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Virus Research 315 (2022) 198765

Contents lists available at ScienceDirect

Virus Research

journal homepage: www.elsevier.com/locate/virusres

Mutational cascade of SARS-CoV-2 leading to evolution and emergence of omicron variant

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ARTICLE INFO

Keywords:
SARS-CoV-2, COVID-19, genome-wide, evolution, variants, VOC, VOI, VUM, SNP, mutation, non-synonymous, silent mutation, spike, RNA dependent RNA polymerase, NSP, UTR: Abbreviations: VOC, variant of concern
VOI, variant of interest
VUM, variant under monitoring
NSP, non-structural protein
UTR, untranslated region
rdrp, RNA dependent RNA polymerase

ABSTRACT

Background: Emergence of new variant of SARS-CoV-2, namely omicron, has posed a global concern because of its high rate of transmissibility and mutations in its genome. Researchers worldwide are trying to understand the evolution and emergence of such variants to understand the mutational cascade events.
Methods: We have considered all omicron genomes (n = 302 genomes) available till 2nd December 2021 in the public repository of GISAID along with representatives of variants of concern (VOC), i.e., alpha, beta, gamma, delta, and omicron; variant of interest (VOI) mu and lambda; and variant under monitoring (VUM). Whole genome-based phylogeny and mutational analysis were performed to understand the evolution of SARS CoV-2 leading to emergence of omicron variant.
Results: Whole genome-based phylogeny depicted two phylogroups (PG-I and PG-II) forming variant specific clades except for gamma and VUM GH. Mutational analysis detected 18,261 mutations in the omicron variant, majority of which were non-synonymous mutations in spike (A67, T547K, D614G, H655Y, N679K, P681H, D796Y, N856K, Q954H), followed by RNA dependent RNA polymerase (rdrp) (A1892T, I189V, P314L, K38R, T492I, V57V), ORF6 (M19M) and nucleocapsid protein (RG203KR).
Conclusion: Delta and omicron have evolutionary diverged into distinct phylogroups and do not share a common ancestry. While, omicron shares common ancestry with VOI lambda and its evolution is mainly derived by the non-synonymous mutations.

1. Introduction

Throughout the globe resurgence of COVID-19 cases has been linked to the emergence of new variants of concern (https://www.hopkinsmedicine.org/health/conditions-and-diseases/coronavirus/first-and-second-waves-of-coronavirus) (Thakur et al., 2021). Currently, the world is witnessing a new variant namely, omicron which was first reported in South Africa on 24th November 2021 from the specimen collected on 9th November 2021(https://www.who.int/publications/m/item/enhancing-readiness-for-omicron-(b.1.1.529)-technical-brief-and-priority-actions-for-member-states). On 26th November 2021, World Health Organisation (WHO) assigned omicron to the 'variant of concern' (VOC) category due to its ability to poses a higher risk of reinfection as compared to previously reported variants (https://www.who.int/news/item/26–11–2021-classification-of-omicron-(b.1.1.529)-sars-cov-2-variant-of-concern; https://www.who.int/news/item/28–11–2021-update-on-omicron). According to the 1st December 2021 update, omicron is reported in at least 23 countries from five out of six WHO regions, with most cases in Africa and Europe (https://www.cnbc.com/2021/12/01/-who-says-omicron-has-been-found-in-23-countries-across-the-world.html).

There is a lot of uncertainty surrounding the omicron variant. For its risk assessment, scientists and researchers are investigating the intensity of its spread, extent of its infection, effectiveness of detection methods, therapeutics, and vaccine efficacy (Knoll & Wonodi, 2021; Lipsitch & Dean, 2020; Pegu et al., 2021). The onset of omicron is reported with mild diseases suggests its low or mild severity than its previous counterparts like delta (Ewen Callaway, 2021; E. Callaway & Ledford, 2021).

Abbreviations: VOC, Variant of concern; VOI, Variant of interest; VUM, Variant under monitoring; NSP, Non-structural protein; UTR, Untranslated region; rdrp, RNA dependent RNA polymerase.

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https://doi.org/10.1016/j.virusres.2022.198765
Received 7 December 2021; Received in revised form 21 February 2022; Accepted 27 March 2022
Available online 31 March 2022

It is known to have a very high mutation rate with more than 30 mutational changes in its spike protein (Ewen Callaway, 2021) (https://www.who.int/publications/m/item/enhancing--readiness-for-omicron-(b.1.1.529)-technical-brief-and-priority-actions-for-member-states)

Globally, high risk of reinfection with omicron variant and its ability to evade vaccine-induced immunity resulting in the emergence of new variants of SARS-CoV-2 (Pulliam et al., 2021). Since COVID-19 inception, researchers have been trying to investigate its origin and evolution (Bansal, Kumar, & Patil, 2021; Singh & Soojin, 2021; Tang et al., 2020). We are currently witnessing a global molecular arms race between SARS-CoV-2 and its preventive therapeutics based on diverse regimes such as DNA, RNA, protein or inactivated whole-virion, etc. (Andreadakis et al., 2020; Corey, Mascola, Fauci, & Collins, 2020; Sharma, Sultan, Ding, & Triggle, 2020). This global crisis can be addressed by a very rapid immunization program worldwide. Moreover, the real-time monitoring of evolutionary cascade of SARS-CoV-2 leading to novel variants is utmost. Earlier investigation of several VOC and VOI suggests some of the crucial mutations for viral survival and high infectivity in humans (Boehm et al., 2021; Kumar & Bansal, 2021; Schmidt et al., 2021). However, mutations giving rise to omicron and intra-omicron genomic diversity are not yet analyzed at a population level.

In the present study, we aim to look for the mutational profile of under-monitoring variants reported till now to understand the emergence of a heavily mutated variant named omicron. Interestingly, whole genome-based phylogeny suggests two major phylogroups PG-I and PG-II. Further, mutational analysis depicted the key role of non-synonymous mutations in the evolution of novel variant. Such genome-wide mutational landscape is required for surveillance and vaccine development.

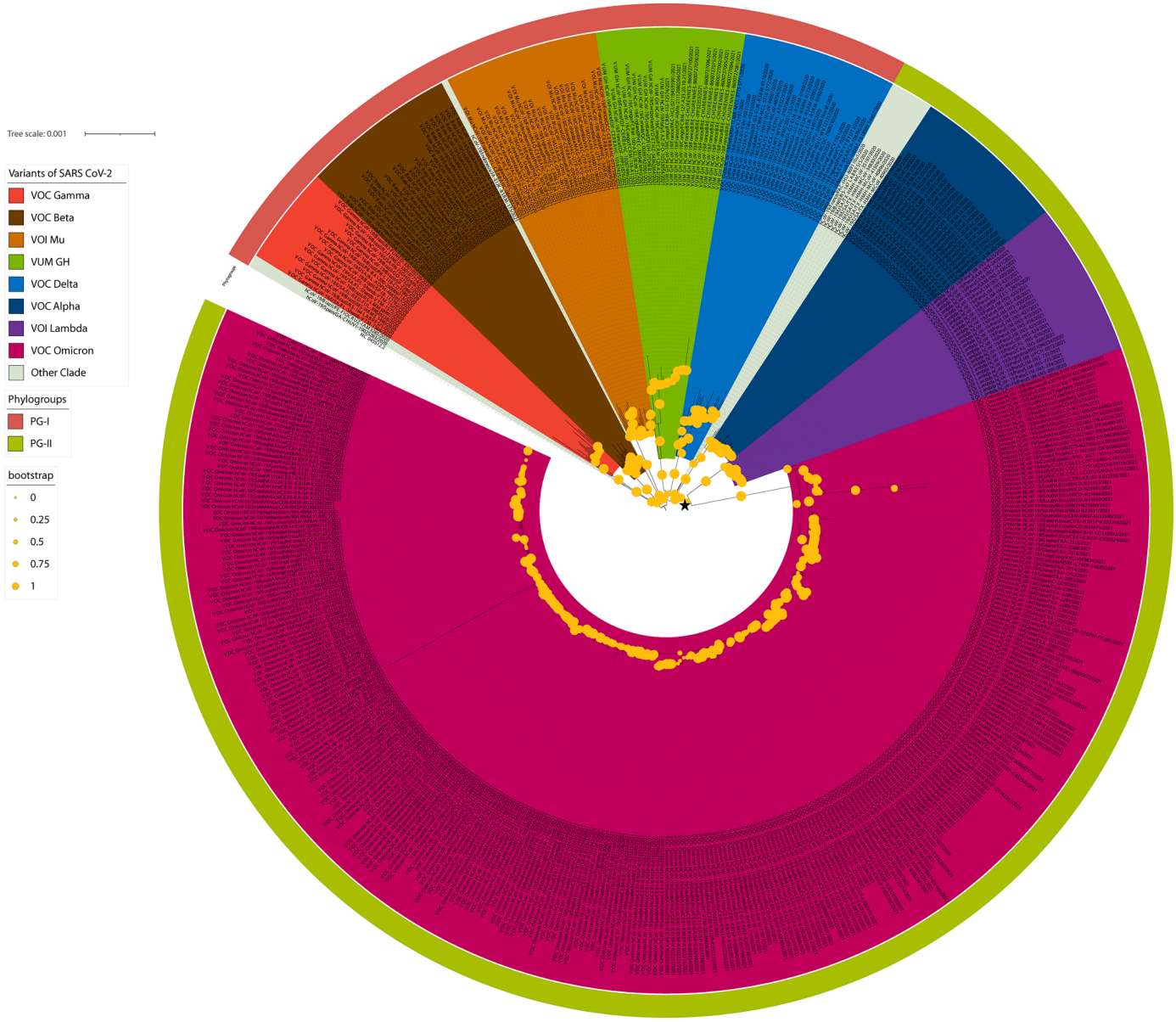

Fig. 1. Maximum likelihood whole genome-based phylogeny of SARS-CoV-2 VOCs, VOIs and VUMs. Here, phylogroups (PG-I and PG-II) and clades (alpha, beta, gamma, delta, omicron, mu etc.) are marked with respective colors as indicated. Bootstrap values are represented by the radius of circle at the nodes. Common ancestry of omicron and lambda is marked by black star.

Table 1
Metadata of the VOCs, VOIs and VUMs strains used in the present study.

