



黎明生物

南京黎明生物制品有限公司
Nanjing Liming Bio-Products Co., Ltd.

统一社会信用代码 Tax No.: 9132010272837745XD

地址: 江苏省南京市玄武区花园路 12 号

邮编: 210042

Add: No.12, Huayuan Road, Xuanwu District, Nanjing, Jiangsu, P.R. China, 210042

Tel: +86-25-85476723/+86-25-85288506

Fax: +86-25-85476387

E-mail: sales@limingbio.com

Web: www.limingbio.com

Silico Analysis for StrongStep® SARS-CoV-2 Antigen Rapid Test on Different SARS-CoV-2 Variant

Test by: Huang Xiang Review by: Liu Guangming Report Date: 2021-11-29

SARS-CoV-2 has now evolved several mutations with serious consequences, some like B.1.1.7, B.1.351, B.1.2, B.1.1.28, B.1.617, Including the **omicron mutant strain(B1.1.529)** reported in recent days.

As an IVD reagent manufacturer, we always pay attention to the development of relevant events, check the changes of relevant amino acids and evaluate the possible impact of mutations on reagents.

Here are the results of amino acid sequence alignment, The mutant status of the Omicron mutant is marked by a red box.

	40th-54th
2019-nCoV	MSDNGFQNRNAPRITFGGSPDSTGSNQNGERSGARSKRRPQGLPNNTASWFTALTQHG
N-std	MSDNGFQNRNAPRITFGGSPDSTGSNQNGERSGARSKRRPQGLPNNTASWFTALTQHG
N-B.1.351	MSDNGFQNRNAPRITFGGSPDSTGSNQNGERSGARSKRRPQGLPNNTASWFTALTQHG
Mu-N-B.1.621	MSDNGFQNRNAPRITFGGSPDSTGSNQNGERSGARSKRRPQGLPNNTASWFTALTQHG
N-B.1.526.1	MSDNGFQNRNAPRITFGGSPDSTGSNQNGERSGARSKRRPQGLPNNTASWFTALTQHG
N-P.2	MSDNGFQNRNAPRITFGGSPDSTGSNQNGERSGARSKRRPQGLPNNTASWFTALTQHG
nCoV-N-P.1	MSDNGFQNRNAPRITFGGSPDSTGSNQNGERSGARSKRRPQGLPNNTASWFTALTQHG
N-B.1.525	MSDNGFQNRNAPRITFGGSPDSTGSNQNGERSGARSKRRPQGLPNNTASWFTALTQHG
N-B.1.1.318	MSDNGFQNRNAPRITFGGSPDSTGSNQNGERSGARSKRRPQGLPNNTASWFTALTQHG
N-C.36.3	MSDNGFQNRNAPRITFGGSPDSTGSNQNGERSGARSKRRPQGLPNNTASWFTALTQHG
N-R1	MSDNGFQNRNAPRITFGGSPDSTGSNQNGERSGARSKRRPQGLPNNTASWFTALTQHG
N-B.1.2	MSDNGFQNRNAPRITFGGSPDSTGSNQNGERSGARSKRRPQGLPNNTASWFTALTQHG
N-B.1.526.2	MSDNGFQNRNAPRITFGGSPDSTGSNQNGERSGARSKRRPQGLPNNTASWFTALTQHG
N-C.1.2	MSDNGFQNRNAPRITFGGSPDSTGSNQNGERSGARSKRRPQGLPNNTASWFTALTQHG
N-B.1.1.529	MSDNGFQNRNAPRITFGGSPDSTGSNQNGERSGARSKRRPQGLPNNTASWFTALTQHG
N-B.1.1.7	MSDNGFQNRNAPRITFGGSPDSTGSNQNGERSGARSKRRPQGLPNNTASWFTALTQHG
N-B.1.617.2	MSDNGFQNRNAPRITFGGSPDSTGSNQNGERSGARSKRRPQGLPNNTASWFTALTQHG
N-B.1.617.3	MSDNGFQNRNAPRITFGGSPDSTGSNQNGERSGARSKRRPQGLPNNTASWFTALTQHG
N-B.1.617.1	MSDNGFQNRNAPRITFGGSPDSTGSNQNGERSGARSKRRPQGLPNNTASWFTALTQHG
2019-nCoV	KEDLKFPRGQVPIINTNSSPDDQIGYRRATRRIRGGDGKMKDLSPRWYFYLLGTGFEAG
N-std	KEDLKFPRGQVPIINTNSSPDDQIGYRRATRRIRGGDGKMKDLSPRWYFYLLGTGFEAG
N-B.1.351	KEDLKFPRGQVPIINTNSSPDDQIGYRRATRRIRGGDGKMKDLSPRWYFYLLGTGFEAG
