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Boletim BiblioCovid

Boletim BiblioCovid v.3 n.01, janeiro 2022 | Variante ômicron e a COVID-19

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Variante ômicron e a COVID-19

Vocabulário controlado

MeSH – Medical Subject Headings (NLM/NIH)

Bases utilizadas

Portal regional BVS

Termos Utilizados (com base nos Descritores em Ciências da Saúde – DeCS):

Descritores e/ou palavras-chave

Ômicron
COVID-19
PANDEMIA
Sars-CoV-2

Filtros utilizados

Artigos
Texto completo
Ano: 2020-2022

Estratégias de busca

(ômicron) AND (covid-19 OR pandemia OR sars-cov-2 OR coronavírus) AND (type:(“article”)) AND (year_cluster:[2020 TO 2022])

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Seleção dos dez artigos mais relevantes, segundo critérios da base de dados Portal regional BVS

1. SARS-CoV-2 variant exposures elicit antibody responses with differential cross-neutralization of established and emerging strains including Delta and Omicron

Doi: https://doi.org/10.1093/infdis/jiab635

Resumo

The wide spectrum of SARS-CoV-2 variants with phenotypes impacting transmission and antibody sensitivity necessitates investigation of the immune response to different spike protein versions. Here, we compare the neutralization of variants of concern, including B.1.617.2 (Delta) and B.1.1.529 (Omicron) in sera from individuals exposed to variant infection, vaccination, or both. We demonstrate that neutralizing antibody responses are strongest against variants sharing certain spike mutations with the immunizing exposure. We also observe that exposure to multiple spike variants increases the breadth of variant cross-neutralization. These findings contribute to understanding relationships between exposures and antibody responses and may inform booster vaccination strategies.

Referência

LAURIE, et al. SARS-CoV-2 variant exposures elicit antibody responses with differential cross-neutralization of established and emerging strains including Delta and Omicron. **The Journal of Infectious Diseases**, Jan. 2022.

2. Two cases of breakthrough SARS-CoV-2 infections caused by the Omicron variant (B.1.1.529 lineage) in international travelers to Japan

Doi: https://doi.org/10.1093/cid/ciab1072

Resumo

In November 2021, the World Health Organization designated a new SARS-CoV-2 variant of concern, Omicron (PANGO lineage B.1.1.529). We report on first two cases of breakthrough COVID-19 caused by Omicron in Japan among international travelers returning from the country with undetected infection. The spread of infection by Omicron were considered.

Referência

MARUKI, Takemoto. Two cases of breakthrough SARS-CoV-2 infections caused by the Omicron variant (B.1.1.529 lineage) in international travelers to Japan. **Clinical Infectious Disease**, 3 Jan. 2022.

3. Necessity of COVID-19 Vaccination in Persons Who Have Already Had COVID-19

Doi: https://doi.org/10.1093/cid/ciac022

Resumo

Background: The purpose of this study was to evaluate the necessity of COVID-19 vaccination in persons with prior COVID-19. Methods: Employees of Cleveland Clinic working in Ohio on Dec 16, 2020, the day COVID-19 vaccination was started, were included. Anyone who tested positive for COVID-19 at least once before the study start date was considered previously infected. One was considered vaccinated 14 days after receiving the second dose of a COVID-19 mRNA vaccine. The cumulative incidence of COVID-19, symptomatic COVID-19, and hospitalizations for COVID-19, were examined over the next year. Results: Among 52238 employees, 4718 (9%) were previously infected, and 36922 (71%) were vaccinated by the study's end. Cumulative incidence of COVID-19 was substantially higher throughout for those previously uninfected who remained unvaccinated than for all other groups, lower for the vaccinated than unvaccinated, and lower for those previously infected than those not. Incidence of COVID-19 increased dramatically in all groups after the Omicron variant emerged. In multivariable Cox proportional hazards regression, both prior COVID-19 and vaccination were independently associated with significantly lower risk of COVID-19. Among previously infected subjects, a lower risk of COVID-19 overall was not demonstrated, but vaccination was associated with a significantly lower risk of symptomatic COVID-19 in both the pre-Omicron (HR 0.60, 95% CI 0.40–0.90) and Omicron (HR 0.36, 95% CI 0.23–0.57) phases. Conclusions: Both previous infection and vaccination provide substantial protection against COVID-19. Vaccination of previously infected individuals does not provide additional protection against COVID-19 for several months, but after that provides significant protection at least against symptomatic COVID-19.

Referência

SHRESTHA, N.K. et al. Necessity of COVID-19 Vaccination in Persons Who Have Already Had COVID-19. **Clinical Infectious Disease**, 13 Jan. 2022.

4. Probable Transmission of SARS-CoV-2 Omicron Variant in Quarantine Hotel, Hong Kong, China, November 2021

Doi: https://doi.org/10.3201/eid2802.212422

Resumo

We report detection of severe acute respiratory syndrome coronavirus 2 Omicron variant (B.1.1.529) in an asymptomatic, fully vaccinated traveler in a quarantine hotel in Hong Kong, China. The Omicron variant was also detected in a fully vaccinated traveler staying in a room across the corridor from the index patient, suggesting transmission despite strict quarantine precautions.