Variant	strain	Strain_analysis	virus	gisaid_epi	date	region	country	division	location	region_ex	country_e	division_e	segment	length	host	age	sex	pangolin_	GISAID_cl	originating	submitting	authors	url	date_submitted
Omicron	hCoV-19/HongKong/VM21044713-1/2021	VOC_Omicron_hCoV-19/HongKong/VM21044713-1/2021	betacoron	EPI_ISL_65	13/11/2021	Asia	Hong Kong			Asia	Hong Kong		genome	29752	Human	36	Male	B.1.1.529	GR	Home Qua	Hong Kong	Alan K.L. T	https://ww	22/11/2021
Omicron	hCoV-19/Botswana/R40B59_BHP_3321001248/2021	VOC_Omicron_hCoV-19/Botswana/R40B59_BHP_3321001248/2021	betacoron	EPI_ISL_66	11/11/2021	Africa	Botswana	South East	Greater Ga	Africa	Botswana	South East	genome	29684	Human	57	Female	B.1.1.529	GR	Botswana	Botswana	Sikhulile M	https://ww	23/11/2021
Omicron	hCoV-19/Botswana/R40B60_BHP_3321001247/2021	VOC_Omicron_hCoV-19/Botswana/R40B60_BHP_3321001247/2021	betacoron	EPI_ISL_66	11/11/2021	Africa	Botswana	South East	Greater Ga	Africa	Botswana	South East	genome	29684	Human	64	Male	B.1.1.529	GR	Botswana	Botswana	Sikhulile M	https://ww	23/11/2021
Omicron	hCoV-19/Botswana/R40B58_BHP_3321001245/2021	VOC_Omicron_hCoV-19/Botswana/R40B58_BHP_3321001245/2021	betacoron	EPI_ISL_66	11/11/2021	Africa	Botswana	South East	Greater Ga	Africa	Botswana	South East	genome	29684	Human	33	Female	B.1.1.529	GR	Botswana	Botswana	Sikhulile M	https://ww	23/11/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21600-DX03569/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21600-DX03569/2021	betacoron	EPI_ISL_66	14/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29804	Human	27	Female	B.1.1.529	GR	LANCET LA	National Ir	Amoako D	https://ww	23/11/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21602-DX040380/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21602-DX040380/2021	betacoron	EPI_ISL_66	15/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29804	Human	28	Female	B.1.1.529	GR	LANCET LA	National Ir	Amoako D	https://ww	23/11/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21603-DX64204/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21603-DX64204/2021	betacoron	EPI_ISL_66	16/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29804	Human	35	Male	B.1.1.529	GR	LANCET LA	National Ir	Amoako D	https://ww	23/11/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21604-DX64219/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21604-DX64219/2021	betacoron	EPI_ISL_66	16/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29804	Human	29	Male	B.1.1.529	GR	LANCET LA	National Ir	Amoako D	https://ww	23/11/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21605-DX64490/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21605-DX64490/2021	betacoron	EPI_ISL_66	15/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29804	Human	21	unknown	B.1.1.529	GR	LANCET LA	National Ir	Amoako D	https://ww	23/11/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21606-DX64492/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21606-DX64492/2021	betacoron	EPI_ISL_66	15/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29804	Human	38	unknown	B.1.1.529	GR	LANCET LA	National Ir	Amoako D	https://ww	23/11/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21607-DX64624/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21607-DX64624/2021	betacoron	EPI_ISL_66	16/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29804	Human	0	Female	B.1.1.529	GR	LANCET LA	National Ir	Amoako D	https://ww	23/11/2021
Omicron	hCoV-19/Botswana/R40B61_BHP_3321001244/2021	VOC_Omicron_hCoV-19/Botswana/R40B61_BHP_3321001244/2021	betacoron	EPI_ISL_66	11/11/2021	Africa	Botswana	South East	Greater Ga	Africa	Botswana	South East	genome	29714	Human	64	Male	B.1.1.529	GR	Botswana	Botswana	Sikhulile M	https://ww	24/11/2021
Omicron	hCoV-19/HongKong/VM21045145/2021	VOC_Omicron_hCoV-19/HongKong/VM21045145/2021	betacoron	EPI_ISL_66	18/11/2021	Asia	Hong Kong			Asia	Hong Kong		genome	29752	Human	62	Male	B.1.1.529	GR	HOME QU	Hong Kong	Alan K.L. T	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21601-DX04008/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21601-DX04008/2021	betacoron	EPI_ISL_66	15/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29804	Human	38	Female	B.1.1.529	GR	LANCET LA	National Ir	Amoako D	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032188/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032188/2021	betacoron	EPI_ISL_66	17/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29852	Human	14	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032189/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032189/2021	betacoron	EPI_ISL_66	17/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29796	Human	28	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032191/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032191/2021	betacoron	EPI_ISL_66	17/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29871	Human	21	Male	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032192/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032192/2021	betacoron	EPI_ISL_66	16/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29798	Human	29	Male	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032195/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032195/2021	betacoron	EPI_ISL_66	15/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29813	Human	46	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032197/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032197/2021	betacoron	EPI_ISL_66	15/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29813	Human	46	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032198/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032198/2021	betacoron	EPI_ISL_66	14/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29852	Human	0.4	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032199/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032199/2021	betacoron	EPI_ISL_66	15/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29848	Human	27	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032201/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032201/2021	betacoron	EPI_ISL_66	16/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29800	Human	52	Male	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032203/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032203/2021	betacoron	EPI_ISL_66	16/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29869	Human	53	Male	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032204/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032204/2021	betacoron	EPI_ISL_66	17/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29852	Human	22	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032205/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032205/2021	betacoron	EPI_ISL_66	18/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29791	Human	34	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032206/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032206/2021	betacoron	EPI_ISL_66	18/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29842	Human	21	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032207/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032207/2021	betacoron	EPI_ISL_66	18/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29852	Human	37	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032210/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032210/2021	betacoron	EPI_ISL_66	18/11/2021	Africa	South Afri	Gauteng	Sedibeng	Africa	South Afri	Gauteng	genome	29650	Human	17	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032211/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032211/2021	betacoron	EPI_ISL_66	18/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29790	Human	55	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032214/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032214/2021	betacoron	EPI_ISL_66	17/11/2021	Africa	South Afri	Gauteng	Sedibeng	Africa	South Afri	Gauteng	genome	29869	Human	14	Male	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032215/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032215/2021	betacoron	EPI_ISL_66	19/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29802	Human	24	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032216/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032216/2021	betacoron	EPI_ISL_66	17/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29860	Human	36	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032217/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032217/2021	betacoron	EPI_ISL_66	19/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29852	Human	31	unknown	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032218/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032218/2021	betacoron	EPI_ISL_66	19/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29806	Human	28	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032219/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032219/2021	betacoron	EPI_ISL_66	19/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29805	Human	49	Male	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032221/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032221/2021	betacoron	EPI_ISL_66	19/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29859	Human	31	unknown	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032223/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032223/2021	betacoron	EPI_ISL_66	19/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29808	Human	23	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032226/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032226/2021	betacoron	EPI_ISL_66	19/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29870	Human	53	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032227/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032227/2021	betacoron	EPI_ISL_66	19/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29869	Human	23	Male	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032228/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032228/2021	betacoron	EPI_ISL_66	19/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29857	Human	unknown	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032231/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032231/2021	betacoron	EPI_ISL_66	22/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29869	Human	39	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032232/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032232/2021	betacoron	EPI_ISL_66	22/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29842	Human	27	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032233/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032233/2021	betacoron	EPI_ISL_66	22/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29815	Human	22	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032237/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032237/2021	betacoron	EPI_ISL_66	21/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29788	Human	40	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032238/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032238/2021	betacoron	EPI_ISL_66	22/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29811	Human	24	Male	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032239/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032239/2021	betacoron	EPI_ISL_66	22/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29864	Human	27	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032241/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032241/2021	betacoron	EPI_ISL_66	20/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29816	Human	19	Male	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032242/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032242/2021	betacoron	EPI_ISL_66	20/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29852	Human	13	Male	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032243/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032243/2021	betacoron	EPI_ISL_66	20/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29796	Human	45	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032244/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032244/2021	betacoron	EPI_ISL_66	20/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29792	Human	29	Male	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032245/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032245/2021	betacoron	EPI_ISL_66	20/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29796	Human	55	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032246/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032246/2021	betacoron	EPI_ISL_66	19/11/2021	Africa	South Afri	Gauteng	Sedibeng	Africa	South Afri	Gauteng	genome	29869	Human	14	Male	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032248/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032248/2021	betacoron	EPI_ISL_66	21/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29867	Human	27	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032250/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032250/2021	betacoron	EPI_ISL_66	22/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29867	Human	70	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032251/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032251/2021	betacoron	EPI_ISL_66	22/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29866	Human	unknown	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032253/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032253/2021	betacoron	EPI_ISL_66	22/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29852	Human	38	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032254/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032254/2021	betacoron	EPI_ISL_66	22/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29860	Human	52	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21665/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21665/2021	betacoron	EPI_ISL_67	20/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29824	Human	37	Female	B.1.1.529	GR	LANCET LA	National Ir	Amoako D	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21668/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21668/2021	betacoron	EPI_ISL_67	20/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29841	Human	21	Female	B.1.1.529	GR	LANCET LA	National Ir	Amoako D	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21671/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21671/2021	betacoron	EPI_ISL_67	20/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29841	Human	53	Male	B.1.1.529	GR	LANCET LA	National Ir	Amoako D	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21672/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21672/2021	betacoron	EPI_ISL_67	20/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29808	Human	47	Male	B.1.1.529	GR	LANCET LA	National Ir	Amoako D	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21673/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21673/2021	betacoron	EPI_ISL_67	20/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29835	Human	38	Male	B.1.1.529	GR	LANCET LA	National Ir	Amoako D	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21674/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21674/2021	betacoron	EPI_ISL_67	20/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29842	Human	12	Female	B.1.1.529	GR	LANCET LA	National Ir	Amoako D	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21675/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21675/2021	betacoron	EPI_ISL_67	20/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29816	Human	17	Female	B.1.1.529	GR	LANCET LA	National Ir	Amoako D	https://ww	25/11/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21676/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21676/2021	betacoron	EPI_ISL_67	20/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29827	Human	35	Male	B.1.1.529	GR	LANCET LA	National Ir	Amoako D	https://ww	25/11/2021
Omicron	hCoV-19/HongKong/VM21044713_WHP5047-S5-iseq/2021	VOC_Omicron_hCoV-19/HongKong/VM21044713_WHP5047-S5-iseq/2021	betacoron	EPI_ISL_67	15/11/2021	Asia	Hong Kong			Asia	Hong Kong		genome	29640	Human	36	Male	B.1.1.529	GR	Hong Kong	School of F	Dominic N	https://ww	25/11/2021
Omicron	hCoV-19/Botswana/R42B5_BHP_AAC25114/2021	VOC_Omicron_hCoV-19/Botswana/R42B5_BHP_AAC25114/2021	betacoron	EPI_ISL_67	11/11/2021	Africa	Botswana	Lobatse		Africa	Botswana	Lobatse	genome	29693	Human	43	Male	B.1.1.529	GR	Botswana	Botswana	Sikhulile M	https://ww	25/11/2021
Omicron	hCoV-19/Botswana/R42B90_BHP_000842207/2021	VOC_Omicron_hCoV-19/Botswana/R42B90_BHP_000842207/2021	betacoron	EPI_ISL_67	21/11/2021	Africa	Botswana	Gaborone		Africa	Botswana	Gaborone	genome	29684	Human	58	Male	B.1.1.529	GR	Botswana	Botswana	Sikhulile M	https://ww	25/11/2021
Omicron	hCoV-19/Botswana/R43B69_BHP_2421009581/2021	VOC_Omicron_hCoV-19/Botswana/R43B69_BHP_2421009581/2021	betacoron	EPI_ISL_67	23/11/2021	Africa	Botswana	Gaborone		Africa	Botswana	Gaborone	genome	29714	Human	38	Male	B.1.1.529	GR	Botswana	Botswana	Sikhulile M	https://ww	26/11/2021
Omicron	hCoV-19/Botswana/R43B15_BHP_000842375/2021	VOC_Omicron_hCoV-19/Botswana/R43B15_BHP_000842375/2021	betacoron	EPI_ISL_67	21/11/2021	Africa	Botswana	Palapye		Africa	Botswana	Palapye	genome	29714	Human	44	Male	B.1.1.529	GR	Palapye Pr	Botswana	Sikhulile M	https://ww	26/11/2021
Omicron	hCoV-19/Botswana/R43B68_BHP_121142361/2021	VOC_Omicron_hCoV-19/Botswana/R43B68_BHP_121142361/2021	betacoron	EPI_ISL_67	23/11/2021	Africa	Botswana	Gaborone		Africa	Botswana	Gaborone	genome	29714	Human	41	Female	B.1.1.529	GR	Botswana	Botswana	Sikhulile M	https://ww	26/11/2021
Omicron	hCoV-19/Botswana/R43B34_BHP_AAC25685/2021	VOC_Omicron_hCoV-19/Botswana/R43B34_BHP_AAC25685/2021	betacoron	EPI_ISL_67	22/11/2021	Africa	Botswana	Gaborone		Africa	Botswana	Gaborone	genome	29714	Human	32	Female	B.1.1.529	GR	Botswana	Botswana	Sikhulile M	https://ww	26/11/2021
Omicron	hCoV-19/Botswana/R43B71_BHP_121142518/2021	VOC_Omicron_hCoV-19/Botswana/R43B71_BHP_121142518/2021	betacoron	EPI_ISL_67	23/11/2021	Africa	Botswana	Gaborone		Africa	Botswana	Gaborone	genome	29714	Human	48	Male	B.1.1.529	GR	Botswana	Botswana	Sikhulile M	https://ww	26/11/2021
Omicron	hCoV-19/Botswana/R43B14_BHP_000842147/2021	VOC_Omicron_hCoV-19/Botswana/R43B14_BHP_000842147/2021	betacoron	EPI_ISL_67	21/11/2021	Africa	Botswana	Palapye		Africa	Botswana	Palapye	genome	29714	Human	39	Male	B.1.1.529	GR	Palapye Pr	Botswana	Sikhulile M	https://ww	26/11/2021
Omicron	hCoV-19/Botswana/R43B67_BHP_2021010142/2021	VOC_Omicron_hCoV-19/Botswana/R43B67_BHP_2021010142/2021	betacoron	EPI_ISL_67	23/11/2021	Africa	Botswana	Gaborone		Africa	Botswana	Gaborone	genome	29714	Human	47	Male	B.1.1.529	GR	Botswana	Botswana	Sikhulile M	https://ww	26/11/2021
Omicron	hCoV-19/Botswana/R43B70_BHP_4021000195/2021	VOC_Omicron_hCoV-19/Botswana/R43B70_BHP_4021000195/2021	betacoron	EPI_ISL_67	23/11/2021	Africa	Botswana	Gaborone		Africa	Botswana	Gaborone	genome	29714	Human	38	Male	B.1.1.529	GR	Botswana	Botswana	Sikhulile M	https://ww	26/11/2021
Omicron	hCoV-19/Botswana/R43B33_BHP_AAC25682/2021	VOC_Omicron_hCoV-19/Botswana/R43B33_BHP_AAC25682/2021	betacoron	EPI_ISL_67	22/11/2021	Africa	Botswana	Gaborone		Africa	Botswana	Gaborone	genome	29707	Human	5	Male	B.1.1.529	GR	Botswana	Botswana	Sikhulile M	https://ww	26/11/2021
Omicron	hCoV-19/Botswana/R43B65_BHP_2021010151/2021	VOC_Omicron_hCoV-19/Botswana/R43B65_BHP_2021010151/2021	betacoron	EPI_ISL_67	23/11/2021	Africa	Botswana	Gaborone		Africa	Botswana	Gaborone	genome	29714	Human	52	Male	B.1.1.529	GR	Botswana	Botswana	Sikhulile M	https://ww	26/11/2021
Omicron	hCoV-19/Botswana/R43B66_BHP_521004487/2021	VOC_Omicron_hCoV-19/Botswana/R43B66_BHP_521004487/2021	betacoron	EPI_ISL_67	23/11/2021	Africa	Botswana	Gaborone		Africa	Botswana	Gaborone	genome	29714	Human	47	Male	B.1.1.529	GR	Botswana	Botswana	Sikhulile M	https://ww	26/11/2021
Omicron	hCoV-19/Botswana/R43B16_BHP_000837253/2021	VOC_Omicron_hCoV-19/Botswana/R43B16_BHP_000837253/2021	betacoron	EPI_ISL_67	17/11/2021	Africa	Botswana	Palapye		Africa	Botswana	Palapye	genome	29714	Human	45	Male	B.1.1.529	GR	Palapye Pr	Botswana	Sikhulile M	https://ww	26/11/2021
Omicron	hCoV-19/Botswana/R43B64_BHP_121142532/2021	VOC_Omicron_hCoV-19/Botswana/R43B64_BHP_121142532/2021	betacoron	EPI_ISL_67	23/11/2021	Africa	Botswana	Gaborone		Africa	Botswana	Gaborone	genome	29714	Human	35	Male	B.1.1.529	GK	Botswana	Botswana	Sikhulile M	https://ww	26/11/2021
Omicron	hCoV-19/Italy/LOM-Sacco_Var_T96348/2021	VOC_Omicron_hCoV-19/Italy/LOM-Sacco_Var_T96348/2021	betacoron	EPI_ISL_67	22/11/2021	Europe	Italy	Lombardia		Europe	Italy	Lombardia	genome	29799	Human	40-49	unknown	B.1.1.529	GR	Policlinico	Laboratory	Valeria Mi	https://ww	26/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032212/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032212/2021	betacoron	EPI_ISL_67	18/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29850	Human	36	Male	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	26/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032252/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032252/2021	betacoron	EPI_ISL_67	22/11/2021	Africa	South Afri	Gauteng	City of Joh	Africa	South Afri	Gauteng	genome	29849	Human	23	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	26/11/2021
Omicron	hCoV-19/Belgium/rega-20174/2021	VOC_Omicron_hCoV-19/Belgium/rega-20174/2021	betacoron	EPI_ISL_67	24/11/2021	Europe	Belgium	Sint-Pieters-Leeuw		Europe	Belgium	Sint-Pieter	genome	29684	Human	32	Female	B.1.1.529	GR	KU Leuven	KU Leuven	Tony Waw	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K030835/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K030835/2021	betacoron	EPI_ISL_67	12/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29735	Human	27	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K030836/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K030836/2021	betacoron	EPI_ISL_67	12/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29871	Human	35	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K030837/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K030837/2021	betacoron	EPI_ISL_67	12/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29861	Human	55	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K030838/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K030838/2021	betacoron	EPI_ISL_67	11/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29852	Human	21	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K030840/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K030840/2021	betacoron	EPI_ISL_67	9/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29820	Human	34	Male	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K030842/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K030842/2021	betacoron	EPI_ISL_67	12/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29851	Human	21	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032258/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032258/2021	betacoron	EPI_ISL_67	19/11/2021	Africa	South Afri	KwaZulu-Natal		Africa	South Afri	KwaZulu-N	genome	29782	Human	26	Female	B.1.1.529	GR	National H	CERI, Cent	Nokukhan	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032271/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032271/2021	betacoron	EPI_ISL_67	19/11/2021	Africa	South Afri	KwaZulu-Natal		Africa	South Afri	KwaZulu-N	genome	29783	Human	38	Female	B.1.1.529	GR	National H	CERI, Cent	Nokukhan	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032283/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032283/2021	betacoron	EPI_ISL_67	22/11/2021	Africa	South Afri	KwaZulu-Natal		Africa	South Afri	KwaZulu-N	genome	29490	Human	62	Female	B.1.1.529	GR	National H	CERI, Cent	Nokukhan	https://ww	27/11/2021
