

AMINO ACIDS, NUCLEOTIDES AND VECTORS EXPRESSING THE SAME AND USES THEREOF IN PREVENTING SARBECOVIRUS INFECTION

REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the priority to Singapore patent application No. 10202105099S, filed 15 May 2021, the contents of which are incorporated herein by reference.

TECHNICAL FIELD

[0002] The present invention generally relates to proteins and their use in the treatment and/or prevention of Severe Acute Respiratory Syndrome (SARS)-related coronavirus infections, particularly sarbecovirus infections.

BACKGROUND

[0003] The following discussion of the background to the invention is intended to facilitate an understanding of the present invention only. It should be appreciated that the discussion is not an acknowledgement or admission that any of the material referred to was published, known or part of the common general knowledge of the person skilled in the art in any jurisdiction as at the priority date of the invention.

[0004] Since 2002, we had three major human infectious diseases caused by coronaviruses (CoVs), SARS coronavirus (SARS-CoV) in 2002-2003 (Peiris *et al.* Nat Med 2004, 10:S88-97), Middle East Respiratory Syndrome coronavirus (MERS-CoV) since 2012 (Zaki *et al.* N Engl J Med 2012, 367:1814-1820) and the ongoing COVID-19 or SARS coronavirus 2 (SARS-CoV-2) (Wang *et al.* Lancet 2020, 395:470-473). All of these diseases have caused devastating economic and human losses globally. For SARS-CoV and MERS-CoV, **we still don't have a** licensed vaccine to protect us from future infections. For SARS-CoV-2, the unprecedented speed of vaccine development has resulted in many licensed vaccines for human use (Fauci, Science 2021, 372:109).

[0005] However, the recent emergence of SARS-CoV-2 variants such as the SARS-CoV-2 B.1.1.7/20I/501Y.V1 detected in the UK; the South African SARS-CoV-2 B.1.351/20H/501Y.V2, the Brazil SARS-CoV-2 P.1/20J/501Y.V3/B.1.1.248, and the U.S. SARS-CoV-2 B.1.1427/B.1.429 (Mascola *et al.* JAMA 2021, 325:1261-1262; Zhang *et al.* JAMA 2021, 325(13):1324-1326) and the observed reduction of immune protection against

new variants from vaccines based on the original virus strain raised a new challenge on the need for a broad-spectrum protection against all known and future SARS-CoV-2 variants.

[0006] Furthermore, there are many more coronaviruses circulating in wildlife reservoirs such as the SC2r-CoV RaTG13 in bats and the SC2r-CoV GX-P5L in pangolins (Wang *et al.* Curr Opin Virol 2019, 34:79-89; Zhou *et al.* Nature 2020, 579:270-273; Lam *et al.* Nature 2020, 583:282-285).

[0007] In addition, there is a high chance of future outbreaks (SARS3, SARS4, etc.) caused by different but related coronaviruses (Calistri *et al.* Microorganisms 2021, 9).

[0008] The current classification of coronaviruses is shown in Figure 1. Four genera, alpha, beta, delta and gamma have been identified. The most transmissible coronaviruses for human infections are from the sarbecoviruses group. It was also found that all sarbecoviruses use the angiotensin-converting enzyme 2 (ACE2) as an entry receptor to human host cells.

[0009] Accordingly, there exists a need for prophylactic or therapeutic vaccine for the treatment and/or prevention of current and any future infections caused by sarbecoviruses.

SUMMARY

[0010] Amino acid constructs, nucleotides, vectors and immunogenic composition containing or expressing the amino acid sequences used in preventing and/or treating a sarbecovirus infection are envisioned.

[0011] According to an aspect of the present disclosure, there is provided an amino acid construct comprising any one of amino acid sequences selected from the group comprising SEQ ID Nos. 10 to 22 164 and 165, the amino acid construct having at least 90% sequence identity to at least two different sarbecovirus Spike proteins, or a fragment thereof.

[0012] According to another aspect there is a nucleic acid encoding the amino acid construct as described herein above.

[0013] According to another aspect there is an immunogenic composition comprising the amino acid construct as described herein above or the nucleic acid as described herein above.

[0014] According to another aspect there is a viral vector comprising the nucleic acid as

described herein above.

[0015] According to another aspect there is an amino acid construct as described herein above, a nucleic acid as described herein above, an immunogenic composition as described herein above, a viral vector as described herein above or vaccine formulations suitable for use in the treatment or prevention of sarbecovirus infections.

[0016] According to another aspect there is a use of an amino acid construct as described herein above, a nucleic acid as described herein above, an immunogenic composition as described herein above, a viral vector as described herein above in the manufacture of a medicament for the treatment or prevention of sarbecovirus infections.

[0017] According to another aspect there is a method for treating and/or preventing an infection caused by sarbecoviruses comprising administering a vaccine molecule comprising an amino acid construct as described herein above, a nucleic acid as described herein above, an immunogenic composition as described herein above, or a viral vector as described herein above to a subject.

[0018] According to another aspect there is method of making an amino acid construct as described herein above, comprising: a) comparing amino acid sequences from at least two different sarbecovirus spike proteins or a fragment thereof; b) identifying identical amino acid in the sequences from the at least two different sarbecovirus spike proteins or fragments thereof; c) removing any different amino acids from the sequences of the at least two different sarbecovirus spike proteins or fragments thereof to identify a unique amino acid sequence; and d) forming the amino construct of the unique amino acid sequence wherein the amino construct has at least 90% sequence identity to the at least two different sarbecovirus Spike proteins, or a fragment thereof.

[0019] Other aspects and features will become apparent to those of ordinary skill in the art upon review of the following description of specific embodiments in conjunction with the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] In the figures, which illustrate, by way of example only, embodiments of the present invention,

[0021] Figure 1 illustrates the family tree of four known coronavirus genera;

[0022] Figure 2 illustrates the consensus groups established taking into consideration of phylogenetic relationship and ACE2 receptor usages;

[0023] Figure 3 illustrates the design method to generate amino acid consensus sequences;

[0024] Figure 4 illustrates a surrogate virus neutralization test (sVNT) which allowed a rapid and multiplex determination of Nabs;

[0025] Figure 5 illustrates a **A)** multiplex sVNT on the Luminex platform **B)** showing that six RBD proteins are able to bind the hACE2 receptor molecule in the following order (from high to low affinity): SARS-CoV-2 B.1.351 > SARS-CoV-2 B.1.1.7 = SC2r-CoV GX-P5L (pangolin) > SARS-CoV-2 > SARS-CoV > SC2r-CoV RaTG13 (bat);

[0026] Figure 6 illustrates a multiplex sVNT on six different RBDs (from left to right: SARS-CoV-2 WT, B.1.1.7, B.1.351; Bat virus RaTG13; Pangolin virus GX-P5L; SARS-CoV). **A)** SARS patient (N=11); **B)** COVID-19 patient (N=40); **C)** Healthy-vaccinated (N=20). Serum samples were taken two weeks after second dose; **D)** SARS-vaccinated (N=9). Sera from SARS survivors taken 21-62 days after the first vaccination. All serum samples were tested at a single dilution of 1:20. A cut-off of 30% was set as previously determined.

[0027] Figure 7 illustrates a titration of neutralizing antibody levels (NT50) in different groups against six sarbecoviruses. Serum samples were tested at dilutions from 1:20 to 1:20480 by a 4-fold serial titration.

[0028] Figure 8 illustrates a confirmation of boosting pan-sarbecovirus cross-neutralizing antibodies in the SARS-vaccinated group. Figure 8A shows the pan-sarbecovirus neutralization of mAb 5B7D7 against SARS-CoV-2 variants of concern, bat SC2r-CoV RaTG13, Pangolin SC2r-CoV GX-P5L and SARS-CoV measured by the multiplex sVNT. Figure 8B illustrates an inhibition of 5B7D7 binding to different RBDs by the four different panels of sera.

[0029] Figure 9 illustrates neutralization patterns from rabbit hyper immune sera targeting different beta coronavirus RBD proteins.

[0030] Figure 10 illustrates challenge with 20 RBD of different sarbecovirus after vaccination with either 2 doses of 25µg protein (SEQ ID No. 165, a modified version of SEQ ID No. 13 with foldon and linker sequence) and sigma adjuvant or one dose of 25µg protein (SEQ ID No. 165) and sigma adjuvant followed by one dose of Sinovac vaccine.

[0031] Figure 11 illustrates challenge with 20 RBD of different sarbecovirus after vaccination with either 2 doses of 25µg protein (SEQ ID No. 165, a modified version of SEQ ID No. 13 with foldon and linker sequence) and sigma adjuvant or one dose of 25µg protein (SEQ ID No. 165, a modified version of SEQ ID No. 13 with foldon and linker sequence) and sigma adjuvant followed by one dose of Sinovac vaccine.

[0032] Figure 12 illustrates Separate dosage regimens were compared: the first being 3 doses of the Pfizer BioNTech vaccine; the second being 2 doses of the Pfizer BioNTech vaccine followed by a dose of 25µg of the protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13 with foldon and linker sequence) administered with Sigma adjuvant; the third being 2 doses of the Pfizer BioNTech vaccine followed by a dose of 1µg of the protein listed in SEQ ID No. 165, a modified version of SEQ ID No. 13 with foldon and linker sequence; the fourth being 2 doses of the Pfizer BioNTech vaccine followed by a dose of saline; and the final being 3 doses of saline.

[0033] Figure 13 illustrates Separate dosage regimens were compared: the first being 3 doses of the Moderna vaccine; the second being 2 doses of the Moderna vaccine followed by a dose of 25µg of the protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13 with foldon and linker sequence) administered with Sigma adjuvant; the third being 2 doses of the Moderna vaccine followed by a dose of 1µg of the protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13 with foldon and linker sequence); the fourth being 2 doses of the Moderna vaccine followed by a dose of saline; and the final being 3 doses of saline.

[0034] Figure 14 illustrates Separate dosage regimens were compared: the first being 3 doses of the Sinovac vaccine; the second being 2 doses of the Sinovac vaccine followed by a dose of 25µg of the protein listed in SEQ ID No. 164 (a modified version of SEQ ID No. 1 with foldon and linker sequence) administered with Sigma adjuvant; the third being 2 doses of the Sinovac vaccine followed by a dose of 25µg of the protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13 with foldon and linker sequence) administered with Sigma adjuvant; the fourth being 2 doses of the Sinovac vaccine followed by a dose of 1µg of the protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13 with foldon and linker sequence); and the final being 3 doses of saline.

DETAILED DESCRIPTION

[0035] The present disclosure provides proteins comprising an amino acid sequence from sarbecovirus Spike proteins. Such polypeptides are exemplified below.

[0036] Throughout this document, unless otherwise indicated to the contrary, the terms “comprising”, “consisting of”, “having” and the like, are to be construed as non-exhaustive, or in other words, as meaning “including, but not limited to”.

[0037] Furthermore, throughout the specification, unless the context requires otherwise, the word “include” or variations such as “includes” or “including” will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

[0038] Unless defined otherwise, all technical and scientific terms used herein have the same meaning as is commonly understood by a skilled person to which the subject matter herein belongs.

[0039] According to various embodiments there is an amino acid construct comprising any one of the amino acid sequence selected from the group comprising SEQ ID Nos. 10 to 22, 164 and 165, the amino acid construct having at least 90% sequence identity to at least two different sarbecovirus Spike proteins, or a fragment thereof.

[0040] Throughout the description, it is to be appreciated that the term ‘Sarbecovirus’ and its plural form include any beta coronavirus that uses angiotensin converting enzyme 2 (ACE2) receptor as entry into cells. In various embodiments, the sarbecovirus comprises any beta coronavirus that uses ACE2 receptor as entry into cells. In various embodiments, the sarbecovirus comprises any beta coronavirus that uses human ACE2 receptor as entry into human cells. In various embodiments, the sarbecovirus comprises any known or new sarbecovirus. In various embodiments, the sarbecovirus is selected from the group comprising or consisting of SARS-CoV, SARS-CoV-2, SARS-CoV-2 B.1.1.7, SARS-CoV-2 B.1.351, SC2r-CoV RaTG13, and SC2r-CoV GX-P5L.

[0041] In various embodiments, the amino acid construct comprises a sequence designed to have consensus with two or more different sarbecovirus Spike protein sequences, or fragments thereof. Whereby two or more different sarbecovirus Spike protein sequences, or fragments thereof are aligned, and all identical amino acids are retained, and the first variation is arbitrarily selected from at least one of the sarbecovirus Spike protein sequences, or fragments thereof and the subsequent variation is selected from a different sarbecovirus Spike protein sequences, or fragments thereof. The resulting consensus

sequence is therefore, similar to and has consensus with the two or more different from sarbecovirus Spike protein sequences, or fragments thereof from which it is derived but it varies from each of these. In various embodiments the construct may be modified with foldon and linker sequence. The advantage is that when such an amino acid construct is used as an immunogenic composition it results in antibodies able to neutralise several different sarbecovirus infections i.e., the protein can be used as a pan-sarbecovirus vaccine.

[0042] In various embodiments, the sarbecovirus Spike protein refers to a wild type spike protein identified or isolated from any of sarbecovirus as listed above and a fragment thereof refers to a wild type sarbecovirus receptor binding domain (RBD) of the spike protein that binds to the ACE2 receptor. In various embodiments, the sarbecovirus Spike protein comprises a SARS-CoV spike protein having an amino acid sequence set forth in SEQ ID NO:1. In various embodiments, the sarbecovirus Spike protein comprises a SARS-CoV2 spike protein having an amino acid sequence set forth in SEQ ID NO:2. In various embodiments, the sarbecovirus Spike protein comprises any one of the proteins having an amino acid sequence set forth in SEQ ID NOs: 23-163. In various embodiments, the fragment of the spike protein comprises a SARS-CoV, RBD having an amino acid sequence set forth in SEQ ID NO:4. In various embodiments, the fragment of the spike protein comprises a SARS-CoV2, RBD having an amino acid sequence set forth in SEQ ID NO:7. In various embodiments, the fragment of the spike protein comprises an amino acid sequence set forth in SEQ ID NO:3 or SEQ ID NO: 5. In various embodiments, the amino acid construct has at least 75%, including one of 75%, 80%, 85%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, or even 99.9% sequence identity to at least two different sarbecovirus Spike proteins, or a fragment thereof. In various embodiments, the amino acid construct has at least 75%, including one of 75%, 80%, 85%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, or even 99.9% sequence identity to both a wild type of a spike protein or a fragment thereof of a first sarbecovirus and a spike protein or a fragment thereof of a second sarbecovirus. In various embodiments, the first sarbecovirus may comprise SARS-CoV and the second sarbecovirus may comprise SC1r-CoV. In various embodiments, the first sarbecovirus may comprise SARS-CoV and the second sarbecovirus may comprise SARS-CoV-2 B.1.1.7. In various embodiments, the first sarbecovirus may comprise SARS-CoV and the second sarbecovirus may comprise SARS-CoV-2 B.1.351. In various embodiments, the first sarbecovirus may comprise SARS-CoV-2 and the second sarbecovirus may comprise SC2r-CoV. In various embodiments, the first sarbecovirus may be selected from any one of SARS-CoV-2, Brazil SARS-CoV-2 variant P.1 also known as 20J/501Y.V3/B.1.1.248, UK SARS-CoV-2 variant B.1.1.7, South African

SARS-CoV-2 variant B.1.351 also known as 20H/501Y.V2, or 501Y.V2 variant, Indian SARS-CoV-2 variant B.1.617, SC2r-CoV RaTG13, and SC2r-CoV GX-P5L and the second sarbecovirus may be selected from any one of SARS-CoV, SARS-CoV-2, SARS-CoV-2 B.1.1.7, SARS-CoV-2 B.1.351, SARS-CoV-2 B.1.617, SC2r-CoV RaTG13, and SC2r-CoV GX-P5L provided it is different from the first sarbecovirus.

[0043] Throughout the description, it is to be appreciated that the term 'isolated' include those purified by standard purification methods. It does not require absolute purity and can include protein, peptide, nucleic acid or vaccine molecules that are at least 80%, 85%, 90%, 95%, 98%, or 99% isolated.

[0044] In various embodiments, the at least two different sarbecovirus Spike proteins or fragment comprises an amino acid sequence having at least 90%, including one of 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, or even 99.9% sequence identity to the at least two sarbecovirus Spike protein, and an amino acid sequence having at least 90%, including one of 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, or even 99.9% sequence identity to two or more different sarbecovirus Spike proteins or fragment thereof. In various embodiments, the at least two different sarbecovirus Spike proteins or fragment comprise a sarbecovirus Spike protein and a fragment of a different sarbecovirus Spike protein.

[0045] In various embodiments, the fragment comprises a receptor binding domain fragment of a sarbecovirus Spike protein.

[0046] In various embodiments, the amino acid sequence comprises or consists of any one of sequence selected from SEQ ID NOs: 10 to 22 or 165 or any combination thereof. In various embodiments, the amino acid sequence comprises or consists a construct designed to have at least 75% sequence identity with at least two of any one of sequence selected from SEQ ID NOs: 1 to 9 or 23 to 163.

[0047] In various embodiments, the amino acid construct comprises a consensus sequence set forth in SEQ ID NO: 10.

[0048] In various embodiments, the amino acid construct comprises a consensus sequence set forth in SEQ ID NO: 11.

[0049] In various embodiments, the amino acid construct comprises a consensus sequence set forth in SEQ ID NO: 12.

[0050] In various embodiments, the amino acid construct comprises a consensus sequence set forth in SEQ ID NO: 13.

[0051] In various embodiments, the amino acid construct comprises a consensus sequence set forth in SEQ ID NO: 14.

[0052] In various embodiments, the amino acid construct comprises a consensus sequence set forth in SEQ ID NO: 15.

[0053] In various embodiments, the amino acid construct comprises a consensus sequence set forth in SEQ ID NO: 16.

[0054] In various embodiments, the amino acid construct comprises a consensus sequence set forth in SEQ ID NO: 17.

[0055] In various embodiments, the amino acid construct comprises a consensus sequence set forth in SEQ ID NO: 18.

[0056] In various embodiments, the amino acid construct comprises a consensus sequence set forth in SEQ ID NO: 19.

[0057] In various embodiments, the amino acid construct comprises a consensus sequence set forth in SEQ ID NO: 20.

[0058] In various embodiments, the amino acid construct comprises a consensus sequence set forth in SEQ ID NO: 21.

[0059] In various embodiments, the amino acid construct comprises a consensus sequence set forth in SEQ ID NO: 22.

[0060] In various embodiments, the amino acid construct comprises a foldon and a linker sequence. In various embodiments, the amino acid construct comprising a foldon and a linker sequence comprises consensus sequence set forth in SEQ ID NO: 164 or SEQ ID NO: 165.

[0061]

[0062] In various embodiments, the amino acid construct comprises an oligomeric polypeptide. In various embodiments, the oligomeric polypeptide comprises a hetero-oligomer.

[0063] In various embodiments, the polypeptide is a fusion dimer.

[0064] According to various embodiments there is a nucleic acid encoding the amino acid construct as described herein above.

[0065] In various embodiments, the nucleic acid comprises a messenger ribonucleic acid (mRNA).

[0066] In various embodiments, the nucleic acid is a RNA. The term 'RNA' includes a ribonucleic acid (RNA) polynucleotide having an open reading frame encoding a polypeptide of the amino acid construct capable of inducing an immune response against one or more sarbecovirus infections. In various embodiment, it includes at least one ribonucleic acid (RNA) polynucleotide having an open reading frame that encodes amino acid construct that can elicit an immune response against two or more different sarbecovirus infections wherein the amino acid constructs are as described herein above.

[0067] According to various embodiments there is an immunogenic composition comprising amino acid construct as described herein above or the nucleic acid as described herein above.

[0068] In various embodiments, the immunogenic composition includes a recombinant sarbecovirus spike ectodomain trimer that elicits or induces a measurable response against the sarbecovirus when administered to a subject. For *in vivo* use, the immunogenic composition will typically include the recombinant coronavirus spike ectodomain trimer or a nucleic acid molecule encoding a protomer of the recombinant coronavirus spike ectodomain trimer in a pharmaceutically acceptable carrier and may also include other agents, such as an adjuvant.

[0069] In various embodiments, the adjuvant includes MF59, Adjuvant System 03 (A S03), CpG 1018 or Sigma Adjuvant System (S6322).

[0070] In various embodiments, the immunogenic composition comprises at least two amino acid constructs capable of eliciting or inducing a measurable response against the sarbecovirus when administered to a subject. In various embodiments the subject or individual is an animal, such as a mammal such as a human at risk of coming into contact with a sarbecovirus infection.

[0071] In various embodiments, the immunogenic composition is an RNA vaccine. The term 'RNA vaccine' includes a vaccine having a ribonucleic acid (RNA) polynucleotide having

an open reading frame encoding the amino acid construct capable of inducing an immune response against sarbecovirus infections. In various embodiments, the immunogenic composition includes at least one ribonucleic acid (RNA) polynucleotide having an open reading frame that encodes two or more the amino acid constructs that can elicit an immune response against sarbecovirus infections.

[0072] In various embodiments, the immunogenic composition comprises the amino acid construct as described herein above, or the nucleic acid as described herein above enclosed in a lipid nanoparticles. In various embodiments, the immunogenic composition is a mRNA vaccine comprising lipid nanoparticles. In various embodiments, the immunogenic composition comprises a pre-fusion stabilized spike-RBD-adjuvant trimer.

[0073] In various embodiments, the amino acid construct having at least 75% sequence identity to sarbecovirus RBD fragment comprises a recombinant RBD (rRBD). In various embodiments, the immunogenic composition comprises two dimeric formats selected from tandem dimer and rRBD-Fc fusion dimer.

[0074] In various embodiments, the immunogenic composition comprises a carrier. In various embodiments, the carrier is any one of a lipid nanoparticle (LNP), a polymeric nanoparticle, a lipid carrier such as a lipidoid, a liposome, a lipoplex, a peptide carrier, a nanoparticle mimic, a nanotube, or a conjugate.

[0075] According to various embodiments there is a viral vector comprising a nucleic acid as described herein above.

[0076] In various embodiments, the vector is selected from a recombinant measles virus vector, a vesicular stomatitis virus (VSV) vector, a vaccinia virus vector or an adenovirus vector.

[0077] According to various embodiments there is an amino acid construct as described herein above for use in the treatment or prevention of sarbecovirus infections.

[0078] According to various embodiments there is an immunogenic composition as described herein above for use in the treatment and/or prevention of sarbecovirus infections.

[0079] According to various embodiments there is use of an amino acid construct as described herein above in the manufacture of a medicament for the treatment and/or prevention of sarbecovirus infections.

[0080] According to various embodiments there is use of an immunogenic composition as described herein above in the manufacture of a medicament for the treatment and/or prevention of sarbecovirus infections.

[0081] According to various embodiments there is use of a method of treating and/or preventing an infection caused by sarbecovirus comprising administering a vaccine molecule comprising an amino acid construct as described herein above, an immunogenic composition as described herein above, or a viral vector as described herein above to a subject.

[0082] In various embodiments, a method for inducing an immune response to a mammalian subject comprises administering a therapeutically effective amount of the immunogenic composition as described herein above, to the mammalian subject.

[0083] According to various embodiments, there is a method of making an amino acid construct as described herein above, the method comprising: a) comparing amino acid sequences from at least two different sarbecovirus spike proteins or fragments thereof; b) identifying identical amino acid in the sequences from the at least two different sarbecovirus spike proteins or fragments thereof; c) removing any different amino acids from the sequences of the at least two different sarbecovirus spike proteins or fragments thereof to identify a unique amino acid sequence; and d) forming the amino construct of unique amino acid sequence wherein the amino construct has at least 75% sequence identity to the at least two different sarbecovirus Spike protein, or a fragment thereof.

[0084] In various embodiments, the method of making an amino acid construct further comprising modifying the unique amino acid sequence with a foldon and a linker sequence. The C-terminal domain of T4 fibrin (foldon) is known for the formation of the fibrin trimer structure and can be used as an artificial trimerization domain. In various embodiments the linker comprises a His6-tag.