Mu-N-B.1.621	KEDLKFPRGQVPIINTNSSPDDQIGYRRATRRIRGGDGKMKDLSPRWYFYLLGTGFEAG
N-B.1.526.1	KEDLKFPRGQVPIINTNSSPDDQIGYRRATRRIRGGDGKMKDLSPRWYFYLLGTGFEAG
N-P.2	KEDLKFPRGQVPIINTNSSPDDQIGYRRATRRIRGGDGKMKDLSPRWYFYLLGTGFEAG
nCoV-N-P.1	KEDLKFPRGQVPIINTNSSPDDQIGYRRATRRIRGGDGKMKDLSPRWYFYLLGTGFEAG
N-B.1.525	KEDLKFPRGQVPIINTNSSPDDQIGYRRATRRIRGGDGKMKDLSPRWYFYLLGTGFEAG
N-B.1.1.318	KEDLKFPRGQVPIINTNSSPDDQIGYRRATRRIRGGDGKMKDLSPRWYFYLLGTGFEAG
N-C.36.3	KEDLKFPRGQVPIINTNSSPDDQIGYRRATRRIRGGDGKMKDLSPRWYFYLLGTGFEAG
N-R1	KEDLKFPRGQVPIINTNSSPDDQIGYRRATRRIRGGDGKMKDLSPRWYFYLLGTGFEAG
N-B.1.2	KEDLKFPRGQVPIINTNSSPDDQIGYRRATRRIRGGDGKMKDLSPRWYFYLLGTGFEAG
N-B.1.526.2	KEDLKFPRGQVPIINTNSSPDDQIGYRRATRRIRGGDGKMKDLSPRWYFYLLGTGFEAG
N-C.1.2	KEDLKFPRGQVPIINTNSSPDDQIGYRRATRRIRGGDGKMKDLSPRWYFYLLGTGFEAG
N-B.1.1.529	KEDLKFPRGQVPIINTNSSPDDQIGYRRATRRIRGGDGKMKDLSPRWYFYLLGTGFEAG
N-B.1.1.7	KEDLKFPRGQVPIINTNSSPDDQIGYRRATRRIRGGDGKMKDLSPRWYFYLLGTGFEAG
N-B.1.617.2	KEDLKFPRGQVPIINTNSSPDDQIGYRRATRRIRGGDGKMKDLSPRWYFYLLGTGFEAG
N-B.1.617.3	KEDLKFPRGQVPIINTNSSPDDQIGYRRATRRIRGGDGKMKDLSPRWYFYLLGTGFEAG
N-B.1.617.1	KEDLKFPRGQVPIINTNSSPDDQIGYRRATRRIRGGDGKMKDLSPRWYFYLLGTGFEAG
2019-nCoV	LPYGANKDGIHWVATEGALNTPKDHIGTRNPANNAIIVLQLPQGTTLPKGFYAEGRSGGS
N-std	LPYGANKDGIHWVATEGALNTPKDHIGTRNPANNAIIVLQLPQGTTLPKGFYAEGRSGGS
N-B.1.351	LPYGANKDGIHWVATEGALNTPKDHIGTRNPANNAIIVLQLPQGTTLPKGFYAEGRSGGS
Mu-N-B.1.621	LPYGANKDGIHWVATEGALNTPKDHIGTRNPANNAIIVLQLPQGTTLPKGFYAEGRSGGS
N-B.1.526.1	LPYGANKDGIHWVATEGALNTPKDHIGTRNPANNAIIVLQLPQGTTLPKGFYAEGRSGGS
N-P.2	LPYGANKDGIHWVATEGALNTPKDHIGTRNPANNAIIVLQLPQGTTLPKGFYAEGRSGGS
nCoV-N-P.1	LPYGANKDGIHWVATEGALNTPKDHIGTRNPANNAIIVLQLPQGTTLPKGFYAEGRSGGS
N-B.1.525	LPYGANKDGIHWVATEGALNTPKDHIGTRNPANNAIIVLQLPQGTTLPKGFYAEGRSGGS
N-B.1.1.318	LPYGANKDGIHWVATEGALNTPKDHIGTRNPANNAIIVLQLPQGTTLPKGFYAEGRSGGS
N-C.36.3	LPYGANKDGIHWVATEGALNTPKDHIGTRNPANNAIIVLQLPQGTTLPKGFYAEGRSGGS
N-R1	LPYGANKDGIHWVATEGALNTPKDHIGTRNPANNAIIVLQLPQGTTLPKGFYAEGRSGGS
N-B.1.2	LPYGANKDGIHWVATEGALNTPKDHIGTRNPANNAIIVLQLPQGTTLPKGFYAEGRSGGS
N-B.1.526.2	LPYGANKDGIHWVATEGALNTPKDHIGTRNPANNAIIVLQLPQGTTLPKGFYAEGRSGGS
N-C.1.2	LPYGANKDGIHWVATEGALNTPKDHIGTRNPANNAIIVLQLPQGTTLPKGFYAEGRSGGS
N-B.1.1.529	LPYGANKDGIHWVATEGALNTPKDHIGTRNPANNAIIVLQLPQGTTLPKGFYAEGRSGGS
N-B.1.1.7	LPYGANKDGIHWVATEGALNTPKDHIGTRNPANNAIIVLQLPQGTTLPKGFYAEGRSGGS
N-B.1.617.2	LPYGANKDGIHWVATEGALNTPKDHIGTRNPANNAIIVLQLPQGTTLPKGFYAEGRSGGS
N-B.1.617.3	LPYGANKDGIHWVATEGALNTPKDHIGTRNPANNAIIVLQLPQGTTLPKGFYAEGRSGGS
N-B.1.617.1	LPYGANKDGIHWVATEGALNTPKDHIGTRNPANNAIIVLQLPQGTTLPKGFYAEGRSGGS





