REGEN-COV and COVID-19, update on the drug profile and FDA status: A mini-review and bibliometric study

Saeid Mezail Mawazi,1 Jiyauddin Khan,1 Noordin Othman,1,2 Sultan Othman Alolayan,2 Yaser M. Alahmadi,2 Sultan S. Al Thagfan,2 Sally A. Helmy,2,3 Roy Rillera Marzo4

1School of Pharmacy, Management & Science University (MSU), Selangor, Malaysia; 2Department of Clinical and Hospital Pharmacy, College of Pharmacy, Taibah University, Saudi Arabia; 3Department of Pharmaceutics, Faculty of Pharmacy, Damanhour University, Damanhour, Egypt; 4Department of Community Medicine, International Medical School, Management and Science University, Selangor, Malaysia

Abstract

COVID-19 is caused by coronavirus (SARS-CoV-2) and is a worldwide health crisis. This severe acute respiratory syndrome was declared an outbreak after the first case was reported in Wuhan, the capital city of Hubei Province in China. On March 11th, 2020, the World Health Organization (WHO) declared it as a pandemic. The pharmaceutical treatment of COVID-19 has garnered significant critical attention due to the unavailability of medications to treat COVID-19. Recently, researchers have shown an increased interest in the monoclonal antibody drugs to treat COVID-19 especially REGN-COV (casirivimab and imdevimab). This review aims to highlight the relation between the drug and COVID-19 and the recently updated information on the monoclonal antibody REGN-COV from the U.S. Food and Drug Administration and other authorities. It is also designed to focus on the bibliometric data of REGN-COV for the last three years (2020, 2021, and 2021) in PubMed and Google Scholar.

Bibliometric analysis of REGN-COV

A growing body of literature recognises the importance of REGN-COV since the SARS-CoV-2 started. The availability of this literature could be translated and analysed as bibliometric data to give a clear picture of the REGN-COV importance in the treatment of the novel SARS-CoV-2 chronologically. The bibliometrics data were obtained from PubMed and Google Scholar. The key phrases used in this article were picked based on the authors’ previous experience. The main phrases used in PubMed and Google Scholar were “REGN-COV” and “Ronapreve”. The data was taken from the platforms indicated above on January 27th, 2022. According to PubMed, there were 152 published studies between 2020 and 2022. (7 in 2020, 118 in 2021, and 27 in 2022) when the key phrase “REGN-COV” is used in the search. At the same time, four published studies were noted when the key phrase “Ronapreve” was used in the same platform (Figure 1).

The importance of this medicine in treating SARS-CoV-2 and the attractiveness of the REGN-COV drug name compared to Ronapreve may be inferred from the findings. When the key phrase “REGN-COV” was searched on Google Scholar, there were 471 published data (5 in 2020, 402 in 2021, and 64 in 2022; Figure 2). About 60 articles were found on Google Scholar when the key phrase “Ronapreve” was used in the search. This result indicated that the researchers often use the keyword “REGN-COV” more than “Ronapreve”.

Nonetheless, Google Scholar’s findings differ from PubMed’s prior findings; Google Scholar produced more results, but no indication of this disparity was found. This inconsistency could be due to the results being repeated while searching in Google Scholar, a more general platform for the published work than PubMed (Figure 2). Both platforms, however, demonstrated frequent use of “REGN-COV” in SARS-CoV-2 research.

REGEN-COV (casirivimab and imdevimab)

“REGN-COV”, also known as “Ronapreve,” is a drug suggested to treat the novel SARS-CoV-2 that combines casirivimab and imdevimab; two monoclonal antibodies.2,3 This combination works by targeting the SARS-CoV-2 spike protein, inhibiting its interaction with the human angiotensin-converting enzyme 2 (ACE2) receptors, and eliminating the virus (Figure 3).2,3 Despite the importance of SARS-CoV-2, there remains a paucity of evidence on the treatment of the novel pandemic SARS-CoV-2. However, in a preliminary analysis of an ongoing double-blind, randomised trial of 275 SARS-CoV-2 outpatients, the REGN-COV2 antibody (1200mg, 8000mg casirivimab, and 1200mg and 400mg imdevimab) have been found to reduce viral load better.