Omicron	hCoV-19/Israel/SMC-7022800/2021	VOC_Omicron_hCoV-19/Israel/SMC-7022800/2021	betacoron	EPI_ISL_67	20/11/2021	Asia	Israel			Asia	Israel		genome	29787	Human	34	unknown	B.1.1.529	GR	Shamir Me	Shamir Me	Nir Rainy,(	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032284/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032284/2021	betacoron	EPI_ISL_67	23/11/2021	Africa	South Afri	KwaZulu-Natal		Africa	South Afri	KwaZulu-N	genome	29873	Human	61	Female	B.1.1.529	GR	National H	CERI, Cent	Nokukhan	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032304/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032304/2021	betacoron	EPI_ISL_67	17/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29782	Human	56	Female	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032319/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032319/2021	betacoron	EPI_ISL_67	17/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29742	Human	21	Female	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032324/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032324/2021	betacoron	EPI_ISL_67	17/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29710	Human	22	Male	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032331/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032331/2021	betacoron	EPI_ISL_67	16/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29732	Human	43	Female	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032338/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032338/2021	betacoron	EPI_ISL_67	16/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29680	Human	39	Female	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032341/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032341/2021	betacoron	EPI_ISL_67	16/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29727	Human	23	Male	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032343/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032343/2021	betacoron	EPI_ISL_67	16/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29795	Human	47	Female	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032344/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032344/2021	betacoron	EPI_ISL_67	16/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29847	Human	37	Female	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032348/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032348/2021	betacoron	EPI_ISL_67	16/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29655	Human	unknown	Female	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032359/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032359/2021	betacoron	EPI_ISL_67	16/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29757	Human	12	Female	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032365/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032365/2021	betacoron	EPI_ISL_67	15/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29650	Human	21	Female	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032366/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032366/2021	betacoron	EPI_ISL_67	15/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29744	Human	27	Female	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032367/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032367/2021	betacoron	EPI_ISL_67	15/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29729	Human	54	Female	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032368/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032368/2021	betacoron	EPI_ISL_67	15/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29694	Human	32	Male	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032373/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032373/2021	betacoron	EPI_ISL_67	13/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29800	Human	38	Male	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032190/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032190/2021	betacoron	EPI_ISL_68	17/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29847	Human	30	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032202/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032202/2021	betacoron	EPI_ISL_68	16/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29850	Human	32	Male	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032225/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032225/2021	betacoron	EPI_ISL_68	19/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29788	Human	49	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032235_2/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032235_2/2021	betacoron	EPI_ISL_68	22/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29847	Human	39	Female	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	27/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032249/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032249/2021	betacoron	EPI_ISL_68	22/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29870	Human	unknown	Male	B.1.1.529	GR	National H	CERI, Cent	Kathleen S	https://ww	27/11/2021
Omicron	hCoV-19/Australia/NSW-RPAH-1933/2021	VOC_Omicron_hCoV-19/Australia/NSW-RPAH-1933/2021	betacoron	EPI_ISL_68	27/11/2021	Oceania	Australia	New South	Sydney	Oceania	Australia	New South	genome	29693	Human	unknown	unknown	B.1.1.529	GR	New South	Microbiolo	Foster, C.;	https://ww	28/11/2021
Omicron	hCoV-19/England/MILK-2B67570/2021	VOC_Omicron_hCoV-19/England/MILK-2B67570/2021	betacoron	EPI_ISL_68	21/11/2021	Europe	United Kin	England		Europe	United Kin	England	genome	29747	Human	unknown	unknown	B.1.1.529	GR	Lighthouse	Wellcome	The Lighth	https://ww	28/11/2021
Omicron	hCoV-19/England/ALDP-2B4DF63/2021	VOC_Omicron_hCoV-19/England/ALDP-2B4DF63/2021	betacoron	EPI_ISL_68	20/11/2021	Europe	United Kin	England		Europe	United Kin	England	genome	29747	Human	unknown	unknown	B.1.1.529	GR	Lighthouse	Wellcome	Jacquelyn	https://ww	28/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032300/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032300/2021	betacoron	EPI_ISL_68	17/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29730	Human	20	Female	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	28/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032326/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032326/2021	betacoron	EPI_ISL_68	17/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29732	Human	31	Male	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	28/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032332/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032332/2021	betacoron	EPI_ISL_68	16/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29767	Human	54	Male	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	28/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032340/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032340/2021	betacoron	EPI_ISL_68	16/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29730	Human	41	Female	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	28/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032342/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032342/2021	betacoron	EPI_ISL_68	16/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29769	Human	26	Male	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	28/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032354/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032354/2021	betacoron	EPI_ISL_68	16/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29798	Human	33	Male	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	28/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032355/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032355/2021	betacoron	EPI_ISL_68	16/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29847	Human	33	Female	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	28/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032357/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032357/2021	betacoron	EPI_ISL_68	16/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29651	Human	20	Female	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	28/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032360/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032360/2021	betacoron	EPI_ISL_68	16/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29796	Human	18	Male	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	28/11/2021
Omicron	hCoV-19/SouthAfrica/CERI-KRISP-K032370/2021	VOC_Omicron_hCoV-19/SouthAfrica/CERI-KRISP-K032370/2021	betacoron	EPI_ISL_68	14/11/2021	Africa	South Afri	Gauteng	Tshwane	Africa	South Afri	Gauteng	genome	29767	Human	6	Female	B.1.1.529	GR	ZARV/NHL	CERI, Cent	Amy Stryd	https://ww	28/11/2021
Omicron	hCoV-19/Austria/MUIV-0229/2021	VOC_Omicron_hCoV-19/Austria/MUIV-0229/2021	betacoron	EPI_ISL_68	28/11/2021	Europe	Austria	Tyrol	Schwaz	Europe	Austria	Tyrol	genome	29693	Human	unknown	unknown	B.1.1.529	GR	Institute o	Institute o	David Bant	https://ww	28/11/2021
Omicron	hCoV-19/Canada/ON-NML-249359/2021	VOC_Omicron_hCoV-19/Canada/ON-NML-249359/2021	betacoron	EPI_ISL_68	23/11/2021	North Ame	Canada	Ontario		North Ame	Canada	Ontario	genome	29693	Human	40 - 49	Female	B.1.1.529	GR	Dynacare	National M	Anna Maje	https://ww	29/11/2021
Omicron	hCoV-19/Canada/ON-NML-249358/2021	VOC_Omicron_hCoV-19/Canada/ON-NML-249358/2021	betacoron	EPI_ISL_68	23/11/2021	North Ame	Canada	Ontario		North Ame	Canada	Ontario	genome	29693	Human	50 - 59	Male	B.1.1.529	GR	Dynacare	National M	Anna Maje	https://ww	29/11/2021
Omicron	hCoV-19/Australia/NSW-RPAH-1935/2021	VOC_Omicron_hCoV-19/Australia/NSW-RPAH-1935/2021	betacoron	EPI_ISL_68	28/11/2021	Oceania	Australia	New South	Sydney	Oceania	Australia	New South	genome	29693	Human	unknown	unknown	B.1.1.529	GR	New South	Microbiolo	Foster, C.;	https://ww	29/11/2021
Omicron	hCoV-19/Australia/NSW-RPAH-1937/2021	VOC_Omicron_hCoV-19/Australia/NSW-RPAH-1937/2021	betacoron	EPI_ISL_68	28/11/2021	Oceania	Australia	New South	Sydney	Oceania	Australia	New South	genome	29693	Human	unknown	unknown	B.1.1.529	GR	New South	Microbiolo	Foster, C.;	https://ww	29/11/2021
Omicron	hCoV-19/HongKong/VM21045834/2021	VOC_Omicron_hCoV-19/HongKong/VM21045834/2021	betacoron	EPI_ISL_68	26/11/2021	Asia	Hong Kong			Asia	Hong Kong		genome	29747	Human	37	Male	B.1.1.529	GR	Home Qua	Hong Kong	Alan K.L. T	https://ww	29/11/2021
Omicron	hCoV-19/Germany/32703755/2021	VOC_Omicron_hCoV-19/Germany/32703755/2021	betacoron	EPI_ISL_68	26/11/2021	Europe	Germany	Hesse		Europe	Germany	Hesse	genome	29708	Human	31	Female	B.1.1.529	GR	Institute fo	Institute fo	Toptan T.,	https://ww	29/11/2021
Omicron	hCoV-19/England/MILK-2B987AD/2021	VOC_Omicron_hCoV-19/England/MILK-2B987AD/2021	betacoron	EPI_ISL_68	22/11/2021	Europe	United Kin	England		Europe	United Kin	England	genome	29747	Human	unknown	unknown	B.1.1.529	GR	Lighthouse	Wellcome	The Lighth	https://ww	29/11/2021
Omicron	hCoV-19/England/MILK-2B95A89/2021	VOC_Omicron_hCoV-19/England/MILK-2B95A89/2021	betacoron	EPI_ISL_68	22/11/2021	Europe	United Kin	England		Europe	United Kin	England	genome	29747	Human	unknown	unknown	B.1.1.529	GR	Lighthouse	Wellcome	The Lighth	https://ww	29/11/2021
Omicron	hCoV-19/Netherlands/NH-RIVM-71071/2021	VOC_Omicron_hCoV-19/Netherlands/NH-RIVM-71071/2021	betacoron	EPI_ISL_68	26/11/2021	Europe	Netherlan	Noord-Holland		Europe	Netherlan	Noord-Hol	genome	29752	Human	unknown	unknown	B.1.1.529	GR	Dutch COV	National Ir	Adam Mei	https://ww	29/11/2021
Omicron	hCoV-19/Netherlands/NH-RIVM-71072/2021	VOC_Omicron_hCoV-19/Netherlands/NH-RIVM-71072/2021	betacoron	EPI_ISL_68	26/11/2021	Europe	Netherlan	Noord-Holland		Europe	Netherlan	Noord-Hol	genome	29752	Human	unknown	unknown	B.1.1.529	GR	Dutch COV	National Ir	Adam Mei	https://ww	29/11/2021
Omicron	hCoV-19/Netherlands/NH-RIVM-71074/2021	VOC_Omicron_hCoV-19/Netherlands/NH-RIVM-71074/2021	betacoron	EPI_ISL_68	26/11/2021	Europe	Netherlan	Noord-Holland		Europe	Netherlan	Noord-Hol	genome	29752	Human	unknown	unknown	B.1.1.529	GR	Dutch COV	National Ir	Adam Mei	https://ww	29/11/2021
Omicron	hCoV-19/Netherlands/NH-RIVM-71075/2021	VOC_Omicron_hCoV-19/Netherlands/NH-RIVM-71075/2021	betacoron	EPI_ISL_68	26/11/2021	Europe	Netherlan	Noord-Holland		Europe	Netherlan	Noord-Hol	genome	29752	Human	unknown	unknown	B.1.1.529	GR	Dutch COV	National Ir	Adam Mei	https://ww	29/11/2021
Omicron	hCoV-19/Netherlands/NH-RIVM-71076/2021	VOC_Omicron_hCoV-19/Netherlands/NH-RIVM-71076/2021	betacoron	EPI_ISL_68	26/11/2021	Europe	Netherlan	Noord-Holland		Europe	Netherlan	Noord-Hol	genome	29464	Human	unknown	unknown	B.1.1.529	GR	Dutch COV	National Ir	Adam Mei	https://ww	29/11/2021
Omicron	hCoV-19/Netherlands/NH-RIVM-71077/2021	VOC_Omicron_hCoV-19/Netherlands/NH-RIVM-71077/2021	betacoron	EPI_ISL_68	26/11/2021	Europe	Netherlan	Noord-Holland		Europe	Netherlan	Noord-Hol	genome	29749	Human	unknown	unknown	B.1.1.529	GR	Dutch COV	National Ir	Adam Mei	https://ww	29/11/2021
Omicron	hCoV-19/Netherlands/NH-RIVM-71078/2021	VOC_Omicron_hCoV-19/Netherlands/NH-RIVM-71078/2021	betacoron	EPI_ISL_68	26/11/2021	Europe	Netherlan	Noord-Holland		Europe	Netherlan	Noord-Hol	genome	29752	Human	unknown	unknown	B.1.1.529	GR	Dutch COV	National Ir	Adam Mei	https://ww	29/11/2021
Omicron	hCoV-19/Netherlands/NH-RIVM-71079/2021	VOC_Omicron_hCoV-19/Netherlands/NH-RIVM-71079/2021	betacoron	EPI_ISL_68	26/11/2021	Europe	Netherlan	Noord-Holland		Europe	Netherlan	Noord-Hol	genome	29752	Human	unknown	unknown	B.1.1.529	GR	Dutch COV	National Ir	Adam Mei	https://ww	29/11/2021
Omicron	hCoV-19/Netherlands/NH-RIVM-71081/2021	VOC_Omicron_hCoV-19/Netherlands/NH-RIVM-71081/2021	betacoron	EPI_ISL_68	26/11/2021	Europe	Netherlan	Noord-Holland		Europe	Netherlan	Noord-Hol	genome	29752	Human	unknown	unknown	B.1.1.529	GR	Dutch COV	National Ir	Adam Mei	https://ww	29/11/2021
Omicron	hCoV-19/Netherlands/NH-RIVM-71082/2021	VOC_Omicron_hCoV-19/Netherlands/NH-RIVM-71082/2021	betacoron	EPI_ISL_68	26/11/2021	Europe	Netherlan	Noord-Holland		Europe	Netherlan	Noord-Hol	genome	29752	Human	unknown	unknown	B.1.1.529	GR	Dutch COV	National Ir	Adam Mei	https://ww	29/11/2021
Omicron	hCoV-19/Netherlands/NH-RIVM-71083/2021	VOC_Omicron_hCoV-19/Netherlands/NH-RIVM-71083/2021	betacoron	EPI_ISL_68	26/11/2021	Europe	Netherlan	Noord-Holland		Europe	Netherlan	Noord-Hol	genome	29752	Human	unknown	unknown	B.1.1.529	GR	Dutch COV	National Ir	Adam Mei	https://ww	29/11/2021
Omicron	hCoV-19/Netherlands/NH-RIVM-71085/2021	VOC_Omicron_hCoV-19/Netherlands/NH-RIVM-71085/2021	betacoron	EPI_ISL_68	26/11/2021	Europe	Netherlan	Noord-Holland		Europe	Netherlan	Noord-Hol	genome	29752	Human	unknown	unknown	B.1.1.529	GR	Dutch COV	National Ir	Adam Mei	https://ww	29/11/2021
Omicron	hCoV-19/HongKong/HKU-211129-001/2021	VOC_Omicron_hCoV-19/HongKong/HKU-211129-001/2021	betacoron	EPI_ISL_68	14/11/2021	Asia	Hong Kong			Asia	Hong Kong		genome	29752	Human	unknown	unknown	B.1.1.529	GR	Departme	Departme	Kelvin K.W	https://ww	29/11/2021
Omicron	hCoV-19/HongKong/HKU-211129-002/2021	VOC_Omicron_hCoV-19/HongKong/HKU-211129-002/2021	betacoron	EPI_ISL_68	21/11/2021	Asia	Hong Kong			Asia	Hong Kong		genome	29752	Human	unknown	unknown	B.1.1.529	GR	Departme	Departme	Kelvin K.W	https://ww	29/11/2021
Omicron	hCoV-19/SouthAfrica/Tygerberg_3060/2021	VOC_Omicron_hCoV-19/SouthAfrica/Tygerberg_3060/2021	betacoron	EPI_ISL_68	22/11/2021	Africa	South Afri	Western C	Cape Town	Africa	South Afri	Western C	genome	29746	Human	44	Female	B.1.1.529	GR	PathCare,	Division of	Jean Marit	https://ww	29/11/2021
Omicron	hCoV-19/SouthAfrica/Tygerberg_3058/2021	VOC_Omicron_hCoV-19/SouthAfrica/Tygerberg_3058/2021	betacoron	EPI_ISL_68	22/11/2021	Africa	South Afri	Western C	Cape Town	Africa	South Afri	Western C	genome	29746	Human	39	Male	B.1.1.529	GR	PathCare,	Division of	Jean Marit	https://ww	29/11/2021
Omicron	hCoV-19/SouthAfrica/Tygerberg_3082/2021	VOC_Omicron_hCoV-19/SouthAfrica/Tygerberg_3082/2021	betacoron	EPI_ISL_68	21/11/2021	Africa	South Afri	Western C	Cape Town	Africa	South Afri	Western C	genome	29746	Human	52	Male	B.1.1.529	GR	Division of	Division of	Susan Eng	https://ww	29/11/2021
Omicron	hCoV-19/SouthAfrica/Tygerberg_3072/2021	VOC_Omicron_hCoV-19/SouthAfrica/Tygerberg_3072/2021	betacoron	EPI_ISL_68	25/11/2021	Africa	South Afri	Western C	Cape Town	Africa	South Afri	Western C	genome	29737	Human	26	Female	B.1.1.529	GR	PathCare,	Division of	Jean Marit	https://ww	29/11/2021
Omicron	hCoV-19/SouthAfrica/Tygerberg_3059/2021	VOC_Omicron_hCoV-19/SouthAfrica/Tygerberg_3059/2021	betacoron	EPI_ISL_68	23/11/2021	Africa	South Afri	Western C	Cape Town	Africa	South Afri	Western C	genome	29746	Human	62	Male	B.1.1.529	GR	PathCare,	Division of	Jean Marit	https://ww	29/11/2021
Omicron	hCoV-19/SouthAfrica/Tygerberg_3056/2021	VOC_Omicron_hCoV-19/SouthAfrica/Tygerberg_3056/2021	betacoron	EPI_ISL_68	24/11/2021	Africa	South Afri	Western C	Cape Town	Africa	South Afri	Western C	genome	29746	Human	35	Male	B.1.1.529	GR	Division of	Division of	Susan Eng	https://ww	29/11/2021
Omicron	hCoV-19/SouthAfrica/Tygerberg_3066/2021	VOC_Omicron_hCoV-19/SouthAfrica/Tygerberg_3066/2021	betacoron	EPI_ISL_68	19/11/2021	Africa	South Afri	Western C	Cape Town	Africa	South Afri	Western C	genome	29746	Human	40	Male	B.1.1.529	GR	PathCare,	Division of	Jean Marit	https://ww	29/11/2021
Omicron	hCoV-19/SouthAfrica/Tygerberg_3068/2021	VOC_Omicron_hCoV-19/SouthAfrica/Tygerberg_3068/2021	betacoron	EPI_ISL_68	19/11/2021	Africa	South Afri	Western C	Cape Town	Africa	South Afri	Western C	genome	29746	Human	47	Male	B.1.1.529	GR	PathCare,	Division of	Jean Marit	https://ww	29/11/2021
Omicron	hCoV-19/SouthAfrica/Tygerberg_3054/2021	VOC_Omicron_hCoV-19/SouthAfrica/Tygerberg_3054/2021	betacoron	EPI_ISL_68	24/11/2021	Africa	South Afri	Western C	Cape Town	Africa	South Afri	Western C	genome	29746	Human	35	Female	B.1.1.529	GR	Division of	Division of	Susan Eng	https://ww	29/11/2021
Omicron	hCoV-19/SouthAfrica/Tygerberg_3083/2021	VOC_Omicron_hCoV-19/SouthAfrica/Tygerberg_3083/2021	betacoron	EPI_ISL_68	22/11/2021	Africa	South Afri	Western C	Cape Town	Africa	South Afri	Western C	genome	29746	Human	26	Female	B.1.1.529	GR	Division of	Division of	Susan Eng	https://ww	29/11/2021
Omicron	hCoV-19/SouthAfrica/Tygerberg_3057/2021	VOC_Omicron_hCoV-19/SouthAfrica/Tygerberg_3057/2021	betacoron	EPI_ISL_68	22/11/2021	Africa	South Afri	Western C	Cape Town	Africa	South Afri	Western C	genome	29746	Human	50	Female	B.1.1.529	GR	PathCare,	Division of	Jean Marit	https://ww	29/11/2021
Omicron	hCoV-19/SouthAfrica/Tygerberg_3055/2021	VOC_Omicron_hCoV-19/SouthAfrica/Tygerberg_3055/2021	betacoron	EPI_ISL_68	24/11/2021	Africa	South Afri	Western C	Cape Town	Africa	South Afri	Western C	genome	29746	Human	34	Male	B.1.1.529	GR	Division of	Division of	Susan Eng	https://ww	29/11/2021
Omicron	hCoV-19/SouthAfrica/Tygerberg_3064/2021	VOC_Omicron_hCoV-19/SouthAfrica/Tygerberg_3064/2021	betacoron	EPI_ISL_68	20/11/2021	Africa	South Afri	Western C	Cape Town	Africa	South Afri	Western C	genome	29746	Human	51	Male	B.1.1.529	GR	PathCare,	Division of	Jean Marit	https://ww	29/11/2021
Omicron	hCoV-19/SouthAfrica/Tygerberg_3069/2021	VOC_Omicron_hCoV-19/SouthAfrica/Tygerberg_3069/2021	betacoron	EPI_ISL_68	23/11/2021	Africa	South Afri	Western C	Cape Town	Africa	South Afri	Western C	genome	29746	Human	27	Male	B.1.1.529	GR	PathCare,	Division of	Jean Marit	https://ww	29/11/2021
Omicron	hCoV-19/Spain/MD-HGUGM-5821169/2021	VOC_Omicron_hCoV-19/Spain/MD-HGUGM-5821169/2021	betacoron	EPI_ISL_68	28/11/2021	Europe	Spain	Madrid		Europe	Spain	Madrid	genome	29754	Human	51	Male	B.1.1.529	GR	Hospital G	Hospital G	Sergio Bue	https://ww	29/11/2021
Omicron	hCoV-19/Italy/CAM-COLLI-COTUGNO-A10117/2021	VOC_Omicron_hCoV-19/Italy/CAM-COLLI-COTUGNO-A10117/2021	betacoron	EPI_ISL_68	28/11/2021	Europe	Italy	Campania		Europe	Italy	Campania	genome	29645	Human	77	Female	B.1.1.529	GR	Microbiolo	Microbiolo	Claudia Tit	https://ww	29/11/2021
Omicron	hCoV-19/Italy/CAM-COLLI-COTUGNO-B10118/2021	VOC_Omicron_hCoV-19/Italy/CAM-COLLI-COTUGNO-B10118/2021	betacoron	EPI_ISL_68	28/11/2021	Europe	Italy	Campania		Europe	Italy	Campania	genome	29795	Human	8	Female	B.1.1.529	GR	Microbiolo	Microbiolo	Claudia Tit	https://ww	29/11/2021
Omicron	hCoV-19/Italy/CAM-COLLI-COTUGNO-C10119/2021	VOC_Omicron_hCoV-19/Italy/CAM-COLLI-COTUGNO-C10119/2021	betacoron	EPI_ISL_68	28/11/2021	Europe	Italy	Campania		Europe	Italy	Campania	genome	29488	Human	81	Female	B.1.1.529	GR	Microbiolo	Microbiolo	Claudia Tit	https://ww	29/11/2021
Omicron	hCoV-19/CzechRepublic/KNL_2021-110119140/2021	VOC_Omicron_hCoV-19/CzechRepublic/KNL_2021-110119140/2021	betacoron	EPI_ISL_68	26/11/2021	Europe	Czech Rep	Liberec Re	Rynoltice	Europe	Czech Rep	Liberec Re	genome	29770	Human	60	Female	B.1.1.529	GR	Regional H	Regional H	Tomas Zaji	https://ww	29/11/2021
Omicron	hCoV-19/Reunion/PIMIT_Om1/2021	VOC_Omicron_hCoV-19/Reunion/PIMIT_Om1/2021	betacoron	EPI_ISL_68	22/11/2021	Africa	Reunion			Africa	Reunion		genome	29747	Human	53	Male	B.1.1.529	GR	CERBALLIA	UMR PIMI	David A W	https://ww	29/11/2021
Omicron	hCoV-19/Scotland/QEUH-2BA62F6/2021	VOC_Omicron_hCoV-19/Scotland/QEUH-2BA62F6/2021	betacoron	EPI_ISL_68	23/11/2021	Europe	United Kin	Scotland		Europe	United Kin	Scotland	genome	29747	Human	unknown	unknown	B.1.1.529	GR	Lighthouse	Wellcome	Harper Va	https://ww	30/11/2021
Omicron	hCoV-19/Scotland/QEUH-2BA60B0/2021	VOC_Omicron_hCoV-19/Scotland/QEUH-2BA60B0/2021	betacoron	EPI_ISL_68	23/11/2021	Europe	United Kin	Scotland		Europe	United Kin	Scotland	genome	29747	Human	unknown	unknown	B.1.1.529	GR	Lighthouse	Wellcome	Harper Va	https://ww	30/11/2021
Omicron	hCoV-19/Scotland/QEUH-2BA650C/2021	VOC_Omicron_hCoV-19/Scotland/QEUH-2BA650C/2021	betacoron	EPI_ISL_68	23/11/2021	Europe	United Kin	Scotland		Europe	United Kin	Scotland	genome	29747	Human	unknown	unknown	B.1.1.529	GR	Lighthouse	Wellcome	Harper Va	https://ww	30/11/2021
Omicron	hCoV-19/Scotland/QEUH-2BA4586/2021	VOC_Omicron_hCoV-19/Scotland/QEUH-2BA4586/2021	betacoron	EPI_ISL_68	23/11/2021	Europe	United Kin	Scotland		Europe	United Kin	Scotland	genome	29747	Human	unknown	unknown	B.1.1.529	GR	Lighthouse	Wellcome	Harper Va	https://ww	30/11/2021
Omicron	hCoV-19/Sweden/10190023/2021	VOC_Omicron_hCoV-19/Sweden/10190023/2021	betacoron	EPI_ISL_68	19/11/2021	Europe	Sweden	Skane		Europe	Sweden	Skane	genome	29644	Human	unknown	unknown	B.1.1.529	GR	Swedish na	The Public	Maximilian	https://ww	30/11/2021
Omicron	hCoV-19/Germany/BY-MVP-000009717/2021	VOC_Omicron_hCoV-19/Germany/BY-MVP-000009717/2021	betacoron	EPI_ISL_68	27/11/2021	Europe	Germany	Bavaria	Munich	Europe	Germany	Bavaria	genome	29752	Human	65	Female	B.1.1.529	GR	Max von P	Laboratory	Max Muer	https://ww	30/11/2021
Omicron	hCoV-19/Germany/BY-MVP-000009711/2021	VOC_Omicron_hCoV-19/Germany/BY-MVP-000009711/2021	betacoron	EPI_ISL_68	27/11/2021	Europe	Germany	Bavaria	Munich	Europe	Germany	Bavaria	genome	29746	Human	66	Male	B.1.1.529	GR	Max von P	Laboratory	Max Muer	https://ww	30/11/2021
Omicron	hCoV-19/Germany/BY-MVP-000009706/2021	VOC_Omicron_hCoV-19/Germany/BY-MVP-000009706/2021	betacoron	EPI_ISL_68	26/11/2021	Europe	Germany	Bavaria	Munich	Europe	Germany	Bavaria	genome	29747	Human	34	Male	B.1.1.529	GR	Max von P	Laboratory	Max Muer	https://ww	30/11/2021
Omicron	hCoV-19/Portugal/PT21722/2021	VOC_Omicron_hCoV-19/Portugal/PT21722/2021	betacoron	EPI_ISL_68	27/11/2021	Europe	Portugal			Europe	Portugal		genome	29777	Human	unknown	unknown	B.1.1.529	GR	Germano (	Instituto N	Borges et a	https://ww	30/11/2021
Omicron	hCoV-19/Portugal/PT21715/2021	VOC_Omicron_hCoV-19/Portugal/PT21715/2021	betacoron	EPI_ISL_68	27/11/2021	Europe	Portugal			Europe	Portugal		genome	29796	Human	unknown	unknown	B.1.1.529	GR	Germano (	Instituto N	Borges et a	https://ww	30/11/2021
Omicron	hCoV-19/Portugal/PT21716/2021	VOC_Omicron_hCoV-19/Portugal/PT21716/2021	betacoron	EPI_ISL_68	27/11/2021	Europe	Portugal			Europe	Portugal		genome	29795	Human	unknown	unknown	B.1.1.529	GR	Germano (	Instituto N	Borges et a	https://ww	30/11/2021
Omicron	hCoV-19/Portugal/PT21727/2021	VOC_Omicron_hCoV-19/Portugal/PT21727/2021	betacoron	EPI_ISL_68	27/11/2021	Europe	Portugal			Europe	Portugal		genome	29793	Human	unknown	unknown	B.1.1.529	GR	Germano (	Instituto N	Borges et a	https://ww	30/11/2021
Omicron	hCoV-19/Portugal/PT21717/2021	VOC_Omicron_hCoV-19/Portugal/PT21717/2021	betacoron	EPI_ISL_68	27/11/2021	Europe	Portugal			Europe	Portugal		genome	29795	Human	unknown	unknown	B.1.1.529	GR	Germano (	Instituto N	Borges et a	https://ww	30/11/2021
Omicron	hCoV-19/Portugal/PT21718/2021	VOC_Omicron_hCoV-19/Portugal/PT21718/2021	betacoron	EPI_ISL_68	27/11/2021	Europe	Portugal			Europe	Portugal		genome	29783	Human	unknown	unknown	B.1.1.529	GR	Germano (	Instituto N	Borges et a	https://ww	30/11/2021
Omicron	hCoV-19/Portugal/PT21719/2021	VOC_Omicron_hCoV-19/Portugal/PT21719/2021	betacoron	EPI_ISL_68	27/11/2021	Europe	Portugal			Europe	Portugal		genome	29794	Human	unknown	unknown	B.1.1.529	GR	Germano (	Instituto N	Borges et a	https://ww	30/11/2021