Referência

GU, H. et al. Probable transmission of SARS-CoV-2 omicron variant in quarantine hotel, Hong Kong, China. **Emerg. Infect. Dis**. V. 28, n. 2, 2021.

5. Activity of convalescent and vaccine serum against SARS-CoV-2 Omicron

Doi: https://doi.org/10.1038/s41586-022-04399-5

Resumo

The Omicron (B.1.1.529) variant of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was initially identified in November of 2021 in South Africa and Botswana as well as in a sample from a traveler from South Africa in Hong Kong1,2. Since then, B.1.1.529 has been detected globally. This variant seems to be at least equally infectious than B.1.617.2 (Delta), has already caused super spreader events3 and has outcompeted Delta within weeks in several countries and metropolitan areas. B.1.1.529 hosts an unprecedented number of mutations in its spike gene and early reports have provided evidence for extensive immune escape and reduced vaccine effectiveness2,4–6. Here, we investigated the neutralizing and binding activity of sera from convalescent, mRNA double vaccinated, mRNA boosted, convalescent double vaccinated, and convalescent boosted individuals against wild type, B.1.351 and B.1.1.529 SARS-CoV-2 isolates. Neutralizing activity of sera from convalescent and double vaccinated participants was undetectable to very low against B.1.1.529 while neutralizing activity of sera from individuals who had been exposed to spike three or four times was maintained, albeit at significantly reduced levels. Binding to the B.1.1.529 receptor binding domain (RBD) and N-terminal domain (NTD) was reduced in convalescent not vaccinated individuals, but was mostly retained in vaccinated individuals.

Referência

CARREÑO, J.M. et al. Activity of convalescent and vaccine serum against SARS-CoV-2 Omicron**. Nature**, Dez. 2021.

6. mRNA-based COVID-19 vaccine boosters induce neutralizing immunity against SARS-CoV-2 Omicron variant

Doi : https://doi.org/10.1016/j.cell.2021.12.033

Resumo

Recent surveillance has revealed the emergence of the SARS-CoV-2 Omicron variant (BA.1/B.1.1.529) harboring up to 36 mutations in spike protein, the target of neutralizing antibodies. Given its potential to escape vaccine-induced humoral immunity, we measured the neutralization potency of sera from 88 mRNA-1273, 111 BNT162b, and 40 Ad26.COV2.S vaccine recipients against wild-type, Delta, and Omicron SARS-CoV-2 pseudoviruses. We included individuals that received their primary series recently (<3 months), distantly (6-12 months), or an additional "booster" dose, while accounting for prior SARS-CoV-2 infection. Remarkably, neutralization of Omicron was undetectable in most vaccinees. However, individuals boosted with mRNA vaccines exhibited potent neutralization of Omicron, only 4-6-fold lower than wild type, suggesting enhanced cross-reactivity of neutralizing antibody responses. In addition, we find that Omicron pseudovirus infects more efficiently than other variants tested. Overall, this study highlights the importance of additional mRNA doses to broaden neutralizing antibody responses against highly divergent SARS-CoV-2 variants.

Referência

GARCIA-BELTRAN, W.F. et al. mRNA-based COVID-19 vaccine boosters induce neutralizing immunity against SARS-CoV-2 Omicron variant. **Cell**, Jan. 2022.

7. The Omicron variant is highly resistant against antibody-mediated neutralization: Implications for control of the COVID-19 pandemic

Doi: https://doi.org/10.1016/j.cell.2021.12.032

Resumo

The rapid spread of the SARS-CoV-2 Omicron variant suggests that the virus might become globally dominant. Further, the high number of mutations in the viral spike protein raised concerns that the virus might evade antibodies induced by infection or vaccination. Here, we report that the Omicron spike was resistant against most therapeutic antibodies but remained susceptible to inhibition by sotrovimab. Similarly, the Omicron spike evaded neutralization by antibodies from convalescent patients or individuals vaccinated with the BioNTech-Pfizer vaccine (BNT162b2) with 12- to 44-fold higher efficiency than the spike of the Delta variant. Neutralization of the Omicron spike by antibodies induced upon heterologous ChAdOx1 (Astra Zeneca-Oxford)/BNT162b2 vaccination or vaccination with three doses of BNT162b2 was more efficient, but the Omicron spike still evaded neutralization more efficiently than the Delta spike. These findings indicate that most therapeutic antibodies will be ineffective against the Omicron variant and that double immunization with BNT162b2 might not adequately protect against severe disease induced by this variant.

Referência

HOFFMAN, M. et al. The Omicron variant is highly resistant against antibody-mediated neutralization: Implications for control of the COVID-19 pandemic. **Cell,** dez. 2021.