黎明生物

南京黎明生物制品有限公司
Nanjing Liming Bio-Products Co., Ltd.

统一社会信用代码 Tax No.: 9132010272837745XD

地址: 江苏省南京市玄武区花园路 12 号

邮编: 210042

Add: No.12, Huayuan Road, Xuanwu District, Nanjing, Jiangsu, P.R. China, 210042

Tel: +86-25-85476723/+86-25-85288506

Fax: +86-25-85476387

E-mail: sales@limingbio.com

Web: www.limingbio.com

```

2019-nCoV
N-std
N-B.1.351
Mu-N-B.1.621
N-B.1.526.1
N-P.2
nCoV-N-P.1
N-B.1.525
N-B.1.1.318
N-C.36.3
N-R1
N-B.1.2
N-B.1.526.2
N-C.1.2
N-B.1.1.529
N-B.1.1.7
N-B.1.617.2
N-B.1.617.3
N-B.1.617.1
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
QASSRSSRSRNSRNSTPGSSRGTSPPARMAGNGGDAALALLLDRNLQLESKMSGKGGQQ
*****

2019-nCoV
N-std
N-B.1.351
Mu-N-B.1.621
N-B.1.526.1
N-P.2
nCoV-N-P.1
N-B.1.525
N-B.1.1.318
N-C.36.3
N-R1
N-B.1.2
N-B.1.526.2
N-C.1.2
N-B.1.1.529
N-B.1.1.7
N-B.1.617.2
N-B.1.617.3
N-B.1.617.1
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
QQGQTVTKKSAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH
*****

2019-nCoV
N-std
N-B.1.351
Mu-N-B.1.621
N-B.1.526.1
N-P.2
nCoV-N-P.1
N-B.1.525
N-B.1.1.318
N-C.36.3
N-R1
N-B.1.2
N-B.1.526.2
N-C.1.2
N-B.1.1.529
N-B.1.1.7
N-B.1.617.2
N-B.1.617.3
N-B.1.617.1
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY
*****