(*continued on next page*)

Table 1 (*continued*)

Omicron	hCoV-19/Portugal/PT21720/2021	VOC_Omicron_hCoV-19/Portugal/PT21720/2021	betacoron	EPI_ISL_68	27/11/2021	Europe	Portugal			Europe	Portugal		genome	29793	Human	unknown	unknown	B.1.1.529	GR	Germano (	Instituto N	Borges et a	https://wv	30/11/2021
Omicron	hCoV-19/Portugal/PT21721/2021	VOC_Omicron_hCoV-19/Portugal/PT21721/2021	betacoron	EPI_ISL_68	27/11/2021	Europe	Portugal			Europe	Portugal		genome	29787	Human	unknown	unknown	B.1.1.529	GR	Germano (	Instituto N	Borges et a	https://wv	30/11/2021
Omicron	hCoV-19/Portugal/PT21725/2021	VOC_Omicron_hCoV-19/Portugal/PT21725/2021	betacoron	EPI_ISL_68	27/11/2021	Europe	Portugal			Europe	Portugal		genome	29789	Human	unknown	unknown	B.1.1.529	GR	Germano (	Instituto N	Borges et a	https://wv	30/11/2021
Omicron	hCoV-19/Portugal/PT21726/2021	VOC_Omicron_hCoV-19/Portugal/PT21726/2021	betacoron	EPI_ISL_68	27/11/2021	Europe	Portugal			Europe	Portugal		genome	29831	Human	unknown	unknown	B.1.1.529	GR	Germano (	Instituto N	Borges et a	https://wv	30/11/2021
Omicron	hCoV-19/Portugal/PT21724/2021	VOC_Omicron_hCoV-19/Portugal/PT21724/2021	betacoron	EPI_ISL_68	27/11/2021	Europe	Portugal			Europe	Portugal		genome	29804	Human	unknown	unknown	B.1.1.529	GR	Germano (	Instituto N	Borges et a	https://wv	30/11/2021
Omicron	hCoV-19/Portugal/PT21723/2021	VOC_Omicron_hCoV-19/Portugal/PT21723/2021	betacoron	EPI_ISL_68	27/11/2021	Europe	Portugal			Europe	Portugal		genome	29794	Human	unknown	unknown	B.1.1.529	GR	Germano (	Instituto N	Borges et a	https://wv	30/11/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21256/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21256/2021	betacoron	EPI_ISL_69	10/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29722	Human	25	Male	B.1.1.529	GR	HELEN JOS	National Ir	Amoako D	https://wv	30/11/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21261/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21261/2021	betacoron	EPI_ISL_69	10/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29719	Human	23	Female	B.1.1.529	GR	HELEN JOS	National Ir	Amoako D	https://wv	30/11/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21262/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21262/2021	betacoron	EPI_ISL_69	9/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29624	Human	23	Male	B.1.1.529	GR	HELEN JOS	National Ir	Amoako D	https://wv	30/11/2021
Omicron	hCoV-19/Brazil/SP-HIAE-ID989/2021	VOC_Omicron_hCoV-19/Brazil/SP-HIAE-ID989/2021	betacoron	EPI_ISL_69	25/11/2021	South Ame	Brazil	Sao Paulo		South Ame	Brazil	Sao Paulo	genome	29871	Human	unknown	unknown	B.1.1.529	GR	LATE - Lab	LATE - Lab	Deyvid Am	https://wv	30/11/2021
Omicron	hCoV-19/Brazil/SP-HIAE-ID990/2021	VOC_Omicron_hCoV-19/Brazil/SP-HIAE-ID990/2021	betacoron	EPI_ISL_69	25/11/2021	South Ame	Brazil	Sao Paulo		South Ame	Brazil	Sao Paulo	genome	29832	Human	unknown	unknown	B.1.1.529	GR	LATE - Lab	LATE - Lab	Deyvid Am	https://wv	30/11/2021
Omicron	hCoV-19/Austria/MUIV-0230/2021	VOC_Omicron_hCoV-19/Austria/MUIV-0230/2021	betacoron	EPI_ISL_69	28/11/2021	Europe	Austria	Tyrol	Schwaz	Europe	Austria	Tyrol	genome	29684	Human	unknown	unknown	B.1.1.529	GR	Institute o	Institute o	David Ban	https://wv	30/11/2021
Omicron	hCoV-19/Austria/MUIV-0231/2021	VOC_Omicron_hCoV-19/Austria/MUIV-0231/2021	betacoron	EPI_ISL_69	28/11/2021	Europe	Austria	Tyrol	Schwaz	Europe	Austria	Tyrol	genome	29693	Human	unknown	unknown	B.1.1.529	GR	Institute o	Institute o	David Ban	https://wv	30/11/2021
Omicron	hCoV-19/Spain/MD-HGUGM-5835945/2021	VOC_Omicron_hCoV-19/Spain/MD-HGUGM-5835945/2021	betacoron	EPI_ISL_69	30/11/2021	Europe	Spain	Madrid		Europe	Spain	Madrid	genome	29749	Human	60	Female	B.1.1.529	GR	Hospital G	Hospital G	Sergio Bue	https://wv	30/11/2021
Omicron	hCoV-19/Brazil/SP-IAL-6479/2021	VOC_Omicron_hCoV-19/Brazil/SP-IAL-6479/2021	betacoron	EPI_ISL_69	27/11/2021	South Ame	Brazil	Sao Paulo	Guarulhos	South Ame	Brazil	Sao Paulo	genome	29821	Human	29	Male	B.1.1.529	GR	Grupo CR I	Instituto A	Claudio Ta	https://wv	1/12/2021
Omicron	hCoV-19/Japan/IC-2278/2021	VOC_Omicron_hCoV-19/Japan/IC-2278/2021	betacoron	EPI_ISL_69	28/11/2021	Asia	Japan			Asia	Japan		genome	29752	Human	unknown	unknown	B.1.1.529	GR	SARS-CoV-	Pathogen (	Tsuyoshi S	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21437/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21437/2021	betacoron	EPI_ISL_69	9/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	unknown	unknown	B.1.1.529	GR	Lancet Lab	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21438/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21438/2021	betacoron	EPI_ISL_69	10/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	unknown	unknown	B.1.1.529	GR	Lancet Lab	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21439/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21439/2021	betacoron	EPI_ISL_69	10/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	unknown	unknown	B.1.1.529	GR	Lancet Lab	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21440/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21440/2021	betacoron	EPI_ISL_69	10/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	unknown	unknown	B.1.1.529	GR	Lancet Lab	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21441/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21441/2021	betacoron	EPI_ISL_69	8/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	unknown	unknown	B.1.1.529	GR	Lancet Lab	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21442/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21442/2021	betacoron	EPI_ISL_69	15/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	unknown	unknown	B.1.1.529	GR	Lancet Lab	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21443/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21443/2021	betacoron	EPI_ISL_69	15/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	unknown	unknown	B.1.1.529	GR	Lancet Lab	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21444/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21444/2021	betacoron	EPI_ISL_69	15/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	unknown	unknown	B.1.1.529	GR	Lancet Lab	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21446/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21446/2021	betacoron	EPI_ISL_69	15/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	unknown	unknown	B.1.1.529	GR	Lancet Lab	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21447/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21447/2021	betacoron	EPI_ISL_69	16/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	unknown	unknown	B.1.1.529	GR	Lancet Lab	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21448/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21448/2021	betacoron	EPI_ISL_69	16/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	unknown	unknown	B.1.1.529	GR	Lancet Lab	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21449/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21449/2021	betacoron	EPI_ISL_69	16/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	unknown	unknown	B.1.1.529	GR	Lancet Lab	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21450/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21450/2021	betacoron	EPI_ISL_69	16/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	unknown	unknown	B.1.1.529	GR	Lancet Lab	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21451/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21451/2021	betacoron	EPI_ISL_69	16/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	unknown	unknown	B.1.1.529	GR	Lancet Lab	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21452/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21452/2021	betacoron	EPI_ISL_69	16/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	unknown	unknown	B.1.1.529	GR	Lancet Lab	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21453/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21453/2021	betacoron	EPI_ISL_69	16/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	unknown	unknown	B.1.1.529	GR	Lancet Lab	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21454/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21454/2021	betacoron	EPI_ISL_69	15/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	unknown	unknown	B.1.1.529	GR	Lancet Lab	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21614/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21614/2021	betacoron	EPI_ISL_69	17/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	56	Male	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21618/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21618/2021	betacoron	EPI_ISL_69	18/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29313	Human	68	Female	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21620/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21620/2021	betacoron	EPI_ISL_69	18/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	30	Male	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21623/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21623/2021	betacoron	EPI_ISL_69	17/11/2021	Africa	South Afri	Mpumalanga		Africa	South Afri	Mpumalar	genome	29751	Human	29	Female	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21627/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21627/2021	betacoron	EPI_ISL_69	18/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29687	Human	35	Female	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21630/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21630/2021	betacoron	EPI_ISL_69	17/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	79	Female	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21631/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21631/2021	betacoron	EPI_ISL_69	18/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29688	Human	20	Female	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21633/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21633/2021	betacoron	EPI_ISL_69	17/11/2021	Africa	South Afri	Eastern Cape		Africa	South Afri	Eastern Ca	genome	29751	Human	47	Male	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21634/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21634/2021	betacoron	EPI_ISL_69	17/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	4	Female	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21635/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21635/2021	betacoron	EPI_ISL_69	18/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29411	Human	30	Female	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21638/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21638/2021	betacoron	EPI_ISL_69	17/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	24	Male	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21641/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21641/2021	betacoron	EPI_ISL_69	16/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	19	Male	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21644/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21644/2021	betacoron	EPI_ISL_69	16/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29574	Human	21	Female	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21646/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21646/2021	betacoron	EPI_ISL_69	17/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	20	Female	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21648/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21648/2021	betacoron	EPI_ISL_69	17/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	28	Male	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21649/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21649/2021	betacoron	EPI_ISL_69	16/11/2021	Africa	South Afri	Mpumalanga		Africa	South Afri	Mpumalar	genome	29562	Human	36	Female	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21650/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21650/2021	betacoron	EPI_ISL_69	17/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	5	Male	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21651/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21651/2021	betacoron	EPI_ISL_69	17/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29691	Human	43	Male	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21655/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21655/2021	betacoron	EPI_ISL_69	17/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	16	Male	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21656/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21656/2021	betacoron	EPI_ISL_69	17/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	35	Male	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21657/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21657/2021	betacoron	EPI_ISL_69	18/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	28	Male	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21658/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21658/2021	betacoron	EPI_ISL_69	18/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29504	Human	65	Female	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21660/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21660/2021	betacoron	EPI_ISL_69	18/11/2021	Africa	South Afri	Western Cape		Africa	South Afri	Western C	genome	29751	Human	51	Female	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/SouthAfrica/NICD-N21661/2021	VOC_Omicron_hCoV-19/SouthAfrica/NICD-N21661/2021	betacoron	EPI_ISL_69	19/11/2021	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29751	Human	74	Female	B.1.1.529	GR	Ampath La	National Ir	Amoako D	https://wv	1/12/2021
Omicron	hCoV-19/Japan/IC-2279/2021	VOC_Omicron_hCoV-19/Japan/IC-2279/2021	betacoron	EPI_ISL_69	27/11/2021	Asia	Japan			Asia	Japan		genome	29745	Human	unknown	unknown	B.1.1.529	GR	SARS-CoV-	Pathogen (	Tsuyoshi S	https://wv	1/12/2021
Omicron	hCoV-19/England/MILK-2BE8E12/2021	VOC_Omicron_hCoV-19/England/MILK-2BE8E12/2021	betacoron	EPI_ISL_69	25/11/2021	Europe	United Kin	England		Europe	United Kin	England	genome	29747	Human	unknown	unknown	B.1.1.529	GR	Lighthouse	Wellcome	The Lighth	https://wv	1/12/2021
Omicron	hCoV-19/England/ALDP-2BEB0A0/2021	VOC_Omicron_hCoV-19/England/ALDP-2BEB0A0/2021	betacoron	EPI_ISL_69	24/11/2021	Europe	United Kin	England		Europe	United Kin	England	genome	29747	Human	unknown	unknown	B.1.1.529	GR	Lighthouse	Wellcome	Jacquelyn	https://wv	1/12/2021
Omicron	hCoV-19/England/MILK-2BF501C/2021	VOC_Omicron_hCoV-19/England/MILK-2BF501C/2021	betacoron	EPI_ISL_69	25/11/2021	Europe	United Kin	England		Europe	United Kin	England	genome	29747	Human	unknown	unknown	B.1.1.529	GR	Lighthouse	Wellcome	The Lighth	https://wv	1/12/2021
Omicron	hCoV-19/Scotland/QEUH-2BEC476/2021	VOC_Omicron_hCoV-19/Scotland/QEUH-2BEC476/2021	betacoron	EPI_ISL_69	25/11/2021	Europe	United Kin	Scotland		Europe	United Kin	Scotland	genome	29747	Human	unknown	unknown	B.1.1.529	GR	Lighthouse	Wellcome	Harper Va	https://wv	1/12/2021
Omicron	hCoV-19/England/MILK-2BD889F/2021	VOC_Omicron_hCoV-19/England/MILK-2BD889F/2021	betacoron	EPI_ISL_69	25/11/2021	Europe	United Kin	England		Europe	United Kin	England	genome	29747	Human	unknown	unknown	B.1.1.529	GR	Lighthouse	Wellcome	The Lighth	https://wv	1/12/2021
Omicron	hCoV-19/Scotland/QEUH-2BD01BA/2021	VOC_Omicron_hCoV-19/Scotland/QEUH-2BD01BA/2021	betacoron	EPI_ISL_69	23/11/2021	Europe	United Kin	Scotland		Europe	United Kin	Scotland	genome	29747	Human	unknown	unknown	B.1.1.529	GR	Lighthouse	Wellcome	Harper Va	https://wv	1/12/2021
Omicron	hCoV-19/Scotland/QEUH-2BD0211/2021	VOC_Omicron_hCoV-19/Scotland/QEUH-2BD0211/2021	betacoron	EPI_ISL_69	23/11/2021	Europe	United Kin	Scotland		Europe	United Kin	Scotland	genome	29747	Human	unknown	unknown	B.1.1.529	GR	Lighthouse	Wellcome	Harper Va	https://wv	1/12/2021
Omicron	hCoV-19/Scotland/QEUH-2BBE079/2021	VOC_Omicron_hCoV-19/Scotland/QEUH-2BBE079/2021	betacoron	EPI_ISL_69	24/11/2021	Europe	United Kin	Scotland		Europe	United Kin	Scotland	genome	29747	Human	unknown	unknown	B.1.1.529	GR	Lighthouse	Wellcome	Harper Va	https://wv	1/12/2021
Omicron	hCoV-19/Belgium/ULG-22181/2021	VOC_Omicron_hCoV-19/Belgium/ULG-22181/2021	betacoron	EPI_ISL_69	29/11/2021	Europe	Belgium	Sint-Agatha-Berchem		Europe	Belgium	Sint-Agath	genome	29684	Human	28	Male	B.1.1.529	GR	University	GIGA Med	Keith Durk	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2298/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2298/2021	betacoron	EPI_ISL_69	25/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	35	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2303/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2303/2021	betacoron	EPI_ISL_69	25/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	38	Female	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2314/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2314/2021	betacoron	EPI_ISL_69	25/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	44	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2342/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2342/2021	betacoron	EPI_ISL_69	26/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	50	Female	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2292/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2292/2021	betacoron	EPI_ISL_69	24/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	34	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2294/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2294/2021	betacoron	EPI_ISL_69	25/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	30	Female	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2288/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2288/2021	betacoron	EPI_ISL_69	24/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	47	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2310/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2310/2021	betacoron	EPI_ISL_69	25/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	41	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2311/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2311/2021	betacoron	EPI_ISL_69	25/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	40	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2312/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2312/2021	betacoron	EPI_ISL_69	25/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	42	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2317/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2317/2021	betacoron	EPI_ISL_69	25/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	30	Female	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2339/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2339/2021	betacoron	EPI_ISL_69	26/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	42	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2286/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2286/2021	betacoron	EPI_ISL_69	24/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	27	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2275/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2275/2021	betacoron	EPI_ISL_69	24/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	31	Female	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2299/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2299/2021	betacoron	EPI_ISL_69	25/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	42	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2315/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2315/2021	betacoron	EPI_ISL_69	25/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	36	Female	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2289/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2289/2021	betacoron	EPI_ISL_69	24/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	31	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2309/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2309/2021	betacoron	EPI_ISL_69	25/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	31	Female	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2280/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2280/2021	betacoron	EPI_ISL_69	24/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	31	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2307/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2307/2021	betacoron	EPI_ISL_69	25/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29684	Human	44	Female	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2306/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2306/2021	betacoron	EPI_ISL_69	25/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29693	Human	53	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2296/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2296/2021	betacoron	EPI_ISL_69	25/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29693	Human	62	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2271/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2271/2021	betacoron	EPI_ISL_69	24/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29693	Human	39	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2261/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2261/2021	betacoron	EPI_ISL_69	23/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29693	Human	50	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2265/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2265/2021	betacoron	EPI_ISL_69	23/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29693	Human	21	Female	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2282/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2282/2021	betacoron	EPI_ISL_69	24/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29693	Human	35	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2283/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2283/2021	betacoron	EPI_ISL_69	24/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29693	Human	27	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2284/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2284/2021	betacoron	EPI_ISL_69	24/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29693	Human	41	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2291/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2291/2021	betacoron	EPI_ISL_69	24/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29693	Human	50	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2308/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2308/2021	betacoron	EPI_ISL_69	25/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29693	Human	38	Female	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2249/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2249/2021	betacoron	EPI_ISL_69	21/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29693	Human	26	Female	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2300/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2300/2021	betacoron	EPI_ISL_69	25/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29686	Human	33	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ghana/TRA-2290/2021	VOC_Omicron_hCoV-19/Ghana/TRA-2290/2021	betacoron	EPI_ISL_69	24/11/2021	Africa	Ghana	Accra		Africa	Ghana	Accra	genome	29686	Human	35	Male	B.1.1.529	GR	National Ir	National Ir	William K.	https://wv	1/12/2021