[0085] In various embodiments, the at least two different sarbecovirus spike proteins or fragments thereof comprise any one of 2, 5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, and 170 different sarbecovirus spike proteins or fragments thereof. In various embodiments the at least two different sarbecovirus spike proteins or fragments thereof comprise a plurality of sarbecovirus spike proteins or fragments thereof. In various embodiments, the plurality of sarbecovirus spike proteins or fragments thereof comprise 50-100, 80-150, 100-200 different sarbecovirus spike proteins or fragments thereof. In various embodiments step a) comprises comparing amino acid sequences from a plurality of different

sarbecovirus spike proteins or fragments thereof, and step b) comprises identifying amino acid sequences from the plurality of different sarbecovirus spike proteins or fragments thereof above a predetermined sequence identity to the majority of the plurality of different sarbecovirus spike proteins or fragments thereof and step c) comprises removing any amino acids sequences from the plurality of different sarbecovirus spike proteins or fragments thereof below a predetermined sequence identity to the majority of the plurality of different sarbecovirus spike proteins or fragments thereof. In various embodiments the predetermined sequence identity is 85% or 90% or 95%, or 96% or 97%, or 98% or 99%.

[0086] In various embodiments, the method further comprising identifying a fragment within the unique amino acid sequence that corresponds to a receptor binding domain of the at least two different sarbecovirus spike proteins to form a unique amino acid fragment sequence; and forming the amino construct of the combined the unique amino acid fragment sequence with the unique amino acid sequence.

[0087] In various embodiments, forming the amino construct in step d) comprises forming a nucleic acid encoding the amino acid construct, able to express the amino acid construct.

[0088] In various embodiments, the nucleic acid comprises a messenger ribonucleic acid (mRNA).

[0089] In various embodiments, the amino acid construct or a nucleic acid encoding the amino acid construct able to express the amino acid construct is prepared as an immunogenic composition.

[0090] In various embodiments, the immunogenic composition comprises an adjuvant.

[0091] In various embodiments, the nucleic acid is prepared in a viral vector.

[0092] In various embodiments, the vector is selected from a recombinant measles virus vector, a vesicular stomatitis virus (VSV) vector, a vaccinia virus vector or an adenovirus vector.

[0093] Throughout the description, it is to be appreciated that the term 'polypeptide', used interchangeably with protein or peptide, includes amino acid polymers including naturally occurring amino acid polymers and non-naturally occurring amino acid polymers. A polypeptide has an amino terminal (N-terminal) end and a carboxy terminal (C-terminal) end.

[0094] In various embodiments the amino acid construct comprises a consensus amino acid sequence as set forth in SEQ ID NO: 10; SEQ ID NO: 11; SEQ ID NO: 12; SEQ ID NO: 13; SEQ ID NO: 14; SEQ ID NO: 15; SEQ ID NO: 16; SEQ ID NO: 17, SEQ ID NO: 18; SEQ ID NO: 19; SEQ ID NO: 20; SEQ ID NO: 21 ;SEQ ID NO: 22 SEQ ID NO: 164 or SEQ ID NO: 165.

[0095] In various embodiments, the amino acid construct having at least 75% sequence identity to a sarbecovirus spike protein, comprises amino acid sequence as set forth in SEQ ID NO:1; SEQ ID NO: 10; SEQ ID NO: 11; SEQ ID NO: 12; SEQ ID NO: 13; SEQ ID NO: 14; SEQ ID NO: 15; SEQ ID NO: 16; SEQ ID NO: 17; SEQ ID NO: 164; SEQ ID NO: 165.

[0096] In various embodiments, there is the amino acid construct having at least 75% sequence identity to a sarbecovirus receptor binding domain (RBD) protein comprises a consensus amino acid sequence as set forth in SEQ ID NO: 4; SEQ ID NO: 18; SEQ ID NO: 19; SEQ ID NO: 20; SEQ ID NO: 21; SEQ ID NO: 22; SEQ ID NO: 164; or SEQ ID NO: 165.

[0097] In various embodiments, the amino acid construct having at least 75% sequence identity to a sarbecovirus spike protein may have a minimum length of one of 25, 50, 100, 200, 300, 400, 500, 600, 700, 800, 900, 1,000, 1,100 or 1,200 amino acids, and may have a maximum length of one of 50, 100, 200, 300, 400, 500, 600, 700, 800, 900, 1,000, 1,100 or 1,200 amino acids.

[0098] In various embodiments, the amino acid construct having at least 75% sequence identity to a sarbecovirus receptor binding domain (RBD) protein may have a minimum length of one of 10, 20, 30, 40, 50, 100, 150, 200 amino acids, and may have a maximum length of one of 20, 10, 20, 30, 40, 50, 100, 150, 200 amino acids.

[0099] Examples

[00100] Sequences:

SEQ ID NO:	DESCRIPTION	AMINO ACID SEQUENCE
1	SARS-CoV spike protein	MFIFLLFLTSLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTLQDLFLPFYSNVTGFHTINHTFDNPVVPKDGIIY FAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVVIRACNFE LCDNPFFAVSKPMGTQTHMIFDNAFNCTFEYISDAFSLDVSE KSGNFKHLREFVFNKNDGFLYVYKGYQPIDVVRDLPSGFNTLK PIFKLPLGINITNFRILTAFAQDTWGTSAAYFVGYLKPTTF MLKYDENGITDAVDCSQNPLAELKCSVKSFEIDKGIYQTSNF RVVPSGDVVRFPNITNLCPFGEVFNATKFPVYAWERKKISNC VADYSVLYNSTFFSTFKCYGVSATKLNDLCFSNVYADSFVVKG

		DDVRQIAPGQTGVIADYNYKLPDDFMGCVLAWNTRNIDATST GNVNYKYRYLRHGKLRPFERDISNVFSPDGKPCPPALNCY WPLNDYGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNQCVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTAAGCLIGAEHVDTSEY CDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGADSSAIYSNN TIAIPTNFSISITTEVMPVSMAKTSVDCNMYICGDSTECANLLLQ YGSFCTQLNRALSGIAAEQDRNTREVFAQVKQMYKTPTLKVF GGFNFSQILPDPLKPTKRSFIEDLLFNKVTADAGFMKQYGE LGDINARDLCAQKFNGLTVLPLLTDMMIAAYTAALVSGTATA GWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKQIANQ FNKAISQIQESLTSTALGKLQDVVNQNAQALNTLVKQLSSNF GAISSVLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVTQQLIRA AEIRASANLAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAP HGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNG TSWFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVYDPLQPE LDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKEIDRLNE VAKNLNESLIDLQELGKYEQYIKWPWYVWLGFIAGLIAIVMTIL LCCMTSCCSCCLKGACSCGSCCKFDEDDSEPVKGVKLHYT
2	SARS-CoV-2 spike protein	MFLTTKRTMFVFLVLLPLVSSQCVNLTRTQLPPAYTNSFTR GVYYPDKVFRSSVLHSTQDLFLPFFSNVTWFHAIHVSGTNGTK RFDNPVLPFNDGVYFASTEKSNIIRGWIFGTTLDSTQSLIIVN NATNVVIVKCEFQFCNDPFLGVYHKNKSWMESEFRVYSSA NNCTFEYVSQPFLMDLEGKQGNFKNLREFVFNIDGYFKIYSK HTPINLVRDLPQGFSALEPLVDLPIGINITRFQTLALHRSYLT GDSSSGWTAGAAAYYVGYLQPRFTLLKYNENGTITDAVDCAL DPLSETKCTLSFTVEKGIYQTSNFRVQPTESIVRFPNITNLCP FGEVFNATRFASVYAWNKRISNCVADYSVLYNSASFSTFKC YGVSPKLNLDLCTNVYADSFVIRGDEVQRQIAPGQTGKIADYN YKLPDDFTGCVIAWNSNNLDSKVGGNYYLYRLFRKSNLKP ERDISTEIQAGSTPCNGVEGFNCYFPLQSYGFQPTNGVGYQ PYRVVLSFELLHAPATVCGPKKSTNLVKNKCVNFNFNGLTGT GVLTESNKKFLPFQFGRDIADTTDAVRDPQTLTILITPCSFG GVSIVITPGTNTSNQVAVLYQDVNCTEVPVAIHADQLTPTWRVY STGSNVFQTRAGCLIGAEHVNNSECDIPIGAGICASYQTQT SPRRARSVASQSIAYTMSLGAENSVAYSNNIAIPTNFTISVTT EILPVSMTKTSVDCTMYICGDSTECNLLLQYGSFCTQLNRAL TGIAVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQILPDPSK PSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLCAQKF NGLTVLPLLTDemiaQYTSALLAGTITSGWTFGAGAALQIPFA MQMAYRFNGIGVTQNVLYENQKLIANQFNSAIGKIQDLSSTA SALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLNDILSRDL KVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASANLAATKM SECVLGQSKRVDFCGKGYHLMSFPQSAPHGVVFLHVTYVPA QEKNTTAPAICHGKAHFPREGVFSNGTHWFTQRNFYEP QIITDNTFVSGNCDVVIGIVNNTVYDPLQPELDSFKEELDKYF KNHTSPDVLGDISGINASVVNIQKEIDRLNEVAKNLNESLIDLQ ELGKYEQYIKWPWYIWLGFIAGLIAIVMTIMLCCMTSCCSCCLK GCCSCGSCCKFDEDDSEPVKGVKLHYT
3	SARS-CoV spike protein S1 subunit	SDLDRCTTFDDVQAPNYTQHTSSMRGVYYPDEIFRSDTLYLT QDLFLPFYSNVTGFHTINHTFDNPVIPFKDGIYFAATEKSNVVR GWVFGSTMNNKSQSVIIINNSTNVIRACNFELCDNPFFAVSK PMGTQHTMIFDNAFNCTFEYISDAFSLDVSEKSGNFKHLREF

		VFKNKDGLYVYKGYQPIDVVRDLPSGFNTLKPIFKLPLGINITN FRAILTAFSPAQDTWGTSAAYFVGYLKPTTFMLKYDENGIT DAVDCSQNPLAELKCSVKSFEIDKGIYQTSNFRVVPVSGDVVRF PNITNLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLNST FFSTFKCYGVSATKLNLCFSNVYADSFVVKGDVVRQIAPGQ TGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNKYRYL RHGKLRPFERDISNVFSPDGKPCPPALNCYWPLNDYGFYT TTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQCVNF NGLTGTGVLTPSSKRFQPFQFGRDVSDFTDSVRDPKTS DISPCSFGGVSVITPGTNASSEVAVLYQDVNCTDVSTAIHADQ LTPAWRIYSTGNNVFQTAAGCLIGAEHVDTSECDIPIGAGICA SYHTVSLLR
4	SARS-CoV spike protein RBD	RVVPSGDVVRFPNITNLCPFGEVFNATKFPSVYAWERKKISNC VADYSVLNSTFFSTFKCYGVSATKLNLCFSNVYADSFVVKG DDVRQIAPGQTGVIADYNYKLPDDFMGCVLAWNTRNIDATST GNYNKYRYLRHKGKLRPFERDISNVFSPDGKPCPPALNCY WPLNDYGFYTGTGIGYQPYRVVLSFELLNAPATVCGPKLST DLIKNQCVNF
5	SARS-CoV-2 spike protein S1 subunit	SQCVNLTTRTLPPAYTNSFTRGVYYPDKVFRSSVLHSTQDL FLPFFSNVTWFHAIHVSGTNGTKRFDNPVLPFNDGVYFASTEK SNIIRGWIFGTTLDLSDKTSLLIVNNATNVVVKVCEFCNDPFLG VYYHKNKSWMESEFRVYSSANNCTFEYVSQPFMDLEGKQ GNFKNLREFVFNIDGYFKIYKHTPINLVRDLPPQGSALPLV DLPIGINITRFQTLALHRSYLTGDSGSSGWTAGAAAYVGYLQ PRTFLLKYNENGTITDAVDCALDPLSETKCTLSFTVEKGIYQT SNFRVQPTESIVRFPNITNLCPFGEVFNATRFASVYAWNRKRI SNCVADYSVLNSASFSTFKCYGVSPTKLNLCFTNVYADSFV IRGDEVQRQIAPGQTGKIADYNYKLPDDFTGCVIWNNSNNLDSK VGGNYYLYRLFRKSNLKPFERDISTEYQAGSTPCNGVEGFN CYFPLQSYGFQPTNGVGYQPYRVVLSFELLHAPATVCGPKK STNLVKNKCVNFNGLTGTGVLTESNKKFLPFQFGRDIADT TDAVRDPQTLEILDITPCSFSGGVSVITPGTNTSNQVAVLYQDVN CTEVPVAIHADQLTPTWRVYSTGSNVFQTRAGCLIGAEHVNN SYECDIPIGAGICASYQTQTNPRRAR
6	SARS-CoV-2 spike protein RBD	RVQPTESIVRFPNITNLCPFGEVFNATRFASVYAWNRKRISNC VADYSVLNSASFSTFKCYGVSPTKLNLCFTNVYADSFVIRG DEVQRQIAPGQTGKIADYNYKLPDDFTGCVIWNNSNNLDSKVG GNYYLYRLFRKSNLKPFERDISTEYQAGSTPCNGVEGFNCY FPLQSYGFQPTNGVGYQPYRVVLSFELLHAPATVCGPKKST NLVKNKCVNF
7	SARS-CoV-2 spike protein RBD	PNITNLCPFGEVFNATRFASVYAWNRKRISNCVADYSVLNSA SFSTFKCYGVSPTKLNLCFTNVYDSFVIRGDEVQRQIAPGQTG KIADYNYKLPDDFTGCVIWNNSNNLDSKVGNNYYLYRLFRKS NLKPFERDISTEYQAGSTPCNGVEGFNCYFPLQSYGFQPTNG VGYQPYRVVLSFELLHAPATVCGPKKS
8	SARS-CoV-2 spike protein S1 subunit	MLLVNQSHQGFNKEHTSKMVSAILVYVLLAAAAHSAFAQCVNL TTRTQLPPAYTNSFTRGVYYPDKVFRSSVLHSTQDLFLPFFSN VTWFHAIHVSGTNGTKRFDNPVLPFNDGVYFASTEKSNIIRGW IFGTTLDLSDKTSLLIVNNATNVVVKVCEFCNDPFLGVYYHKN NKSWMSESEFRVYSSANNCTFEYVSQPFMDLEGKQGNFKNL REFVFNIDGYFKIYKHTPINLVRDLPPQGSALPLVLDPIGINI TRFQTLALHRSYLTGDSGSSGWTAGAAAYVGYLQPRFTLL KYNENGTITDAVDCALDPLSETKCTLSFTVEKGIYQTSNFRV QPTESIVRFPNITNLCPFGEVFNATRFASVYAWNRKRISNCVA

		DYSVLVNSASFSTFKCYGVSPTKLNLCFTNVYADSFVIRGDE VRQIAPGQTGKIADYNYKLPPDFTGCVIAWNSNNLDSKVGGN YNYLYRLFRKSNLKPFERDISTEIQAGSTPCNGVEGFNCYFP LQSYGFQPTNGVGYQPYRVVLSFELLHAPATVCGPKKSTNL VKNKCVNFNFNGLTGTGVLTESNKKFLPFQQFGRDIADTTDAV RDPQTLEILDITPCSFGGVSVITPGTNTSNQVAVLYQDVNCTEV PVAIHADQLTPTWRVYSTGSNVFQTRAGCLIGAEHVNNSEYEC DIPIGAGICASYQTQTNSPRRAR
9	SARS-CoV spike protein RBD	MNITNLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLNST FFSTFKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPGQ TGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNKYRYL RHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLNDYGFYT TTGIGYQPYRVVLSFELLNAPATYLSLNTAAAL
10	Artificial Sarbecovirus spike consensus 1	MFIFLFFTLTVSGSTIEKCTTFDDVQPPNYTQFLSSHRGVYYP DIFRSDVLHLTQDHLFPDSNVTGFITFGLNFDNPIIPFKDGIY AATEKSNVIRGWVFGSTMNNKSQSVIIMNNSTNVVIRACNFEL CDNPFFAVSKPNTQIPSYIFNNAFNCTFEYVSDDFNLDVGEK PGNFKHLREFVFNKNDGFLYVYSGYQPIDVASGLPSGFNALKP IFKLPLGINITNFRLLTAFPPRPDYWGTSAAAYFVGYLKPTTF MLKYDENGITDAVDCSQNPLAELKCSVKSFEIDKGIYQTSNF RVVPSGDVVRFPNITNLCPFGEVFNATKFPSVYAWERKRISNC VADYSVLNSTFFSTFKCYGVSATKLNLCFSNVYADSFVVKG DDVRQIAPGQTGVIADYNYKLPPDFMGCVLAWNTRNIDATST GNYNKYRYLRHGKLRPFERDISNVPFSPDGKCTPPALNCY WPLNDYGFYTGTGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNQCVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDIPCSFSGGVSVITPGTNTSSEAVLYQDVNCT DVPVAIHADQLTPAWRVYSTGNNVFQTQAGCLIGAEHVDTSY ECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGADSTSIAYS NNTIAIPTNFSISITTEVMPVSMAKTSVDCNMVYICGDSTECANLL LQYGSFCTQLNRALSGIAVEQDRNTREVFAQVKQMYKTPTLK DFGGFNFSQILPDPLKPTKRSFIEDLLFNKVTADAGFMKQYG ECLGDINARDLCAQKFNGLTVLPPLLTDDMIAAYTAALVSGTA TAGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKQIA NQFNKAISQIQESLTTTSTALGKLQDVVNQNAQALNTLVKQLS SNFGAISSVLNDILSRDPPEAEVQIDRLITGRLQSLQTYVTQQ LIRAAEIRASANLAATKMSECVLGQSKRVDFCGKGYHLMSPQ AAPHGTVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVF NGTSWFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTVYDPLQ PELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKEIDRL NEVAKNLNESLIDLQELGKYEQYIKWPWYVWLGFIAGLIAVMV TILLCCMTSCCSCCLKGACSCGSCCKFDEDDSEPVLGKVKLHY T
11	Artificial Sarbecovirus spike consensus 2	MFIFLFFTLTVSGSLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPVIPFKDGIY FAATEKSNVVRGWVFGSTMNNKSQSVIIMNNSTNVVIRACNFE LCDNPFFVSKPMGTRTHMIFDNFAFNCTFEYISDAFSLDVSE KSGNFKHLREFVFNKNDGFLYVYKGYQPIDVVRDLPSGFNTLK PIFKLPLGIKITNFRILTAFAQAGTWGTSAAAYFVGYLKPTTF MLKYDENGITDAVDCSQNPLAELKCSVKSFEIDKGIYQTSNF RVVPSGDVVRFPNITNLCPFGEVFNATKFPSVYAWERKRISNC VADYSVLNSTSFSTFKCYGVSATKLNLCFSNVYADSFVVKG DDVRQIAPGQTGVIADYNYKLPPDFMGCVLAWNTRNIDATST GNHNYKYRYLRHGKLRPFERDISNVPFSPDGKCTPPAPNCY

		WPLRGYGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNQCVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPRSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAEHVDTSYE CDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGADSSIAYSN NTIAIPTNFSISITTEVMPVSMTKTSVDCNMYICGDSTECANLLL QYGSFCRQLNRALSGIAAEQDRNTREVFVQVKQMYKTPTLKD FGGFNFSQILPDPLKPTKRSFIEDLLFNKVTLADAGFMKQYGE CLGDINARDLICAQKFNGLTVLPPLLTVDMIAAYTAALVSGTAT AGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKQIAN QFNKAISQIQESLTTTSTALGKLQDVVNQNAQALNTLVKQLSS NFGAISSVLNDILSRDPPEAEVQIDRLITGRLQSLQTYVTQQLI RAAEIRASANLAATKMSECVLGQSKRVGFCGKGYYHLMSPFQA APHGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVS GTSWFITQRNFFSPQIITTDNTFVSGNCDVIGIINNTVYDPLQP ELDSFKEELDKYFKNHTSPDVLGDISGINASVWNIQEIDRLN EVAKNLNESLIDLQELGKYEQYIKWPWYVWLGFIAGLIAIVMTI LLCCMTSCCSCLKGACSCGSCCKFDEDDSEPVLKGVKLHYT
12	Artificial Sarbecovirus spike consensus 3	MFIFLFFLTLVSGSDLESCCTTFDDVQAPNYPQHSSRRGVYYP DEIFRSDTLYLTQDLFLPFDSNVTGFHTINHRFDNPVIFKDG YFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVIRACNF ELCDNPFPAVSKPTGTQHTMIFNNAFNCTFEYISDSFSLDVA EKSGNFKHLREFVFNKNDGFLYVYKGYQPIDVVRDLPSGFNIL KPIFKLPLGINITNFRAILTAFLPAQDTWGTSAAYFVGYLKPAT FMLKYDENGITDAVDCSQNPLAELKCSVKSFEIDKGIYQTSNF RVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRISNC VADYSVLNYSFSTFKCYGVSATKLNDLCFSNVYADSFVVKG DDVRQIAPGQTGVIADYNYKLPPDFTGCVLAWNTRNIDATQT GNYNKYRSLRHGKLRFERDISNVPFSPDGKPCPTPAFNCY WPLNDYGFYTTNGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNQCVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNTSSEVAVLYQDVNCT DVPVAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAEHVDTSYE CDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGADSSIAYSN NTIAIPTNFSISITTEVMPVSMAKTSVDCNMYICGDSTECANLLL QYGSFCTQLNRALSGIAVEQDRNTREVFVQVKQMYKTPTLKD FGGFNFSQILPDPLKPTKRSFIEDLLFNKVTLADAGFMKQYGE CLGDINARDLICAQKFNGLTVLPPLLTDDMIAAYTAALVSGTAT AGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKQIAN QFNKAISQIQESLTTTSTALGKLQDVVNQNAQALNTLVKQLSS NFGAISSVLNDILSRDPPEAEVQIDRLITGRLQSLQTYVTQQLI RAAEIRASANLAATKMSECVLGQSKRVDFCGKGYYHLMSPFQA APHGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVN GTSWFITQRNFFSPQIITTDNTFVSGNCDVIGIINNTVYDPLQP ELDSFKEELDKYFKNHTSPDVLGDISGINASVWNIQKEIDRLN EVAKNLNESLIDLQELGKYEQYIKWPWYVWLGFIAGLIAIVMTI LLCCMTSCCSCLKGACSCGSCCKFDEDDSEPVLKGVKLHYT
13	Artificial Sarbecovirus spike consensus 4	MFIFLFFLTLVSGSTIEKCTTFDDVQPPNYTQFLSSHRGVYYP DIFRSDVLHLTQDHFLPFDSNVTGFITFGLNFDNPIIPFKDGIYF AATEKSNVIRGWVFGSTMNNKSQSVIIMNNSTNVIRACNFEL CDNPFPAVSKPNNQIPSYIFNNAFNCTFEYVSDDFNLDVGEK PGNFKHLREFVFNKNDGFLYVYSGYQPIDVASGLPSGFNALKP IFKLPLGINITNFRLLTAFPPRPDYWGTSAAAYFVGYLKPTTF MLKYDENGITDAVDCSQNPLAELKCSVKSFEIDKGIYQTSNF

		RVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRISNC VADYSVLNSTSFSTFKCYGVSATKLNLCFSNVYADSFVVKG DDVRQIAPGQTGVIADYNYKLPDDFMGCVLAWNTRNIDATST GNYNYKYRSLRHGKLRPFERDISNVPFSPDGKPCPPAFNCY WPLNDYGFFTTNGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNNQCVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNTSSEAVLYQDVNCT DVPVAIHADQLTPAWRVYSTGNNVFQTAQAGCLIGAEHVDTSY ECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGADSSIAYS NNTIAIPTNFSISITTEVMPVSMAKTSVDCNMICGDSTECANLL LQYGSFCTQLNRALSGIAVEQDRNTREVFAQVKQMYKTPTLK DFGGFNFSQILPDPLKPTKRSFIEDLLFNKVTADAGFMKQYG ECLGDINARDLCAQKFNGLTVLPPLLTDDMIAAYTAALVSGTA TAGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKQIA NQFNKAISQIQESLTSTALGKLQDVVNQNAQALNTLVKQLS SNFGAISSVLNDILSRDPPEAEVQIDRLITGRLQSLQTYVTQQ LIRAAEIRASANLAATKMSECVLGQSKRVDFCGKGYHLMSFPQ AAPHGVLHVTVVPSQERNFTTAPAICHEGKAYFPREGVVF NGTSWFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTVYDPLQ PELDSFKEELDKYFKNHTSPDVLGDIGINASVVNIQKEIDRL NEVAKNLNESLIDLQELGKYEQYIKWPWYVWLGFIAGLIAIMV TILLCCMTSCCCLKGACSCGSCCKFDEDDSEPVLGKVKLHY T
14	Artificial Sarbecovirus spike consensus 5	MFVFLFLLPLVSSQCVNLTTRTGIPPGYTNSSTRGVYYPDKVF RSSVLHLTQDLFLPFFSNVTWFNAINYQGGFKRFDNPVLPFND GVYFASTEKSNIRGWIFGTTLTARTQSLLIVNNATNVVIVKCEF QFCTDPFLGVYHNNNKTWVENEFVYSSANNCTFEYVSQP FLMDLEGKQGNFKNLREFVFKNVGDFYFKIYSKHTPIDLVRDLP RGFSALEPLVDLPIGINITRFQTLALHRSYLTGKLESGWTTG AAAYYVGYLQPRFTLLSYNENGTTDAVDCALDPLSETKCTLK SLTVEKGIYQTSNFRVQPTISIVRFPNITNLCPFGEVFNATRFAS VYAWNRRKRISNCVADYSVLNSTSFSTFKCYGVSPTKLNLCF TNVYADSFVVRGDEVVRQIAPGQTGVIADYNYKLPDDFTGCVIA WNSVKQDALTGNNYNYLRLFRKSKLKPFERDISTEYQAGST PCNGVVLNLCYPLQRYGFHPTTGVGYPYRVVLSFELLNA PATVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTESNKKFLPF QQFGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSN QVAVLYQDVNCTEVPVAIHADQLTPTWRVYSTGNNVFQTRAG CLIGAEHVNNSECDIPIGAGICASYQTQTNPRRARSVNSQSI IAYTMSLGAENSVAYSNNIAIPTNFTISVTTEILPVSMTKTSVD CTMYICGDSIECSNLLLQYGSFCTQLNRALTGIAVEQDKNTQE VFAQVKQIYKTPPIKDFGGFNFSQILPDPSKPSKRSFIEDLLFNK VTLADAGFIKQYGDCLGDIAARDLCAQKFNGLTVLPPLTDEM IAQYTSALLAGTITSGWTFGAGAALQIPFAMQMAYRFNGIGVT QNVLYENQKLIANQFNSAIGKIQDSLSTASALGKLQDVVNQN AQALNTLVKQLSSNFGAISSVLNDILSRDPPEAEVQIDRLITGR LQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVDFC GKGYHLMSFPQSAPHGVVLHVTVVPAQEKNTTAPAICHEG KAHFPREGVVFVSNGTHWVFTQRNFYEPQIITDNTFVSGSCD VVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDIG INASVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYI WLGFIAGLIAIIMVTIMLCCMTSCCCLKGCCSCGSCCKFDED DSEPVLGKVKLHYT

15	Artificial Sarbecovirus spike consensus 6	MFVFLFLLPLVSSQCVNLTTRTGIPPGYTNSSTRGVVYYPDKVF RSSVLHLTQDLFLPFFSNVTWFNAINYQGGFKRFDNPVLPFND GVYFASTEKSNIIRGWIFGTTLTDLARTQSLIVNATNVVIVKCEF QFCTDPFLGVYHNNNKTWVNEFRVYSSANNCTFEYVSQP FLMDLEGKQGNFKNLREFVFNVDGYFKIYKHTPIDLVRDLP RGFSALEPLVDLPIGINITRFQTLALHRSYLTGKLESGWTTG AAAYYVGYLQPRTFLLSYNENGITDAVDCALDPLSETKCTLK SFTVEKGIYQTSNFRVQPTESIVRFPNITNLCPFGEVFNATRFA SVYAWNRRKRISNCVADYSVLYNSASFSTFKCYGVSPTKLNLDL CFTNVYADSFVIRGDEVQRQIAPGQTGKIADYNYKLPDDFTGCVI AWNSNNLDSKVGGNYNLYRLFRKSNLKPFERDISTEIYQAGS TPCNGVEGFNCYFPLQSYGFQPTNGVGYQPYRVVLSFELLH APATVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTESNKKFLPF QQFGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSN QVAVLYQDVNCTEVPVAIHADQLTPTWRVYSTGSNVFQTRAG CLIGAEHVNNSECDIPGAGICASYQTQTNSPRRARSVNSQSI IAYTMSLGAENSVAYSNNIAIPTNFTISVTTEILPVSMTKTSVD CTMYICGDSIECSNLLLQYGSFCTQLNRALTGIAVEQDKNTQE VFAQVKQIYKTPPIKDFGGFNFSQILPDPSKPSKRSFIEDLLFNK VTLADAGFIKQYGDCLGDIAARDLCAQKFNGLTVLPPLLTDEM IAQYTSALLAGTITSGWTFGAGAALQIPFAMQMAYRFNGIGVT QNVLYENQKLIANQFNSAIGKIQDSLSSTASALGKLQDVVNQN AQALNTLVKQLSSNFGAISSVLNDILSRDPPEAEVQIDRLITGR LQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVDFC GKGYHLMSFPQSAPHGVVFLHVTYVPAQEKNTTAPAICHEG KAHFPREGVFSNGTHWFTVQRNFYEPQIITDNTFVSGSCD VVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISG INASVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYI WLGFIAGLIAIMVTIMLCCMTSCCSCCLKGCCSCGSCCKFDED DSEPVLGKVKLHYT
16	Artificial Sarbecovirus spike consensus 7	MFVFLFLLPLVSSQCVNLTTRTGIPPGYTNSSTRGVVYYPDKVF RSSILHLTQDLFLPFFSNVTWFNNTINYQGGFKKFDNPVLPFND GVYFASTEKSNIIRGWIFGTTLTDLNTTQSLIVNATNVVIVKCEF QFCTDPFLGVYHNNNKTWVNEFRVYSSANNCTFEYVSQP FLMDLEGKQGNFKNLREFVFNVDGYFKIYKHTPIDLVRDLP RGFSALEPLVDLPIGINITRFQTLALHRSYLTGKLESGWTTG AAAYYVGYLQQRTFLLSYNENGITDAVDCSLDPLSETKCTLK SLTVEKGIYQTSNFRVQPTISIVRFPNITNLCPFGEVFNATKFS VYAWNRRKRISNCVADYSVLYNSTSFSTFKCYGVSPTKLNLDLCLF TNVYADSFVVRGDEVQRQIAPGQTGVIADYNYKLPDDFTGC VIAWNSVKQDAKTGGNYNLYRLFRKSKLKPFERDISTEIYQA GSTPCNGVVGLNCCYPLERYGFHPTNGVGYQPYRVVLSFEL LNAPATVCGPKLSTTLVKNKCVNFNFNGLTGTGVLTTSKKKFL PFQQFGRDISDTTDAVRDPQTLEILDITPCSFGGVSVITPGTNT SNQVAVLYQDVNCTEVPMAIHADQLTPTWRVYSTGANVFQTR AGCLIGAEHVNNSECDIPGAGICASYHTQTNRSVNSQSIIA YTMSLGAENSVAYSNNIAIPTNFTISVTTEILPVSMTKTSVDCT MYICGDSIECSNLLLQYGSFCTQLNRALTGIAVEQDKNTQEVF AQVKQIYKTPPIKDFGGFNFSQILPDPSKPSKRSFIEDLLFNKVT LADAGFIKQYGDCLGDIAARDLCAQKFNGLTVLPPLLTDEMIA QYTSALLAGTITSGWTFGAGAALQIPFAMQMAYRFNGIGVTQN VLNENQKLIANQFNSAIGKIQDSLSSTASALGKLQDVVNQNAQ ALNTLVKQLSSNFGAISSVLNDILSRDPPEAEVQIDRLITGR SLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVDFCGK

		GYHLSFPQSAPHGVFLHVTYVPAQEKNTTAPAICHEGKA HFPREGVFSNGTHWVFTQRNFYEPQIITDNTFVSGSDVVI GIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISGINA SVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEYIKWPWYIWL GFIAGLIAIIMVTIMLCCMTSCCSCCLKGCCSCGSCCKFDEDDSE PVLKGVKLHYT
17	Artificial Sarbecovirus spike consensus 8	MFIFLFFTLVSSQCVNFDDRTPPPPTQTNSSSTRGVYYPDDIF RSSVLHLTQDLFLPFFSNVTWFHTINYRFDNPVIPFKDGVYFAA TEKSNVIRGWIFGSTMDNKSQSVIIVNNSTNVIRVCNLFQLCDN PFFAVYNKTWTQIESRVYSNAFNCTFEYVSKSFLLDLGEKQGN FKHLREFVFNKNDGFLKVYSGYTPIDLVRDLPSGFNALKPIFKL PLGINITNFRLLTAFRPGQSGWGTSAAYFVGYLKPRTFMLK YDENGITDAVDCSQDPLAELKCTLKSFEVEKGIYQTSNFRVQ PTKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRISNCVAD YSVLNSTSFSTFKCYGVSPTKLNDLCFSNVYADSFVVGDD VRQIAPGQTGVIADYNYKLPPDFTGCVLAWNTRNIDATGGNY NYLYRLFRHSLKLPFERDISNVIYSPGGKCTPPGFNCYWPLN DYGFYPTNGVGYQPYRVVLSFELLNAPATVCGPKLSTDLVK NKCYNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFDTSVR DPKLTLEILDISPCSFGGVSVITPGTNTSSEVAVLYQDVNCTDVP VAIHADQLTPAWRVYSTGNNVFQQTQAGCLIGAEHVNNSYECDI PIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAENSIAYSNNIA IPTNFSISVTTEVLVPVSMTKTSVDCTMYICGDSTECSNLLQYG SFCTQLNRALSGIAVEQDKNTQEVFAQVKQIYKTPPIKDFGGF NFSQILPDPSKPSKRSFIEDLLFNKVTADAGFMKQYGDCLGDI NARDLICAQKFNGLTVLPLLTDEMIAAYTAALVSGTATAGWT FGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKQIANQFNK AISQIQESLTTTSTALGKLQDVVNQNAQALNTLVKQLSSNFGAI SSVLNDILSRDPPEAEVQIDRLITGRLQSLQTYVTQQLIRAAEI RASANLAATKMSCEVLGQSKRVDFCGKGYHLSFPQAAPHG VFLHVTYVPSQERNFTTAPAICHEGKAHFPREGVFSNGTH WVFTQRNFYSPQIITDNTFVSGSDVVIIVNNTVYDPLQPEL DSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKEIDRLNEV AKNLNESLIDLQELGKYEYIKWPWYVWLGFIAGLIAIIMVTIM LCCMTSCCSCCLKGCCSCGSCCKFDEDDSEPVKGVKLHYT
18	Artificial Sarbecovirus RBD consensus 1	SNFRVVPSPGDVVRFPNITNLCPFGEVFNATKFPVYAWERKRI SNCVADYSVLNSTSFSTFKCYGVSATKLNLCFSNVYADSFV VKGDDVRQIAPGQTGVIADYNYKLPPDFMGCVLAWNTRNIDA TSTGNHNYKYRYLRHGKLRPFERDISNVPFSPDGKCTPPAP NCYWPLRGYGYFTTSGIGYQPYRVVLSFELLNAPATVCGPK LSTDLIKNQCVNFFNGLTGTGVLTPSSKRFQPFQQFGRDVS DFTDSVRDPKTSEIL
19	Artificial Sarbecovirus RBD consensus 2	SNFRVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLNSTSFSTFKCYGVSATKLNLCFSNVYADSFV VKGDDVRQIAPGQTGVIADYNYKLPPDFTGCVLAWNTRNIDAT QTGNYNKYRSLRHGKLRPFERDISNVPFSPDGKCTPPAFN CYWPLNDYGYTTNGIGYQPYRVVLSFELLNAPATVCGPKLS TDLIKNQCVNFFNGLTGTGVLTPSSRFQPFQQFGRDVSDFD DSVRDPKTSEIL
20	Artificial Sarbecovirus RBD consensus 3	SNFRVQPTISIVRFPNITNLCPFGEVFNATRFASVYAWNKRIS NCVADYSVLNSTSFSTFKCYGVSPTKLNDLCFTNVYADSFV RGDEVVRQIAPGQTGVIADYNYKLPPDFTGCVIWNVSKQDAL TGGNYYLYRLFRSKLKPFERDISTEYIYQAGSTPCNGVGLN CYYPLQRYGFHPTTGVGYPYRVVLSFELLNAPATVCGPKK

		STNLVKNKCVNFNFNGLTGTGVLTESNKKFLPFQQFGRDIADT TDAVRDPQTLEIL
21	Artificial Sarbecovirus RBD consensus 4	SNFRVQPTISIVRFPNITNLCPFGEVFNATKFASVYAWNRKRIS NCVADYSVLNYSFSTFKCYGVSPTKLNDLCFTNVYADSFVV RGDEVQRQIAPGQTGVIADYNYKLPPDFTGCVIWNNSVKQDAK TGGNYNYLYRLFRKSKLPFERDISTEIQAGSTPCNGVVGLN CYYPLERYGFHTNGVGYQPYRVVLSFELLNAPATVCGPKL STTLVKNKCVNFNFNGLTGTGVLTTSSKKFLPFQQFGRDISDT TDAVRDPQTLEIL
22	Artificial Sarbecovirus RBD consensus 5	SNFRVQPTKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLNYSFSTFKCYGVSPTKLNDLCFSNVYADSFV VKGDDVRQIAPGQTGVIADYNYKLPPDFTGCVLAWNTRNIDAT TGGNYNYLYRLFRHSLKLPFERDISNVIYSPGGKPCPPGFNC YWPLNDYGFYPTNGVGYQPYRVVLSFELLNAPATVCGPKLS TDLVKNKCVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFT TDSVRDPKTLEIL
23	Coronavirus BtRs- BetaCoV/YN20 18B Spike protein (Genbank: QDF43825)	MKLLVLVFATLVSSYIEKCTDFDDRTPPSNTQFLSSHRGVYY PDDIFRSNVHLVQDHFLPFDSNVTRFITFGLNFDNP IIPFRDGVYFAATEKSNVIRGWVFGSTMNNKSQSVIIMNNSTNL VIRACNFELCDNPFFVLRNNTQIPSYIFNNAFNC TFEYVSKDFNLDIGEKPNGFKDLREFVFRNKDGLHVVSGYQ PISAASGLPTGFNALKPIFKLPLGINITNFRLLTAF PNPGYWGTSAAAYFVGYLKPTTFMLKYDENGITDAVDCSQN PLAELKCSVKSFEIDKGIYQTSNFRVAPSKEVVRFPNI TNLCPFGEVFNATTFPSVYAWERKRISNCVADYSVLNYSFST TFKCYGVSATKLNDLCFSNVYADSFVKGDDVRQIAP GQTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKYR SLRHGKLRPFERDISNVPFSPDGKPCPPAFNCYWPLN DYGFFTTNGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKN QCVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFT DSVRDPKTSEILDSPCSFGGVSVITPGTNTSSEVAVLYQDVNC TDVPVAIHADQLTPAWRIYSTGNNVFQTQAGCLIGA EHVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGA DSSAIYSNNTIAIPTNFSISITTEVMPVSMAKTSVD CNMYICGDSTECANLLQYGSFCTQLNRALSGIAVEQDRNTR EVFAQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSF IEDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIP FAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTT TSTALGKLQDVVNQNAQALNTLVKQLSSNFGAIVSVL NDILSRDLKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASA NLAATKMSECVLGQSKRVDFCGKGYHLSFPQAAP HGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNG TSWFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTV YDPLQPELDSFKEELDKYFKNHTSPDVLGDIGINASVWNIQK EIDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVW LGFIAGLIAIVMTILLCCMTSCCCLKGACSCGSCCKFDEDD EPVLKGVKLHYT
24	Bat SARS-like coronavirus Spike protein (Genbank: ATO98218)	MKLLVLVFATLVSSYIEKCLDFDDRTPPANTQFLSSHRGVYY PDDIFRSNVHLVQDHFLPFDSNVTRFITFGLNFDNP IIPFRDGIYFAATEKSNVIRGWVFGSTMNNKSQSVIIMNNSTNL VIRACNFELCDNPFFVVLKSNNTQIPSYIFNNAFNC TFEYVSKDFNLDLGEKPNGFKDLREFVFRNKDGLHVVSGYQ PISAASGLPTGFNALKPIFKLPLGINITNFRLLTAF

		PRPDYWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQN PLAELKCSVKSFEIDKGIYQTSNFRVAPSKEVVRFPNI TNLCPFGEVFNATTFPSVYAWERKRISNCVADYSVLYNSTSFS TFKCYGVSATKLNDLCFSNVYADSFVVKGDDVRQIAP GQTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNKYR SLRHGKLRPFERDISNVPFSPDGKPCPPAFNCYWPLN DYGFFTTNGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKN QCVNFNFNGLTGTGVLTSKSRFQPFQQFGRDVSDFT DSVRDPKTSEILDSPCSFGGVSVITPGTNTSSEVAVLYQDVNC TDVPVAIHADQLTPAWRIYSTGNNVFQTQAGCLIGA EHVDTSECDIPGAGICASYHTVSSLRSTSQKSIVAYTMSLGA DSSIVYSNNTIAIPTNFSISITTEVMPVSMAKTSVD CNMYICGDSTECANLLLQYGSFCTQLNRALSGIAVEQDRNTR EVFAQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSF IEDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIP FAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTT TSTALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVL NDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASA NLAATKMSECVLGQSKRVDFCGKGYHLSFPQAAP HGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNG TSWFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTV YDPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQK EIDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVW LGFIAGLIAIVMTILLCCMTSCCCLKGACSCGSCCKFDEDDSD EPVLKGVKLHYT
25	Bat SARS-like coronavirus Spike protein (Genbank: ATO98231)	MKLLVLFATLVSSYTIKCLDFDRTTPANTQFLSSHRGVYY PDDIFRSNVHLVQDHFLPFDNSVTRFITFGLNFDNP IIPFRDGIYFAATEKSNVIRGWVFGSTMNNKSQSVIIMNNSTNL VIRACNFELCDNPPFFVVLKSNNTQIPSYIFNNAFNC TFEYVSKDFNLDLGEKPGNFKDLREFVFRNKDGFLHVYSGYQ PISAASGLPTGFNALKPIFKLPLGINITNFRLLTAFP PRPDYWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQN PLAELKCSVKSFEIDKGIYQTSNFRVAPSKEVVRFPNI TNLCPFGEVFNATTFPSVYAWERKRISNCVADYSVLYNSTSFS TFKCYGVSATKLNDLCFSNVYADSFVVKGDDVRQIAP GQTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNKYR SLRHGKLRPFERDISNVPFSPDGKPCPPAFNCYWPLN DYGFFTTNGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKN QCVNFNFNGLTGTGVLTSKSRFQPFQQFGRDVSDFT DSVRDPKTSEILDSPCSFGGVSVITPGTNTSSEVAVLYQDVNC TDVPVAIHADQLTPAWRIYSTGNNVFQTQAGCLIGA EHVDTSECDIPGAGICASYHTVSSLRSTSQKSIVAYTMSLGA DSSIVYSNNTIAIPTNFSISITTEVMPVSMAKTSVD CNMYICGDSTECANLLLQYGSFCTQLNRALSGIAVEQDRNTR EVFAQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSF IEDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIP FAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTT TSTALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVL NDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASA NLAATKMSECVLGQSKRVDFCGKGYHLSFPQAAP HGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNG TSWFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTV

		YDPLQPELDSFKEELDKYFKNHTSPDVDLGDISGINASVWNIQK EIDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVW LGFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDP EPVLKGVKLHYT
26	Bat SARS-like coronavirus RsSHC014 Spike protein (Genbank: AGZ48806)	MKLLVLFATLVSSYIEKCLDFDRTTPANTQFLSSHRGVYY PDDIFRSNVLHLVQDHFLPFDSNVTRFITFGLNFDNP IIPFRDGIYFAATEKSNVIRGWVFGSTMNNKSQSVIIMNNSTNL VIRACNFELCDNPFFVVLKSNNTQIPSYIFNNAFNC TFEYVSKDFNLDLGEKPGNFKDLREFVFRNKDGLHVYSGYQ PISAASGLPTGFNALKPIFKLPLGINITNFRLLTAFP PRPDYWGTSAAAYFVGYLKPTTFMLKYDENGITITDAVDCSQN PLAELKCSVKSFEIDKGIYQTSNFRVAPSKEVVRFPNI TNLCPFGEVFNATTFPSVYAWERKRISNCVADYSVLNSTSFS TFKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAP GQTGVIADYNYKLPDDFLGCVLAWNTNSKDSSTSGNYNYLYR WVRRSKLNPYERDLNDIYSPGGQSCSAVGPNPCYNPLR PYGFFTTAGVGHQPYRVVLSFELLNAPATVCGPKLSTDLIKN QCVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDF DSVRDPKTSEILDISPCSFGGVSVITPGTNTSSEVAVLYQDVNC TDVPVAIHADQLTPSWRVYSTGNNVFQQTQAGCLIGA EHVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGA DSSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVD CNMYICGDSTECANLLLQYGSFCTQLNRALSGIAVEQDRNTR EVFAQVKQMYKTPTLKDFFGFFNFSQILPDPLKPTKRSF IEDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIP FAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTT TSTALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVL NDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASA NLAATKMSECVLGQSKRVDFCGKGYHLSFPQAAP HGTVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNG TSWFITQRNFFSPQIITDNTFVSGSCDVGIIINNTV YDPLQPELDSFKEELDKYFKNHTSPDVDLGDISGINASVWNIQK EIDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVW LGFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDP EPVLKGVKLHYT
27	Bat SARS-like coronavirus Spike protein (Genbank: ATO98132)	MKLLVLFATLVSSYIEKCLDFDRTTPANTQFLSSHRGVYY PDDIFRSNVLHLVQDHFLPFDSNVTRFITFGLNFDNP IIPFRDGIYFAATEKSNVIRGWVFGSTMNNKSQSVIIMNNSTNL VIRACNFELCDNPFFVVLKSNNTQIPSYIFNNAFNC TFEYVSKDFNLDLGEKPGNFKDLREFVFRNKDGLHVYSGYQ PISAASGLPTGFNALKPIFKLPLGINITNFRLLTAFP PRPDYWGTSAAAYFVGYLKPTTFMLKYDENGITITDAVDCSQN PLAELKCSVKSFEIDKGIYQTSNFRVAPSKEVVRFPNI TNLCPFGEVFNATTFPSVYAWERKRISNCVADYSILYNSTSFS TFKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAP GQTGVIADYNYKLPDDFLGCVLAWNTNSKDSSTSGNYNYLYR WVRRSKLNPYERDLNDIYSPGGQSCSAVGPNPCYNPLR PYGFFTTAGVGHQPYRVVLSFELLNAPATVCGPKLSTDLIKN QCVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDF DSVRDPKTSEILDISPCSFGGVSVITPGTNTSSEVAVLYQDVNC TDVPVAIHADQLTPSWRVYSTGNNVFQQTQAGCLIGA EHVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGA DSSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVD

		CNMYICGDSTECANLLLQYGSFCTQLNRALSGIAVEQDRNTR EVFAQVKQMYKTPTLKDFFGFNFSQILPDPLKPTKRSE IEDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIP FAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTT TSTALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVL NDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASA NLAATKMSECVLGQSKRVDFCGKGYHLSFPQAAP HGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNG TSWFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTV YDPLQPELDSFKEELDKYFKNHTSPDVLGDIGINASVWNIQK EIDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVW LGFIAGLIAIVMTILLCCMTSCCSCLKGACSCGSCCKFDEDDSD EPVLKGVKLHYT
28	Bat SARS-like coronavirus Rs3367 Spike protein (Genbank: AGZ48818)	MKLLVLFATLVSSYTIKCLDFDRTTPANTQFLSSHRGVVY PDDIFRSNVHLVQDHFLPFDSNVTRFITFGLNFDNP IIPFKDGIYFAATEKSNVIRGWVFGSTMNNKSQSVIIMNNSTNL VIRACNFELCDNPFFVVLKSNNTQIPSYIFNNAFNC TFEYVSKDFNLDLGEKPGNFKDLREFVFRNKDGLHVVSGYQ PISAASGLPTGFNALKPIFKLPLGINITNFRLLTAF PRPDYWGTSAAAYFVGYLKPTTFMLKYDENGITITDAVDCSQN PLAELKCSVKSFEIDKGIYQTSNFRVAPSKEVVRFPNI TNLCPFGEVFNATTFPSVYAWERKRISNCVADYSVLNSTFS TFKCYGVSATKLNDLCFSNVYADSFVVKGDDVRQIAP GQTGVIADYNYKLPPDFTGCVLAWNTRNIDATQTGNVNYKYR SLRHGKLRPFERDISNVFPSPDGKCTPPAFNCYWPLN DYGFIYITNGIGYQPYRVVVLSEFLLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDF DSVRDPKTSEILDSPCSFGGVSIVITPGTNTSSEVAVLYQDVNC TDVPVAIHADQLTPSWRVYSTGNNVFQTQAGCLIGA EHVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGA DSSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVD CNMYICGDSTECANLLLQYGSFCTQLNRALSGIAVEQDRNTR EVFAQVKQMYKTPTLKDFFGFNFSQILPDPLKPTKRSE IEDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIP FAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTT TSTALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVL NDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASA NLAATKMSECVLGQSKRVDFCGKGYHLSFPQAAP HGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNG TSWFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTV YDPLQPELDSFKEELDKYFKNHTSPDVLGDIGINASVWNIQK EINRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVW LGFIAGLIAIVMTILLCCMTSCCSCLKGACSCGSCCKFDEDDSD EPVLKGVKLHYT
29	Bat SARS-like coronavirus WIV1 Spike protein (Genbank: AGZ48828)	MKLLVLFATLVSSYTIKCLDFDRTTPANTQFLSSHRGVVY PDDIFRSNVHLVQDHFLPFDSNVTRFITFGLNFDNP IIPFKDGIYFAATEKSNVIRGWVFGSTMNNKSQSVIIMNNSTNL VIRACNFELCDNPFFVVLKSNNTQIPSYIFNNAFNC TFEYVSKDFNLDLGEKPGNFKDLREFVFRNKDGLHVVSGYQ PISAASGLPTGFNALKPIFKLPLGINITNFRLLTAF PRPDYWGTSAAAYFVGYLKPTTFMLKYDENGITITDAVDCSQN PLAELKCSVKSFEIDKGIYQTSNFRVAPSKEVVRFPNI

		TNLCPFGEVFNATTFPSVYAWERKRISNCVADYSVLYNSTSFS TFKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAP GQTGVIADYNYKLPPDFTGCVLAWNTRNIDATQTGNVNYKYR SLRHGKLRPFERDISNVPFSPDGKPCPPAFNCYWPLN DYGFYITNGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDF DSVRDPKTSEILDSPCSFGGVSIVITPGTNTSSEVAVLYQDVNC TDVPVAIHADQLTPSWRVHSTGNNVFQTQAGCLIGA EHVDTSECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGA DSSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVD CNMYICGDSTECANLLLQYGSFCTQLNRALSGIAVEQDRNTR EVFAQVKQMYKTPTLKDFFGFFNFSQILPDPLKPTKRSF IEDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLT PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIP FAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTT TSTALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVL NDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASA NLAATKMSECVLGQSKRVDFCGKGYHLSFPQAAP HGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNG TSWFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTV YDPLQPELDSFKEELDKYFKNHTSPDVLGDIGINASVVNIQK EIDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVW LGFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDS EPVLKGVKLHYT
30	SARS coronavirus Tor2 Spike glycoprotein (Genbank: YP_00982505 1)	MFIFLLFLTSTSGSDDLRCCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP AELKCSVKSFEIDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPVYAWERKKISNCVADYSVLYNSTFFST FKCYSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNVNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDF SVRDPKTSEILDSPCAFSGGVSIVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECIDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGA DSSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLT PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDIGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL

		GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
31	Bat SARS-like coronavirus Spike protein (Genbank: ATO98157)	MFIFLFFLTLTSGSDLESCCTTFDDVQAPNYPQHSSSRRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHRFDNPV IPFKDGVYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNV VIRACNFELCDNPFFAVSKPTGTQTHTMIFDNAFNCT FEYISDSFSLDVAEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNILKPIFKLPLGINITNFRAILTAFLP AQDTWGTSAAYFVGYLKPATFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVAPSKEVVRFPNIT NLCPFGEVFNATTFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVGDDVRQIAPG QTGVIADYNYKLDDFLGCVLAWNTNSKDSSTSGNYNYLYRW VRRSKLNPYERDLSNDIYSPGGQSCSAIGPNCYNPLRP YGFFTTAGVGHQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTSKSRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNTSSEVAVLYQDVNCT DVPVAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAVEQDRNTREV FAQVQKMYKTPALKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDVNARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTCPVPSQERNFTTAPAICHEGKAYFPREGVVFVNGT SWFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
32	SARS-like coronavirus WIV16 Spike protein (Genbank: ALK02457)	MFIFLFFLTLTSGSDLESCCTTFDDVQAPNYPQHSSSRRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHRFDNPV IPFKDGVYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNV VIRACNFELCDNPFFAVSKPTGTQTHTMIFDNAFNCT FEYISDSFSLDVAEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNILKPIFKLPLGINITNFRAILTAFLP AQDTWGTSAAYFVGYLKPATFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVAPSKEVVRFPNIT NLCPFGEVFNATTFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVGDDVRQIAPG QTGVIADYNYKLDDFTGCVLAWNTRNIDATQTGNYNYKYRS LRHGKLRPFERDISNVPFSPDGKCTPPAFNCYWPLND YGFYITNGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVLDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNTSSEVAVLYQDVNCT DVPVAIHADQLTPSWRVYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAVEQDRNTREV FAQVQKMYKTPTLKDFFGGFNFSQILPDPLKPTKRSFI

		EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGTLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
33	Bat SARS-like coronavirus Spike protein (Genbank: ATO98205)	MFIFLFFLTLTSGSDLESCFTFDDVQAPNYPQHSSSRRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHRFDNPV IPFKDGVYFAATEKSNVVRGWVFGSTMNNKSQSVMNNSTNV VIRACNFELCDNPFFAVSKPTGTQHTMIFDFAFNCT FEYISDSFSLDVAEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNLIKPIFKLPLGINITNFRILTAFPL AQDTWGTSAAYFVGYLKPATFMLKYDENGITDAVDCSQNP LAELKCSVKSFEDKGIYQTSNFRVAPSKEVVRFPNIT NLCPFGEVFNATTFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFTGCVLAWNTRNIDATQTGNVNYKYRS LRHGKLRPFERDISNVPFSPDGKPCPTPPAFNICYWPLND YGFYITNGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDIPCSFSGGVSVITPGTNTSSEAVLYQDVNCT DVPVAIHADQLTPSWRVYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNITIAIPTNFISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAVEQDRNTREV FAQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGTLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
34	<i>Rhinolophus affinis</i> coronavirus Spike protein (Genbank: AHX37558)	MFLTCFILSFLFCVSGDSIDTCETFDDVSPQQLNVSSSKRG VYYPDDIYRSDVHHLVQDLFLPFNSNVVGLMSFNRYF DNPIIPFKDGVYFAATEKSNVVRGWVFGSTMNNKSQSVMNN STNVVIRACNFQLCDNPFFAVIRPTSQQIETILFENA FNCTFEYVSDSFLMDVGEKPGNFKHLREFIFKNKDGFLNIYS FQNIADVANGLP SGFSLLKPLLKLPLGLNITNFRVLLT AFIPNIGTWGTSPVAYFVGYLKPTTFMLKYDNGTIVDAVDCS QHPLAELKCSVKSFEDKGIYQTSNFRVSPSKEVVRFP PNITNLCPFGEVFNATTFPSVYAWERKRISNCVADYSVLYNST SFSTFKCYGVSAILNLCFSNVYADSFVVKGDDVRQ

		IAPGQTGVIADYNYKLPDDFMGCVLAWNTRNIDATSSGNFNYK YRSLRHGKLRPFERDISNVPFSPDGKCTPPAFNCYW PLNDYGfYTTNGIGYQPYRVVLSFELLNAPATVCGPKLSTDLI TNQCVNFNFNGLTGTGVLTPSLKRFQPFQQFGRDFS DFTDSVRDPKTLEVLDISPCSFSGGVSVITPGTNISSEVAVLYQD VNCTDVPTAIHADQLTPAWRIYSAGVNVFQTQAGCL IGAETHVNASYECDIPGAGICASYHTASLLRNTDQKSIVAYTMS LGAENSIAYANNSIAIPTNFSISITTEVMPVSMKT SVDCTMYICGDSQECNLLLQYGSFCTQLNRALSGIAVEQDK NTQEVFAQVKQIYKTPAIKDFGGFNFSQILPDPSKPTK RSFIEDLLFNKVTLDAGFMKQYGECLGDISARDLCAQKFNGL TVLPPLLTDEMIAAYTAALVSGTATAGWTFGAGAAL QIPFAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQES LTTTSTALGKLQDVVNQNAQALNTLVKQLSSNFGAIS SVLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIR ASANLAATKMSECVLGQSKRVDFCGKGYHLMSPFQ AAPHGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVS NGTSWFITQRNFFSPQLITTDNTFVSGNCDVVIGIIN NTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISRINASVV NIQKEIDRLNEVAKNLNESLIDLQELGKYEQYIKWPW YVWLGFIAGLIAIVMATILLCCMTSCCSCCLKGACSCGSCCKFDE DDSEPVKGVKLHYT
35	<i>Rhinolophus affinis</i> coronavirus Spike protein (Genbank: AHX37569)	MFLTCLIFSLFCVSGDSIDTCETFDVSPPPQNLVSSSKRGV YYPDDIYRSDAHLVQDLFLPFNSNVVGLMSFNRYF DNPIIPFKDGVYFAATEKSNVVRGWVFGSTMNNKSQSIAIMNN STNVVIRACNFQLCDNPFFAVIRPTSQQIETILFENA FNCTFEYVSDSFLMDVGEKPGNFKHLREFIFKNKDGFLYISG FQNIADVANGLPSPGFSLLKPLKPLGLNITNFRVLLT AFIPNIGTWGTSPVAYFVGYLKPTTFMLKYDNGTIVDAVDCS QHPLAELKCSVKSFDIDKGIYQTSNFRVSPSREVVRF PNITNLCPPGGEVFNATTFPSVYAWERKRISNCVADYSVLNST SFSTFKCYGVSAIKLNDLCFSNVYADSFVVKGDDVRQ IAPGQTGVIADYNYKLPDDFMGCVLAWNTRNIDATSSGNFHYK YRSLRHGKLRPFERDISNVPFSPDGKCTPPAFNCYW PLNDYGfYTTNGIGYQPYRVVLSFELLNAPATVCGPKLSTDLI TNQCVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVS DFTDSVRDPKTLEVLDISPCSFSGGVSVITPGTNISSEVAVLYQD VNCTDVPTAIHADQLTPAWRIYSAGENVFQTQAGCL IGAETHVNASYECDIPGAGICASYHTASLLRNTGQKSIVAYTMS LGAENSIAYANNSIAIPTNFSISITTEVMPVSMKT SVDCTMYICGDSQECNLLLQYGSFCTQLNRALSGIAVEQDS NTQEVFAQVKQIYKTPAIKDFGGFNFSQILPDPSKPTK RSFIEDLLFNKVTLDAGFMKQYGECLGDISARDLCAQKFNGL TVLPPLLTDEMIAAYTAALVSGTATAGWTFGAGAAL QIPFAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQES LTTTSTALGKLQDVVNQNAQALNTLVKQLSSNFGAIS SVLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIR ASANLAATKMSECVLGQSKRVDFCGKGYHLMSPFQ AAPHGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVF NGTSWFITQRNFFSPQLITTDNTFVSGNCDVVIGIIN NTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISRINASVV NIQKEIDRLNEVAKNLNESLIDLQELGKYEQYIKWPW YVWLGFIAGLIAIVMATILLCCMTSCCSCCLKGACSCGSCCKFDE DDSEPVKGVKLHYT

36	SARS-related coronavirus Spike protein (Genbank: APO40579)	MKFFILLSLLSFTTAQEGCGILSNKSNPALTQYFSSRRGFYYFD DTRSSVRVLTGTYFLPFNSNLTYSSRNSVTGRLI QFDNPNIPIKDGLYFAATERSNVIRGWIFGSTLDNTTQSAVLF NNGTHIVINVCNFYFCQDPMLAVANGSHFKSWVFLNA TNCTYNRVHGFIDPSPNTGSFIHLREHVFRNVDGFLYVYHNY ERVDVYDNFPQGFSVLKPIFKLPFGLNITQFKVIMTL FSPTTSSFNADASVYFVGHLKPLTMLAEFDENGITDAVDCSQ DPLSELKCTTKSLTVEKGIYQTSNFRVSPSTEVVRF NITNLCPPFGQVFNASNFPSVYAWERLRISDCVADYAVLYNSSS SFSTFKCYGVSPTKLNDLCFSSVYADYFVVKGDVVRQ IAPAQTGVIADYNYKLPDDFTGCVLAWNTNSVDSKSGNNFY RLFRHGKIKPYERDISNVLYNSAGGTCSSISQLGCYEP LKSYGFTPTVGVGYPYRVVLSFELLNAPATVCGPKKSTELV KNKCVNFNFNGLTGTGVLTSSTKKFQPFQFGRDVSD FTDSVRDPKTFEILDIPCSYGGVSVITPGTNTSKAVAVLYQDV NCTDVPTMIHVEQVSSDWRVYAFNSYGNMFQTQAGC LVGAIYENTTYECDIPGAGICAKFGSDKIRMGQESIVAYTMSIG EDQSIAYSNNIIAIPTNFSISVTTEVLPVSMTKTS VDCNMYICGDSTECNLLQYGSFCTQLNRALSGIAVEQDRN TRDVFAQTKSIYKTPNIKDFGGFNFSQILPDPKKLSYR SFIEDLLYNKVTLSDPGFMKQYGDCLGGINARDLCAQKFNGL TVLPPLLTDDMIAAYTAALISGTATAGYTFGAGAAALQ IPFAMQMAYRFNGIGVTQNVLYENQKQIANQFNNAISKIQLSLT TTSAALGKLQDVINQNAVALNTLVKQLSSNFGAISS VLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRA SANLAATKMSECVLGQSKRVDFCGKGYHLSFPQA APHGVVFLHVTYVPSQQQNFTTAPAICHNGKAYFPREGVFVM NGTHWFITQRNFYSPQVITDNTFESGSCDVVIGIINN TVYDPLQPELESFKQELDKYFKNHTSPDVDFGDISGINASVVDI KKEIAHLNEIAKNLNEIDLQELGKYEQYVWPWY VWLGFVAGIVAILMSVIMLCCMTNCCSCFKGMCSCGSCCKFD EDHSEPVSGVKLHYT
37	SARS-like coronavirus BatCoV/BB990 4/BGR/2008 Spike glycoprotein (Genbank: ALJ94036)	MKVLIFLSLLSLVSAQDGCDFSSKKTPLLQFPSSKRGLYYF DDIFRSSTRVLTSGHFLPFNSNVTRYTTQHSAPGEWM IYFDNPNIPTFGDGVYFGAAERSNALRGWIFGSTMDNTTQSAIL YNNGTHIVISVCNLFNCEQPMIKVFAGRSYRSLIYN AANCTYQRVHAFNITTATGNGNLIHFREHVFRNVDGFLYVYHN YELVNLSTNPSFPAGFSVLKPIFKLPFGLNITFVRA IMTVFSASTSQFEADYSAYFVGHLKPLTMLVDFDENGITDAV DCSQDPLSELKCTTKSFTVEKGIYQTSNFRVTPTEV VRFPNITKLCPPDQVFNASSFPSVYAWERVRITDCVANYAVLY NSSVSFSTFQCYGVSPTKLNDLCFSSVYADYFIVKGD DVRQIAPSQTGVIADYNYKLPDDFTGCVIAWNTNALDSNKDFY YRLFRHGKIKPYGRDLSNIPYSPSGTCSTINNLNCF PLKSYGFTQSSGISFQPYRVVLSFELLNAPATVCGPKQSTEL VKDKCVNFNFNGLTGTGVLTSSTKKFQPFQFGRDVS DFTDSVRDPKTLEILDIAPCSYGGVSVITPGTNASNSVAVLYQD VNCTDVPTMLHAEQISHDWRVYTFSSDSNIYQTQAG CLIGAAYNSSYECDIPGAGICAKYGISSNTRLRSNSQSIVAYT MSLGEDQSIAYSNNIIAIPMNFSISVTTEVLPVSM TKTSVDCNMYICGDSTECNLLQYGSFCTQLNRALAGIAVEQ DRNTRDVFAQTKAMYKTPSLKDFGGFNFSQILPDPK PSSRSFIEDLLYNKVTLADPGFMKQYGDCLGGVNARDLCAQK FNGLTVLPPLLTDEMIAAYTAALVSGTATAGFTFGAG

		AALQIPFAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQI QDSLSTTTTALGKLQDVINQNAIALNTLVKQLSSNFG AISSVLNDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAA EIRASANIAATKMSECVLGQSKRVDFCGKGYHLMS FPQAAPHGVVFLHVTYVPSQEQNFTTAPAICHGGKAHFPREG VFVTNGTHWFITQRNFYSPQPITTDNTFVSGNCDVVIG IVNNTVYDPLQPELESFKEELDKYFKNHTSQNVSLDGLNNINA SVVDIKKEIEHLNEIAKSLNESLIDLQELGKYEYIK WPWYVWLGFIAGLIAIVMATIMLCCMTSCCSCCLKGVCSASC CKFDEHSEPVLTGVKLHYT
38	Bat coronavirus BM48- 31/BGR/2008 Spike protein (Genbank: YP_00385858 4)	MKFLAFLCLLGFANAQDGKCGTLSNKSPLTQTPSSRRGFY YFDDIFRSSIRVLTTGHFLPFNTNLTWYLTLSNGKQR IYYDNPINIFGDGVYFGLTEKSNVFRGWIFGSTLDNTTQSAVL FNNGTHIVIDVCNFCADPMFAVNSGQPYKTWYTS AANCTYHRAHAFNISTNMNPGKFKHFREHLFKNVDGFLYVYH NYEPIDLNSGFPSPGFSVLKPKLPFGLNITYVKAIMT LFSSTQSNFDADASAYFVGHKPLTMLVDFDENGTIIDAIDCSQ DPLSELKCTTKSFTVEKGIYQTSNFRVTPTEVVR PNITQLCPFNEVFNITSFSPSVYAWERMRTNCVADYSVLNNS ASFSTFCYGVSPTKLNDLCFSSVYADYFVVKGDDVR QIAPAQTGVIADYNYKLPDDFTGCVIAWNTNSLDSSNEFFYRR FRHGKIKPYGRDLSNVLFNPSGGTCSAEGLNICYKPLA SYGFTQSSGIGFQPYRVVLSFELLNAPATVCGPKQSTELVK KCVNFNFNGLTGTGVLNSTKKFQPFQQGRDVSDF DSVRDPKLEILDIAPCSYGGVSVITPGTNASSSVAVLYQDVNC TDVPTMLHADQISHDWRVYAFRNDGNIFQTQAGCLI GAAYDNSSYECDIPIGAGICAKYTNVSSTLVRSGGHSILAYTMS LGDNDQDIVYSNNTIAIPMNFSISVTTEVLPVSMTKT SVDCNMYICGDSTECNLLLQYGSFCTQLNRLAGIAVEQDR NTRDVFQAQTKAMYKTPSLKDFGGFNFSQILPDPAPSS RSFIEDLLYNKVTLADPGFMKQYGDCLGGVNARDLICAQKFN GLTVLPPLTDEMIAAYTAALISGTATAGFTFGAGAAL QIPFAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQDS LSTTTTALGKLQDVINQNAIALNTLVKQLSSNFGAIS SVLNDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIR ASANLAATKMSECVLGQSKRVDFCGKGYHLMSFPQ AAPHGVVFLHVTYVPSQEQNFTTAPAICHEGKAHFPREGV TNGTHWFITQRNFYSPQPITTDNTFVSGNCDVVIGIVN NTVYDPLQPELDSFKEELDKYFKNHTSQNVSLDGLNNINASV DIKKEIEHLNEIAKSLNESLIDLQELGKYEYIKWPW YVWLGFIAGLIAIVMATIMLCCMTSCCSCCLKGVCSASCCKFD EDHSEPVLTGVKLHYT
39	Pangolin coronavirus Surface glycoprotein (Genbank: QLR06867)	MLFFFFLHFALVNSQCVNLTGRAAIQPSFTNSSQRGVYYPDTI FRSNTLVLSQGYFLPFYSNVSWYYALTKTNSAEKRVD NPVLDFKDGIFYAATEKSNIVRGWIFGTTLNDSQSLLIVNNAT NVIKVCNFCYQDPYLSGYYHNNKTWSTREFAVYS SYANCTFEYVSKSFMLDIAGKSGLFDLREFVFRNVDGYFKIY SKYTTPVNVNSNLPIGFSALEPLVEIPAGINITKFRTL LTIHRGDPMPNNGWTVFSAAYYVGYLAPRTFMLNYNENGTIT DAVDCALDPLSEAKCTLKSLTVEKGIYQTSNFRVQPT SIVRFPNITNLCPFGEVFNATTFASVYAWNRKRISNCVADYSVL YNSTSFSTFKCYGVSPTKLNDLCFTNVYADSFVVRG DEVQRQIAPGQTGRIADYNYKLPDDFTGCVIAWNSNNLDSKVG GNYNLYRLFRKSNLKPFERDISTEIQAGSTPCNGVE

		GFNCYFPLQSYGFHPTNGVGYQPYRVVLSFELLNAPATVCG PKQSTNLVKNKCVNFNFNGLTGTGVLTESSKKFLPFQQ FGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSNQV AVLYQDVNCTEVPVAIHADQLTPTWSVYSTGNSNVFQ TRAGCLIGAEHVNNSECDIPGAGICASYQTQTNSRSVSSQAI IAYTMSLGAENSVAYANNSIAIPTNFTISVTTEILP VSMTKTSVDCTMYICGDSIECSNLLLQYGSFCTQLNRALTGIA VEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQILPD PSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLICA QKFNGLTVLPPLLDEMIQAQYTSALLAGTITSGWTF GAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNSAI GKIQDSLSTASALGKLQDVVNQNAQALNTLVKQLSS NFGAISSVLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVTQQLI RAAEIRASANLAATKMSECVLGQSKRVDFCGKGYH LMSFPQSAPHGVVFLHVTYVPSQEKNFTTTTPAICHEGKAHFPR EGVFVSNGTWVFTQRNFYEPQIITDNTFVSGSCDV VIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISGI NASVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEQ YIKWPWYIWLGFIAGLIAIIMVTIMLCCMTSCCCLKGCCSCGS CCKFDEDDSEPVLKGVKLHYT
40	Pangolin coronavirus Surface glycoprotein (Genbank: QLR06864)	MLFFFFLHFALVNSQCVNLTGRAAIQPSFTNSSQRGVYYPDIT FRSNLTVLSQGYFLPFYSNVSWYYALTKTNSAEKRVD NPVLDFKDGIFYAATEKSNIVRGWIFGTTLDNSTQSLLIVNNAT NVIIKVCNFCQCYDPYLSGYYHNNKTWSTREFAVYS SYANCTFEYVSKSFMLDIAGKSGLFDLREFVFRNVDGYFKIY SKYTPVNVNSNLPIGFSALEPLVEIPAGINITKFRTL LTIHRGDPMPNNGWTVFSAAYYVGYLAPRTFMLNYNENGIT DAVDCALDPLSEAKCTLKSLTVEKGIYQTSNFRVQPT SIVRFPNITNLCPFGEVFNATTFASVYAWNRKRISNCVADYSVL YNSTSFSTFKCYGVSPTKLNDLCFTNVYADSFVVRG DEVRQIAPGQTGRIADYNYKLDPDDFTGCVIAWNSNNLDSKVG GNYNYLYRLFRKSNLKPFERDISTEYIYQAGSTPCNGVE GFNCYFPLQSYGFHPTNGVGYQPYRVVLSFELLNAPATVCG PKQSTNLVKNKCVNFNFNGLTGTGVLTESSKKFLPFQQ FGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSNQV AVLYQDVNCTEVPVAIHADQLTPTWRVYSTGNSNVFQ TRAGCLIGAEHVNNSECDIPGAGICASYQTQTNSRSVSSQAI IAYTMSLGAENSVAYANNSIAIPTNFTISVTTEILP VSMTKTSVDCTMYICGDSIECSNLLLQYGSFCTQLNRALTGIA VEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQILPD PSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLICA QKFNGLTVLPPLLDEMIQAQYTSALLAGTITSGWTF GAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNSAI GKIQDSLSTASALGKLQDVVNQNAQALNTLVKQLSS NFGAISSVLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVTQQLI RAAEIRASANLAATKMSECVLGQSKRVDFCGKGYH LMSFPQSAPHGVVFLHVTYVPSQEKNFTTTTPAICHEGKAHFPR EGVFVSNGTWVFTQRNFYEPQIITDNTFVSGSCDV VIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISGI NASVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEQ YIKWPWYIWLGFIAGLIAIIMVTIMLCCMTSCCCLKGCCSCGS CCKFDEDDSEPVLKGVKLHYT
41	Pangolin coronavirus	MLFFFFLHFALVNSQCVNLTGRAAIQPSFTNSSQRGVYYPDIT FRSNLTVLSQGYFLPFYSNVSWYYALTKTNSAEKRVD