8. Considerable escape of SARS-CoV-2 Omicron to antibody neutralization

Doi: https://doi.org/10.1038/s41586-021-04389-z

Resumo

The SARS-CoV-2 Omicron variant was first identified in November 2021 in Botswana and South Africa1–3. It has since then spread to many countries and is expected to rapidly become dominant worldwide. The lineage is characterized by the presence of about 32 mutations in the spike, located mostly in the N-terminal domain (NTD) and the receptor binding domain (RBD), which may enhance viral fitness and allow antibody evasion. Here, we isolated an infectious Omicron virus in Belgium, from a traveller returning from Egypt. We examined its sensitivity to 9 monoclonal antibodies (mAbs) clinically approved or in development4, and to antibodies present in 115 sera from COVID-19 vaccine recipients or convalescent individuals. Omicron was totally or partially resistant to neutralization by all mAbs tested. Sera from Pfizer or AstraZeneca vaccine recipients, sampled 5 months after complete vaccination, barely inhibited Omicron. Sera from COVID-19 convalescent patients collected 6 or 12 months post symptoms displayed low or no neutralizing activity against Omicron. Administration of a booster Pfizer dose as well as vaccination of previously infected individuals generated an anti-Omicron neutralizing response, with titers 6 to 23 fold lower against Omicron than against Delta. Thus, Omicron escapes most therapeutic monoclonal antibodies and to a large extent vaccine-elicited antibodies. Omicron remains however neutralized by antibodies generated by a booster vaccine dose.

Referência

PLANAS, D. et al. Considerable escape of SARS-CoV-2 Omicron to antibody neutralization. **Nature**, dez. 2021.

9. Striking Antibody Evasion Manifested by the Omicron Variant of SARS-CoV-2

Doi: https://doi.org/10.1038/s41586-021-04388-0

Resumo

The Omicron (B.1.1.529) variant of SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) was only recently detected in southern Africa, but its subsequent spread has been extensive, both regionally and globally1. It is expected to become dominant in the coming weeks2, probably due to enhanced transmissibility. A striking feature of this variant is the large number of spike mutations3 that pose a threat to the efficacy of current COVID-19 (coronavirus disease 2019) vaccines and antibody therapies4. This concern is amplified by the findings from our study. We found B.1.1.529 to be markedly resistant to neutralization by serum not only from convalescent patients, but also from individuals vaccinated with one of the four widely used COVID-19 vaccines. Even serum from persons vaccinated and boosted with mRNA-based vaccines exhibited substantially diminished neutralizing activity against B.1.1.529. By evaluating a panel of monoclonal antibodies to all known epitope clusters on the spike protein, we noted that the activity of 17 of the 19 antibodies tested were either abolished or impaired, including ones currently authorized or approved for use in patients. In addition, we also identified four new spike mutations (S371L, N440K, G446S, and Q493R) that confer greater antibody resistance to B.1.1.529. The Omicron variant presents a serious threat to many existing COVID-19 vaccines and therapies, compelling the development of new interventions that anticipate the evolutionary trajectory of SARS-CoV-2.

Referência

LIU, L. et al. Striking Antibody Evasion Manifested by the Omicron Variant of SARS-CoV-2. **Nature,** dez. 2021.

10. Broadly neutralizing antibodies overcome SARS-CoV-2 Omicron antigenic shift

Doi: https://doi.org/10.1038/s41586-021-04386-2

Resumo

The recently emerged SARS-CoV-2 Omicron variant encodes 37 amino acid substitutions in the spike (S) protein, 15 of which are in the receptor-binding domain (RBD), thereby raising concerns about the effectiveness of available vaccines and antibody therapeutics. Here, we show that the Omicron RBD binds to human ACE2 with enhanced affinity, relative to the Wuhan-Hu-1 RBD, and binds to mouse ACE2. Marked reductions of plasma neutralizing activity were observed against Omicron compared to the ancestral pseudovirus for convalescent and vaccinated individuals, but this loss was less pronounced after a third vaccine dose. Most receptor-binding motif (RBM)-directed monoclonal antibodies (mAbs) lost in vitro neutralizing activity against Omicron, with only 3 out of 29 mAbs retaining unaltered potency, including the ACE2-mimicking S2K146 mAb1. Furthermore, a fraction of broadly neutralizing sarbecovirus mAbs neutralized Omicron through recognition of antigenic sites outside the RBM, including sotrovimab2, S2X2593 and S2H974. The magnitude of Omicron-mediated immune evasion marks a major SARS-CoV-2 antigenic shift. Broadly neutralizing mAbs recognizing RBD epitopes conserved among SARS-CoV-2 variants and other sarbecoviruses may prove key to controlling the ongoing pandemic and future zoonotic spillovers.

Referência

CAMERONI, E. et al. Broadly neutralizing antibodies overcome SARS-CoV-2 Omicron antigenic shift. **Nature**, Dez. 2021.

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Expediente

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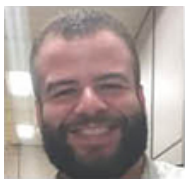

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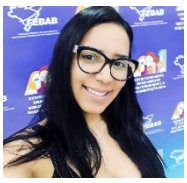

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