```



We selected two monoclonal antibodies. The first antibody corresponds to an antigen labeled from 40th to 54th amino acid, called 33HB(As shown in the first image above); The other antibody corresponds to an antigen labeled from amino acid 100th to amino acid 130th, called 22M(As shown in the first image above). According to the sequence alignment results, no mutation occurred in the 33HB epitope; there was only one amino acid change(A119S mutation) in the mutations named P.2 of the 22M epitope, **We have been fully confirm that the test kits have not been affected, including omicron mutant strain(B1.1.529).**

Future experiments will be conducted using recombinant antigens (and clinical samples if possible) to fully evaluate the effectiveness of our reagent in testing the omicron mutant strain.



黎明生物

南京黎明生物制品有限公司
Nanjing Liming Bio-Products Co., Ltd.

统一社会信用代码 Tax No.: 9132010272837745XD

地址: 江苏省南京市玄武区花园路 12 号

Add: No.12, Huayuan Road, Xuanwu District, Nanjing, Jiangsu, P.R. China, 210042

Tel: +86-25-85476723/+86-25-85288506

E-mail: sales@limingbio.com

邮编: 210042

Fax: +86-25-85476387

Web: www.limingbio.com

name	Mutant strains	GenBank ID
2019-nCoV	WT	GenBank:NC_045512.2
B.1.351	nCoV-N-B.1.351 (Beta)	GenBank: FR990755.1
N-B.1.2	nCoV-N-B.1.2 (P67S, P199L)	GenBank: MT811485.1
N-P.1	nCoV-N-P.1 (Gamma P80R)	GenBank: MZ427312.1
N-B.1.1.7	nCoV-N-B.1.1.7 (Alpha D3L S235F)	GenBank:MZ773903; MZ773924
N-std	The standard sequence	GenBank:NC_045512.2
N-P.2	nCoV-N-P.2 (A119S, M234I)	GenBank:FR992894.1;M W338781.1
N-B.1.617.2	nCoV-N-B.1.617.2 (Delta R203M, D377Y)	GenBank:MW891333.1
N-B.1.617.3	nCoV-N-B.1.617.3 (P67S, R203M, D377Y)	GenBank:MZ779752.1
N-B.1.617.1	nCoV-N-B.1.617.1 (Kappa)	GenBank:LC633761.1;M W932634.1
N-B.1.525	nCoV-N-B.1.525 (Eta)	GenBank:MW571191.1
Mu-N-B.1.621	nCoV-N-B.1.621 (Mu)	GenBank:MZ141872.1;M Z233528.1
N-B.1.1.318	nCoV-N-B.1.1.318	GenBank: OK183381.1
N-C.36.3	nCoV-N-C.36.3	GenBank: OU194093.1
N-B.1.526.1	nCoV-N-B.1.526.1(Lota)	GenBank: MW424878.1
B.1.526.2	nCoV-N-B.1.526.2(Lota)	GenBank: MW689815.1
N-R1	nCoV-N-R1	GenBank:MZ141771.1;M Z182023.1
N-C.1.2	nCoV-N-C.1.2	GenBank:OK433429.1
N-B.1.1.529	B.1.1.529(P13L,DEL31-31,R203K,G20 4R)	EPI_ISL_6704875