	Surface glycoprotein (Genbank: QLR06866)	NPVLDFKDGIFYAATEKSNIVRGWIFGTTLDNTSQSLIVNNAT NVIIKVCNFQFCYDPYLSGYYHNNKTWSTREFAVYS SYANCTFEYVSKSFMLDIAGKSGLFDTLREFVFRNVDGYFKIY SKYTPVNVNSNLPIGFSALEPLVEIPAGINITKFRTL LTIHRGDPMPNNGWTVFSAAYYVGYLAPRTFMLNYNENGTIT DAVECALDPLSEAKCTLKSLTVEKGIYQTSNFRVQPT SIVRFPNITNLCPPFGEVFNATTFASVYAWNRKRISNCVADYSVL YNSTSFSTFKCYGVSPTKLNDLCFTNVYADSFVVRG DEVRQIAPGQTGRIADYNYKLPDDFTGCVIAWNSNNLDSKVG GNYNYLYRLFRKSNLKPFERDISTEIQAGSTPCNGVE GFNCYFPLQSYGFHPTNGVGYQPYRVVLSFELLNAPATVCG PKQSTNLVKNKCVNFNFNGLTGTGVLTESSKKFLPFQ FGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSNQV AVLYQDVNCTEVPVAIHADQLTPTWRVYSTGSNVFQ TRAGCLIGAEHVNNITYECDIPGAGICASYQTQTNRSVSSQAI IAYTMSLGAENSVAYANNSIAIPTNFTISVTTEILP VSMTKTSVDCTMYICGDSIECSNLLLQYGSFCTQLNRALTGIA VEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQILPD PSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLICA QKFNGLTVLPPLLTDEMIAQYTSALLAGTITSGWTF GAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFN SAI GKIQDSLSTASALGKLQDVVNQNAQALNTLVKQLSS NFGAISSVLNDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLI RAAEIRASANLAATKMSECVLGQSKRVDFCGKGYH LMSFPQSAPHGVVFLHVTYVPSQEKNTTTPAICHEGKAHFRP EGVFVSNGTHWFVTQRNFYEPQIITDNTFVSGSCDV VIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISGI NASVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEQ YIKWPWYIWLGFIAGLIAIIMVTIMLCCMTSCCCLKGCCSCGS CCKFDEDDSEPVLKGVKLHYT
42	Bat coronavirus RaTG13 Spike glycoprotein (Genbank: QHR63300)	MFVFLVLLPLVSSQCVNLTTTRTQLPPAYTNSSTRGVYYPDKVF RSSVLHLTQDLFLPFFSNVTWFAIHVSGTNGIKRFD NPVLPFNDGVYFASTKSNIRGWIFGTTLDSTQSLIVNNAT NVVIKVCNFQFCNDPFLGVYHKNKSWMESEFRVY SSANNTFEYVSQPFMDLEGKQGNFKNLREFVFKNIDGYFKI YSKHTPINLVRDLPPGFSALEPLVDLPIGINITRFQT LLALHRSYLTGDSGWTAGAAAYYVGYLQPRFTLLKYEN GTITDAVDCALDPLSETKCTKSFTVEKGIYQTSNFRV QPTDSIVRFPNITNLCPPFGEVFNATTFASVYAWNRKRISNCVA DYSVLYNSTSFSTFKCYGVSPTKLNDLCFTNVYADSF VITGDEVRQIAPGQTGKIADYNYKLPDDFTGCVIAWNSKHIDAK EGGNFNYLYRLFRKANLKPFERDISTEIQAGSKPC NGQTGLNCYYPYRYGFYPTDGVGHQPYRVVLSFELLNAPA TVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTESNKKFL PFQQFGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNA SNQVAVLYQDVNCTEVPVAIHADQLTPTWRVYSTGS NVFQTRAGCLIGAEHVNNISYECDIPGAGICASYQTQTNRSV ASQSIIAYTMSLGAENSVAYSNNIAIPTNFTISVT EILPVSMKTSVDCTMYICGDSTECNLLLQYGSFCTQLNRAL TGIAVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQ ILPDPSPKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDL ICAQKFNGLTVLPPLLTDEMIAQYTSALLAGTITS GWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQ FNSAIGKIQDSLSTASALGKLQDVVNQNAQALNTLVK

		QLSSNFGAISSVLNDILSRDKVEAEVQIDRLITGRLQSLQTYVT QQLIRAAEIRASANLAATKMSECVLGQSKRVDFCG KGYHLMSFPQSAPHGVVFLHVTYVPAQEKNTTAPAICHGDK AHFPREGVFSNGTHWFTVQRNFYEPQIITDNTFVSG SCDVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLG DISGINASVVNIQKEIDRLNEVAKNLNLSLIDLQELG KYEQYIKWPWYIWLGFIAGLIAIMVTIMLCCMTSCCSCCKGCC SCGSCCKFDEDDSEPVLKGVKLHYT
43	SARS-CoV2 Surface glycoprotein (Genbank: YP_00972439 0)	MFVFLVLLPLVSSQCVNLTTTRQLPPAYTNSFTRGVYYPDKVF RSSVLHSTQDLFLPFFSNVTWFHAIHVSGTNGTKRFD NPVLPFNDGVYFASTEKSNIRGWIFGTTLDSTQSLIVNNAT NVVIKVFCEFCNDPFLGVYHKNKSWMESEFRVY SSANNCTFEYVSPFLMDLEGKQGNFKNLREFVFKNIDGYFKI YSKHTPINLVRDLPGGFSALEPLVDLPIGINITRFQT LLALHRSYLTGPDSSSGWTAGAAAYYVGYLQPRTFLLKYNN GTITDAVDCALDPLSETKCTLKSTVEKGIYQTSNFRV QPTESIVRFPNITNLCPFGEVFNATRFASVYAWNKRISNCVA DYSLVYNSASFSTFKCYGVSPTKLNDLCFTNVYADSF VIRGDEVQRQIAPGQTGKIADYNYKLPPDFTGCVIAWNSNNLDS KVGGNYNLYRLFRKSNLKPFERDISTEIQAGSTPC NGVEGFNCYFPLQSYGFQPTNGVGYQPYRVVLSFELLHAPA TVCGPKKSTNLVKNKCVNFNENGLTGTGVLTESNKKFL PFQQFGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNT SNQVAVLYQDVNCTEVPVAIHADQLTPTWRVYSTGS NVFQTRAGCLIGAEHVNSYECDIPIGAGICASYQTQTNSPRR ARSVASQSIIAYTMSLGAENSVAYSNNIAIPTNFTI SVTTEILPVSMTKTSVDCTMYICGDSTECNLLLQYGSFCTQL NRALTGIAVEQDKNTQEVFAQVKQIYKTPPIKDFGGF NFSQILPDPSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDI AARDLICAQKFNGLTVLPPLLTDEMIAQYTSALLAG TITSGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLI ANQFNSAIGKIQDLSSTASALGKLQDVVNQNAQALN TLVKQLSSNFGAISSVLNDILSRDKVEAEVQIDRLITGRLQSLQ TYVTQQLIRAAEIRASANLAATKMSECVLGQSKRV DFCGKGYHLMSFPQSAPHGVVFLHVTYVPAQEKNTTAPAIC HDGKAHFPREGVFSNGTHWFTVQRNFYEPQIITDNT FVSGNCDVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPD VDLGDISGINASVVNIQKEIDRLNEVAKNLNLSLIDL QELGKYEQYIKWPWYIWLGFIAGLIAIMVTIMLCCMTSCCSCCKGCC SCGSCCKFDEDDSEPVLKGVKLHYT
44	SARS-CoV2 VOC_May_01	MFVFFVLLPLVFIQCVSFTNIIHLPSSYINSFTRGVYYPDKVFRS SVLYSIRDFFLPFFSNVTWFHVIRTNVIKRFANPV LPFNDGVYFAFIDKFNIIRGWIFGTTLDSTQSLIVNNATNVVIK VCEFQFCNYPFYKNNKSCCKSESRYSSATNCTF EYVSKPFFIDLVVKQGNFKNFSEFVFKNIDGYFKIYKHTPNLV RGFPQGFLVLEPLVDLPIGINITRFQILYRSYLTG GFFLGLTAGSAAYYVGYLQLRTFLLKYNNENGTITDAVDCALDP LSEIKCTLKSFIEKGIYQTSNFRVQPTESIVRFPNI TNLCPFGEVFNATRFASVYAWNKRISNCVADYSFLYNSASF STFKCYGVSLTKLNDLCFTNVYADSFVIRGDEVQRQIAP GKTGNIADYNYKLPPDFTGCVIAWNSKKLDSKVGGNKYRFR LFRKSNLKPFERDISTEIQAGNKPCNGVKGFNCYSPL QPYGFQPTYGVGYQPYRVVLSFELLHSPSTVCGPKKSTNLV KNKCVNFNFNGLIGTGVLTESNKNFLPFQQFGRDIDDI

		TDAVRDPQTL DILDITPCSFGGVS VITPGTNTSNQVAVLYHGV NCTEV PFAIHS DQLTPTWRVYSTGFNVFQTRAGCLIG VEYVNNSEYEC DIPIGAGICATYHTHTKSHRRARSVVSQSIAYT MSLGVENLVVYSNNSIAIPINF TISVITEILPV SMA KTSVDCTMYICGDSTEC SNLLLQYGSFCTQLNRALT VIAIEQDK NTQQVFAQVKQIYKIPPIKYFGGFNFSQILPDSSKS SKRSFIEDLFFNKVTLADAGFIKQYGDCLGDISARDLICAQKFN GLNVLPPLL TDEMIAQYTSALLSGTITSGWTLGAGA ALQIPFSMQMAYRFNGIGVTQNVLYENQKLIANQFN SAIGKIQY SFFFTAPALGKLQHVVNQ NARALNTLVKQLSSNFGA ISSVLNDILARLDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEI RSSANLAAIKMSECVLGQSKRVDFCGKGYHLMSF PQSAPHGVVFFHV TYVPALENNFTTSPAICHYGAHFPREGVF VSNGTYWFLTQRNFYEPQIITIHNTFLSGNCDVVIGI VNNTVYDPLQPELDSFKEELDKYFKNHTSSYVDLVDISGINASF VNIQKEIDRLNEVANNL NESLIDLQQLGKYEQYIKW PWYIWLCFIAGLIAILIVTIMLCCITSCCSCLKGCCSCGF CCKFD EDDSELLKGVKLHYT
45	SARS-CoV2 VOC Whole VOC surface glycoprotein (Genbank: YP_00972439 0)	MFVFFVLLPLVFIQCVNFTIIHLPSSYINSFTRGVYYPDKVFRSS VLYSIRDFFLPFFSNVTWFHVIRTNVIKRFANPV LPFNDGVYFASIDKFNIIRGWIFGTTLDSKTQSLIVNNATNVVI KVCEQFCNYPFYKNNKSCTESES RVYSSATNCTF EYVSKPFFIDL VVKQGNFKNFSEFVFNIDGYFKIYSKHTPNLV RGFPQGFVLVLEPLVDLPIGINITRFQTLYRSYLTGP GFFLGLTAGSAAYYVGYLQLRTFLLKYNENGTITDAVDCALDP LSEIKCTLKSFILEKGIYQTSNFRVQPTESIVRFPNI TNLCPFGEVFNATRFASVYAWNKRISNCVADYSFLYNSASF STFKCYGVSLTKLNDLCFTNVYADSFVIRGDEVRIQAP GKTGNIADYNYKL PDDFTGCVIAWNSKKLDSKVGGNYNYRFR LFRKSNLKPFERDISTEIYQAGNKP CNGVKGFNCYSPL QPYGFQPTYGVGYQPYRVVLSFELLHSPSTVCGPKKSTNLV KNKCVNFNFNGLIGTGVLTESNKNFLPFQQFGRDIDDI TDAVRDPQTL DILDITPCSFGGVS VITPGTNTSNQVAVLYHGV NCTEV PFAIHS DQLTPTWRVYSTGFNVFQTRAGCLIG VQYVNNSEYEC DIPIGAGICATYHTHTKSHRRARSVVSQSIAYT MSLGVENLVVYSNNSIAIPINF TISVITEILPV SMA KTSVDCTMYICGDSTEC SNLLLQYGSFCTQLNRALT VIAIEQDK NTQQVFAQVKQIYKIPPIKYFGGFNFSQILPDSSKS SKRSFIEDLFFNKVTLADAGFIKQYGDCLGDISARDLICAQKFN GLNVLPPLL TDEMIAQYTSALLSGTITSGWTLGAGA ALQIPFSMQMAYRFNGIGVTQNVLYENQKLIANQFN SAIGKIQY SFFFTASALGKLQHVVNQ NARALNTLVKQLSSNFGA ISSVLNDILARLDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEI RSSANLAAIKMSECVLGQSKRVDFCGKGYHLMSF PQSAPHGVVFFHV TYVPALENNFTTSPAICHYGAHFPREGVF VSNGTHWFLTQRNFYEPQIITIHNTFLSGNCDVVIGI VNNTVYDPLQPELDSFKEELDKYFKNHTSSYVDLVDISGINASF VNIQKEIDRLNEVANNL NESLIDLQQLGKYEQYIKW PWYIWLCFIAGFIAILIVTIMLCCITSCCSCLKGCCSCGF CCKFD EDDSELLKGVKLHYT
46	Pangolin coronavirus Spike protein	MFVFLFVLPLVSSQCVNLTTRTGIPPGYTNSSTRGVYYPDKVF RSSILHLTQDLFLPFFSNVTWFNTINYQGGFKKFDNP VLPFNDGVYFAST EKSNIIRGWIFGTTL DARTQSLIVNNATNV VIKVCEQFCTDPFLGVYHNNNKTW WENEFVYSS

	(Genbank: QIA48614)	ANNCTFEYISQPFLMDLEGKQGNFKNLREFVFNVDGYFKIYS KHTPIDLVRDLPRGFAALEPLVDLPIGINITRFQTL ALHRSYLTGPNLESGWTTGAAAYYVGYLQQRFTLLSYNQNGT ITDAVDCSLDPLSETKCTLKSLTVEKGIYQTSNFRVQP TISIVRFPNITNLCPFGEVFNASKFASVYAWNRKRISNCVADYS VLYNSTSFSTFKCYGVSPTKLNDLCFTNVYADSFV KGDEVQRQIAPGQTGVIADYNYKLPDDFTGCVIAWNSVKQDAL TGGNYGYLYRLFRKSKLKPFERDISTEIQAGSTPCNG QVGLNCYYPLERYGFHPTTG VNYQPFRRVVLSFELLNGPATV CGPKLSTTLVKDKCVNFNFNGLTGTGVLTTSSKKQFLPF QQFGRDISDTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSN QVAVLYQDVNCTEVPMAIHAEQLTPAWRVYSAGANV FQTRAGCLVGAEHVNNSYECIPVGAGICASYHSMSSLRSVN QRSIIAYTMSLGAENSVAYSNNNSIAIPTNFTISVTTEI LPVSMTKTSVDCTMYICGDSIECSNLLLQYGSFCTQLNRALTGI AVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQIL PDPSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLI CAQKFNGLTVLPLLTDEMIAQYTSALLAGTITSGW TFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNS AIGKIQDLSSTASALGKLQDVVNQNAQALNTLVKQL SSNFGAISSVLNDILSRDKVEAEVQIDRLITGRLQSLQTYVTQ QLIRAAEIRASANLAATKMSECVLGQSKRVDFCGKG YHLMSPQSAHPGVVFLHVTYVPAQEKNTTAPAICHEGKAH FPREGVFSNGTHWFITQRNFYEPQIITDNTFVSGSC DVVIGIVNNTVYDPLQPELDSFKEELDKYFNHTSPDVLGDIS GINASVVNIQKEIDRLNEVAKNLNESPIDLQELGKY EQYIKWPWYIWLGFIAGLIAIMVTIMLCCMTSCCSCSLKGCCSC GSCCKFDEDDSEPVLKGVLHYT
47	Pangolin coronavirus Spike protein (Genbank: QIA48623)	MFVFLFVLPLVSSQCVNLTTTRTGIQPGYTNSSSTRGVYYPDKVF RSSILHLTQDLFLPFFSNVTWFNTINYQGGFKKFDNP VLPFNDGVYFASTEKSNIIRGWIFGTTLTDLARTQSLIVNNATNV VIKVCEQFCTDPFLGVYYHNNNKTWVENEFRVYSS ANNCTFEYISQPFLMDLEGKQGNFKNLREFVFNVDGYFKIYS KHTPIDLVRDLPRGFAALEPLVDLPIGINITRFQTL ALHRSYLTGPNLESGWTTGAAAYYVGYLQQRFTLLSYNQNGT ITDAVDCSLDPLSETKCTLKSLTVEKGIYQTSNFRVQP TISIVRFPNITNLCPFGEVFNASKFASVYAWNRKRISNCVADYS VLYNSTSFSTFKCYGVSPTKLNDLCFTNVYADSFV KGDEVQRQIAPGQTGVIADYNYKLPDDFTGCVIAWNSVKQDAL TGGNYLYRLFRKSKLKPFERDISTEIQAGSTPCNGQV GLNCYYPLERYGFHPTTG VNYQPFRRVVLSFELLNGPATVCG PKLSTTLVKDKCVNFNFNGLTGTGVLTTSSKKQFLPFQ FGRDISDTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSNQV AVLYQDVNCTEVPMAIHAEQLTPAWRVYSAGANVFQ TRAGCLVGAEHVNNSYECIPVGAGICASYHSMSSLRSVNQ RSIIAYTMSLGAENSVAYSNNNSIAIPTNFTISVTTEILP VSMTKTSVDCTMYICGDSIECSNLLLQYGSFCTQLNRALTGIA VEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQILPD PSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLICA QKFNGLTVLPLLTDEMIAQYTSALLAGTITSGWTF GAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNSAI GKIQDLSSTASALGKLQDVVNQNAQALNTLVKQLSS NFGAISSVLNDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLI RAAEIRASANLAATKMSECVLGQSKRVDFCGKGYH

		LMSFPQSAPHGVVFLHVTYVPAQEKNFTTAPAICHEGKAHFP REGVVFVSNQTHWFWITQRNFYEPQIITTDNTFVSGSCDV VIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISGI NASVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEQ YIKWPWYIWLGFIAGLIAIIMVTIMLCCMTSCCSCCLKGCCSCGS CCKFDEDDSEPVLKGVKLHYT
48	Pangolin coronavirus Spike protein (Genbank: QIA48641)	MFVFLFVLPLVSSQCVNLTTTRTGIPPGYTNSSSTRGVVYPDKVF RSSILHLTQDLFLPFFSNVTWFTNTITYQGGSKKFDNP VLPFNDGVYFASTEKSNIRGWIFGTTLTDLARTQSLIVNNATNV VIKVECFQFCTDPFLGVYYHNNNKTWVENEFRVYSS ANNCTFEYISQPFLMDLEGKQGNFKNLREFVFNVDGYFKIYS KHTPIDLVRDLPRGFAALEPLVDLPIGINITRFQTL ALHRSYLTGKLESGWTTGAAAYYVGYLQQRFTLLSYNQNGT ITDAVDCSLDPLSETKCTLKSLTVEKGIYQTSNFRVQP TISIVRFPNITNLCPFGEVFNASKFASVYAWNRKRISNCVADYS VLYNSTSFSTFKCYGVSPTKLNDLCFTNVYADSFVV KGDEVQRQIAPGQTGVIADYNYKLPPDFTGCVIAWNSVKQDAL GDNYGYLYRLFRKSKLKPFERDISTEIQAGSTPCNG QVGLNCYYPLERYGFHPTTGVNYQPFRVVLSFELLNGPATV CGPKLSTTLVKDKCVNFNFNGLTGTGVLTTSSKKQFLPF QQFGRDISDITDAVRDPQTLEILDITPCSFGGVSVITPGTNTSN QVAVLYQDVNCTEVPMAIHAEQLTPAWRVYSAGANV FQTRAGCLVGAHVNNSECDIPVGAGICASYHSMSSFRSVN QRSIIAYTMSLGAENSVAYSNNIAIPTNFTISVTTEI LPVSMTKTSVDCTMYICGDSIECSNLLLQYGSFCTQLNRALTGI AVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQIL PDPSKPSKRSFIEDLLFNKVTLDAGFIKQYGDCLGDIAARDLI CAQKFNGLTVLPLLTDEMIAQYTSALLAGTITSGW TFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNS AIGKIQDSLSSSTASALGKLQDVVNQNAQALNTLVKQL SSNFGAISSVLNDILSRDKVEAEVQIDRLITGRLQSLQTYVTQ QLIRAAEIRASANLAATKMSECVLGQSKRVDFCGKG YHLSFPQSAPHGVVFLHVTYVPAQEKNFTTAPAICHEGKAH FPREGVVFVSNQTHWFWITQRNFYEPQIITTDNTFVSGSC DVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDIS GINASVVNIQKEIDRLNEVAKNLNESLIDLQELGKY EQYIKWPWYIWLGFIAGLIAIIMVTIMLCCMTSCCSCCLKGCCSC GSCCKFDEDDSEPVLKGVKLHYT
49	Pangolin coronavirus Spike protein (Genbank: QIA48632)	MFVFLFVLPLVSSQCVNLTTTRTGIPPGYTNSSSTRGVVYPDKVF RSSILHLTQDLFLPFFSNVTWFTNTINYQGGFKKFDNP VLPFNDGVYFASTEKSNIRGWIFGTTLTDLARTQSLIVNNATNV VIKVECFQFCTDPFLGVYYHNNNKTWVENEFRVYSS ANNCTFEYISQPFLMDLEGKQGNFKNLREFVFNVDGYFKIYS KHTPIDLVRDLPRGFAALEPLVDLPIGINITRFQTL ALHRSYLTGKLESGWTTGAAAYYVGYLQQRFTLLSYNQNGT ITDAVDCSLDPLSETKCTLKSLTVEKGIYQTSNFRVQP TISIVRFPNITNLCPFGEVFNASKFASVYAWNRKRISNCVADYS VLYNSTSFSTFKCYGVSPTKLNDLCFTNVYADSFVV KGDEVQRQIAPGQTGVIADYNYKLPPDFTGCVIAWNSVKQDAL GGNYGYLYRLFRKSKLKPFERDISTEIQAGSTPCNG QVGLNCYYPLERYGFHPTTGVNYQPFRVVLSFELLNGPATV CGPKLSTTLVKDKCVNFNFNGLTGTGVLTTSSKKQFLPF QQFGRDISDITDAVRDPQTLEILDITPCSFGGVSVITPGTNTSN QVAVLYQDVNCTEVPMAIHAEQLTPAWRVYSAGANV

