for these sensory disorders.

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