Significance for public health

REGEN-COV is one of the drugs that have been prescribed for the treatment of the novel SARS-CoV-2. More attention was paid to the monoclonal antibody drugs since the SARS-CoV-2 started. The drug has been used to treat SARS-CoV-2 patients since November 21st, 2020. However, on January 24th, 2022, and due to its weak activity against the new SARS-CoV-2 variants, the FDA limited the use of REGN-COV drug. As a result, drug prescribers should be cautious of prescribing the medicine to the public for the reasons stated above, and prescribing this drug, particularly for the Omicron variant, will not result in the desired therapeutic outcomes and may result in unwanted and unnecessary side effects.
than placebo. In a separate study, the combination of casirivimab and imdevimab reduced hospital admission or mortality in high-risk non-admitted patients by 70% in a phase III trial. For the novel Omicron type of SARS-CoV-2, a combination of monoclonal antibodies has been reported as ineffective. The main adverse effects reported for REGEN-COV were dizziness, nausea, rash, chills, and lymphadenopathy. Whereas flushing, urticaria, anaphylaxis, and pruritus were rarely reported.

**REGEN-COV FDA and other authorities approval**

REGEN-COV acquired its first emergency use license in the United States to treat COVID-19 on November 21st, 2020. Moreover, The FDA issued a Letter of Authorization (LOA) to Regeneron (the pharmaceutical company that applied for the authorization) on February 3, 2021, for the emergency use of casirivimab and imdevimab in combination to prevent sickness in patients who have been exposed to someone with laboratory-confirmed SARS-CoV-2. Moreover, it was reported that Japan became the first country to license this combination to treat SARS-CoV-2 in July 2021. The LOA includes a stipulation that Regeneron provides instructional and educational materials to the FDA for review and approval prior to their initial distribution. The REGEN-COV LOA was issued for the treatment of mild to mod-
erate coronavirus disease 2019 (COVID-19) in adults and paediatric patients (12 years of age and older, weighing at least 40 kg) who have positive results from direct SARS-CoV-2 viral testing and are at high risk of developing severe COVID-19 and/or hospitalisation. Later on, the medicine acquired conditional marketing authorisation in the United Kingdom to prevent and treat SARS-CoV-2 on August 20th, 2021.5

### January 24th, 2022, FDA update for REGEN-COV

On January 24th, 2022, due to the data that showed that REGEN-COV is ineffective against the Omicron variant, the FDA changed the authorizations for the monoclonal antibody treatments REGEN-COV (casiirivimab and imdevimab) to restrict their use to patients who are likely to have been infected with or exposed to a variation susceptible to these treatments.9 Monoclonal antibodies are lab-made proteins that imitate the immune system’s capacity to combat diseases like SARS-CoV-2 viruses; as a result, specific variants, such as Omicron, are ineffective against specific variations.9 The FDA reauthorization of this drug is to prevent patients from being exposed to potentially dangerous side effects such as injection site responses or allergic reactions from certain medications that are not likely to help individuals who have been infected with or exposed to the Omicron form.9

### Conclusions

The purpose of this review was to highlight the link between the drug and COVID-19, as well as the FDA’s and other authorities’ recently updated information on the monoclonal antibody REGEN-COV (casiirivimab and imdevimab). It’s also concentrated on REGEN-COV bibliometric data in PubMed and Google Scholar over the last three years (2020, 2021, and 2021). One of the more significant findings to emerge from this study is that the drug was shown no activity against the Omicron variant of the SARS-CoV-2 virus. Therefore, the FDA has limited drug use based on the drug’s action on the SARS-CoV-2 infection.

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### Correspondence:
Saeid Mezail Mawazi, School of Pharmacy, Management & science University, University Drive, Off Persiaran Olahraga, 40100 Shah Alam, Selangor Province, Country.
Tel.: +601123766349. E-mail: saeidmezail@gmail.com

**Key words:** REGEN-COV; casiirivimab and imdevimab; COVID-19; SARS-CoV-2; Ronapreve.

**Contributions:** Conceptualization, SMM; Methodology, SMM, and NO; Data Formal Analysis, SMM, YMA, SSAT, and SAH; Investigation, SMM, JK; Data Curation, SMM, and SAO Writing—Original Draft SMM; Writing—Review & Editing, SMM, NO, SOA, YMA, SSAT SAH, RRM.

**Conflict of interest:** The authors declare no conflict of interest.

**Availability of data and material:** All data generated or analysed during this study are included in this published article.

**Ethical approval:** Not applicable.

**Patient consent for publication:** Not applicable.

**Informed consent:** Not applicable.

Received for publication: 13 February 2022.
Revision received: 2 March 2022.
Accepted for publication: 2 March 2022.

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Journal of Public Health Research 2021; 10(s2):2930
doi:10.4081/jphr.2021.2930
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