Omicron	hCoV-19/Ireland/MH-NVRL-S21IRL00506672/2021	VOC_Omicron_hCoV-19/Ireland/MH-NVRL-S21IRL00506672/2021	betacoron	EPI_ISL_69	25/11/2021	Europe	Ireland	Meath		Europe	Ireland	Meath	genome	29697	Human	21-30	Female	B.1.1.529	GR	National V	National V	Zoe Yandle	https://wv	1/12/2021
Omicron	hCoV-19/USA/CA-UCSF-COLOR-SFDPH-CC001/2021	VOC_Omicron_hCoV-19/USA/CA-UCSF-COLOR-SFDPH-CC001/2021	betacoron	EPI_ISL_69	28/11/2021	North Ame	USA	California	San Franci	North Ame	USA	California	genome	29873	Human	unknown	unknown	B.1.1.529	GR	Color Gen	Chiu Labor	Charles Ch	https://wv	2/12/2021
Omicron	hCoV-19/Australia/NSW-ICPMR-14638/2021	VOC_Omicron_hCoV-19/Australia/NSW-ICPMR-14638/2021	betacoron	EPI_ISL_69	30/11/2021	Oceania	Australia	New South	Sydney	Oceania	Australia	New South	genome	29387	Human	unknown	unknown	B.1.1.529	GR	Pathology	NSW Healt	Arnott A.,	https://wv	2/12/2021
Omicron	hCoV-19/Australia/NSW-ICPMR-14639/2021	VOC_Omicron_hCoV-19/Australia/NSW-ICPMR-14639/2021	betacoron	EPI_ISL_69	27/11/2021	Oceania	Australia	New South	Sydney	Oceania	Australia	New South	genome	29378	Human	unknown	unknown	B.1.1.529	GR	Pathology	NSW Healt	Arnott A.,	https://wv	2/12/2021
Omicron	hCoV-19/Australia/NSW-RPAH-CoV2050/2021	VOC_Omicron_hCoV-19/Australia/NSW-RPAH-CoV2050/2021	betacoron	EPI_ISL_69	1/12/2021	Oceania	Australia	New South	Sydney	Oceania	Australia	New South	genome	29693	Human	unknown	unknown	B.1.1.529	GR	New South	Microbiolo	Foster, C.;	https://wv	2/12/2021
Omicron	hCoV-19/Germany/HE-FFM-30318738/2021	VOC_Omicron_hCoV-19/Germany/HE-FFM-30318738/2021	betacoron	EPI_ISL_69	28/11/2021	Europe	Germany	Hesse		Europe	Germany	Hesse	genome	29747	Human	32	Male	B.1.1.529	GR	Institute fc	Institute fc	Toptan T.,	https://wv	2/12/2021
Omicron	hCoV-19/Germany/HE-FFM-30318739/2021	VOC_Omicron_hCoV-19/Germany/HE-FFM-30318739/2021	betacoron	EPI_ISL_69	28/11/2021	Europe	Germany	Hesse		Europe	Germany	Hesse	genome	29747	Human	35	Female	B.1.1.529	GR	Institute fc	Institute fc	Toptan T.,	https://wv	2/12/2021
Omicron	hCoV-19/Germany/HE-FFM-30318740/2021	VOC_Omicron_hCoV-19/Germany/HE-FFM-30318740/2021	betacoron	EPI_ISL_69	28/11/2021	Europe	Germany	Hesse		Europe	Germany	Hesse	genome	29747	Human	72	Female	B.1.1.529	GR	Institute fc	Institute fc	Toptan T.,	https://wv	2/12/2021
Omicron	hCoV-19/Germany/HE-FFM-30286807/2021	VOC_Omicron_hCoV-19/Germany/HE-FFM-30286807/2021	betacoron	EPI_ISL_69	28/11/2021	Europe	Germany	Hesse		Europe	Germany	Hesse	genome	29747	Human	41	Female	B.1.1.529	GR	Institute fc	Institute fc	Toptan T.,	https://wv	2/12/2021
Omicron	hCoV-19/Germany/HE-FFM-30318741/2021	VOC_Omicron_hCoV-19/Germany/HE-FFM-30318741/2021	betacoron	EPI_ISL_69	28/11/2021	Europe	Germany	Hesse		Europe	Germany	Hesse	genome	29738	Human	40	Male	B.1.1.529	GR	Institute fc	Institute fc	Toptan T.,	https://wv	2/12/2021
Omicron	hCoV-19/Germany/HE-FFM-30286808/2021	VOC_Omicron_hCoV-19/Germany/HE-FFM-30286808/2021	betacoron	EPI_ISL_69	28/11/2021	Europe	Germany	Hesse		Europe	Germany	Hesse	genome	29747	Human	38	Male	B.1.1.529	GR	Institute fc	Institute fc	Toptan T.,	https://wv	2/12/2021
Omicron	hCoV-19/SouthKorea/KDCA18124/2021	VOC_Omicron_hCoV-19/SouthKorea/KDCA18124/2021	betacoron	EPI_ISL_69	24/11/2021	Asia	South Korea			Asia	South Korea		genome	29872	Human	56	Female	B.1.1.529	GR	Division of	Division of	Ae Kyung I	https://wv	2/12/2021
Omicron	hCoV-19/SouthKorea/KDCA18125/2021	VOC_Omicron_hCoV-19/SouthKorea/KDCA18125/2021	betacoron	EPI_ISL_69	25/11/2021	Asia	South Korea			Asia	South Korea		genome	29869	Human	46	Female	B.1.1.529	GR	Division of	Division of	Ae Kyung I	https://wv	2/12/2021
Omicron	hCoV-19/SouthKorea/KDCA18126/2021	VOC_Omicron_hCoV-19/SouthKorea/KDCA18126/2021	betacoron	EPI_ISL_69	29/11/2021	Asia	South Korea			Asia	South Korea		genome	29862	Human	38	Male	B.1.1.529	GR	Division of	Division of	Ae Kyung I	https://wv	2/12/2021
Alpha	hCoV-19/England/PORT-2E9EF2/2020	VOC_Alpha_hCoV-19/England/PORT-2E9EF2/2020	betacoron	EPI_ISL_67	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GRY	Centre for	COVID-19	Angela Bei	https://wv	7/12/2020
Alpha	hCoV-19/England/PORT-2E9E4D/2020	VOC_Alpha_hCoV-19/England/PORT-2E9E4D/2020	betacoron	EPI_ISL_70	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GRY	Centre for	COVID-19	Angela Bei	https://wv	14/12/2020
Alpha	hCoV-19/England/PORT-2E9C70/2020	VOC_Alpha_hCoV-19/England/PORT-2E9C70/2020	betacoron	EPI_ISL_70	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GRY	Centre for	COVID-19	Angela Bei	https://wv	14/12/2020
Alpha	hCoV-19/England/CAMB-1BC9F8/2020	VOC_Alpha_hCoV-19/England/CAMB-1BC9F8/2020	betacoron	EPI_ISL_70	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GRY	Departmei	COVID-19	Aminu S. J	https://wv	14/12/2020
Alpha	hCoV-19/England/CAMB-1BCA22/2020	VOC_Alpha_hCoV-19/England/CAMB-1BCA22/2020	betacoron	EPI_ISL_70	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GRY	Departmei	COVID-19	Aminu S. J	https://wv	14/12/2020
Alpha	hCoV-19/England/PORT-2E9B91/2020	VOC_Alpha_hCoV-19/England/PORT-2E9B91/2020	betacoron	EPI_ISL_70	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GRY	Centre for	COVID-19	Angela Bei	https://wv	14/12/2020
Alpha	hCoV-19/England/205041766/2020	VOC_Alpha_hCoV-19/England/205041766/2020	betacoron	EPI_ISL_71	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29861	Human	unknown	unknown	B.1.1.7	GRY	Respirator	COVID-19	PHE Covid	https://wv	18/12/2020
Alpha	hCoV-19/England/PORT-2E9742/2020	VOC_Alpha_hCoV-19/England/PORT-2E9742/2020	betacoron	EPI_ISL_72	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GRY	Centre for	COVID-19	Angela Bei	https://wv	22/12/2020
Alpha	hCoV-19/England/PORT-2E9751/2020	VOC_Alpha_hCoV-19/England/PORT-2E9751/2020	betacoron	EPI_ISL_72	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GRY	Centre for	COVID-19	Angela Bei	https://wv	22/12/2020
Alpha	hCoV-19/England/PORT-2E979D/2020	VOC_Alpha_hCoV-19/England/PORT-2E979D/2020	betacoron	EPI_ISL_72	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GRY	Centre for	COVID-19	Angela Bei	https://wv	22/12/2020
Alpha	hCoV-19/England/PORT-2E97BB/2020	VOC_Alpha_hCoV-19/England/PORT-2E97BB/2020	betacoron	EPI_ISL_72	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29476	Human	unknown	unknown	B.1.1.7	GRY	Centre for	COVID-19	Angela Bei	https://wv	22/12/2020
Alpha	hCoV-19/England/PORT-2E99E2/2020	VOC_Alpha_hCoV-19/England/PORT-2E99E2/2020	betacoron	EPI_ISL_72	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GRY	Centre for	COVID-19	Angela Bei	https://wv	22/12/2020
Alpha	hCoV-19/England/PORT-2E9A3A/2020	VOC_Alpha_hCoV-19/England/PORT-2E9A3A/2020	betacoron	EPI_ISL_72	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GRY	Centre for	COVID-19	Angela Bei	https://wv	22/12/2020
Alpha	hCoV-19/England/PORT-2E9A58/2020	VOC_Alpha_hCoV-19/England/PORT-2E9A58/2020	betacoron	EPI_ISL_72	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GRY	Centre for	COVID-19	Angela Bei	https://wv	22/12/2020
Alpha	hCoV-19/England/CAMB-1BD6B4/2020	VOC_Alpha_hCoV-19/England/CAMB-1BD6B4/2020	betacoron	EPI_ISL_74	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GRY	Departmei	COVID-19	Aminu S. J	https://wv	29/12/2020
Alpha	hCoV-19/England/CAMB-A97BE5/2020	VOC_Alpha_hCoV-19/England/CAMB-A97BE5/2020	betacoron	EPI_ISL_74	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GRY	Departmei	COVID-19	Aminu S. J	https://wv	29/12/2020
Alpha	hCoV-19/England/PORT-2D4F24/2020	VOC_Alpha_hCoV-19/England/PORT-2D4F24/2020	betacoron	EPI_ISL_74	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GRY	Centre for	COVID-19	Angela Bei	https://wv	29/12/2020
Alpha	hCoV-19/England/PORT-2D4F33/2020	VOC_Alpha_hCoV-19/England/PORT-2D4F33/2020	betacoron	EPI_ISL_74	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GRY	Centre for	COVID-19	Angela Bei	https://wv	29/12/2020
Alpha	hCoV-19/England/PORT-2D4F7F/2020	VOC_Alpha_hCoV-19/England/PORT-2D4F7F/2020	betacoron	EPI_ISL_74	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GR	Centre for	COVID-19	Angela Bei	https://wv	29/12/2020
Alpha	hCoV-19/England/PORT-2D4F8E/2020	VOC_Alpha_hCoV-19/England/PORT-2D4F8E/2020	betacoron	EPI_ISL_74	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GRY	Centre for	COVID-19	Angela Bei	https://wv	29/12/2020
Alpha	hCoV-19/England/PORT-2D4FAC/2020	VOC_Alpha_hCoV-19/England/PORT-2D4FAC/2020	betacoron	EPI_ISL_74	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GRY	Centre for	COVID-19	Angela Bei	https://wv	29/12/2020
Alpha	hCoV-19/England/PORT-2D4FD9/2020	VOC_Alpha_hCoV-19/England/PORT-2D4FD9/2020	betacoron	EPI_ISL_74	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GR	Centre for	COVID-19	Angela Bei	https://wv	29/12/2020
Alpha	hCoV-19/England/PORT-2D5002/2020	VOC_Alpha_hCoV-19/England/PORT-2D5002/2020	betacoron	EPI_ISL_74	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GR	Centre for	COVID-19	Angela Bei	https://wv	29/12/2020
Alpha	hCoV-19/England/PORT-2D5020/2020	VOC_Alpha_hCoV-19/England/PORT-2D5020/2020	betacoron	EPI_ISL_74	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GRY	Centre for	COVID-19	Angela Bei	https://wv	29/12/2020
Alpha	hCoV-19/England/PORT-2D505D/2020	VOC_Alpha_hCoV-19/England/PORT-2D505D/2020	betacoron	EPI_ISL_74	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29763	Human	unknown	unknown	B.1.1.7	GR	Centre for	COVID-19	Angela Bei	https://wv	29/12/2020
Beta	hCoV-19/England/205260233/2020	VOC_Beta_hCoV-19/England/205260233/2020	betacoron	EPI_ISL_77	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29834	Human	29	Male	B.1.351	GH	Respirator	COVID-19	PHE Covid	https://wv	6/1/2021
Beta	hCoV-19/England/205261884/2020	VOC_Beta_hCoV-19/England/205261884/2020	betacoron	EPI_ISL_77	2020	Europe	United Kin	England		Europe	United Kin	England	genome	29803	Human	37	Male	B.1.351	GH	Respirator	COVID-19	PHE Covid	https://wv	6/1/2021
Beta	hCoV-19/Austria/CeMM1952/2020	VOC_Beta_hCoV-19/Austria/CeMM1952/2020	betacoron	EPI_ISL_85	2020	Europe	Austria			Europe	Austria		genome	29773	Human	unknown	unknown	B.1.351	GH	Austrian A	Bergthaler	Lukas Endl	https://wv	20/1/2021
Beta	hCoV-19/Zimbabwe/ZW-29001/2020	VOC_Beta_hCoV-19/Zimbabwe/ZW-29001/2020	betacoron	EPI_ISL_11	1/9/2020	Africa	Zimbabwe			Africa	Zimbabwe		genome	29779	Human	36	Male	B.1.351	GH	National M	Quadram I	Tapfuman	https://wv	9/3/2021
Beta	hCoV-19/Netherlands/ZH-EMC-1903/2020	VOC_Beta_hCoV-19/Netherlands/ZH-EMC-1903/2020	betacoron	EPI_ISL_13	2020	Europe	Netherlan	Zuid-Holland		Europe	Netherlan	Zuid-Holla	genome	29757	Human	unknown	unknown	B.1.351	GH	Dutch COV	Erasmus M	Bas Oude I	https://wv	22/3/2021
Beta	hCoV-19/Qatar/QA-QU_19-1-B2/2020	VOC_Beta_hCoV-19/Qatar/QA-QU_19-1-B2/2020	betacoron	EPI_ISL_17	2020-02	Asia	Qatar	Doha		Asia	Qatar	Doha	genome	29764	Human	62	Male	B.1.351	GH	Ministry o	Biomedica	BRC: Fatiha M. Benslii		25/4/2021
Beta	hCoV-19/Qatar/QA.QU_18.10.B12/2020	VOC_Beta_hCoV-19/Qatar/QA.QU_18.10.B12/2020	betacoron	EPI_ISL_22	27/3/2020	Asia	Qatar	Doha		Asia	Qatar	Doha	genome	29764	Human	28	Male	B.1.351	GH	Ministry o	Biomedica	BRC: Fatih	https://wv	26/5/2021
Beta	hCoV-19/SouthAfrica/VIDA-KRISP-K012424/2020	VOC_Beta_hCoV-19/SouthAfrica/VIDA-KRISP-K012424/2020	betacoron	EPI_ISL_23	31/8/2020	Africa	South Afri	Free State		Africa	South Afri	Free State	genome	29804	Human	21	Male	B.1.351	G	Vaccines a	KRISP, KZN	Baillie Vick	https://wv	31/5/2021
Beta	hCoV-19/USA/SC-DHEC-1826/2020	VOC_Beta_hCoV-19/USA/SC-DHEC-1826/2020	betacoron	EPI_ISL_25	7/5/2020	North Ame	USA	South Carc	Laurens	North Ame	USA	South Carc	genome	29800	Human	unknown	Female	B.1.351	GH	Microbiolo	Microbiolo	Freeman,J	https://wv	7/6/2021
Beta	hCoV-19/SouthAfrica/NICD-N00240/2020	VOC_Beta_hCoV-19/SouthAfrica/NICD-N00240/2020	betacoron	EPI_ISL_24	28/8/2020	Africa	South Afri	Eastern Cape		Africa	South Afri	Eastern Ca	genome	29890	Human	39	Male	B.1.351	GH	National Ir	National Ir	Amoako D	https://wv	7/6/2021
Beta	hCoV-19/SouthAfrica/NICD-N00440/2020	VOC_Beta_hCoV-19/SouthAfrica/NICD-N00440/2020	betacoron	EPI_ISL_24	2020	Africa	South Africa			Africa	South Africa		genome	29849	Human	unknown	unknown	B.1.351	GH	National Ir	National Ir	Amoako D	https://wv	8/6/2021
Beta	hCoV-19/SouthAfrica/NICD-R21068/2020	VOC_Beta_hCoV-19/SouthAfrica/NICD-R21068/2020	betacoron	EPI_ISL_24	2020	Africa	South Africa			Africa	South Africa		genome	29852	Human	unknown	unknown	B.1.351	GH	National Ir	National Ir	Amoako D	https://wv	8/6/2021
Beta	hCoV-19/SouthAfrica/NICD-R21076/2020	VOC_Beta_hCoV-19/SouthAfrica/NICD-R21076/2020	betacoron	EPI_ISL_24	2020	Africa	South Africa			Africa	South Africa		genome	29856	Human	unknown	unknown	B.1.351	GH	National Ir	National Ir	Amoako D	https://wv	8/6/2021
Beta	hCoV-19/Zimbabwe/CERI-KRISP-K011662/2020	VOC_Beta_hCoV-19/Zimbabwe/CERI-KRISP-K011662/2020	betacoron	EPI_ISL_24	27/5/2020	Africa	Zimbabwe	Masvingo		Africa	Zimbabwe	Masvingo	genome	29827	Human	34	Male	B.1.351	GH	National M	CERI, Cent	Air Comod	https://wv	11/6/2021
Beta	hCoV-19/Zimbabwe/CERI-KRISP-K011643/2020	VOC_Beta_hCoV-19/Zimbabwe/CERI-KRISP-K011643/2020	betacoron	EPI_ISL_24	9/7/2020	Africa	Zimbabwe	Masvingo		Africa	Zimbabwe	Masvingo	genome	29847	Human	28	Female	B.1.351	G	National M	CERI, Cent	Air Comod	https://wv	11/6/2021
Beta	hCoV-19/SouthAfrica/VIDA-KRISP-K012818/2020	VOC_Beta_hCoV-19/SouthAfrica/VIDA-KRISP-K012818/2020	betacoron	EPI_ISL_24	4/9/2020	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29828	Human	unknown	unknown	B.1.351	GH	Vaccines a	KRISP, KZN	Baillie Vick	https://wv	11/6/2021
Beta	hCoV-19/SouthAfrica/VIDA-KRISP-K012825/2020	VOC_Beta_hCoV-19/SouthAfrica/VIDA-KRISP-K012825/2020	betacoron	EPI_ISL_24	8/9/2020	Africa	South Afri	Free State		Africa	South Afri	Free State	genome	29807	Human	unknown	unknown	B.1.351	GH	Vaccines a	KRISP, KZN	Baillie Vick	https://wv	11/6/2021
Beta	hCoV-19/SouthAfrica/VIDA-KRISP-K012823/2020	VOC_Beta_hCoV-19/SouthAfrica/VIDA-KRISP-K012823/2020	betacoron	EPI_ISL_24	9/9/2020	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29831	Human	unknown	unknown	B.1.351	GH	Vaccines a	KRISP, KZN	Baillie Vick	https://wv	11/6/2021
Beta	hCoV-19/SouthAfrica/VIDA-KRISP-K012822/2020	VOC_Beta_hCoV-19/SouthAfrica/VIDA-KRISP-K012822/2020	betacoron	EPI_ISL_24	9/9/2020	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29878	Human	unknown	unknown	B.1.351	GH	Vaccines a	KRISP, KZN	Baillie Vick	https://wv	11/6/2021
Beta	hCoV-19/SouthAfrica/VIDA-KRISP-K012826/2020	VOC_Beta_hCoV-19/SouthAfrica/VIDA-KRISP-K012826/2020	betacoron	EPI_ISL_24	10/9/2020	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29832	Human	unknown	unknown	B.1.351	GH	Vaccines a	KRISP, KZN	Baillie Vick	https://wv	11/6/2021
Beta	hCoV-19/SouthAfrica/VIDA-KRISP-K012913/2020	VOC_Beta_hCoV-19/SouthAfrica/VIDA-KRISP-K012913/2020	betacoron	EPI_ISL_24	10/9/2020	Africa	South Afri	Gauteng		Africa	South Afri	Gauteng	genome	29832	Human	unknown	unknown	B.1.351	GH	Vaccines a	KRISP, KZN	Baillie Vick	https://wv	11/6/2021
Beta	hCoV-19/SouthAfrica/VIDA-KRISP-K012912/2020	VOC_Beta_hCoV-19/SouthAfrica/VIDA-KRISP-K012912/2020	betacoron	EPI_ISL_24	10/9/2020	Africa	South Afri	Free State		Africa	South Afri	Free State	genome	29825	Human	unknown	unknown	B.1.351	GH	Vaccines a	KRISP, KZN	Baillie Vick	https://wv	11/6/2021
Beta	hCoV-19/Rwanda/CV2217/2020	VOC_Beta_hCoV-19/Rwanda/CV2217/2020	betacoron	EPI_ISL_47	4/6/2020	Africa	Rwanda	Rusizi		Africa	Rwanda	Rusizi	genome	29832	Human	41	Male	B.1.351	GH	Rwanda N	Africa Cen	Enatha Mu	https://wv	4/10/2021
Beta	hCoV-19/UnitedArabEmirates/BTC-5011/2020	VOC_Beta_hCoV-19/UnitedArabEmirates/BTC-5011/2020	betacoron	EPI_ISL_51	28/8/2020	Asia	United Ara	Abu Dhabi		Asia	United Ara	Abu Dhabi	genome	29885	Human	73	Male	B.1.351	GH	BTC, Khalif	BTC, Khalif	Habiba Al	https://wv	14/10/2021
Beta	hCoV-19/SouthAfrica/NICD-N19828/2020	VOC_Beta_hCoV-19/SouthAfrica/NICD-N19828/2020	betacoron	EPI_ISL_66	26/6/2020	Africa	South Afri	NORTH WEST		Africa	South Afri	NORTH WI	genome	29760	Human	78	Female	B.1.351	GH	TSHEPONC	National Ir	Amoako D	https://wv	24/11/2021
	hCoV-19/France/PAC-IHU-8691_Illu1/2020	hCoV-19/France/PAC-IHU-8691_Illu1/2020	betacoron	EPI_ISL_24	23/3/2020	Europe	France	Provence-,	Marseille	Europe	France	Provence-,	genome	29673	Human	unknown	unknown	P.1.15	GR	MEPHI, Ai	MEPHI, Ai	Anthony L	https://wv	8/6/2021
Gamma	hCoV-19/USA/IL-RED-FUL-39828238/2020	VOC_Gamma_hCoV-19/USA/IL-RED-FUL-39828238/2020	betacoron	EPI_ISL_22	7/4/2020	North Ame	USA	Illinois		North Ame	USA	Illinois	genome	29883	Human	unknown	unknown	P.1	GR	Reditus La	Reditus La	Joshua J. C	https://wv	25/5/2021
Gamma	hCoV-19/USA/IN-ISDHQ409/2020	VOC_Gamma_hCoV-19/USA/IN-ISDHQ409/2020	betacoron	EPI_ISL_26	23/4/2020	North Ame	USA	Indiana		North Ame	USA	Indiana	genome	29830	Human	93	Male	P.1	GR	ISDH	Quantigen	Paul J. Chi	https://wv	18/6/2021
	hCoV-19/USA/TX-HMH-MCoV-40896/2020	hCoV-19/USA/TX-HMH-MCoV-40896/2020	betacoron	EPI_ISL_22	22/7/2020	North Ame	USA	Texas	Houston	North Ame	USA	Texas	genome	29678	Human	unknown	unknown	P.1.1	GR	Houston M	Houston M	Randall J. (	https://wv	21/5/2021
	hCoV-19/USA/TX-HMH-MCoV-40905/2020	hCoV-19/USA/TX-HMH-MCoV-40905/2020	betacoron	EPI_ISL_22	22/7/2020	North Ame	USA	Texas	Houston	North Ame	USA	Texas	genome	29771	Human	unknown	unknown	P.1.1	GR	Houston M	Houston M	Randall J. (	https://wv	21/5/2021
	hCoV-19/USA/TX-HMH-MCoV-41509/2020	hCoV-19/USA/TX-HMH-MCoV-41509/2020	betacoron	EPI_ISL_22	31/7/2020	North Ame	USA	Texas	Houston	North Ame	USA	Texas	genome	29787	Human	unknown	unknown	P.1.1	GR	Houston M	Houston M	Randall J. (	https://wv	21/5/2021
Gamma	hCoV-19/Brazil/SP-IB_112782/2020	VOC_Gamma_hCoV-19/Brazil/SP-IB_112782/2020	betacoron	EPI_ISL_56	7/8/2020	South Ame	Brazil	Sao Paulo		South Ame	Brazil	Sao Paulo	genome	29886	Human	unknown	unknown	P.1	GR	HOSP STA	Instituto B	Dimas Tad	https://wv	28/10/2021
	hCoV-19/USA/TX-HMH-MCoV-35197/2020	hCoV-19/USA/TX-HMH-MCoV-35197/2020	betacoron	EPI_ISL_22	11/8/2020	North Ame	USA	Texas	Houston	North Ame	USA	Texas	genome	29771	Human	unknown	unknown	P.1.1	GR	Houston M	Houston M	Randall J. (	https://wv	21/5/2021
	hCoV-19/USA/TX-HMH-MCoV-34830/2020	hCoV-19/USA/TX-HMH-MCoV-34830/2020	betacoron	EPI_ISL_22	13/8/2020	North Ame	USA	Texas	Houston	North Ame	USA	Texas	genome	29811	Human	unknown	unknown	P.1.1	G	Houston M	Houston M	Randall J. (	https://wv	21/5/2021
Gamma	hCoV-19/Brazil/MS-HRMS_1490/2020	VOC_Gamma_hCoV-19/Brazil/MS-HRMS_1490/2020	betacoron	EPI_ISL_66	24/8/2020	South Ame	Brazil	Mato Gros	Campo Gr:	South Ame	Brazil	Mato Gros	genome	29903	Human	38	Male	P.1	GR	Infectious	Infectious	Wellingtor	https://wv	23/11/2021
	hCoV-19/Spain/GA-CHUVI-19025283/2020	hCoV-19/Spain/GA-CHUVI-19025283/2020	betacoron	EPI_ISL_26	6/9/2020	Europe	Spain	Galicia	Vigo	Europe	Spain	Galicia	genome	29856	Human	38	Male	P.1.12	GV	Microbiolo	Microbiolo	Alfaya N, A	https://wv	18/6/2021
	hCoV-19/Brazil/PE-FIOCRUZ-IAM3285/2020	hCoV-19/Brazil/PE-FIOCRUZ-IAM3285/2020	betacoron	EPI_ISL_37	22/9/2020	South Ame	Brazil	Pernambu	Petrolina	South Ame	Brazil	Pernambu	genome	29643	Human	27	Male	P.1.12	G	LACEN/PE	WallauLab	Marcelo H	https://wv	26/8/2021
Gamma	hCoV-19/Brazil/PB-BA1200-250009713/2020	VOC_Gamma_hCoV-19/Brazil/PB-BA1200-250009713/2020	betacoron	EPI_ISL_22	1/10/2020	South Ame	Brazil	Paraiba	Ingá	South Ame	Brazil	Paraiba	genome	29829	Human	unknown	unknown	P.1	GR	Laboratóri	Coordenaç	Vagner Fo	https://wv	24/5/2021
Gamma	hCoV-19/Brazil/PR-L119-CD7789/2020	VOC_Gamma_hCoV-19/Brazil/PR-L119-CD7789/2020	betacoron	EPI_ISL_23	26/10/2020	South Ame	Brazil	Parana	Curitiba	South Ame	Brazil	Parana	genome	29777	Human	unknown	unknown	P.1	GR	Instituto B	Instituto d	Brazil-UK (	https://wv	30/5/2021
Gamma	hCoV-19/Brazil/GO-2732R1/2020	VOC_Gamma_hCoV-19/Brazil/GO-2732R1/2020	betacoron	EPI_ISL_26	26/10/2020	South Ame	Brazil	Goias	Goiania	South Ame	Brazil	Goias	genome	29865	Human	31	Female	P.1	GR	LACEN do	Instituto A	Claudio Ta	https://wv	18/6/2021
Gamma	hCoV-19/Brazil/SP-2389/2020	VOC_Gamma_hCoV-19/Brazil/SP-2389/2020	betacoron	EPI_ISL_18	3/11/2020	South Ame	Brazil	Sao Paulo	Bauru	South Ame	Brazil	Sao Paulo	genome	29837	Human	94	Female	P.1.14	GR	Hospital d	Instituto A	Claudio Ta	https://wv	30/4/2021
Gamma	hCoV-19/Brazil/RJ-FUNED-330105720/2020	VOC_Gamma_hCoV-19/Brazil/RJ-FUNED-330105720/2020	betacoron	EPI_ISL_22	18/11/2020	South Ame	Brazil	Rio de Jan	Volta Redc	South Ame	Brazil	Rio de Jan	genome	29826	Human	unknown	unknown	P.1	GR	Laboratóri	Coordenaç	Vagner Fo	https://wv	25/5/2021
Gamma	hCoV-19/Brazil/RJ-FUNED-330107714/2020	VOC_Gamma_hCoV-19/Brazil/RJ-FUNED-330107714/2020	betacoron	EPI_ISL_22	18/11/2020	South Ame	Brazil	Rio de Jan	Tres Rios	South Ame	Brazil	Rio de Jan	genome	29829	Human	unknown	unknown	P.1	GR	Laboratóri	Coordenaç	Vagner Fo	https://wv	25/5/2021
Gamma	hCoV-19/Brazil/RS-LMM38991/2020	VOC_Gamma_hCoV-19/Brazil/RS-LMM38991/2020	betacoron	EPI_ISL_16	30/11/2020	South Ame	Brazil	Rio Grand	Campo Bo	South Ame	Brazil	Rio Grand	genome	29802	Human	39	Male	P.1	GR	Laboratóri	Laboratóri	Alana Witt	https://wv	18/4/2021
Gamma	hCoV-19/USA/AL-ADPH-4665937/2020	VOC_Gamma_hCoV-19/USA/AL-ADPH-4665937/2020	betacoron	EPI_ISL_26	2020-05	North Ame	USA	Alabama	Prattville	North Ame	USA	Alabama	genome	29819	Human	3	Female	P.1	GR	Alabama D	Alabama D	Adrianna \	https://wv	25/6/2021
	hCoV-19/Brazil/RS-147_LABRESIS/2020	hCoV-19/Brazil/RS-147_LABRESIS/2020	betacoron	EPI_ISL_32	2020-09	South Ame	Brazil	Rio Grande do Sul		South Ame	Brazil	Rio Grand	genome	29868	Human	40	Female	P.1	GR	LABCOVID	LABRESIS	Wink PL, N	https://wv	3/8/2021
Gamma	hCoV-19/Brazil/RS-164_LABRESIS/2020	VOC_Gamma_hCoV-19/Brazil/RS-164_LABRESIS/2020	betacoron	EPI_ISL_32	2020-11	South Ame	Brazil	Rio Grande do Sul		South Ame	Brazil	Rio Grand	genome	29821	Human	48	Female	P.1	GR	LABRESIS	LABRESIS	Wink PL, N	https://wv	4/8/2021
Gamma	hCoV-19/USA/FL-Shands-VTM-1547/2020	VOC_Gamma_hCoV-19/USA/FL-Shands-VTM-1547/2020	betacoron	EPI_ISL_29	2020-12	North Ame	USA	Florida		North Ame	USA	Florida	genome	29837	Human	unknown	unknown	P.1.10	GR	UF Health	Salemi Lab	Magalis Bl	https://wv	19/7/2021
Gamma	hCoV-19/USA/FL-Shands-VTM-1564/2020	VOC_Gamma_hCoV-19/USA/FL-Shands-VTM-1564/2020	betacoron	EPI_ISL_29	2020-12	North Ame	USA	Florida	Gainesville	North Ame	USA	Florida	genome	29786	Human	unknown	unknown	P.1.10	G	UF Health	Salemi Lab	Magalis Bl	https://wv	19/7/2021
Gamma	hCoV-19/USA/FL-Shands-VTM-1572/2020	VOC_Gamma_hCoV-19/USA/FL-Shands-VTM-1572/2020	betacoron	EPI_ISL_29	2020-12	North Ame	USA	Florida	Gainesville	North Ame	USA	Florida	genome	29817	Human	unknown	unknown	P.1.10	GR	UF Health	Salemi Lab	Magalis Bl	https://wv	19/7/2021
Delta	hCoV-19/USA/NY-WMC2021-152/2020	VOC_Delta_hCoV-19/USA/NY-WMC2021-152/2020	betacoron	EPI_ISL_66	12/3/2020	North Ame	USA	New York	Westchest	North Ame	USA	New York	genome	29769	Human	37	Female	AY.23	GK	Molecular	Genomics	Weihua Hu	https://wv	23/11/2021