		FQTRAGCLVGAEHVNNSEYECIPVGAGICASYHSMSSFRSVN QRSIIAYTMSLGAENSVAYSNNNSIAIPTNFTISVTTEI LPVSMTKTSVDCTMYICGDSIECSNLLLQYGSFCTQLNRALTGI AVEQDKNTQEVEFAQVKQIYKTPPIKDFGGFNFSQIL PDPSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLI CAQKFNGLTVLPPLLTDEMIQYTSALLAGTITSGW TFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNS AIGKIQDSLSSSTASALGKLQDVVNQNAQALNTLVKQL SSNFGAISSVLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVTQ QLIRAAEIRASANLAATKMSECVLGQSKRVDFCGKG YHLSMFPQSAPHGVVFLHVTYVPAQEKNTTAPAICHEGKAH FPREGVFVSNGTHWFITQRNFYEPQIITDNTFVSGSC DVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDIS GINASVVNIQKEIDRLNEVAKNLNESLIDLQELGKY EQYIKWPWYIWLGFIAGLIAIMVTIMLCCMTSCCSCCLKGCCSC GSCCKFDEDDSEPVKGVKLHYT
50	Pangolin coronavirus Spike protein (Genbank: QIQ54048)	MFVFLFVLPLVSSQCVNLTRTGIPPGYTNSSTRGVYYPDKVF RSSILHLTQDLFLPFFSNVTWFNTIHLNYQGGFKKFD NPVLPXNDGVYFASTEKSNIIRGWIFGTTLTARTQSLIVNNAT NVVIKVFCEQFCTDPFLGVYHNNNKTWVENEFRVY SSANNCTFEYISQPFMDLEGKQGNFKNLREFVFKNVGDGYFKI YSKHTPIDLVRDLPRGFAALEPLVDLPIGINITRFQT LLALHRSYLTGKLESGWTTGAAAYYVGYLQQRTFLLSYNQN GTITDAVDCSLDPLSETKCTLKSLTVEKGIYQTSNFRV QPTISIVRFPNITNLCPFGEVFNASKFASVYAWNRKRISNCVAD YSVLNSTSFSTFKCYGVSPTKLNDLCFTNVYADSF VVKGDEVQRQIAPGQTGVIADYNYKLPDDFTGCVIWNQSVKQD ALTGGNYGYLYRLFRKSKLKPFERDISTEYQAGSTPC NGQVGLNCYPLERYGFHPTTG VNYQPFRVVLSXELLNGPA TVCGPKLSTTLVKDKCVNFNFNGLTGTGVLTTSKKQFL PFQQFGRDISDTTDAVRDPQTLEILDITPCSFGGVSVITPGTNT SNQVAVLYQDVNCTEVPMAIHAEQLTPAWRVYSAGA NVFQTRAGCLVGAEHVNNSEYECIPVGAGICASYHSMSSFRS VNQRSIIAYTMSLGAENSVAYSNNNSIAIPTNFTISVT EILPVSMTKTSVDCTMYICGDSIECSNLLLQYGSFCTQLNRALT GIAVEQDKNTQEVEFAQVKQIYKTPPIKDFGGFNFLQ ILPDPSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDL ICAQKFNGLTVLPPLLTDEMIQYTSALLAGTITS GWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQ FNSAIGKIQDSLSSSTASALGKLQDVVNQNAQALNTLVK QLSSNFGAISSVLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVT QQLIRAAEIRASANLAATKMSECVLGQSKRVDFCG KGYHLSMFPQSAPHGVVFLHVTYVPAQEKNTTAPAICHEGK AHFPREGVFVSNGTHWFITQRNFYEPQIITDNTFVSG SCDVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLG DISGINASVVNIQKEIDRLNEVAKNLNESLIDLQELG KYEYIKWPWYIWLGFIAGLIAIMVTIMLCCMTSCCSCCLKGCC SCGSCCKFDEDDSEPVKGVKLHYT
51	SC2r-CoV batACE2 Spike	MFILVLLNVLVSYGCVNITYGSHHLYVSSRTRGVYYPDDAFRS STNVLHEGFFLPFDSNVTWYSFWNQKYSVATSPFGDG VYFSTIDKSNVVRGWVFGTTLDNDTQSVLLYNDGTHVRVEVC TFHFCPTPVFSASSPHLYSSAFNCTLNLYLASVRADFT EVDGSFKTIREFVFKLQDGS LN VYASTSYVLAIGATSQLPSG VTPLVPLWKIPIGLNITNFKTLVYLRSDNTPLQAAYV

		VGHLKRRTMMFKYDENGITIVDAIDCALDPLSETKCTLRSFIVEK GIYQTSNFRVQPQDTVVRFPNITNLCPFSEVFNATT FASVYAWNRRKRISNCVADYSVLNSTSFSTFQCYGVSSTKLN DLCFTNVYADSFVVRGDEVQRQIAPGQTGVIADYNYKLP DDFTGCVLAWNSRNQDASTSGNFNYYYRIWRSEKLRPFERDI AHYDYQVGTQFKSSLKNYGFYSSAGDSHQPYRVVLSF ELLNAPATVCGPKQSTELIKNCVNFNFNGLTGTGVLTDSENKK FQSFQQFGRDVSDFTDSVKDPKTLEVLDITPCSYGGV SVITPGTNASTQVAVLYQDVNCTDVPTAIHAEQLTPSWRVYST GTNMFQTQAGCLIGAEHVNNSYDCDIPGAGICATYH TPSMLRSANNKRIVAYVMSLGAENSVAYSNNIAIPTNFTISV TTEVMPVSMTKTSVDCTMYICGDSVECSLTLQYGS FCTQLNRALTGIAVEQDKNTQEVFAQVKQIYKTPDIKDFGGFN FSQILPDPSKPSKRSFIEDLLFNKVTLADAGFVKQYG DCLGDIQARDLCAQKFNGLTVPPLLTDEMIAAYTAALISGTAT AGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYE NQKLIANQFNSAIGKIQESLTSTASALGKLQDVVNQNAQALNTL VKQLSSNFGAISSVLNDIISRLDKVEAEVQIDRLIT GRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVD FCGKGYHLMSFPQAAPHGVVFLHVTYIPSQERNFTTA PAICHEGKAHFPREGVFVSNGTHWFITQRNFYEPQIITDNTFV SGTCDVVIGIVNNTVYDPLQPELESFKDELDKYFKN HTSPDIDLGDISGINASVVDIQKEIDILKDVAKNLNESLINLQELG KYEQYIKWPWYVWLGFIAGLIAIIMVTIMLCCMT SCCSCLKGCCSCGSCCKFDEDDSEPVLKGVKLHYT
52	Bats SARS coronavirus Rc-0319 Spike (Genbank: QIQ54048)	MFILVLLNVLSVYGCVNITYGSHHLYVSSRTRGVVYPDDAFRS STNVLHEGFFLPFDSNVTWYSFWNQKYSVATSPFGDG VYFSTIDKSNVVRGWVFGTTLDNDTQSVLLYNDGTHVRVEVC TFHFCPTPVFSASSPHLYSSAFNCTLNITLASVRADFT EVDGSFKTIREFVFKLQDGSNLVYYASTSYVLAIGATSQLPSG VTPLVPLWKIPIGLNITNFKTLVYLRSDNTPLQAAYV VGHLKRRTMMFKYDENGITIVDAIDCALDPLSETKCTLRSFIVEK GIYQTSNFRVQPQDTVVRFPNITNLCPFSEVFNATT FASVYAWNRRKRISNCVADYSVLNSTSFSTFQCYGVSSTKLN DLCFTNVYADSFVVRGDEVQRQIAPGQTGVIADYNYKLP DDFTGCVLAWNSRNQDASTSGNFNYYYRIWRSEKLRPFERDI AHYDYQVGTQFKSSLKNYGFYSSAGDSHQPYRVVLSF ELLNAPATVCGPKQSTELIKNCVNFNFNGLTGTGVLTDSENKK FQSFQQFGRDVSDFTDSVKDPKTLEVLDITPCSYGGV SVITPGTNASTQVAVLYQDVNCTDVPTAIHAEQLTPSWRVYST GTNMFQTQAGCLIGAEHVNNSYDCDIPGAGICATYH TPSMLRSANNKRIVAYVMSLGAENSVAYSNNIAIPTNFTISV TTEVMPVSMTKTSVDCTMYICGDSVECSLTLQYGS FCTQLNRALTGIAVEQDKNTQEVFAQVKQIYKTPDIKDFGGFN FSQILPDPSKPSKRSFIEDLLFNKVTLADAGFVKQYG DCLGDIQARDLCAQKFNGLTVPPLLTDEMIAAYTAALISGTAT AGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYE NQKLIANQFNSAIGKIQESLTSTASALGKLQDVVNQNAQALNTL VKQLSSNFGAISSVLNDIISRLDKVEAEVQIDRLIT GRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVD FCGKGYHLMSFPQAAPHGVVFLHVTYIPSQERNFTTA PAICHEGKAHFPREGVFVSNGTHWFITQRNFYEPQIITDNTFV SGTCDVVIGIVNNTVYDPLQPELESFKDELDKYFKN

		HTSPDIDLGDISGINASVVDIQKEIDILKDVAKNLNESLINLQELG KYEYIKWPWYVWLGFIAIIMVTIMLCCMT SCCCLKGCCSCGSCCKFDEDDSEPVLKGVKLHYT
53	Bat SARS-like coronavirus Rs7327 S protein RBD (Genbank: ATO98218)	SNFRVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLYNSTSFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLPPDFMGCVLAWN TRNIDATSTGNYNKYRSLRHGKLRPFERDISNVPFSP DGKPCTPPAFNCYWPLNDYGFFTTNGIGYQPYRVVLSFELL NAPATVCGPKLSTDLIKNQCVNFNFNGLTGTGVLTPSS KRFQPFQQFGRDVSDFTDSVRDPKTSEIL
54	Coronavirus BtRs- BetaCoV/YN20 18B S protein RBD (Genbank: QDF43825)	SNFRVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLYNSTSFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLPPDFMGCVLAWN TRNIDATSTGNYNKYRSLRHGKLRPFERDISNVPFSP DGKPCTPPAFNCYWPLNDYGFFTTNGIGYQPYRVVLSFELL NAPATVCGPKLSTDLIKNQCVNFNFNGLTGTGVLTPSS KRFQPFQQFGRDVSDFTDSVRDPKTSEIL
55	Rhinolophus affinis coronavirus LYRa11 S protein RBD (Genbank: AHX37558)	SNFRVSPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLYNSTSFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLPPDFMGCVLAWN TRNIDATSSGNFNYKYRSLRHGKLRPFERDISNVPFSP DGKPCTPPAFNCYWPLNDYGFTTNGIGYQPYRVVLSFELL NAPATVCGPKLSTDLIKNQCVNFNFNGLTGTGVLTPSL KRFQPFQQFGRDVSDFDTSVRDPKTLEVL
56	Rhinolophus affinis coronavirus LYRa3 S protein RBD (Genbank: AHX37569)	SNFRVSPSREVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLYNSTSFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLPPDFMGCVLAWN TRNIDATSSGNFHYKYRSLRHGKLRPFERDISNVPFSP DGKPCTPPAFNCYWPLNDYGFTTNGIGYQPYRVVLSFELL NAPATVCGPKLSTDLIKNQCVNFNFNGLTGTGVLTPSS KRFQPFQQFGRDVSDFTDSVRDPKTLEVL
57	SARS coronavirus Tor2 Spike glycoprotein RBD (Genbank: YP_00982505 1)	SNFRVPSGDVVRFPNITNLCPFGEVFNATKFPSVYAWERKKI SNCVADYSVLYNSTFFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLPPDFMGCVLAWN TRNIDATSTGNYNKYRYLRHGKLRPFERDISNVPFSP DGKPCTPPALNCYWPLNDYGFTTTGIGYQPYRVVLSFELL NAPATVCGPKLSTDLIKNQCVNFNFNGLTGTGVLTPSS KRFQPFQQFGRDVSDFTDSVRDPKTSEIL
58	Bat SARS-like coronavirus Rs3367 S protein RBD (Genbank: AGZ48818)	SNFRVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLYNSTSFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLPPDFTGCVLAWN TRNIDATQTGNYNKYRSLRHGKLRPFERDISNVPFSP DGKPCTPPAFNCYWPLNDYGFIYTNIGIGYQPYRVVLSFELL APATVCGPKLSTDLIKNQCVNFNFNGLTGTGVLTPSS KRFQPFQQFGRDVSDFTDSVRDPKTSEIL
59	SARS-like coronavirus WIV16 S protein	SNFRVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLYNSTSFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLPPDFTGCVLAWN TRNIDATQTGNYNKYRSLRHGKLRPFERDISNVPFSP

	RBD (Genbank: ALK02457)	DGKPCTPPAFNCYWPLNDYGFYITNGIGYQPYRVVLSFELLN APATVCGPKLSTDLIKNQCVNFNFNGLTGTGVLTPSS KRFQPFQQFGRDVSDFTDSVRDPKTSEIL
60	Bat SARS-like coronavirus Rs4231 S protein RBD (Genbank: ATO98157)	SNFRVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLNYSSTSFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLPDDFLGCVLAWN TNSKDSSTSGNLYLYRWVRRSKLNPYERDLSNDIYSP GGQSCSAIGPNCYNPLRPYGFFTTAGVGHQPYRVVLSFELL NAPATVCGPKLSTDLIKNQCVNFNFNGLTGTGVLTPSS KRFQPFQQFGRDVSDFTDSVRDPKTSEIL
61	Bat SARS-like coronavirus RsSHC014 S protein RBD (Genbank: AGZ48806)	SNFRVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLNYSSTSFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLPDDFLGCVLAWN TNSKDSSTSGNLYLYRWVRRSKLNPYERDLSNDIYSP GGQSCSAVGPNPCYNPLRPYGFFTTAGVGHQPYRVVLSFELL NAPATVCGPKLSTDLIKNQCVNFNFNGLTGTGVLTPSS KRFQPFQQFGRDVSDFTDSVRDPKTSEIL
62	Bat SARS-like coronavirus Rs4084 S protein RBD (Genbank: ATO98132)	SNFRVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSILYNYSSTSFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLPDDFLGCVLAWN TNSKDSSTSGNLYLYRWVRRSKLNPYERDLSNDIYSP GGQSCSAVGPNPCYNPLRPYGFFTTAGVGHQPYRVVLSFELL NAPATVCGPKLSTDLIKNQCVNFNFNGLTGTGVLTPSS KRFQPFQQFGRDVSDFTDSVRDPKTSEIL
63	Bat SARS coronavirus BtKY72 S protein RBD (Genbank: APO40579)	SNFRVSPSTEVRFPNITNLCPFQVFNASNFPSVYAWERLRI SDCVADYAVLYNSSSSSFSTFKCYGVSPTKLNLCFSS VYADYFVVKGDDVRQIAPAQTGVIADYNYKLPDDFTGCVLAW NTNSVDSKSGNNFYRLFRHGKIKPYERDISNVLYNLSA GGTCSSISQLGCYEPLKSYGFTPTVGVGYPYRVVLSFELLN APATVCGPKKSTELVKNKCVNFNFNGLTGTGVLTSST KKFQPFQQFGRDVSDFTDSVRDPKTSEIL
64	SARS-like coronavirus BatCoV/BB990 4/BGR/2008 S protein RBD (Genbank: ALJ94036)	SNFRVTPTEVVRFPNITKLCPFQVFNASSFSPSVYAWERVRI TDCVANYAVLYNSSVSFSTFQCYGVSPTKLNLCFSS VYADYFIVKGDDVRQIAPSQTGVIADYNYKLPDDFTGCVIAWN TNALDSNKDFYRLFRHGKIKPYGRDLSNIPYSPSGT CSTINNLNCFAPLKSYGFTQSSGISFQPYRVVLSFELLNAPAT VCGPKQSTELVKDKCVNFNFNGLTGTGVLTPSSKKF QPFQFGRDVSDFTDSVRDPKTLEIL
65	Bat coronavirus BM48- 31/BGR/2008 S protein RBD (Genbank: YP_00385858 4)	SNFRVTPTEVVRFPNITQLCPFNEVFNITSFSPSVYAWERMRI NCVADYSVLNYSASFSTFQCYGVSPTKLNLCFSS VYADYFVVKGDDVRQIAPAQTGVIADYNYKLPDDFTGCVIAWN TNSLDSSNEFFYRRFRHGKIKPYGRDLSNVLFNPSGG TCSAEGNLNCKPLASYGFTQSSGIGFQPYRVVLSFELLNAPA TVCGPKQSTELVKNKCVNFNFNGLTGTGVLTPSSKKF QPFQFGRDVSDFTDSVRDPKTLEIL
66	Pangolin coronavirus cDNA8-S S protein RBD	SNFRVQPTESIVRFPNITNLCPFGEVFNATTFASVYAWNKRIS NCVADYSVLNYSSTSFSTFKCYGVSPTKLNLCFTNV YADSFVVRGDEVVRQIAPGQTGRIADYNYKLPDDFTGCVIAWN SNNLDSKVGNNYLYRLFRKSNLKPFERDISTEIYQA GSTPCNGVEGFNCFPLQSYGFHPTNGVGYPYRVVLSFEL LNAPATVCGPKQSTNLVKNKCVNFNFNGLTGTGVLTPSS

	(Genbank: QLR06864)	SKKFLPFQQFGRDIADTTDAVRDPQTLEIL
67	SARS-CoV2 S protein RBD (Genbank: YP_009724390)	SNFRVQPTESIVRFPNITNLCPFGEVFNATRFASVYAWNKRIS SNCVADYSVLYNSASFSTFKCYGVSPKLNLCFTNV YADSFVIRGDEVQRQIAPGQTGKIADYNYKLPPDFTGCVIAWNS NNLDSKVGGNYNYLYRLFRKSNLKPFRDISTEIQAGS GSTPCNGVVEGFNCFYPLQSYGFQPTNGVGYQPYRVVLSFE LLHAPATVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTS NKKFLPFQQFGRDIADTTDAVRDPQTLEIL
68	SARS-CoV2 VOC May 01 RBD	SNFRVQPTESIVRFPNITNLCPFGEVFNATRFASVYAWNKRIS SNCVADYSVLYNSASFSTFKCYGVSLTKLNLCFTNV YADSFVIRGDEVQRQIAPGKTGNIADYNYKLPPDFTGCVIAWNS KKLDSKVGGNYKYRFLFRKSNLKPFRDISTEIQAGS GNKPCNGVKGFNCFYPLQPYGFQPTYGVGYQPYRVVLSFE LLHSPSTVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTS NKNFLPFQQFGRDIDITDAVRDPQTLEIL
69	SARS-CoV2 VOC S protein RBD (Genbank: YP_009724390)	SNFRVQPTESIVRFPNITNLCPFGEVFNATRFASVYAWNKRIS SNCVADYSVLYNSASFSTFKCYGVSLTKLNLCFTNV YADSFVIRGDEVQRQIAPGQTGNIADYNYKLPPDFTGCVIAWNS KKLDSKVGGNYNYRFLFRKSNLKPFRDISTEIQAGS GNKPCNGVKGFNCFYPLQPYGFQPTYGVGYQPYRVVLSFE LLHSPSTVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTS NKKFLPFQQFGRDIDITDAVRDPQTLEIL
70	Bat coronavirus RaTG13 S protein RBD (Genbank: QHR63300)	SNFRVQPTDSIVRFPNITNLCPFGEVFNATTFASVYAWNKRIS SNCVADYSVLYNSTSFSTFKCYGVSPKLNLCFTNV YADSFVITGDEVQRQIAPGQTGKIADYNYKLPPDFTGCVIAWNS KHIDAKEGGNFNYLYRLFRKANLKPFRDISTEIQAGS GSKPCNGQTGLNCFYPLRYGFYPTDGVGHQPYRVVLSFE LLNAPATVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTS NKKFLPFQQFGRDIADTTDAVRDPQTLEIL
71	Pangolin coronavirus GX-P1E S protein RBD (Genbank: QIA48623)	SNFRVQPTISIVRFPNITNLCPFGEVFNASKFASVYAWNKRIS NCVADYSVLYNSTSFSTFKCYGVSPKLNLCFTNV YADSFVVKGDEVQRQIAPGQTGVIADYNYKLPPDFTGCVIAWNS VKQDALTTGGNYLYRLFRKSKLKPFRDISTEIQAGS TPCNGQVGLNCFYPLERYGFHPTTGVDNYQPFVVVLSFELLN GPATVCGPKLSTTLVKDKCVNFNFNGLTGTGVLTTSSK QFLPFQQFGRDISDITDAVRDPQTLEIL
72	Pangolin coronavirus GX-P2V S protein RBD (Genbank: QIQ54048)	SNFRVQPTISIVRFPNITNLCPFGEVFNASKFASVYAWNKRIS NCVADYSVLYNSTSFSTFKCYGVSPKLNLCFTNV YADSFVVKGDEVQRQIAPGQTGVIADYNYKLPPDFTGCVIAWNS VKQDALTTGGNYGYLYRLFRKSKLKPFRDISTEIQAGS GSTPCNGQVGLNCFYPLERYGFHPTTGVDNYQPFVVVLSXEL LNGPATVCGPKLSTTLVKDKCVNFNFNGLTGTGVLTTSS KKQFLPFQQFGRDISDITDAVRDPQTLEIL
73	Pangolin coronavirus GX-P4L S protein RBD (Genbank: QIA48614)	SNFRVQPTISIVRFPNITNLCPFGEVFNASKFASVYAWNKRIS NCVADYSVLYNSTSFSTFKCYGVSPKLNLCFTNV YADSFVVKGDEVQRQIAPGQTGVIADYNYKLPPDFTGCVIAWNS VKQDALTTGGNYGYLYRLFRKSKLKPFRDISTEIQAGS GSTPCNGQVGLNCFYPLERYGFHPTTGVDNYQPFVVVLSFEL LNGPATVCGPKLSTTLVKDKCVNFNFNGLTGTGVLTTSS KKQFLPFQQFGRDISDITDAVRDPQTLEIL
74	Pangolin coronavirus GX-P5E	SNFRVQPTISIVRFPNITNLCPFGEVFNASKFASVYAWNKRIS NCVADYSVLYNSTSFSTFKCYGVSPKLNLCFTNV

	S protein RBD (Genbank: QIA48641)	YADSFVVKGDEVQRQIAPGQTGVIADYNYKLPDDFTGCVIAWNS VKQDALTGDNYGYYLRLFRKSKLPFERDISTEIQQA GSTPCNGQVGLNCCYPLERYGFHPTTGVNYQPFRVWVLSFEL LNGPATVCGPKLSTTLVKDKCVNFNFNGLTGTGVLTTTS KKQFLPFQQFGRDISDITDAVRDPQTLEIL
75	Bat SARS coronavirus Rc-o319 S protein RBD (Genbank: BCG66627)	SNFRVQPQDTVVRFPNITNLCPFSEVFNATTFASVYAWNRRRI SNCVADYSVLNNTSFSTFCYGVSSSTKLNDLCFTNV YADSFVVRGDEVQRQIAPGQTGVIADYNYKLPDDFTGCVLAWN SRNQDASTSGNFNYYRIWRSEKLRPFERDIAHYDYQV GTQFKSSLKNGFYSSAGDSHQPYRVVWLSFELLNAPATVCG PKQSTELIKNKCYNFNFNGLTGTGVLTDNKKFQSFQQ FGRDVSDFTDSVKDPKTLEVL
76	Bat SARS CoV RShSTT182 S protein RBD (Genbank: RShSTT182/2 010 EPI_ISL_8 52604)	SNFRVQPQDTVVRFPNITNLCPFSEVFNATTFASVYAWNRRRI SNCVADYSVLNNTSFSTFCYGVSSSTKLNDLCFTNV YADSFVVRGDEVQRQIAPGQTGVIADYNYKLPDDFMGCVIAWN SISLDAGGSYYYRLFRKSVLKPFERDISTQLYQAGDKP CSVEGPDCYYPLQSYFYQSTNGVGYQPYRVVWLSFELLNAPA TVCGPKKSTHLVVNKCYNFNFNGLTGTGVLTSSTKKFL PFQQFGRDVADTTNAVRDPQTLEVL
77	SARS-related coronavirus Spike glycoprotein (Genbank: ABD72984)	MFIFILFLTLTSGSDLDRCCTTFDDVQAPNYTQHTSSMRGVVYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFIKLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVWVPSGDVVRFPNIT NLCPFGEVFNATKFPVYAWERKKISNCVADYSVLNNTFFST FKCYGVSATKLNDLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVWLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT

