Acta Scientific Medical Sciences
ISSN: 2582-0931

Opinion

Special Issue 2- 2022

Proposal for Use of Saliva IgA and IgG to Monitor the Potential of Intranasal COVID-19 Booster Vaccines

Yuji Aoki*

Graduate School of Health Science, Matsumoto University, Japan

***Corresponding Author:** Yuji Aoki, Graduate School of Health Science, Matsumoto University, Japan.

DOI: 10.31080/ASMS.2022.S02.0001

Received: January 11, 2022

Published: March 10, 2022

Abstract

Now that great effectiveness of intramuscular delivery of messenger RNA vaccines against COVID-19 has been proven, it becomes one of critical issues to maintain the immune potency. Intranasal vaccination has an advantage of easy self-administration but some difficulties in the vaccine formulation for effective mucosal immunization. The potency of the COVID-19 booster vaccination could be monitored even at home by SARS-CoV-2 specific IgA (as local immunity) and IgG (as systemic immunity) in the saliva. Such a safe and feasible strategy to boost the immunity is proposed, especially for vulnerable people, when the COVID-19 booster vaccination is beginning.

Keywords: COVID-19 (Coronavirus Disease 2019); Saliva IgA; Saliva IgG; Intranasal Vaccination; Booster Vaccines

During the coronavirus disease 2019 (COVID-19) pandemic, COVID-19 was the third leading cause of death behind heart disease and cancer in the United States of America for 2020 [1]. In Japan, on the contrary, a decrease in deaths from infectious diseases occurred in the oldest people before starting the COVID-19 vaccination in 2021, suggesting the importance of general precautions against viral infections [2]. Now that great effectiveness of intramuscular delivery of messenger RNA vaccines against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has been proven for the prime vaccination [3], it becomes one of critical issues to maintain or fortify the immune potency besides the general precautions.

The messenger RNA vaccination as a booster (the third vaccination) has been just reported to show an effect of 90% lower mortality in Israel [4]. However, the authors note that studies to assess longer-term effectiveness and safety of the booster are still warranted. At this stage, if possible, a convenient strategy to maintain the immunity against COVID-19 would be also called for [5]. As a safe and feasible strategy, use of saliva immunoglobulins (IgA and IgG) to monitor the potency of intranasal COVID-19 booster vaccines should be proposed. It has been demonstrated that saliva IgA and IgG antibodies specific to SARS-CoV-2 spike antigens were detected by enzyme-linked immunosorbent assays both in convalescent patients and vaccinated individuals [6]. Saliva IgA and IgG are regarded as secretory IgA produced locally in the salivary glands (as local immunity) and most of the IgG derived from the serum through gingival crevices in the gums (as systemic immunity), respectively. Self-collected saliva testing to reduce health care resources and hazard exposure has been evaluated for SARS-CoV-2 detection [7].

Although intranasal vaccination is thought to be a rational approach for preventing infectious respiratory diseases by mucosal immunization, some concerns are raised for triggering respiratory illnesses or poor immunogenicity due to the tolerogenic mucosal environment [8,9]. Contrary to expectations, the completed phase 1 human trial of an intranasal COVID-19 vaccine using an adenovirus-based vector did not succeed [9]. Up to date, only the live-attenuated influenza virus vaccine is available for human intranasal vaccination. Recombinant spike proteins of SARS-CoV-2 may be applicable to intranasal COVID-19 vaccines or to the booster vaccines [10]. Such intranasal booster vaccination is expected to develop and to be validated during the time when the COVID-19 booster vaccination is beginning.

Intranasal COVID-19 vaccines have an advantage of easy self-administration like a nasal spray, but there are some difficulties in the vaccine formulation to achieve effective mucosal immunization [11]. The potency of the COVID-19 booster vaccination could be monitored even at home by SARS-CoV-2 specific IgA and IgG in the saliva. Such a safe and feasible strategy to boost the immunity is proposed, especially for vulnerable people.

Conflicts of Interest

The author has indicated no potential conflicts of interest.

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