(*continued on next page*)

Table 1 (*continued*)

Delta	hCoV-19/USA/TX-HMH-MCoV-49501/2020	VOC_Delta_hCoV-19/USA/TX-HMH-MCoV-49501/2020	betacoron	EPI_ISL_53	13/7/2020	North Ame	USA	Texas	Houston	North Ame	USA	Texas	genome	29783	Human	unknown	unknown	AY.122	GK	Houston M	Houston M	Randall J. (	https://wv	20/10/2021
Delta	hCoV-19/USA/TX-HMH-MCoV-48794/2020	VOC_Delta_hCoV-19/USA/TX-HMH-MCoV-48794/2020	betacoron	EPI_ISL_53	15/7/2020	North Ame	USA	Texas	Houston	North Ame	USA	Texas	genome	29783	Human	unknown	unknown	AY.100	GK	Houston M	Houston M	Randall J. (	https://wv	20/10/2021
Delta	hCoV-19/USA/WV-WVU-WV121217/2020	VOC_Delta_hCoV-19/USA/WV-WVU-WV121217/2020	betacoron	EPI_ISL_46	21/7/2020	North Ame	USA	West Virginia		North Ame	USA	West Virgi	genome	29818	Human	67	Male	AY.25	GK	United Ho:	WVU and I	James Den	https://wv	1/10/2021
Delta	hCoV-19/Indonesia/JA-GS-EIJK-RSRM-0168/2020	VOC_Delta_hCoV-19/Indonesia/JA-GS-EIJK-RSRM-0168/2020	betacoron	EPI_ISL_53	29/7/2020	Asia	Indonesia	Jambi	Jambi	Asia	Indonesia	Jambi	genome	29775	Human	50	Male	AY.23	GK	Raden Mat	Eijkman Re	Sukma Okt	https://wv	21/10/2021
Delta	hCoV-19/Indonesia/JA-GS-EIJK-RSRM-0169/2020	VOC_Delta_hCoV-19/Indonesia/JA-GS-EIJK-RSRM-0169/2020	betacoron	EPI_ISL_53	29/7/2020	Asia	Indonesia	Jambi	Jambi	Asia	Indonesia	Jambi	genome	29769	Human	7	Male	AY.23	GK	Raden Mat	Eijkman Re	Lydia V Pa	https://wv	21/10/2021
Delta	hCoV-19/Indonesia/JA-GS-EIJK-RSRM-0170/2020	VOC_Delta_hCoV-19/Indonesia/JA-GS-EIJK-RSRM-0170/2020	betacoron	EPI_ISL_53	29/7/2020	Asia	Indonesia	Jambi	Jambi	Asia	Indonesia	Jambi	genome	29769	Human	39	Male	AY.24	GK	Raden Mat	Eijkman Re	Willy Agus	https://wv	21/10/2021
Delta	hCoV-19/Indonesia/JA-GS-EIJK-RSRM-0172/2020	VOC_Delta_hCoV-19/Indonesia/JA-GS-EIJK-RSRM-0172/2020	betacoron	EPI_ISL_53	29/7/2020	Asia	Indonesia	Jambi	Jambi	Asia	Indonesia	Jambi	genome	29769	Human	46	Female	AY.23	GK	Raden Mat	Eijkman Re	Jessica R S	https://wv	21/10/2021
Delta	hCoV-19/Indonesia/JA-GS-EIJK-RSRM-0200/2020	VOC_Delta_hCoV-19/Indonesia/JA-GS-EIJK-RSRM-0200/2020	betacoron	EPI_ISL_53	29/7/2020	Asia	Indonesia	Jambi	Jambi	Asia	Indonesia	Jambi	genome	29769	Human	32	Female	AY.23	GK	Raden Mat	Eijkman Re	Sukma Okt	https://wv	21/10/2021
Delta	hCoV-19/England/PHEP-YYBYUTJ/2020	VOC_Delta_hCoV-19/England/PHEP-YYBYUTJ/2020	betacoron	EPI_ISL_52	3/8/2020	Europe	United Kin	England		Europe	United Kin	England	genome	29769	Human	unknown	unknown	AY.4	GK	Respirator	COVID-19	PHE Covid	https://wv	18/10/2021
Delta	hCoV-19/USA/CA-LACPHL-AF03229/2020	VOC_Delta_hCoV-19/USA/CA-LACPHL-AF03229/2020	betacoron	EPI_ISL_50	12/8/2020	North Ame	USA	California	Los Angele	North Ame	USA	California	genome	29598	Human	unknown	unknown	AY.3	GK	Torrance M	Los Angele	P. Hemara	https://wv	12/10/2021
Delta	hCoV-19/USA/VI-Yale-10210/2020	VOC_Delta_hCoV-19/USA/VI-Yale-10210/2020	betacoron	EPI_ISL_45	21/8/2020	North Ame	USA	US Virgin I	St. Croix	North Ame	USA	US Virgin I	genome	29775	Human	unknown	unknown	B.1.617.2	GK	VIDOH (Vi	Grubaugh	Joseph Fau	https://wv	29/9/2021
Delta	hCoV-19/USA/VI-Yale-10211/2020	VOC_Delta_hCoV-19/USA/VI-Yale-10211/2020	betacoron	EPI_ISL_45	21/8/2020	North Ame	USA	US Virgin I	St. Croix	North Ame	USA	US Virgin I	genome	29775	Human	unknown	unknown	AY.35	GK	VIDOH (Vi	Grubaugh	Joseph Fau	https://wv	29/9/2021
Delta	hCoV-19/Fiji/FJ493/2020	VOC_Delta_hCoV-19/Fiji/FJ493/2020	betacoron	EPI_ISL_48	25/8/2020	Oceania	Fiji			Oceania	Fiji		genome	29835	Human	unknown	unknown	AY.82	G	Fiji Centre	Microbiolo	Sahukhan,	https://wv	4/10/2021
Delta	hCoV-19/USA/CA-SEARCH-109796/2020	VOC_Delta_hCoV-19/USA/CA-SEARCH-109796/2020	betacoron	EPI_ISL_52	31/8/2020	North Ame	USA	California	San Diego	North Ame	USA	California	genome	29804	Human	unknown	unknown	B.1.617.2	GK	San Diego	Andersen I	SEARCH Al	https://wv	15/10/2021
Delta	hCoV-19/USA/WY-WYPHL-21070660/2020	VOC_Delta_hCoV-19/USA/WY-WYPHL-21070660/2020	betacoron	EPI_ISL_45	2/9/2020	North Ame	USA	Wyoming		North Ame	USA	Wyoming	genome	29818	Human	10	Male	AY.3	GK	Wyoming I	Wyoming I	Jim Milder	https://wv	28/9/2021
Delta	hCoV-19/India/MP-NCDC-2509230/2020	VOC_Delta_hCoV-19/India/MP-NCDC-2509230/2020	betacoron	EPI_ISL_24	7/9/2020	Asia	India	Madhya Pradesh		Asia	India	Madhya Pr	genome	29778	Human	63	Male	AY.122	GK	National C	NCDC Delh	Radhakrisl	https://wv	9/6/2021
Delta	hCoV-19/USA/ND-NDDH-4397/2020	VOC_Delta_hCoV-19/USA/ND-NDDH-4397/2020	betacoron	EPI_ISL_48	9/9/2020	North Ame	USA	North Dakota		North Ame	USA	North Dak	genome	29775	Human	unknown	unknown	AY.44	GK	North Dak	North Dak	Lisa Winge	https://wv	4/10/2021
Delta	hCoV-19/Rwanda/CV2197/2020	VOC_Delta_hCoV-19/Rwanda/CV2197/2020	betacoron	EPI_ISL_47	10/9/2020	Africa	Rwanda	Nyarugenge		Africa	Rwanda	Nyarugeng	genome	29804	Human	34	Male	B.1.617.2	GK	Rwanda N	Africa Cen	Enatha Mu	https://wv	4/10/2021
Delta	hCoV-19/BurkinaFaso/CV1920/2020	VOC_Delta_hCoV-19/BurkinaFaso/CV1920/2020	betacoron	EPI_ISL_42	16/9/2020	Africa	Burkina Fa	Ouagadougou		Africa	Burkina Fa	Ouagadou	genome	29842	Human	unknown	unknown	AY.36	GK	Centre Ho:	Africa Cen	Olawoye, I	https://wv	17/9/2021
Delta	hCoV-19/BurkinaFaso/CV1921/2020	VOC_Delta_hCoV-19/BurkinaFaso/CV1921/2020	betacoron	EPI_ISL_42	18/9/2020	Africa	Burkina Fa	Ouagadougou		Africa	Burkina Fa	Ouagadou	genome	29808	Human	unknown	unknown	AY.36	GK	Centre Ho:	Africa Cen	Olawoye, I	https://wv	17/9/2021
Delta	hCoV-19/Mexico/AGU-InDRE_FB18599_S4467/2020	VOC_Delta_hCoV-19/Mexico/AGU-InDRE_FB18599_S4467/2020	betacoron	EPI_ISL_29	22/9/2020	North Ame	Mexico	Aguascalientes		North Ame	Mexico	Aguascalie	genome	29814	Human	22	Female	AY.100	GK	LESP Agua	Instituto d	Claudia W	https://wv	14/7/2021
Delta	hCoV-19/India/MH-ICMR-MCL_5716_5772/2020	VOC_Delta_hCoV-19/India/MH-ICMR-MCL_5716_5772/2020	betacoron	EPI_ISL_34	2020-10	Asia	India	Maharashtra		Asia	India	Maharasht	genome	29873	Human	12	Male	AY.50	GK	Indian Cou	Indian Cou	Pragya Yac	https://wv	18/8/2021
Delta	hCoV-19/India/MH-ICMR-MCL_5715_5771/2020	VOC_Delta_hCoV-19/India/MH-ICMR-MCL_5715_5771/2020	betacoron	EPI_ISL_34	2020-10	Asia	India	Maharashtra		Asia	India	Maharasht	genome	29886	Human	17	Female	B.1.617.2	GK	Indian Cou	Indian Cou	Pragya Yac	https://wv	18/8/2021
Delta	hCoV-19/France/PAC-IHU-38688-NovaE/2020	VOC_Delta_hCoV-19/France/PAC-IHU-38688-NovaE/2020	betacoron	EPI_ISL_63	2020-10	Europe	France	Provence-/	Marseille	Europe	France	Provence-/	genome	29689	Human	unknown	unknown	AY.43	GK	MEPHI, Ai	MEPHI, Ai	Anthony Ll	https://wv	16/11/2021
Mu	hCoV-19/Colombia/MAG-INS-VG-482/2021	VOI_Mu_hCoV-19/Colombia/MAG-INS-VG-482/2021	betacoron	EPI_ISL_12	11/1/2021	South Ame	Colombia	Magdalena		South Ame	Colombia	Magdalena	genome	29494	Human	unknown	Female	B.1.621	GH	Universida	Instituto N	Katherine	https://wv	11/3/2021
Mu	hCoV-19/USA/CA-HLX-STM-000080848/2021	VOI_Mu_hCoV-19/USA/CA-HLX-STM-000080848/2021	betacoron	EPI_ISL_26	2021	North Ame	USA	California		North Ame	USA	California	genome	29902	Human	unknown	unknown	B.1.621	GH	Helix	Helix	Celina Anc	https://wv	21/6/2021
Mu	hCoV-19/England/PHEC-31028C/2021	VOI_Mu_hCoV-19/England/PHEC-31028C/2021	betacoron	EPI_ISL_27	2021	Europe	United Kin	England		Europe	United Kin	England	genome	29819	Human	unknown	unknown	B.1.621	GH	Respirator	COVID-19	PHE Covid	https://wv	30/6/2021
Mu	hCoV-19/England/PHEC-313887/2021	VOI_Mu_hCoV-19/England/PHEC-313887/2021	betacoron	EPI_ISL_27	2021	Europe	United Kin	England		Europe	United Kin	England	genome	29818	Human	unknown	unknown	B.1.621.1	GH	Respirator	COVID-19	PHE Covid	https://wv	30/6/2021
Mu	hCoV-19/England/PHEC-L306LE1C/2021	VOI_Mu_hCoV-19/England/PHEC-L306LE1C/2021	betacoron	EPI_ISL_27	2021	Europe	United Kin	England		Europe	United Kin	England	genome	29835	Human	unknown	unknown	B.1.621.1	GH	Respirator	COVID-19	PHE Covid	https://wv	30/6/2021
Mu	hCoV-19/England/PHEC-L306LE3A/2021	VOI_Mu_hCoV-19/England/PHEC-L306LE3A/2021	betacoron	EPI_ISL_27	2021	Europe	United Kin	England		Europe	United Kin	England	genome	29834	Human	unknown	unknown	B.1.621.1	GH	Respirator	COVID-19	PHE Covid	https://wv	30/6/2021
Mu	hCoV-19/NorthernIreland/PHEC-L307L6B9/2021	VOI_Mu_hCoV-19/NorthernIreland/PHEC-L307L6B9/2021	betacoron	EPI_ISL_27	2021	Europe	United Kin	Northern Ireland		Europe	United Kin	Northern I	genome	29830	Human	unknown	unknown	B.1.621.1	GH	Respirator	COVID-19	PHE Covid	https://wv	30/6/2021
Mu	hCoV-19/USA/FL-Shands-VTM-1545/2020	VOI_Mu_hCoV-19/USA/FL-Shands-VTM-1545/2020	betacoron	EPI_ISL_29	2020-12	North Ame	USA	Florida		North Ame	USA	Florida	genome	29747	Human	unknown	unknown	B.1.621.1	GH	UF Health	Salemi Lab	Magalis Bl	https://wv	19/7/2021
Mu	hCoV-19/USA/GA-GPHL-0609/2021	VOI_Mu_hCoV-19/USA/GA-GPHL-0609/2021	betacoron	EPI_ISL_31	2021	North Ame	USA	Georgia		North Ame	USA	Georgia	genome	29835	Human	unknown	unknown	B.1.621	GH	GA Depart	GA Depart	Stacy Reev	https://wv	27/7/2021
Mu	hCoV-19/USA/GA-GPHL-0611/2021	VOI_Mu_hCoV-19/USA/GA-GPHL-0611/2021	betacoron	EPI_ISL_31	2021	North Ame	USA	Georgia		North Ame	USA	Georgia	genome	29835	Human	unknown	unknown	B.1.621	GH	GA Depart	GA Depart	Stacy Reev	https://wv	27/7/2021
Mu	hCoV-19/Venezuela/Fal1944/2021	VOI_Mu_hCoV-19/Venezuela/Fal1944/2021	betacoron	EPI_ISL_35	21/1/2021	South Ame	Venezuela	Falcon		South Ame	Venezuela	Falcon	genome	29831	Human	unknown	unknown	B.1.621	GH	Instituto V	Laboratori	Rossana C	https://wv	19/8/2021
Mu	hCoV-19/France/IDF-CERBAHC-0767669/2021	VOI_Mu_hCoV-19/France/IDF-CERBAHC-0767669/2021	betacoron	EPI_ISL_35	2021	Europe	France	Ile-de-France		Europe	France	Ile-de-Frar	genome	29822	Human	28	Female	B.1.621	GH	LBM Porte	CERBA Hea	Bénédicte	https://wv	20/8/2021
Mu	hCoV-19/France/OCC-CERBAHC-0737599/2021	VOI_Mu_hCoV-19/France/OCC-CERBAHC-0737599/2021	betacoron	EPI_ISL_35	2021	Europe	France	Occitanie		Europe	France	Occitanie	genome	29817	Human	15	Female	B.1.621	GH	LBM Cerba	CERBA Hea	Bénédicte	https://wv	20/8/2021
Mu	hCoV-19/England/PHEC-345E6C/2021	VOI_Mu_hCoV-19/England/PHEC-345E6C/2021	betacoron	EPI_ISL_35	2021	Europe	United Kin	England		Europe	United Kin	England	genome	29525	Human	unknown	unknown	B.1.621	GH	Respirator	COVID-19	PHE Covid	https://wv	23/8/2021
Mu	hCoV-19/France/IDF-CERBAHC-0786809/2021	VOI_Mu_hCoV-19/France/IDF-CERBAHC-0786809/2021	betacoron	EPI_ISL_37	2021	Europe	France	Ile-de-France		Europe	France	Ile-de-Frar	genome	29843	Human	23	Female	B.1.621	GH	EYLAU - Ur	CERBA Hea	Bénédicte	https://wv	26/8/2021
Mu	hCoV-19/France/CVL-CERBAHC-08428324/2021	VOI_Mu_hCoV-19/France/CVL-CERBAHC-08428324/2021	betacoron	EPI_ISL_38	2021	Europe	France	Centre-Val de Loire		Europe	France	Centre-Val	genome	29817	Human	6	Female	B.1.621	GH	Laboratoir	CERBA Hea	Bénédicte	https://wv	2/9/2021
Mu	hCoV-19/France/NAQ-CERBAHC-09538751/2021	VOI_Mu_hCoV-19/France/NAQ-CERBAHC-09538751/2021	betacoron	EPI_ISL_41	2021	Europe	France	Nouvelle-Aquitaine		Europe	France	Nouvelle-/	genome	29827	Human	28	Female	B.1.621.1	GH	Cerballian	CERBA Hea	Bénédicte	https://wv	15/9/2021
Mu	hCoV-19/Colombia/VAC-UTP-VG-024/2021	VOI_Mu_hCoV-19/Colombia/VAC-UTP-VG-024/2021	betacoron	EPI_ISL_56	2021	South Ame	Colombia	Valle del Cauca		South Ame	Colombia	Valle del C	genome	29781	Human	unknown	Male	B.1.621	GH	SYNLAB Án	Laboratori	Fredy A. Ta	https://wv	27/10/2021
Mu	hCoV-19/Colombia/VAC-UTP-VG-026/2021	VOI_Mu_hCoV-19/Colombia/VAC-UTP-VG-026/2021	betacoron	EPI_ISL_56	2021	South Ame	Colombia	Valle del Cauca		South Ame	Colombia	Valle del C	genome	29781	Human	unknown	Female	B.1.621	GH	SYNLAB Án	Laboratori	Fredy A. Ta	https://wv	27/10/2021
Mu	hCoV-19/Colombia/VAC-UTP-VG-027/2021	VOI_Mu_hCoV-19/Colombia/VAC-UTP-VG-027/2021	betacoron	EPI_ISL_56	2021	South Ame	Colombia	Valle del Cauca		South Ame	Colombia	Valle del C	genome	29781	Human	unknown	Female	B.1.621	GH	SYNLAB Án	Laboratori	Fredy A. Ta	https://wv	27/10/2021
Mu	hCoV-19/Colombia/VAC-UTP-VG-029/2021	VOI_Mu_hCoV-19/Colombia/VAC-UTP-VG-029/2021	betacoron	EPI_ISL_56	2021	South Ame	Colombia	Valle del Cauca		South Ame	Colombia	Valle del C	genome	29775	Human	unknown	Female	B.1.621	GH	SYNLAB Án	Laboratori	Fredy A. Ta	https://wv	27/10/2021
Mu	hCoV-19/Colombia/VAC-UTP-VG-025/2021	VOI_Mu_hCoV-19/Colombia/VAC-UTP-VG-025/2021	betacoron	EPI_ISL_56	2021	South Ame	Colombia	Valle del Cauca		South Ame	Colombia	Valle del C	genome	29778	Human	unknown	Male	B.1.621	GH	SYNLAB Án	Laboratori	Fredy A. Ta	https://wv	27/10/2021
Mu	hCoV-19/Colombia/VAC-UTP-VG-228/2021	VOI_Mu_hCoV-19/Colombia/VAC-UTP-VG-228/2021	betacoron	EPI_ISL_56	2021	South Ame	Colombia	Valle del Cauca		South Ame	Colombia	Valle del C	genome	29781	Human	unknown	Female	B.1.621	GH	SYNLAB Án	Laboratori	Fredy A. Ta	https://wv	27/10/2021
Mu	hCoV-19/USA/IN-LH000111869/2021	VOI_Mu_hCoV-19/USA/IN-LH000111869/2021	betacoron	EPI_ISL_57	2021	North Ame	USA	Indiana		North Ame	USA	Indiana	genome	29799	Human	38	Female	B.1.621	GH	PPHC-Purc	Animal Dis	Rebeccca I	https://wv	29/10/2021
Mu	hCoV-19/Colombia/ANT-LDSP461/2020	VOI_Mu_hCoV-19/Colombia/ANT-LDSP461/2020	betacoron	EPI_ISL_65	14/10/2020	South Ame	Colombia	Antioquia	Apartado	South Ame	Colombia	Antioquia	genome	29781	Human	89	Male	B.1.621	GH	SOMER	Laboratori	Idabely Be	https://wv	19/11/2021
	hCoV-19/Indonesia/JA-EIJK-RSRM-175/2021	hCoV-19/Indonesia/JA-EIJK-RSRM-175/2021	betacoron	EPI_ISL_31	18/5/2021	Asia	Indonesia	Jambi	Jambi	Asia	Indonesia	Jambi	genome	29782	Human	18	Female	B.1.640	GH	RSUD Rade	Eijkman In	Sukma Okt	https://wv	1/8/2021
GH	hCoV-19/Congo/FCRM-100-A32.28.09.21/2021	VUM_GH_hCoV-19/Congo/FCRM-100-A32.28.09.21/2021	betacoron	EPI_ISL_55	28/9/2021	Africa	Republic o	Brazzaville		Africa	Republic o	Brazzaville	genome	29683	Human	39	Female	B.1.640	GH	Fondation	Fondation	Mfoutou M	https://wv	27/10/2021