78	SARS coronavirus wtic-MB Spike glycoprotein precursor (Genbank: ACZ72093)	MFIFLLFLTSLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDFAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDIWGTSAAYFFGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQLPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNLSLIDLQELGKYEQYIKWPWYVWL GFIAGLIAVMVTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
79	SARS coronavirus Shanghai LY Spike glycoprotein (Genbank: AAP82968)	MFIFLLFLTSLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV RACNFELCDNPFFAVSKPMGTQTHTMIFDFAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGSLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTGNIDATSTGNYDYKYRY LRHGKLRPFERDISNVPFSPDGKPTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQLPDPLKPTKRSFI EDLPFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF

		AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAAGIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVDLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
80	SARS coronavirus HKU-39849 Spike glycoprotein precursor (Genbank: ADC35483)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSIVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQLPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGIATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVDLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
81	SARS-related coronavirus Spike glycoprotein (Genbank: ABD72982)	MLIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND

		YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVWIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
82	SARS coronavirus Tor2 Spike glycoprotein precursor (Genbank: AFR58672)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLDLCSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDISPCXFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVWIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT

83	SARS coronavirus Tor2 Spike glycoprotein precursor (Genbank: AFR58714)	MFIFLLFLTSLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LXHGKLRPFERDISNVFSPDGKPTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCXFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTONVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNLSLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
84	SARS coronavirus Tor2 Spike glycoprotein (Genbank: YP_00982505 1)	MFIFLLFLTSLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFSPDGKPTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCAFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF

		AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
85	SARS coronavirus ShanghaiQXC 1 Spike (Genbank: AAR86788)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCAFGGVSVITPGTNASSEVAVLYQDVNCT NVSAAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKGELDKYFKNHTSPDVLGDISGINASVVNIQK EIDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
86	SARS Coronavirus CDC#2003011 57 S protein (Genbank: AAU81608)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND

		YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPVGAGICASYHTVSLLRSTSQKSIVAYTMSLGA DSSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
87	SARS coronavirus P2 Spike glycoprotein precursor (Genbank: ACQ82725)	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFPAVSKPMGTQTHMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQGVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPVGAGICASYHTVSLLRSTSQKSIVAYTMSLGA DSSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
88	SARS coronavirus AS	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFGNPV

	Spike protein S (Genbank: AAQ94060)	IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAfsp AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPsgdVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNICYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
89	SARS coronavirus ExoN1 Spike glycoprotein precursor (Genbank: AFM43867)	MFIFLLFLTSTSGSDDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAfsp AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPsgdVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNICYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE YVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISIAITEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN

		DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVDLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
90	SARS coronavirus ExoN1 Spike glycoprotein (Genbank: AGT21078)	MFIFLLFLTTLTSGSDLRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAESP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPBGDVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDVVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNKYRS LRHGKLRPFERDISNVPFSPDGKCTPPALNICYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE YVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISIAIEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRLALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTVTAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVDLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
91	SARS coronavirus Frankfurt 1 Spike protein S (Genbank: AAP33697)	MFIFLLFLTTLTSGSDLRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAESP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPBGDVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDVVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNICYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD

		SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITTDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVDFGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
92	SARS coronavirus Frankfurt1-v01 Spike glycoprotein (Genbank: BAF42873)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPFIKPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDVVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFPSPDGKPTPPALNCYWPVND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE YVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLSADAGFMKQYGECLGDINARDLICAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSFNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITTDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVDFGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
93	SARS coronavirus Frankfurt 1 Spike protein	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT

	(Genbank: BAE93401)	FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDVVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRC LRHGKLRPFERDISNVPFSPDGKCTPPAFNICYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEFAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE YVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKSTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVDFGDISGINASVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAVMVTILLCCMTSCCSCCKGACSCGSCCKFDEDDSE PVLKGVKLHYT
94	SARS-related coronavirus Spike glycoprotein (Genbank: ABD72969)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLNSTFFST FKCYGVSATKLNLCFSNVYVDSFVVKGDVVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNICYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH

		GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
95	SARS coronavirus BJ182-12 Spike glycoprotein S (Genbank: ACB69905)	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFDGFNFSQILPDPLKPIKRSFI EDLLFNKVTALADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIESLTTT STALGKLQDVWNQNAQALNTLVKQLSSNFGAIVSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINAPVVNIQKE IDRLNEVAKNLNESLIDLRELKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
96	SARS coronavirus BJ182a Spike glycoprotein S (Genbank: ACB69860)	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFGNPI IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE

		HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFDGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWAFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIKE IDRLNEVAKNLNESLIDLRELKGYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
97	SARS coronavirus BJ182-8 Spike glycoprotein S (Genbank: ACB69894)	MFIFLLFLTSGSDLRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPFLPLGINITNFRAILTAFFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPBGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGDDVVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGDRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFDGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIKE IDRLNEVAKNLNESLIDLRELKGYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
98	SARS coronavirus BJ182-4 Spike glycoprotein S	MFIFLLFLTSGSDLRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTLGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPFLPLGINITNFRAILTAFFSP

	(Genbank: ACB69883)	AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEDKGIYQTSNFRVVPBGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGDDVVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFDGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLRELKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
99	SARS coronavirus Sino1-11 Spike protein (Genbank: AAR23250)	MFIFLLFLTSTSGSDDLRCRTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDFAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPFIKPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEDKGIYQTSNFRVVPBGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGDDVVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRS LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY

		DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
100	SARS coronavirus ExoN1 Spike glycoprotein precursor (Genbank: ACZ71797)	MFIFLLFLTLTSGSDLRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPFIKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPVSDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDVVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFPSPDGKPTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNAFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMTKTSVDC NMYICGDSTECANLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRQLSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINTSVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
101	SARS coronavirus ExoN1 Spike glycoprotein precursor (Genbank: ACZ72020)	MFIFLLFLTLTSGSDLRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPFIKLPLGINITNFRAILTAFPP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDVVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFPSPDGKPTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMTKTSVDC

		NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLL TDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
102	SARS coronavirus ExoN1 Spike glycoprotein precursor (Genbank: ACZ71976)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMTKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLXKFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLL TDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEIAKNL NESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
103	SARS coronavirus ExoN1 Spike glycoprotein precursor (Genbank: ACZ71961)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEDKGIYQTSNFRVVPVSGDVVRFPNIT

		NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNCQ VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMTKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESFTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIINNTVY DPLQPELNSFKEELDKYFKNHTSPDVLGDIGINASVUNIKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
104	SARS coronavirus ExoN1 Spike glycoprotein precursor (Genbank: ACZ72195)	MFIFLLFLTSTSGSDDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEXISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNCQ VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMTKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDIGINASVUNIKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL

		GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
105	SARS coronavirus ExoN1 Spike glycoprotein precursor (Genbank: ACZ72108)	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYL TQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPFLKPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPBGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNICYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVVYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMTKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVQKMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAIVSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVWIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
106	SARS coronavirus ExoN1 Spike glycoprotein precursor (Genbank: ACZ71826)	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYL TQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPFLKPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPBGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNICYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMTKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVQKMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI

		EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
107	SARS coronavirus ExoN1 Spike glycoprotein precursor (Genbank: ACZ72254)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPBGDVRFPNIT NLCPFGEVFNATKFPVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDIPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMTKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRLSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKIHTSPDVLGDISGINASVVNIQKEI DRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
108	SARS-related coronavirus Spike glycoprotein (Genbank: ABD72972)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPBGDVRFPNIT NLCPFGEVFNATKFPVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG

		QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNNYKYRY LRHGKLRPFERDISNVFSPNGKPTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNGTS WFITQRNFFSPQIITTDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
109	SARS coronavirus MA15 ExoN1 Spike glycoprotein precursor (Genbank: ACZ71991)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFVVSXKPMGTQTHTMIFDFAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVWVPSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNHNYKYRY LRHGKLRPFERDISNVFSPDGKPTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQMLPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNGTS WFITQRNFFSPQIITTDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT

110	SARS coronavirus MA15 ExoN1 Spike glycoprotein precursor (Genbank: ACZ72122)	MFIFLLFLTSTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNHNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQLPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNLSLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
111	SARS coronavirus MA15 ExoN1 Spike glycoprotein precursor (Genbank: AEA10443)	MFIFLLFLTSTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNHNYKYRY LXHGLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQLPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF

		AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
112	SARS coronavirus MA15 Spike glycoprotein precursor (Genbank: ACZ72035)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPPGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNHNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSIVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
113	SARS coronavirus MA15 ExoN1 Spike glycoprotein precursor (GenBank: AEA10473)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPPGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNHNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND

		YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAXSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVT LADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVWIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
114	SARS-related coronavirus Spike glycoprotein (GenBank: ABD73001)	MFIFLLFLT LTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFIAVSKPMGTQHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFLPLGINITNFRILTA FSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLDLCSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKL PDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAXSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVT LADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVWIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIVIMVTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
115	SARS-related coronavirus	MFIFLLFLT LTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV

	Spike glycoprotein (GenBank: ABD72970)	IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAfsp AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPsgdVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDLKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNST WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIVVMVITILLCCMTSCCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
116	SARS-related coronavirus Spike glycoprotein (GenBank: ABD72988)	MFIFLLFLTNGSDLDRCCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAfsp AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPsgdVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN

		DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITTDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVDLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIVIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
117	SARS-related coronavirus Spike glycoprotein (GenBank: ABD72985)	MFIFLLFLTTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFIAVSKPMGTQHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPBGDVRFPNIT NLCPFGEVFNATKFPVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGDDVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRLALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITTDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVDLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
118	SARS-related coronavirus Spike glycoprotein (GenBank: ABD72977)	MFIFLLFLTTLTRGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFIAVSKPMGTQHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPBGDVRFPNIT NLCPFGEVFNATKFPVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGDDVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD

		SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNQTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
119	SARS-related coronavirus Spike glycoprotein (GenBank: ABD72979)	MFIFLLFLTTRGSDLRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPFIKPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDVVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFPSPDGKPTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNQTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
120	SARS-related coronavirus Spike glycoprotein	MFIFLLFLTTRGSDLRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT

	(GenBank: ABD72995)	FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPVYAWERKKISNCVVDYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDVVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFSGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDIGINASVUNIKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAVMVTILLCCMTSCCSCCKGACSCGSCCKFDEDDSE PVLKGVKLHYT
121	SARS coronavirus BJ302 Spike glycoprotein (GenBank: AAR07630)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHMIFDANFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDVVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFSGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH

		GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
122	SARS coronavirus TJF Spike glycoprotein (GenBank: AAT76147)	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFSF AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPPGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRNTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTALADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIESLTTT STALGKLQDVWNQNAQALNTLVKQLSSNFGAIVSVLN DILSRDLKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGKCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
123	SARS coronavirus NS-1 Spike glycoprotein S (GenBank: AAR91586)	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFSF AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPPGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE

		HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIMASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDIGINASVUNIKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
124	SARS coronavirus BJ01 Spike glycoprotein S (GenBank: AAP30030)	MFIFLLFLTSGSDLRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPFLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPTPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDIGINASVUNIKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
125	SARS coronavirus HHS-2004 Spike protein (GenBank: AAT74874)	MAIFLLFLTSGSDLRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPFLPLGINITNFRAILTAFSP

		AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNKYRY LKHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNITIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DVLSRLDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASA NLAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
126	SARS coronavirus WH20 Spike glycoprotein S (GenBank: AAX16192)	MFIFLLFLTSTSGSDDLRCRTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFPAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPFIKPLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNITIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRLDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY

		DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLMAIVMTILLCCMTSCCSCLKGACSCGSCCKFDEDDSE EPVLKGVKLHYT
127	SARS coronavirus BJ302 Spike glycoprotein (GenBank: AAR07624)	MFIFLLFFTLTSGSDLRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFIKLPGLINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEDKGIYQTSNFRVVPBGDVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDVVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFPSPDGKPTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRQLSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVGFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
128	SARS coronavirus BJ302 Spike glycoprotein (GenBank: AAR07626)	MFIFLLFFTLTSGSDLRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFIKLPGLINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEDKGIYQTSNFRVVPBGDVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDVVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFPSPDGKPTPPALNCYWPLSD YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPRSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC

		NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLL TDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVGFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDIGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
129	SARS coronavirus BJ302 Spike glycoprotein (GenBank: AAR07629)	MFIFLLFFTLTSGSDLRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLSD YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLL TVDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVGFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDIGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
130	SARS coronavirus BJ302 Spike glycoprotein (GenBank: AAR07625)	MFIFLLFFTLTSGSDLRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT

		NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLSD YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNCQ VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPRSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTVDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVGFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDIGINASVUNIKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
131	SARS coronavirus BJ302 Spike glycoprotein (GenBank: AAR07627)	MFIFLLFLTSTSGSDDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLSD YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNCQ VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPRSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTVDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVGFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDIGINASVUNIKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL

		GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
132	SARS coronavirus BJ302 Spike glycoprotein (GenBank: AAR07628)	MFIFLLFFTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYL TQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACIFELCDNPFFAVSKPMGTQTHMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPBGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGDDVVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLSD YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFGTLTGTVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPRSFSGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVQKMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTVDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVGFCGKGYHLSFPAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVWIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
133	SARS coronavirus BJ302 Spike glycoprotein (GenBank: AAR07631)	MFIFLLFTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYL TQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACIFELCDNPFFAVSKPMGTQTHMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPBGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGDDVVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLSD YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFGTLTGTVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPRSFSGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVQKMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI

		EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGTLVL PPLLTVDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVGFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
134	SARS coronavirus CS21 Spike glycoprotein (GenBank: ABF68958)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVMIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFIKLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP LAELKCSVKSFEDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLDLCSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNVYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNICYWPLNG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDIPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNITIAIPTNFNISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
135	SARS coronavirus ES260 Spike glycoprotein (GenBank: ABF68957)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVMIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFIKLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP AELKCSVKSFEDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLDLCSNVYADSFVVKGDDVVRQIAPG

		QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFSPDGKPTPPAPNCYWPLNG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKQ CVNFNFNGLTGTGVLTSSKRFQPFQQFGRDVSDFD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITTDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCVTSCCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
136	SARS coronavirus CS24 Spike glycoprotein (GenBank: ABF68959)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFSPDGKPTPPAPNCYWPLND YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKQ CVNFNFNGLTGTGVLTSSKRFQPFQQFGRDVSDFD SVRDPKTSEILDISPCAFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITTDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCVTSCCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT

137	SARS coronavirus ES191 Spike glycoprotein (GenBank: ABF68956)	MFIFLLFLTSTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSIGITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNLSLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCVTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
138	SARS coronavirus WF188 Spike glycoprotein (GenBank: ABF68955)	MFIFLLFLTSTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFPYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFKIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDTPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGA DSSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF

		AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCVTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
139	SARS coronavirus PC4-137 Spike glycoprotein (GenBank: AAV49720)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTRTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPDGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLKG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFAQVKQMYKTPTLTKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
140	SARS coronavirus PC4-199 Spike glycoprotein (GenBank: AAV49722)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTRTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPDGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLRG

		YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKQ CVNFNFNGLTGTGVLTTPSSKRFQPFQQFGRDVSDFD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFAQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
141	SARS coronavirus PC4-241 Spike glycoprotein (GenBank: AAV49723)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVVSXKPMGTRTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPVYAWERKRISNCVADYSVLNYSFST FKCYGVSATKLNLDLCSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLNG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKQ CVNFNFNGLTGTGVLTTPSSKRFQPFQQFGRDVSDFD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT

142	SARS coronavirus PC4-115 Spike glycoprotein (GenBank: AAV49719)	MFIFLLFLTTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHFTDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVVSXKPMGTRTHMTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSTGDDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPTPPAPNCYWPLNG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VVFQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDIGINASVVNIQEE IDRLNEVAKNLNLSLIDLQELGKYEQYIKWPWYVWL GFIAGLIAVMVTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
143	SARS coronavirus GD03T0013 Spike glycoprotein (GenBank: AAS10463)	MFIFLLFLTTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHFTDDPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVVSXKPMGTRTHMTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSTGDDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPTPPAPNCYWPLNG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VVFQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF

		AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
144	SARS coronavirus B012 Spike glycoprotein (GenBank: AAV97989)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTRTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPDGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLNG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSIVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNALTVL TPLLDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
145	SARS coronavirus civet020 Spike glycoprotein (GenBank: AAU04664)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTRTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPDGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLRG

		YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
146	SARS coronavirus B033 Spike glycoprotein (GenBank: AAV97992)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIINNSTNVV IRACNFELCDNPFFVVSXKPMGTRTHMTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPVYAWERKRISNCVADYSVLNYSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKHRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT

147	SARS coronavirus PC4-205 Spike glycoprotein (GenBank: AAU93319)	MFIFLLFLTTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQTVIIINNSTNVVI RACNFELCDNPFFVVSXKPMGTRTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPPGEVFNATKFPVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNLSLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
148	SARS coronavirus C028 Spike glycoprotein (GenBank: AAV98001)	MFIFLLFLTTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVVSXKPMGTRTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPPGEVFNATKFPVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTAGCLIGAE HVDTSYDCDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF

		AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
149	SARS coronavirus A013 Spike glycoprotein (GenBank: AAV97985)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTRTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPDGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSIVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLTKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYDNQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
150	SARS coronavirus civet014 Spike glycoprotein (GenBank: AAU04661)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPDGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLKG

		YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
151	SARS coronavirus A001 Spike glycoprotein (GenBank: AAV97984)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIINNSTNVV IRACNFELCDNPFFVVSXKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNYKXRY LRHGKLRPFERDISNVPFSPXGKCTPPAPNICYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT

152	SARS coronavirus C013 Spike glycoprotein (GenBank: AAV97995)	MFIFLLFLTTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHFTDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVVSXKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSTGDDVVRFPNIT NLCPPGEVFNATKFPVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKFRY LRHGKLRPFERDISNVPFSPDGKPTPPAPNICYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VVFQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDIGINASVVNIQEE IDRLNEVAKNLNLSLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
153	SARS coronavirus C029 Spike glycoprotein (GenBank: AAV98002)	MFIFLLFLTTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHFTDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNDKSQSVIIINNSTNVV IRACNFELCDNPFFVVSXKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSTGDDVVRFPNIT NLCPPGEVFNATKFPVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPTPPAPNICYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VVFQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF

		AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNST WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
154	SARS coronavirus civet019 Spike glycoprotein (GenBank: AAU04662)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPDGVVRFNPIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSSDGKCTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFSGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
155	SARS coronavirus A021 Spike glycoprotein (GenBank: AAV97986)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQGTWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPDGVVRFNPIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLNG

		YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTVIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFSGTS WFITQRNFFSPQIITDNTFVSGNCDVWIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
156	SARS coronavirus C018 Spike glycoprotein (GenBank: AAV97998)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIINNSTNVV IRACNFELCDNPFFVVSXKPMGTRTHMTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFLPLGINITNFRILTAFTSP AQGTWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPVYAWERKRISNCVADYSVLNYSFST FKCYGVSATKLNLDLCSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPFQERNFTTAPAICHEGKAYFPREGVFVFNST WFITQRNFFSPQIITDNTFVSGNCDVWIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT

157	SARS coronavirus B024 Spike glycoprotein (GenBank: AAV97990)	MFIFLLFLTTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHFTDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFVVSXKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGIKITNFRAILTAFTSP AQGTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSTGDVVRFPNIT NLCPFGEVFNATKFPVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPTPPAPNCYWPLNG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPAAPH GVVFLHVTYVPFQERNFTTAPAICHEGKAYFPREGVFVFNST WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
158	SARS coronavirus C025 Spike glycoprotein (GenBank: AAV98000)	MFIFLLFLTTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHFTDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFVVSXKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGIKITNFRAILTAFTSP AQGTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSTGDVVRFPNIT NLCPFGEVFNATKFPVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIAEQQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDSSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF

		AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
159	SARS coronavirus civet010 Spike glycoprotein (GenBank: AAU04649)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGIKITNFRAILTAFSP AQGTWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPDVGVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSSDGKCTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSIVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDLPKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
160	Civet SARS CoV 007/2004 Spike glycoprotein (GenBank: AAU04646)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGIKITNFRAILTAFSP AQGTWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPDVGVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSSDGKCTPPAPNCYWPLRG

		YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFSGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
161	SARS coronavirus A022 Spike glycoprotein (GenBank: AAV91631)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVVSXKPMGTQTHMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFLPLGIKITNFRAILTAFTSP AQGTWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLDLCSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSSDGKCTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFSGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT

162	SARS coronavirus GD01 Spike glycoprotein S (GenBank: AAP51227)	MFIFLLFLTTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHFTDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFLP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPRDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSYELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKDFFGFFNFSQILPDPLKSTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNLSLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
163	SARS coronavirus GZ02 Spike glycoprotein (GenBank: AAS00003)	MFIFLLFLTTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHFTDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFLP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPRDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKDFFGFFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF

		AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQEE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
164	SARS-CoV spike protein with foldon and linker	MFIFLFFLTLVSGSDLRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFDNPVIFKDGIIY FAATEKSNVVRGWVFGSTMNNKSQSVIIINNNTNVVIRACNFE LCDNPFFAVSKPMGTQTHMIFDNFNAFCTFEYISDAFSLDVSE KSGNFKHLREFVFKNKDGLYVYKGYQPIDVVRDLPSGFNTLK PIFKLPLGINITNFRILTAFSPAQDTWGTSAAYFVGYLKPTTF MLKYDENGITDAVDCSQNPLAELKCSVKSFEIDKGIYQTSNF RVVPSGDVVRFPNITNLCPFGEVFNATKFPSVYAWERKKISNC VADYSVLNSTFFSTFKCYGVSATKLNLCFSNVYADSFVVKG DDVRQIAPGQTGVIADYNYKLDDFMGCVLAWNTRNIDATST GNYNYKYRYLRHGKLRPFERDISNVFSPDGKPCPTPALNCY WPLNDYGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNCQVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAEHVDTSYE CDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGADSSIAYSNN TIAIPTNFSISITTEVMPVSMAKTSVDCNMYICGDSTECANLLLQ YGSFCTQLNRLSGIAAEQDRNTREVFAQVKQMYKTPTLKYF GGFNFSQILPDPLKPTKRSFIEDLLFNKVTADAGFMKQYGE LGDINARDLCAQKFNGLTVLPPLTDDMIAAYTAALVSGTATA GWTFGAGAALQIPFAMQMAYRFNGIGVGTQNVLYENQKQIANQ FNKAISQIQESLTTTSTALGKLQDVVNQNAQALNTLVKQLSSNFG AIISSVLNDILSRDPPEAEVQIDRLITGRLQSLQTYVTQQLIRA AEIRASANLAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH HGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCT TSWFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVYDPLQPE LDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQKEIDRLNE VAKNLNESLIDLQELGKYEQYIKWP LVPRGSGYIPEAPRDGQAYVRKDGWVLLSTFLEHHHHHHHH HHH
165	Artificial Sarbecovirus spike consensus 4 with foldon and linker	MFIFLFFLTLVSGSTIEKCTTFDDVQPPNYTQFLSSHRGVYYP DIFRSDVLHLTQDHLFPFDSNVTGFITFGLNFDNPIIPFKDGIYF AATEKSNVIRGWVFGSTMNNKSQSVIIMNNSTNVVIRACNFEL CDNPFFAVSKPNNTQIPSYIFNNAFNAFCTFEYVSDDFNLDVGEK PGNFKHLREFVFKNKDGLYVYSGYQPIDVASGLPSGFNALKP IFKLPLGINITNFRITLLAFPPRPDYWGTSAAYFVGYLKPTTF MLKYDENGITDAVDCSQNPLAELKCSVKSFEIDKGIYQTSNF RVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRISNC VADYSVLNSTSFSTFKCYGVSATKLNLCFSNVYADSFVVKG DDVRQIAPGQTGVIADYNYKLDDFMGCVLAWNTRNIDATST GNYNYKYRSLRHGKLRPFERDISNVFSPDGKPCPTPAFNCY WPLNDYGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNCQVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNTSSEVAVLYQDVNCT

		DVPVAIHADQLTPAWRVYSTGNNVFQTQAGCLIGAEHVDTSY ECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGADSSIAYS NNTIAIPTNFSISITTEVMPVSMAKTSVDCNMYICGDSTECANLL LQYGSFCTQLNRALSGIAVEQDRNTREVFAQVKQMYKTPTLK DFGGFNFSQILPDPLKPTKRSFIEDLLFNKVTADAGFMKQYG ECLGDINARDLICAQKFNGLTVLPPLLTDDMIAAYTAALVSGTA TAGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKQIA NQFNKAISQIQESLTTTSTALGKLQDVVNQNAQALNTLVKQLS SNFGAISSVLNDILSRDPPEAEVQIDRLITGRLQSLQTYVTQQ LIRAAEIRASANLAATKMSECVLGQSKRVDFCGKGYHLMSPFQ AAPHGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVF NGTSWFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTVYDPLQ PELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIKEIDRL NEVAKNLNESLIDLQELGKYEQYIKWPLVPRGSGYIPEAPRDG QAYVRKDG EWLLSTFLEHHHHHHHHHH
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[00101] Figure 2 illustrates a plurality of consensus sequences formed from various sequences listed above.

[00102] In various embodiments, the consensus sequence includes an amino acid sequence set forth in SEQ ID NO:4.

[00103] In various embodiments, the consensus sequence includes an amino acid sequence set forth in SEQ ID NOS: 77 to 163.

[00104] In various embodiments, the consensus sequence includes amino acid 303 to 571 of the amino acid sequence set forth in SEQ ID NOS: 77 to 163.

[00105] In various embodiments, the consensus sequence includes an amino acid sequence set forth in SEQ ID NO:4 and SEQ ID NOS:53 to 62 or any combination thereof.

[00106] In various embodiments, the consensus sequence includes an amino acid sequence set forth in SEQ ID NO:4 and SEQ ID NOS:53 to 62 or any combination thereof.

[00107] In various embodiments, the consensus sequence includes an amino acid sequence set forth in SEQ ID NO:4, SEQ ID NOS:53 to 62, and SEQ ID NOS:63 to 65 or any combination thereof.

[00108] In various embodiments, the consensus sequence includes an amino acid sequence set forth in SEQ ID NO:7 and SEQ ID NOS:66 to 74. or any combination thereof

[00109] In various embodiments, the consensus sequence includes an amino acid sequence set forth in SEQ ID NO:7.

[00110] In various embodiments, the consensus sequence includes an amino acid sequence set forth in SEQ ID NO:7, SEQ ID NOs:66 to 74, and SEQ ID NOs:75 to 76 or any combination thereof.

[00111] In various embodiments, the consensus sequence includes an amino acid sequence set forth in SEQ ID NO:4, SEQ ID NOs:53 to 62, SEQ ID NOs:63 to 65, SEQ ID NOs:7, SEQ ID NOs:66-74, and SEQ ID NOs:75 to 76 or any combination thereof.

[00112] In various embodiments, the consensus sequence includes an amino acid sequence set forth in SEQ ID NO:1 and SEQ ID NOs:23-35 or any combination thereof.

[00113] In various embodiments, the consensus sequence includes an amino acid sequence set forth in SEQ ID NO:1, SEQ ID NOs:23-35, and SEQ ID NOs:36-38 or any combination thereof.

[00114] In various embodiments, the consensus sequence includes an amino acid sequence set forth in SEQ ID NO:2 and SEQ ID NOs:39 to 50 or any combination thereof.

[00115] In various embodiments, the consensus sequence includes an amino acid sequence set forth in SEQ ID NO:2, SEQ ID NOs:39-50 and SEQ ID NOs:51 to 52 or any combination thereof.

[00116] In various embodiments, the consensus sequence includes an amino acid sequence set forth in SEQ ID NO:1, SEQ ID NO:2, SEQ ID NOs:23-35, SEQ ID NOs:36-38, SEQ ID NOs:39-50 and SEQ ID NOs:51 to 52 or any combination thereof.

[00117] In various embodiments, the sarbecovirus is selected from the group comprising of SARS-CoV, SARS-CoV-2, SARS-CoV-2 B.1.1.7, SARS-CoV-2 B.1.351, SC2r-CoV RaTG13, SC2r-CoV GX-P5L, and SARS-CoV combined variants of concern (VOC).

[00118] Figure 3 illustrates the methodology used to generate the consensus sequences.

[00119] It is to be appreciated that the terms SARS1r hACE2/batACE2 Spike, SARS1r hACE2 Spike, SARS2r hACE2 Spike, SARS2r hACE2/batACE2 Spike, SARS1r/SARS2r hACE2 Spike, or SARS1r/SARS2r hACE2/batACE2 Spike are references to SEQ ID NOs. 23 to 52.

[00120] It is to be appreciated that the terms SARS1r hACE RBD, SARS1r

hACE2/batACE2 RBD, SARS2r hACE2 RBD, SARS2r hACE/batACE2 RBD, SARS1r/SARS2r hACE2 RBD, or SARS1r/SARS2r hACE2/batACE2 RBD are references to SEQ ID NOs. 53 to 76.

[00121] It is to be appreciated that the terms SARS-CoV VOC or SARS-CoV-2 VOC are references to SEQ ID NOs: 77 to 163.

[00122] The method to generate consensus sequence from a genotype of sarbecovirus comprises: a) obtaining sarbecovirus spike protein sequences (except for human SARS-CoV2) directly from NCBI protein database and processing in R (v4.0.2) to filter complete protein sequences or by determining the corresponding nucleic acid using a genomic database such as GISAID genome and; b) retrieving and processing GISAID SARS-CoV2 spike protein mutation report in R (v4.0.2) with in-house script to calculate the highest frequency mutation per position using a microprocessor; c) producing the SARS-CoV2 reference and combined variants of concern (VOC) sequence (for example SARS-CoV-2 B.1.1.7, and/or SARS-CoV-2 B.1.351); d) after redundancy removal using CD-hit (v4.8.1), importing 163 unique spike and 81 unique RBD sequences into a microprocessor such as Geneious Prime (v2021.0) for further analysis; d) conducting protein alignment using MAFFT and plotting a phylogeny tree using PhyML; e) inferring the human ACE2, batACE2 and non-ACE2 lineages from the RBD phylogeny tree and validating with experimental evidence and literature search; and f) generating consensus sequences for RBD and non-RBD regions according to the highest frequency per amino acid position in the lineage and combining the initial sequences to establish 8 consensus sequences.

[00123] It is to be appreciated that the effect of the SARS survivors vaccinated with Pfizer–BioNTech mRNA SARS-CoV-2 vaccine BNT162b2 would be similar to using the consensus sequences generated in the present disclosure. Therefore, for the purposes of the following examples, they provide an example of how the amino acid constructs will work.

[00124] Example 1: Human serum panel studies were conducted.

[00125] The four serum panels included in this study were described as below. (1) SARS patient (n = 11): these were sera collected from SARS survivors in Singapore at different time points (2003, 2012 and 2020) before the vaccination program started in February 2021; (2) COVID-19 patient (n = 40): this group of sera was collected during 2020 as part of a national longitudinal study [19]. (3) Healthy-vaccinated (n = 20): these were sera collected at day 14 after second dose (or 35 days after the first dose) of the Pfizer-BioNTech BNT162b2 mRNA vaccine. (4) SARS-vaccinated (n=9): sera taken from SARS survivors 21-

62 days post first vaccination.

[00126] Figure 4 shows a surrogate virus neutralization test (sVNT), which allowed rapid and multiplex determination of Nabs

[00127] We have further improved the sVNT in two aspects: 1) we have immobilized the viral RBD on a solid phase (a magnetic bead) and used a PE-ACE2 to measure the virus-receptor binding (Figure 5) which allowed multiplex detection of NAbs against different sarbecoviruses; 2) we have expanded the RBD proteins to six different viruses. As shown in Figure 5, multiplex sVNT on the Luminex platform shows all six RBD proteins are able to bind the hACE2 receptor molecular as expected in the following order (from high to low affinity): SARS-CoV-2 B.1.351 > SARS-CoV-2 B.1.1.7 = SC2r-CoV GX-P5L (pangolin) > SARS-CoV-2 > SARS-CoV > SC2r-CoV RaTG13 (bat).

[00128] Multiplex sVNT based on RBD from six different sarbecoviruses

[00129] AviTag-biotinylated RBDs were coated on the MagPlex Avidin microsphere (Luminex) at 5 µg/1 million beads. In multiplex sVNT, RBD-coated microspheres (600 beads/antigen) were pre-incubated with serum at a final 1:20 or greater for 1h at 37°C with 800 rpm agitation. After 1h incubation, 50 µl of PE-conjugated hACE2 (GenScript, 1000 ng/ml) were added to the well and incubated for 30 min at 37°C with agitation, followed by two PBS-1% BSA washes. The data were acquired using MAGPIX system.

[00130] Figure 6 shows multiplex sVNT on six different RBDs (from left to right: SARS-CoV-2 WT, UK, SA strains; Bat virus RaTG13; Pangolin virus GX-P5L; SARS-CoV). A). SARS patient. B) COVID-19 patient. C) Healthy-vaccinated. Serum samples were taken two weeks after second dose. D) SARS-vaccinated. All serum samples were tested at a single dilution of 1:20. A cut-off of 30% was set as previously determined.

[00131] The cross-NAb data demonstrated two highly important observations: The first observation is that vaccinated SARS survivors produced very high NAbs against all viruses studied (Panel D), even against the bat and pangolin viruses; and the second observation is that they neutralized the SARS-CoV-2 variants better than the naïve individuals who received the normal two doses (Panel C).

[00132] The SARS patients had minimal cross-NAbs to any of the other five viruses before vaccination (Panel A) whereas the COVID-19 patients had cross-NAbs against other viruses (all of them are SARS-CoV-2 related), they did not have much against the SARS-CoV (Panel B).

[00133] Using serial dilutions, the best performance of pan-sarbecovirus cross-neutralization by the SARS-vaccinated group have been illustrated.

[00134] Figure 7 shows titration of neutralizing antibody levels (NT50) in the different groups against the six sarbecoviruses. Serum samples were tested at dilutions from 1:20 to 1:20480 by a 4-fold serial titration. SAR-vaccinated shows highest log NT50 titer values against all six sarbecoviruses.

[00135] Example 2: Mouse studies

[00136] Pan-sarbecovirus mAb inhibition assay

[00137] RBD-coated microspheres (600 beads/antigen) were pre-incubated with 1:100 diluted serum for 1h at 37°C with agitation. Unbound antibodies were removed by two PBS-1% BSA washes. Pan-sarbecovirus mAbs (1000 ng/ml) were then added, followed by 1h incubation at 37°C with agitation followed by washing. The binding of the pan-sarbecovirus mAb on RBD was detected by PE-conjugated anti-mouse IgG antibodies. The data were acquired using MAGPIX system.

[00138] As shown in Figure 8A, the mAb is able to neutralize all six viruses, albeit with slightly lower efficacy against GX-P5L. Using a blocking assay, same principle as the sVNT by replacing the PE-hACE2 with the mAb, we have determined the ability of the four different serum panels to block the mAb's ability in neutralization (Figure 8B).

[00139] It should be appreciated that that the cross-neutralizing ability of the SARS-vaccinated group is the best among the four groups. Second, during natural infection (for either SARS and COVID-19), there is minimal activation of cross-neutralizing antibodies across the two lineages representing SC2r-CoVs and SARS-CoV. Third, although the mRNA vaccination boosted overall neutralizing ability against SCr2-CoVs, it had minimal impact on cross-neutralization against SARS-CoV.

[00140] Example 3: Rabbit studies

[00141] Multiplex sVNT analysis using rabbit hyper immune sera targeting RBD of six different beta coronaviruses

[00142] The rabbit anti-RBD sera were produced by commercial contract with GenScript Biotech. The testing was conducted essentially the same as those described for the mouse studies. Rabbit sera were used by a 4-fold serial dilution starting at 1:20.

[00143] Figure 9 shows neutralization patterns from rabbit hyper immune sera targeting different beta coronavirus RBD proteins. The data presented in Figure 9 demonstrates that cross-neutralization is limited only to the strain/lineage level among the five SC2r-CoVs. There is no cross-neutralization between SC2r-CoV and SARS-CoV and the negative control HKU1 did not neutralize any virus/strain as shown. The data confirms the virus/strain-specific immunodominant antibody using rabbit hyper immune serum targeting specific virus/strain similar to the results as shown for human serum panel and mouse studies.

[00144] It should be appreciated that the amino acid constructs as mentioned herein above and in Figure 2 may be used to form rabbit anti-amino acid construct sera or rabbit anti-consensus sequence sera to test against the six different sarbecoviruses used in the mouse studies above or the six different beta coronaviruses used in the Rabbit studies above.

[00145] Example 4 vaccination with exemplary protein

[00146] The protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13, with foldon and linker) was administered in 25µg with Sigma Adjuvant System (S6322) in 2 doses 21 days apart. Contemporaneously, a second dosage regime of a first dose of the protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13, with foldon and linker) was **administered with Sigma adjuvant followed by a second dose of the Sinovac's vaccine alone.** The serum from these the dosed subjects was extracted for RBD challenge.

[00147] Using 20 RBD from different sarbecovirus were coated on separate microspheres. Each of the 20 RBD coated microspheres (600 beads/antigen) were pre-incubated with 1:100 diluted serum for 1h at 37°C with agitation. Unbound antibodies were removed by two PBS-1% BSA washes. The subject serum (1000 ng/ml) were then added, followed by 1h incubation at 37°C with agitation followed by washing. The binding of any antibodies formed in the subjects on the various RBD was detected by PE-conjugated anti-mouse IgG antibodies. The data were acquired using MAGPIX system.

[00148] The two doses of the protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13, with foldon and linker) administered with a Sigma adjuvant overall induced higher titre across all 20 RBD challenges carried out compared to the dosage regime of a first dose of the protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13, with foldon and linker) administered **with Sigma adjuvant followed by a second dose of the Sinovac's vaccine alone** (See figure 10).

[00149] The same experiment was repeated using RBD from 20 different sarbecovirus and strains including the new variants of concern. As can be seen in Figure 11, the two doses of the protein (25 ug) listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13, with foldon and linker) administered with Sigma adjuvant overall induced higher titre across all 20 tested RBD compared to a first dose of the protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13, with foldon and linker) administered with a Sigma adjuvant followed by a second dose of the Sinovac's vaccine alone.

[00150] Example 5 booster with exemplary protein

[00151] Separate dosage regimens were compared: the first being 3 doses of the Pfizer BioNTech vaccine; the second being 2 doses of the Pfizer BioNTech vaccine followed by a dose of 25µg of the protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13, with foldon and linker) administered with Sigma adjuvant; the third being 2 doses of the Pfizer BioNTech vaccine followed by a dose of 1µg of the protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13, with foldon and linker); the fourth being 2 doses of the Pfizer BioNTech vaccine followed by a dose of saline; and the final being 3 doses of saline.

[00152] As can be seen in Figure 12, 2 doses of the Pfizer BioNTech vaccine followed by a dose of the protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13, with foldon and linker) administered either with or without the Sigma adjuvant all the clade 1 sarbecovirus were inhibited more than 3 doses with the Pfizer BioNTech vaccine both at 7 and 14 days after dose three.

[00153] Separate dosage regimens were compared: the first being 3 doses of the Moderna vaccine; the second being 2 doses of the Moderna vaccine followed by a dose of 25µg of the protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13, with foldon and linker) administered with Sigma adjuvant; the third being 2 doses of the Moderna vaccine followed by a dose of 1µg of the protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13, with foldon and linker); the fourth being 2 doses of the Moderna vaccine followed by a dose of saline; and the final being 3 doses of saline.

[00154] As can be seen in Figure 13, 2 doses of the Pfizer BioNTech vaccine followed by a dose of the protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13, with foldon and linker) administered either with or without the Sigma adjuvant all the clade 1 sarbecovirus were inhibited more than 3 doses with the Pfizer BioNTech vaccine both at 7 and 14 days after dose three.

[00155] Separate dosage regimens were compared: the first being 3 doses of the Sinovac vaccine; the second being 2 doses of the Sinovac vaccine followed by a dose of 25µg of the protein listed in SEQ ID No. 164 (a modified version of SEQ ID No. 1 with foldon and linker sequence) administered with Sigma adjuvant; the third being 2 doses of the Sinovac vaccine followed by a dose of 25µg of the protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13 with foldon and linker sequence) administered with Sigma adjuvant; the fourth being 2 doses of the Sinovac vaccine followed by a dose of 1µg of the protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13 with foldon and linker sequence); and the final being 3 doses of saline.

[00156] As can be seen in Figure 14, 2 doses of the Sinovac vaccine followed by a dose of the protein listed in the protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13 with foldon and linker sequence) administered either with or without the Sigma adjuvant all the clade 1 sarbecovirus were inhibited more than 3 doses with the Sinovac vaccine both at 7 and 14 days after dose three. 2 doses of the Sinovac vaccine followed by a dose of the protein listed in the protein listed in SEQ ID No. 165 (a modified version of SEQ ID No. 13 with foldon and linker sequence) administered with the Sigma adjuvant all the clade 1 and clade2 sarbecovirus were inhibited more than 2 doses of the Sinovac vaccine followed by a dose of the protein listed in the protein listed in SEQ ID No. 164 (a modified version of SEQ ID No. 1 with foldon and linker sequence) administered with the Sigma adjuvant both at 7 and 14 days after dose three. This result reflected the better booster effect of SEQ ID No. 13 than the natural SARS-CoV-1 shown as SEQ ID No.1 as the same modifications of foldon and linker were applied in SEQ ID No.165 and SEQ ID No.164.

[00157] It should be appreciated by the person skilled in the art that the above invention is not limited to the embodiment described. It is appreciable that modifications and improvements may be made without departing from the scope of the present invention.

[00158] It should be further appreciated by the person skilled in the art that one or more of the above modifications or improvements, not being mutually exclusive, may be further combined to form yet further embodiments of the present invention.

CLAIMS

1. An amino acid construct comprising any one of an amino acid sequence selected from SEQ ID NOs: 10 to 22, 164 and 165, the construct having at least 90% sequence identity to at least two different sarbecovirus Spike proteins, or a fragment thereof.
2. The amino acid construct of claim 1, wherein the at least two different sarbecovirus Spike proteins comprise an amino acid sequence having at least 90% sequence identity to a sarbecovirus Spike protein, or an amino acid sequence having at least 90% sequence identity to a fragment of at least two different sarbecovirus Spike proteins.
3. The amino acid construct of claim 1, wherein the fragment comprises a receptor binding domain fragment of a sarbecovirus Spike protein.
4. The amino acid construct of any one of claims 1-3, wherein the amino acid sequence comprises a sequence set forth in SEQ ID NO: 10.
5. The amino acid construct of any one of claims 1-3, wherein the amino acid sequence comprises a sequence set forth in SEQ ID NO: 11.
6. The amino acid construct of any one of claims 1-3, wherein the amino acid sequence comprises a sequence set forth in SEQ ID NO: 12.
7. The amino acid construct of any one of claims 1-3, wherein the amino acid sequence comprises a sequence set forth in SEQ ID NO: 13.
8. The amino acid construct of any one of claims 1-3, wherein the amino acid sequence comprises a sequence set forth in SEQ ID NO: 14.
9. The amino acid construct of any one of claims 1-3, wherein the amino acid sequence comprises a sequence set forth in SEQ ID NO: 15.
10. The amino acid construct of any one of claims 1-3, wherein the amino acid sequence comprises a sequence set forth in SEQ ID NO: 16.
11. The amino acid construct of any one of claims 1-3, wherein the amino acid sequence comprises a sequence set forth in SEQ ID NO: 17.
12. The amino acid construct of any one of claims 1-3, wherein the amino acid

sequence comprises a sequence set forth in SEQ ID NO: 18.

13. The amino acid construct of any one of claims 1-3, wherein the amino acid sequence comprises a sequence set forth in SEQ ID NO: 19.
14. The amino acid construct of any one of claims 1-3, wherein the amino acid sequence comprises a sequence set forth in SEQ ID NO: 20.
15. The amino acid construct of any one of claims 1-3, wherein the amino acid sequence comprises a sequence set forth in SEQ ID NO: 21.
16. The amino acid construct of any one of claims 1-3, wherein the amino acid sequence comprises a sequence set forth in SEQ ID NO: 22.
17. The amino acid construct of any one of claims 4-16, wherein the amino acid sequence further comprises a foldon and a linker sequence.
18. The amino acid construct of claim 17, wherein the amino acid sequence comprises sequence set forth in SEQ ID NO: 165.
19. The amino acid construct according to any one of claims 1-18, comprising an oligomeric polypeptide.
20. The amino acid construct of claim 19, wherein the polypeptide is a fusion dimer.
21. A nucleic acid encoding the amino acid construct of any one of claims 1 to 18.
22. The nucleic acid according to claim 21, comprising a messenger ribonucleic acid (mRNA)
23. An immunogenic composition comprising the amino acid construct of any one of claims 1 to 19 or the nucleic acid of claim 21 or claim 22.
24. The immunogenic composition of claim 23, further comprising an adjuvant.
25. The immunogenic composition of claim 24, wherein the adjuvant is a Sigma Adjuvant System (S6533).
26. The immunogenic composition of claim 23, comprising at least two sarbecovirus virus antigen.
27. A viral vector comprising a nucleic acid of claim 21 or 22.

28. The viral vector of claim 27, wherein the vector is selected from a recombinant measles virus vector, a vesicular stomatitis virus (VSV) vector, a vaccinia virus vector or an adenovirus vector.
29. The amino acid construct according to any one of claims 1 to 19 for use in the treatment or prevention of sarbecovirus infections.
30. The immunogenic composition according to any one of claims 23 to 26 for use in the treatment and/or prevention of sarbecovirus infections.
31. The nucleic acid according to claim 21 or 22 for use in the treatment and/or prevention of sarbecovirus infections.
32. The viral vector according to claim 27 or 28 for use in the treatment and/or prevention of sarbecovirus infections.
33. Use of an amino acid construct according to any one of claims 1 to 19 in the manufacture of a medicament for the treatment and/or prevention of sarbecovirus infections.
34. Use of an immunogenic composition according to any one of claims 23 to 26 in the manufacture of a medicament for the treatment and/or prevention of sarbecovirus infections.
35. Use of a nucleic acid according to claim 21 or 22 in the manufacture of a medicament for the treatment and/or prevention of sarbecovirus infections.
36. Use of a viral vector according to claim 27 or 28 in the manufacture of a medicament for the treatment and/or prevention of sarbecovirus infections.
37. A method of treating and/or preventing an infection caused by sarbecovirus comprising administering a vaccine molecule comprising an amino acid construct according to any one of claims 1 to 19, an immunogenic composition according to any one of claims 23 to 26, a nucleic acid of claims 21 to 22, or a viral vector of claims 27 to 28 to a subject.
38. A method of making an amino acid construct for the treatment and/or prevention of sarbecovirus infections, comprising:
 - a. comparing amino acid sequences from at least two different sarbecovirus

- spike proteins or fragments thereof;
- b. identifying identical amino acid in the sequences from the at least two different sarbecovirus spike proteins or fragments thereof;
 - c. removing any different amino acids from the sequences of the at least two different sarbecovirus spike proteins or fragments thereof to identify a unique amino acid sequence; and
 - d. forming the amino construct of the unique amino acid sequence wherein the amino construct has at least 90% sequence identity to the at least two different sarbecovirus Spike proteins, or a fragment thereof.
39. The method of claim 38, further comprising modifying the unique amino acid sequence with a foldon and a linker sequence.
40. The method of claim 38 or 39, further comprising identifying a fragment within the unique amino acid sequence that corresponds to a receptor binding domain of the at least two different sarbecovirus spike proteins to form a unique amino acid fragment sequence; and forming the amino construct of the combined unique amino acid fragment sequence with the unique amino acid sequence.
41. The method of any one of claims 38 to 40, wherein forming the amino construct in step d comprises forming a nucleic acid encoding the amino acid construct able to express the amino acid construct.
42. The method of claim 41, wherein the nucleic acid comprises a messenger ribonucleic acid (mRNA).
43. The method of any one of claims 38 to 42, wherein the amino acid construct or a nucleic acid encoding the amino acid construct able to express the amino acid construct is prepared as an immunogenic composition.
44. The method of claim 43, wherein the immunogenic composition comprises an adjuvant.
45. The method of claim 44, wherein the adjuvant is a Sigma Adjuvant system.
46. The method of claim 41 or 42, wherein the nucleic acid is prepared in a viral vector.
47. The method of claim 46, wherein the vector is selected from a recombinant

measles virus vector, a vesicular stomatitis virus (VSV) vector, a vaccinia virus vector or an adenovirus vector.