GH	hCoV-19/Canada/QC-L00397423001/2021	VUM_GH_hCoV-19/Canada/QC-L00397423001/2021	betacoron	EPI_ISL_64	2/10/2021	North Ame	Canada	Quebec		North Ame	Canada	Quebec	genome	29734	Human	34	unknown	B.1.640	GH	Laboratoir	Laboratoir	Sandrine M	https://wv	18/11/2021
GH	hCoV-19/Switzerland/VD-ETHZ-34362364/2021	VUM_GH_hCoV-19/Switzerland/VD-ETHZ-34362364/2021	betacoron	EPI_ISL_55	6/10/2021	Europe	Switzerlan	Vaud		Europe	Switzerlan	Vaud	genome	29788	Human	unknown	unknown	B.1.640	GH	Viollier AG	Departmen	Christian E	https://wv	26/10/2021
GH	hCoV-19/England/PHEC-3M04EMF0/2021	VUM_GH_hCoV-19/England/PHEC-3M04EMF0/2021	betacoron	EPI_ISL_54	11/10/2021	Europe	United Kin	England		Europe	United Kin	England	genome	29779	Human	unknown	unknown	B.1.640	GH	Respirator	COVID-19	PHE Covid	https://wv	25/10/2021
GH	hCoV-19/France/BRE-CHURENNES-8600727075/2021	VUM_GH_hCoV-19/France/BRE-CHURENNES-8600727075/2021	betacoron	EPI_ISL_56	12/10/2021	Europe	France	Bretagne	Bannalec	Europe	France	Bretagne	genome	29799	Human	9	Female	B.1.640	GH	Laboratoir	CHU Pontc	GROLHIER	https://wv	28/10/2021
GH	hCoV-19/France/BRE-CHURENNES-8600727092/2021	VUM_GH_hCoV-19/France/BRE-CHURENNES-8600727092/2021	betacoron	EPI_ISL_56	12/10/2021	Europe	France	Bretagne	Bannalec	Europe	France	Bretagne	genome	29796	Human	9	Male	B.1.640	GH	Laboratoir	CHU Pontc	GROLHIER	https://wv	28/10/2021
GH	hCoV-19/France/BRE-CHURENNES-8600727095/2021	VUM_GH_hCoV-19/France/BRE-CHURENNES-8600727095/2021	betacoron	EPI_ISL_56	12/10/2021	Europe	France	Bretagne	Bannalec	Europe	France	Bretagne	genome	29821	Human	10	Male	B.1.640	GH	Laboratoir	CHU Pontc	GROLHIER	https://wv	28/10/2021
GH	hCoV-19/France/PAC-HCL021184595901/2021	VUM_GH_hCoV-19/France/PAC-HCL021184595901/2021	betacoron	EPI_ISL_59	12/10/2021	Europe	France	Provence-/	Alpes-Mar	Europe	France	Provence-/	genome	29728	Human	36	Male	B.1.640	GH	LABORATC	CNR Virus	Antonin Ba	https://wv	4/11/2021
GH	hCoV-19/France/BRE-CHURENNES-8600727084/2021	VUM_GH_hCoV-19/France/BRE-CHURENNES-8600727084/2021	betacoron	EPI_ISL_56	14/10/2021	Europe	France	Bretagne	Bannalec	Europe	France	Bretagne	genome	29770	Human	10	Male	B.1.640	GH	Laboratoir	CHU Pontc	GROLHIER	https://wv	28/10/2021
GH	hCoV-19/France/IDF-CERBAHC-10167435/2021	VUM_GH_hCoV-19/France/IDF-CERBAHC-10167435/2021	betacoron	EPI_ISL_55	16/10/2021	Europe	France	Ile-de-France		Europe	France	Ile-de-Frar	genome	29822	Human	36	Female	B.1.640	G	LBM Porte	CERBA Hea	Bénédicte	https://wv	27/10/2021
GH	hCoV-19/Scotland/QEUH-27D6EB1/2021	VUM_GH_hCoV-19/Scotland/QEUH-27D6EB1/2021	betacoron	EPI_ISL_56	18/10/2021	Europe	United Kin	Scotland		Europe	United Kin	Scotland	genome	29434	Human	unknown	unknown	B.1.640	GH	Lighthouse	Wellcome	Harper Va	https://wv	27/10/2021
GH	hCoV-19/France/BRE-CHURENNES-8600727081/2021	VUM_GH_hCoV-19/France/BRE-CHURENNES-8600727081/2021	betacoron	EPI_ISL_56	18/10/2021	Europe	France	Bretagne	Bannalec	Europe	France	Bretagne	genome	29770	Human	10	Male	B.1.640	GH	Laboratoir	CHU Pontc	GROLHIER	https://wv	28/10/2021
GH	hCoV-19/France/BRE-CHURENNES-8600727096/2021	VUM_GH_hCoV-19/France/BRE-CHURENNES-8600727096/2021	betacoron	EPI_ISL_56	18/10/2021	Europe	France	Bretagne	Bannalec	Europe	France	Bretagne	genome	29829	Human	10	Male	B.1.640	GH	Laboratoir	CHU Pontc	GROLHIER	https://wv	28/10/2021
GH	hCoV-19/France/BRE-CHURENNES-8600727078/2021	VUM_GH_hCoV-19/France/BRE-CHURENNES-8600727078/2021	betacoron	EPI_ISL_56	18/10/2021	Europe	France	Bretagne	Bannalec	Europe	France	Bretagne	genome	29733	Human	5	Female	B.1.640	GH	Laboratoir	CHU Pontc	GROLHIER	https://wv	28/10/2021
GH	hCoV-19/Congo/FCRM-115-12574/2021	VUM_GH_hCoV-19/Congo/FCRM-115-12574/2021	betacoron	EPI_ISL_60	19/10/2021	Africa	Republic o	Brazzaville		Africa	Republic o	Brazzaville	genome	29714	Human	32	Female	B.1.640	GH	Fondation	Fondation	Mfoutou M	https://wv	9/11/2021
GH	hCoV-19/France/BRE-CHURENNES-8600727100/2021	VUM_GH_hCoV-19/France/BRE-CHURENNES-8600727100/2021	betacoron	EPI_ISL_56	20/10/2021	Europe	France	Bretagne	Bannalec	Europe	France	Bretagne	genome	29770	Human	12	Female	B.1.640	GH	Laboratoir	CHU Pontc	GROLHIER	https://wv	28/10/2021
GH	hCoV-19/Congo/FCRM-127-A23.20.10.21/2021	VUM_GH_hCoV-19/Congo/FCRM-127-A23.20.10.21/2021	betacoron	EPI_ISL_60	20/10/2021	Africa	Republic o	Brazzaville		Africa	Republic o	Brazzaville	genome	29649	Human	4	Female	B.1.640	GH	Fondation	Fondation	Mfoutou M	https://wv	9/11/2021
GH	hCoV-19/France/BRE-IPP32353/2021	VUM_GH_hCoV-19/France/BRE-IPP32353/2021	betacoron	EPI_ISL_64	21/10/2021	Europe	France	Bretagne	Vannes	Europe	France	Bretagne	genome	29733	Human	16	Female	B.1.640	GH	Labo Analy	National R	Marion Ba	https://wv	18/11/2021
GH	hCoV-19/France/IDF-HMN-21112080204/2021	VUM_GH_hCoV-19/France/IDF-HMN-21112080204/2021	betacoron	EPI_ISL_62	22/10/2021	Europe	France	Ile-de-France		Europe	France	Ile-de-Frar	genome	29741	Human	76	Male	B.1.640	GH	Hôpital Lo	Departmen	Christophe	https://wv	12/11/2021
GH	hCoV-19/Italy/LAZ-IFO-10233054/2021	VUM_GH_hCoV-19/Italy/LAZ-IFO-10233054/2021	betacoron	EPI_ISL_57	23/10/2021	Europe	Italy	Lazio	Rome	Europe	Italy	Lazio	genome	29774	Human	unknown	Male	B.1.640	GH	IRCCS San	IRCCS Regi	Frauke Go	https://wv	31/10/2021
GH	hCoV-19/Congo/FCRM-118-A1/2021	VUM_GH_hCoV-19/Congo/FCRM-118-A1/2021	betacoron	EPI_ISL_60	23/10/2021	Africa	Republic o	Brazzaville		Africa	Republic o	Brazzaville	genome	29714	Human	43	Female	B.1.640	GH	Fondation	Fondation	Mfoutou M	https://wv	9/11/2021
GH	hCoV-19/France/IDF-CERBAHC-10287496/2021	VUM_GH_hCoV-19/France/IDF-CERBAHC-10287496/2021	betacoron	EPI_ISL_59	25/10/2021	Europe	France	Ile-de-France		Europe	France	Ile-de-Frar	genome	29814	Human	61	Male	B.1.640	GH	LBM Bois d	CERBA Hea	Bénédicte	https://wv	4/11/2021
GH	hCoV-19/Congo/FCRM-120-A2/2021	VUM_GH_hCoV-19/Congo/FCRM-120-A2/2021	betacoron	EPI_ISL_60	25/10/2021	Africa	Republic o	Brazzaville		Africa	Republic o	Brazzaville	genome	29683	Human	35	Male	B.1.640	GH	Fondation	Fondation	Mfoutou M	https://wv	9/11/2021
GH	hCoV-19/France/IDF-IPP31876/2021	VUM_GH_hCoV-19/France/IDF-IPP31876/2021	betacoron	EPI_ISL_63	25/10/2021	Europe	France	Ile-de-Frar	Lisses	Europe	France	Ile-de-Frar	genome	29745	Human	61	Male	B.1.640	GH	Labo Analy	National R	Marion Ba	https://wv	16/11/2021
Lambda	hCoV-19/Ecuador/UEES-12976/2021	VOI_Lambda_hCoV-19/Ecuador/UEES-12976/2021	betacoron	EPI_ISL_16	2021	South Ame	Ecuador	Guayas		South Ame	Ecuador	Guayas	genome	29783	Human	unknown	unknown	C.37	GR	Omics Scie	Omics Scie	Derly Andr	https://wv	19/4/2021
Lambda	hCoV-19/Peru/LIM-INS-8425/2020	VOI_Lambda_hCoV-19/Peru/LIM-INS-8425/2020	betacoron	EPI_ISL_59	21/7/2020	South Ame	Peru	Lima		South Ame	Peru	Lima	genome	29769	Human	38	Male	C.37	GR	Laboratori	Laboratori	Carlos Pad	https://wv	5/11/2021
Lambda	hCoV-19/Argentina/INEI096534/2020	VOI_Lambda_hCoV-19/Argentina/INEI096534/2020	betacoron	EPI_ISL_21	8/11/2020	South Ame	Argentina	Ciudad Autonoma de		South Ame	Argentina	Ciudad Au	genome	29792	Human	27	Female	C.37	GR	Servicio Vi	Instituto N	Baumeiste	https://wv	19/5/2021
Lambda	hCoV-19/Peru/LIM-INS-895/2020	VOI_Lambda_hCoV-19/Peru/LIM-INS-895/2020	betacoron	EPI_ISL_15	22/12/2020	South Ame	Peru	Lima		South Ame	Peru	Lima	genome	29496	Human	34	Female	C.37	GR	Laboratori	Laboratori	Carlos Pad	https://wv	11/4/2021
Lambda	hCoV-19/Peru/LIM-UPCH-0372/2021	VOI_Lambda_hCoV-19/Peru/LIM-UPCH-0372/2021	betacoron	EPI_ISL_16	1/1/2021	South Ame	Peru	Lima		South Ame	Peru	Lima	genome	29744	Human	unknown	unknown	C.37	GR	Instituto d	Laboratori	Lenin Mati	https://wv	18/4/2021
Lambda	hCoV-19/Peru/SAM-INS-2426/2021	VOI_Lambda_hCoV-19/Peru/SAM-INS-2426/2021	betacoron	EPI_ISL_34	8/1/2021	South Ame	Peru	San Martin		South Ame	Peru	San Martir	genome	29791	Human	22	Male	C.37	GR	Laboratori	Laboratori	Carlos Pad	https://wv	14/8/2021
Lambda	hCoV-19/Peru/SAM-INS-2421/2021	VOI_Lambda_hCoV-19/Peru/SAM-INS-2421/2021	betacoron	EPI_ISL_34	9/1/2021	South Ame	Peru	San Martin		South Ame	Peru	San Martir	genome	29786	Human	25	Male	C.37	GR	Laboratori	Laboratori	Carlos Pad	https://wv	14/8/2021
Lambda	hCoV-19/Peru/SAM-INS-2419/2021	VOI_Lambda_hCoV-19/Peru/SAM-INS-2419/2021	betacoron	EPI_ISL_34	11/1/2021	South Ame	Peru	San Martin		South Ame	Peru	San Martir	genome	29783	Human	40	Female	C.37	GR	Laboratori	Laboratori	Carlos Pad	https://wv	14/8/2021
Lambda	hCoV-19/Peru/LIM-INS-731/2021	VOI_Lambda_hCoV-19/Peru/LIM-INS-731/2021	betacoron	EPI_ISL_11	12/1/2021	South Ame	Peru	Lima		South Ame	Peru	Lima	genome	29496	Human	47	Female	C.37	GR	Laboratori	Laboratori	Carlos Pad	https://wv	4/3/2021
Lambda	hCoV-19/Peru/LIM-INS-734/2021	VOI_Lambda_hCoV-19/Peru/LIM-INS-734/2021	betacoron	EPI_ISL_11	12/1/2021	South Ame	Peru	Lima		South Ame	Peru	Lima	genome	29496	Human	38	Female	C.37	GR	Laboratori	Laboratori	Carlos Pad	https://wv	4/3/2021
Lambda	hCoV-19/Peru/LIM-INS-737/2021	VOI_Lambda_hCoV-19/Peru/LIM-INS-737/2021	betacoron	EPI_ISL_11	12/1/2021	South Ame	Peru	Lima		South Ame	Peru	Lima	genome	29496	Human	74	Female	C.37	GR	Laboratori	Laboratori	Carlos Pad	https://wv	4/3/2021
Lambda	hCoV-19/Peru/CAL-INS-670/2021	VOI_Lambda_hCoV-19/Peru/CAL-INS-670/2021	betacoron	EPI_ISL_11	17/1/2021	South Ame	Peru	Callao		South Ame	Peru	Callao	genome	29901	Human	unknown	unknown	C.37	GR	Laboratori	Laboratori	Ronnie Ga	https://wv	1/3/2021
Lambda	hCoV-19/Peru/LIM-INS-418/2021	VOI_Lambda_hCoV-19/Peru/LIM-INS-418/2021	betacoron	EPI_ISL_11	17/1/2021	South Ame	Peru	Lima		South Ame	Peru	Lima	genome	29890	Human	unknown	unknown	C.37	GR	Laboratori	Laboratori	Ronnie Ga	https://wv	1/3/2021
Lambda	hCoV-19/Peru/LIM-INS-419/2021	VOI_Lambda_hCoV-19/Peru/LIM-INS-419/2021	betacoron	EPI_ISL_11	17/1/2021	South Ame	Peru	Lima		South Ame	Peru	Lima	genome	29901	Human	unknown	unknown	C.37	GR	Laboratori	Laboratori	Ronnie Ga	https://wv	1/3/2021
Lambda	hCoV-19/Peru/LIM-INS-420/2021	VOI_Lambda_hCoV-19/Peru/LIM-INS-420/2021	betacoron	EPI_ISL_11	17/1/2021	South Ame	Peru	Lima		South Ame	Peru	Lima	genome	29898	Human	unknown	unknown	C.37	GR	Laboratori	Laboratori	Ronnie Ga	https://wv	1/3/2021
Lambda	hCoV-19/Peru/LIM-INS-421/2021	VOI_Lambda_hCoV-19/Peru/LIM-INS-421/2021	betacoron	EPI_ISL_11	17/1/2021	South Ame	Peru	Lima		South Ame	Peru	Lima	genome	29895	Human	unknown	unknown	C.37	GR	Laboratori	Laboratori	Ronnie Ga	https://wv	1/3/2021
Lambda	hCoV-19/Peru/LIM-INS-423/2021	VOI_Lambda_hCoV-19/Peru/LIM-INS-423/2021	betacoron	EPI_ISL_11	17/1/2021	South Ame	Peru	Lima		South Ame	Peru	Lima	genome	29899	Human	unknown	unknown	C.37	GR	Laboratori	Laboratori	Ronnie Ga	https://wv	1/3/2021
Lambda	hCoV-19/Peru/LIM-INS-424/2021	VOI_Lambda_hCoV-19/Peru/LIM-INS-424/2021	betacoron	EPI_ISL_11	17/1/2021	South Ame	Peru	Lima		South Ame	Peru	Lima	genome	29863	Human	unknown	unknown	C.37	GR	Laboratori	Laboratori	Ronnie Ga	https://wv	1/3/2021
Lambda	hCoV-19/Peru/LIM-INS-430/2021	VOI_Lambda_hCoV-19/Peru/LIM-INS-430/2021	betacoron	EPI_ISL_11	17/1/2021	South Ame	Peru	Lima		South Ame	Peru	Lima	genome	29895	Human	unknown	unknown	C.37	GR	Laboratori	Laboratori	Ronnie Ga	https://wv	1/3/2021
Lambda	hCoV-19/Peru/LIM-INS-433/2021	VOI_Lambda_hCoV-19/Peru/LIM-INS-433/2021	betacoron	EPI_ISL_11	17/1/2021	South Ame	Peru	Lima		South Ame	Peru	Lima	genome	29901	Human	unknown	unknown	C.37	GR	Laboratori	Laboratori	Ronnie Ga	https://wv	1/3/2021
Lambda	hCoV-19/Peru/LIM-INS-434/2021	VOI_Lambda_hCoV-19/Peru/LIM-INS-434/2021	betacoron	EPI_ISL_11	17/1/2021	South Ame	Peru	Lima		South Ame	Peru	Lima	genome	29887	Human	unknown	unknown	C.37	GR	Laboratori	Laboratori	Ronnie Ga	https://wv	1/3/2021
Lambda	hCoV-19/Peru/LIM-INS-436/2021	VOI_Lambda_hCoV-19/Peru/LIM-INS-436/2021	betacoron	EPI_ISL_11	17/1/2021	South Ame	Peru	Lima		South Ame	Peru	Lima	genome	29901	Human	unknown	unknown	C.37	GR	Laboratori	Laboratori	Ronnie Ga	https://wv	1/3/2021
Lambda	hCoV-19/Peru/LIM-INS-437/2021	VOI_Lambda_hCoV-19/Peru/LIM-INS-437/2021	betacoron	EPI_ISL_11	17/1/2021	South Ame	Peru	Lima		South Ame	Peru	Lima	genome	29874	Human	unknown	unknown	C.37	GR	Laboratori	Laboratori	Ronnie Ga	https://wv	1/3/2021
Lambda	hCoV-19/Peru/LIM-INS-443/2021	VOI_Lambda_hCoV-19/Peru/LIM-INS-443/2021	betacoron	EPI_ISL_11	17/1/2021	South Ame	Peru	Lima		South Ame	Peru	Lima	genome	29901	Human	unknown	unknown	C.37	GR	Laboratori	Laboratori	Ronnie Ga	https://wv	1/3/2021
Lambda	hCoV-19/Peru/CAL-INS-668/2021	VOI_Lambda_hCoV-19/Peru/CAL-INS-668/2021	betacoron	EPI_ISL_11	18/1/2021	South Ame	Peru	Callao		South Ame	Peru	Callao	genome	29888	Human	unknown	unknown	C.37	GR	Laboratori	Laboratori	Ronnie Ga	https://wv	1/3/2021

2. Results

2.1. Phylogenomics suggests common ancestry of omicron and lambda variants

Whole genome-based phylogeny (n = 478 genomes) representing VOC (alpha, beta, gamma, delta, and omicron), VOI (mu and lambda) and VUM depicts two major phylogroups PG-I and PG-II (Fig. 1 and Table 1). Here, the reference strain of SARS-CoV-2 (Wuhan-Hu-1, NC_045512.2) is taken as an outgroup. PG-I has VOC: gamma, beta, and delta; VOI: mu and VUM: GH. Whereas, PG-II includes VOC: alpha, omicron and VOI: lambda. Interestingly, two VOCs, delta and omicron, belong to different phylogroups. Phylogeny depicted that omicron shares a common ancestry with VOI lambda represented by a black asterisk in Fig. 1. Interestingly, three isolates from Italy (EPI_ISL_6854346, EPI_ISL_6854347, and EPI_ISL_6854348) form a diversified sub-lineage among the omicron population. Additionally, EPI_ISL_6886594 from Germany is a diversified omicron strain.

2.2. Very high non-synonymous mutations give rise to omicron

Mutation is driving the evolution and emergence of new variants of COVID-19 worldwide (Islam et al., 2021; Kumar & Bansal, 2021; Thakur et al., 2021). Availability of genomic resources have enabled the research community in tracking mutational events and linking them to new variants (Mercatelli & Giorgi, 2020; Rambaut et al., 2020). Analysis and routine surveillance from South Africa suggested omicron ability to evade immunity from prior infection as compared to other VOCs (Pulliam et al., 2021). In the present study, we intend to understand the evolution and emergence of omicron by its mutational landscape at population level.

We have performed a mutational analysis with respect to the reference genome of SARS-CoV-2 (NC_045512.2) (Fig. 2). Total mutations detected in the dataset were 24,189, and omicron genomes constituted 18,261 mutations (supplementary table 1). For all the strains under study, we have calculated the total number of mutations detected (supplementary table 2). Average mutations per genome for the omicron variant were detected to be 60.5. For the limited genomes of VOCs, VOIs

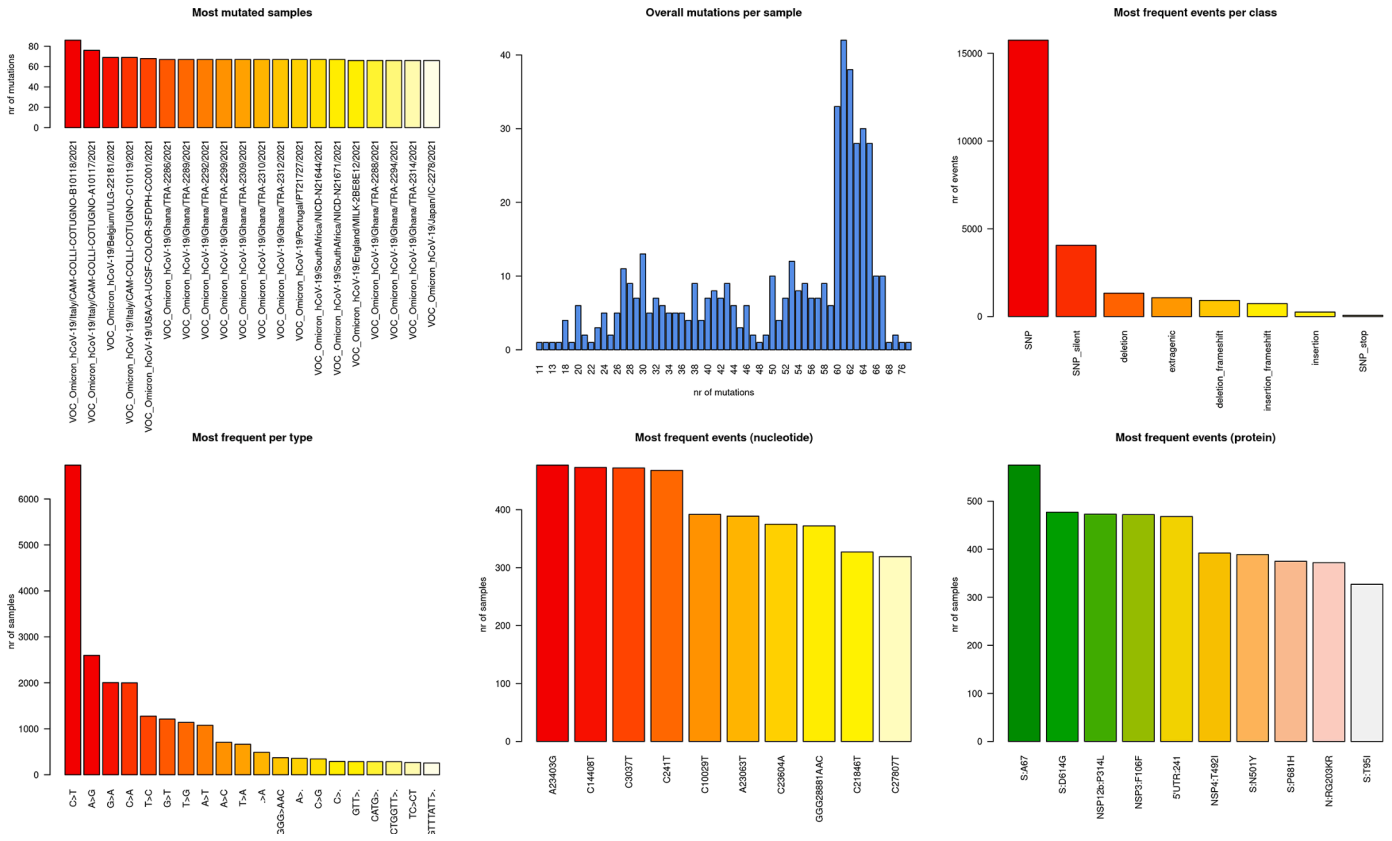

Fig. 2. Mutational analysis of omicron. Six panel image displays the most mutated samples, overall mutations per samples, most frequent events per class of mutation category, changes of nucleotide per type, nucleotide wise most frequent events and protein level most frequent events for the genomes used in the study.

and VUMs, average mutations for GH, delta, mu, gamma, alpha, lambda and beta were 48, 39, 38.5, 37.8, 30.7, 27.4 and 24.2 respectively. This clearly depicts high number of mutations in the omicron variant as compared to other variants of SARS-CoV-2. Except for omicron, average mutations for other variants were calculated on the basis of limited genomes, which might not represent the true mutational events for them. Since, omicron is the recently emerged variant, aim of present study was to understand its mutational landscape at population level.

Interestingly, >97% (n = 17,703 mutations) of the mutations in omicron were in the coding region, and remaining 558 were detected in the extragenic region of the genome. Amongst the coding gene mutations, 2965 were indels while 14,738 were SNPs constituting non-synonymous (n = 11,995 mutations) and synonymous mutations (n = 2743 mutations). Single nucleotide transitions are shown to be major mutational types amongst the SARS-CoV-2 genomes (Kumar & Bansal, 2021; Mercatelli & Giorgi, 2020).

Interestingly, mutational events are highly skewed towards the spike protein, which constitutes ~60% (n = 10,658) of the total mutations in the coding genomic region (n = 17,703) (Fig. 3). The majority of spike protein mutations encompass A67, T547K, D614G, H655Y, N679K, P681H, D796Y, N856K, Q954H, which are reported in all the omicron genomes analysed (Table 3). Count of mutations in the spike was followed by RNA dependent RNA polymerase (rdrp) (n = 4142) constituting A1892T, I189V, P314L, K38R, T492I, V57V in all omicron genomes analyzed (Fig. 3 and Table 3). Remaining 2903 mutations were detected in rest of the coding genomic region (Table 2, 3, and supplementary table 1), where M19M in ORF6, and RG203KR in nucleocapsid protein are amongst the most prevalent mutations in omicron (Fig. 3).

2.3. Low intra-sequence diversity amongst omicron variant

Intra-strain diversity among the omicron variant strains reported worldwide will be crucial in understanding the genome dynamics and rapid evolution of SARS-CoV-2. We performed the mutational analysis on the current dataset using omicron (OL677199) isolated from Canada on 23rd November 2021 as the reference genome (supplementary table 3). Most of the strains (n = 298), irrespective of their geographic origin, had less than ten mutations depicting low intra-strain diversity among omicron strains. We found omicron variants had >55 mutations when compared with other VOCs and VOIs. However, four of the isolates two from Europe (Italy) (EPI_ISL_6854347 (n = 23 mutations) and EPI_ISL_6854346 (n = 14 mutations) and two from South Africa (EPI_ISL_6699742 (n = 12 mutations) and EPI_ISL_6774091 (n = 11 mutations) were most diversified among the omicron genomes.

3. Methods

3.1. Identification and procurement of SARS-CoV-2 genome from the public repository

We have considered all the available genomes of omicron variant available in public domain until 6 pm Indian Standard Time (IST) on 2nd December 2021 from GISAID (n = 302 genomes). A total of 25 strains from each variant of concern, namely alpha (B.1.1.7), beta (B.1.351),

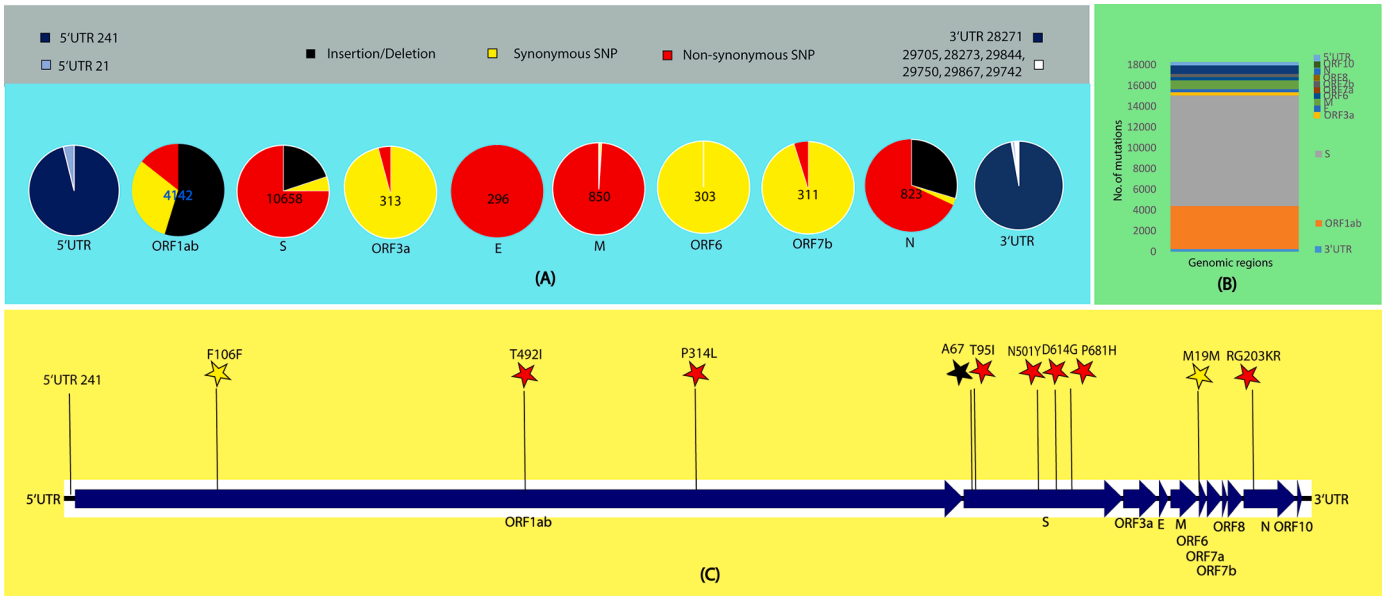

Fig. 3. Mutational analysis of omicron (A) Number of mutations in the coding region is in the centre of the pie-chart representing indels (black), synonymous (yellow) and non-synonymous (red) SNPs. Type and number of mutations in the extergenic region is represented by pie charts blue, light blue and white as represented in the color legends. (B) Bar graph representing number of mutations in the genomic region of SARS-CoV-2. (C) Some of the top mutations (pl. refer Table 3 for all top mutations in omicron) among the omicron variant are represented by stars of black: indels, yellow: synonymous and red: non-synonymous mutations.

Table 2
Genomic region wise mutational count of the omicron isolates by taking NC_045512.2 as a reference.

Genomic region	Mutational count	Annotation
5′UTR	309	5′ Untranslated region
NSP1	5	RNA dependent RNA polymerase
NSP2	31	
NSP3	1572	
NSP4	325	
NSP5	317	
NSP6	595	
NSP7	0	
NSP8	2	
NSP9	9	
NSP10	301	
NSP11	0	
NSP12a	0	
NSP12b	632	
NSP13	14	
NSP14	319	
NSP15	6	
NSP16	14	
S	10,658	Spike
ORF3a	313	ORF3a protein
E	296	Envelope
M	850	Membrane
ORF6	303	ORF6 protein
ORF7a	2	ORF7a protein
ORF7b	311	ORF7b protein
ORF8	4	ORF8 protein
N	823	Nucleocapsid protein
ORF10	1	ORF10 protein
3′UTR	249	3′ Untranslated region

gamma (P.1) and delta (B.1.617.2) and variant of interest, namely lambda (C.37) and mu (B.1.621). We have also considered 25 strains from variant under monitoring, namely GH (B.1.640). These all strains are from their respective earlier reports in the public domain. Pangolin COVID-19 lineage assigner webserver (https://pangolin.cog-uk.io/) was used to truly demarcate the strains of across variants. The investigation suggested that 9 out of 25 strains does not belong to gamma (P.1) and 1 out of 25 strains doesn't belong to VUM GH (B.1.640) and were wrongly classified earlier. A detailed list of all the strains used in the study is provided in Table 1.

3.2. Phylogenetic analysis

A total of 477 high-quality genomes, including the major variants spread across the globe were taken into consideration. Multiple sequence alignment was performed for all the genomes using MAFFT v7.467 (Nakamura, Yamada, Tomii, & Katoh, 2018) followed by phylogenetic tree construction using fasttree v2.1.8 with double precision (Price, Dehal, & Arkin, 2010) with gamma time reversal method. Visualization of the obtained phylogenetic tree was performed using iTol v6 (Letunic & Bork, 2019). Different variants were marked in accordance with different colors as mentioned in the legends.

3.3. Mutational analysis

Mutational analysis of all the strains (n=477) in the study was performed with two different reference genomes. First with NC_045512.2 (Wuhan-Hu-1) strain (reference SARS CoV-2 strain) and another with first reported strain of omicron variant (OL677199.1) (https://www.ncbi.nlm.nih.gov/nuccore/OL677199) using nucmer v3.1 (Delcher, Phillippy, Carlton, & Salzberg, 2002). We have used a well-documented R script described earlier (Mercatelli & Giorgi, 2020). Here, we have used gff3 annotation and reference genome file to extract genomic coordinate of SARS-CoV-2 proteins. R library package seqinr (https://cran.r-project.org/web/packages/seqinr/index.html) and biostring package (https://bioconductor.org/packages/release/bioc/html/Biostrings.html) of bioconductor was implemented to obtain the list of all the mutational events. Mutational events were calculated with respect to two different references (Reference SARS CoV-2 strain: NC_045512.2) (https://www.ncbi.nlm.nih.gov/nuccore/NC_045512.2) and omicron (OL677199.1) (https://www.ncbi.nlm.nih.gov/nuccore/OL677199) separately. Further, the average mutations for a variant were calculated by adding up the mutations in each variant and dividing them by the total number of genomes of the variant used in the present study.

Table 3
Top mutations (>185 in count) in omicron variant as compared to the reference sequence NC_045512.2.

annotation	protein	variant	varclass	Count	Refpos	refvar	qvar	qpos	qlength
Spike	S	A67	deletion_frameshift	575	21,762	C	.	21,483	29,387
Predicted phosphoesterase, papain-like proteinase	NSP3	A1892T	SNP	302	8393	G	A	8124	29,387
Transmembrane protein	NSP6	I189V	SNP	302	11,537	A	G	11,259	29,387
RNA-dependent RNA polymerase, post-ribosomal frameshift	NSP12b	P314L	SNP	302	14,408	C	T	14,130	29,387
Spike	S	T547K	SNP	302	23,202	C	A	22,915	29,387
Spike	S	D614G	SNP	302	23,403	A	G	23,116	29,387
Spike	S	H655Y	SNP	302	23,525	C	T	23,238	29,387
ORF6 protein	ORF6	M19M	SNP_silent	302	27,259	A	C	26,972	29,387
Predicted phosphoesterase, papain-like proteinase	NSP3	K38R	SNP	301	2832	A	G	2566	29,387
Spike	S	N679K	SNP	301	23,599	T	G	23,312	29,387
Transmembrane protein	NSP4	T492I	SNP	301	10,029	C	T	9760	29,378
Nucleocapsid protein	N	RG203K*	SNP	301	28,881	GGG	AAT	28,806	29,693
Growth-factor-like protein	NSP10	V57V	SNP_silent	300	13,195	T	C	12,917	29,387
Spike	S	P681H	SNP	300	23,604	C	A	23,317	29,387
Spike	S	D796Y	SNP	300	23,948	G	T	23,661	29,387
Spike	S	N856K	SNP	300	24,130	C	A	23,843	29,387
Spike	S	Q954H	SNP	300	24,424	A	T	24,137	29,387
Nucleocapsid protein	N	RG203KR	SNP	300	28,881	GGG	AAC	28,594	29,387
RNA-dependent RNA polymerase, post-ribosomal frameshift	NSP12b	N591N	SNP_silent	298	15,240	C	T	14,962	29,387
Spike	S	T95I	SNP	298	21,846	C	T	21,562	29,387
Predicted phosphoesterase, papain-like proteinase	NSP3	F106F	SNP_silent	297	3037	C	T	2771	29,387
Spike	S	G339D	SNP	297	22,578	G	A	22,291	29,387
ORF3a protein	ORF3a	T64T	SNP_silent	297	25,584	C	T	25,297	29,387
NA	5′UTR	241	extragenic	297	241	C	T	187	29,693
3C-like proteinase	NSP5	P132H	SNP	296	10,449	C	A	10,180	29,387
3′-to-5′ exonuclease	NSP14	I42V	SNP	296	18,163	A	G	17,885	29,387
Envelope	E	T9I	SNP	296	26,270	C	T	25,983	29,387
ORF7b protein	ORF7b	L17L	SNP_silent	296	27,807	C	T	27,520	29,387
Spike	S	N969K	SNP	294	24,469	T	A	24,182	29,387
Predicted phosphoesterase, papain-like proteinase	NSP3	A889A	SNP_silent	293	5386	T	G	5120	29,387
Spike	S	L981F	SNP	292	24,503	C	T	24,216	29,387
Spike	S	D1146D	SNP_silent	292	25,000	C	T	24,713	29,387
Membrane	M	A63T	SNP	289	26,709	G	A	26,422	29,387
Predicted phosphoesterase, papain-like proteinase	NSP3	S1265	deletion	288	6513	GTT	.	6246	29,387
Transmembrane protein	NSP6	L105	deletion	287	11,286	TGTCTGGTT	.	11,016	29,387
Spike	S	I68	deletion_frameshift	287	21,767	CATG	.	21,486	29,387
Spike	S	E484A	SNP	284	23,013	A	C	22,726	29,387
Spike	S	S477N	SNP	283	22,992	G	A	22,705	29,387
Spike	S	T478K	SNP	283	22,995	C	A	22,708	29,387
Spike	S	Q493R	SNP	282	23,040	A	G	22,753	29,387
Spike	S	Q498R	SNP	281	23,055	A	G	22,768	29,387
Spike	S	N501Y	SNP	281	23,063	A	T	22,776	29,387
Spike	S	G496S	SNP	280	23,048	G	A	22,761	29,387
Spike	S	Y505H	SNP	277	23,075	T	C	22,788	29,387
Membrane	M	D3G	SNP	275	26,530	A	G	26,243	29,387
Membrane	M	Q19E	SNP	272	26,577	C	G	26,290	29,387
Spike	S	S371L	SNP	270	22,673	TC	CT	22,386	29,387
Spike	S	S373P	SNP	270	22,679	T	C	22,392	29,387
Spike	S	G142	deletion	260	21,987	GTGTTTATT	.	21,702	29,387
Spike	S	S375F	SNP	260	22,686	C	T	22,399	29,387
ORF7b protein	ORF7b	E3*	SNP_stop	253	27,762	G	T	27,687	29,752
Spike	S	I210	insertion_frameshift	243	22,193	.	T	21,901	29,387
Spike	S	R214	insertion_frameshift	243	22,203	.	A	21,916	29,387
Spike	S	R214R	SNP_silent	243	22,204	T	A	21,917	29,387
Nucleocapsid protein	N	E31	deletion	243	28,362	GAGAACGCA	.	28,074	29,378
Spike	S	L212*	SNP_stop	243	22,197	T	G	22,118	29,749
Spike	S	N211K	SNP	242	22,195	T	G	21,903	29,387
Spike	S	L212C	SNP	242	22,197	TA	GC	21,905	29,387
Spike	S	S214	insertion	242	22,201	.	AGC	21,910	29,387
Spike	S	V213	insertion_frameshift	242	22,202	.	A	21,914	29,387
NA	3′UTR	28,271	extragenic	242	28,271	A	T	27,984	29,378
Nucleocapsid protein	N	P13L	SNP	241	28,311	C	T	28,024	29,378
Spike	S	N764K	SNP	234	23,854	C	A	23,567	29,387
Spike	S	G446S	SNP	203	22,898	G	A	22,611	29,387
Spike	S	N440K	SNP	199	22,882	T	G	22,595	29,387
Spike	S	K417N	SNP	183	22,813	G	T	22,526	29,387

Funding Information

Nil

Author contribution statement

Both the authors' KB and SK have contributed equally to the data curation, analysis, and writing of the manuscript.

CRediT authorship contribution statement

Kanika Bansal: Data curation, Formal analysis, Writing – original draft. **Sanjeet Kumar:** Data curation, Formal analysis, Writing – original draft.

Declaration of Competing Interest

The author declares no competing interest.

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgment

Authors acknowledge the support and motivation from Dr. Prabhu B. Patil – CSIR-Institute of Microbial Technology, Chandigarh. We are also thankful to Dr. Santosh Kumar Sethi for his kind support during the process of study. We also acknowledge GISAID initiative for extensive curation and availability of genomic resource in public domain.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.virusres.2022.198765.

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