

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 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 B1.617, 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 B1.617, 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	MFIFLLFLTTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPVIPFKDGIY FAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVVIRACNFE LCDNPFFAVSKPMGTQTHMIFDNAFNCTFEYISDAFSLDVSE KSGNFKHLREFVFNKNDGFLYVYKGYQPIDVVRDLPSGFNTLK PIFKLPLGINITNFRILTAFSPAQDTWGTSAAYFVGYLKPTTF MLKYDENGITDAVDCSQNPLAELKCSVKSFEIDKGIYQTSNF RVVPSGDVVRFPNITNLCPFGEVFNATKFPSVYAWERKKISNC VADYSVLYNSTFFSTFKCYGVSATKLNDLCFSNVYADSFVVKG

		DDVRQIAPGQTGVIADYNYKLPDDFMGCVLAWNTRNIDATST GNYNYKYRYLRHGKLRPFERDISNVFSPDGKCTPPALNCY WPLNDYGfYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNQCVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAEHVDTSEY CDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGADSSAIYSNN TIAIPTNFSISITTEVMPVSMKTSVDCNMYICGDSTECANLLLQ YGSFCTQLNRALSGIAAEQDRNTREVFAQVKQMYKTPTLKYF GGFNFSQILPDPLKPTKRSFIEDLLFNKVTADAGFMKQYGE LGDINARDLCAQKFNGLTVLPPLLTDDMIAAYTAALVSGTATA GWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKQIANQ FNKAISQIQESLTTTSTALGKLQDVVNQNAQALNTLVKQLSSNF GAISSVLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVTQQLIRA AEIRASANLAATKMSECVLGQSKRVDFCGKGYHLSFPAAP HGTVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNG TSWFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVYDPLQPE LDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKEIDRLNE VAKNLNESLIDLQELGKYEQYIKWPWYVWLGFIAGLIAIVMTIL LCCMTSCCSCCLKGACSCGSCCKFDEDDSEPVLKGVKLHYT
2	SARS-CoV-2 spike protein	MFLTTKRTMFVFLVLLPLVSSQCVNLTRTQLPPAYTNSFTR GVYYPDKVFRSSVLHSTQDLFLPFFSNVTWFHAIHVSNGTK RFDNPVLPFNDGVYFASTKSNIRGWIFGTTLDSTQSLIIVN NATNVVIKVECFQFCNDPFLGVYHKNKSWMESEFRVYSSA NNCTFEYVSQPFLMDLEGKQGNFKNLREFVFNIDGYFKIYSK HTPINLVRDLPPQGSALPLVDLPIGINITRFQTLALHRSYLT GDSSSGWTAGAAAYVGYLQPRFTLLKYNENGITDAVDCAL DPLSETKCTLKSTVEKGIYQTSNFRVQPTESIVRFPNITNLC FGEVFNATRFASVYAWNRKRISNCVADYSLVNSASFSTFKC YGVSPKLNLCFTNVYADSFVIRGDEVQIAPGQTGKIADYN YKLPDDFTGCVIAWNSNNLDSKVGGNYNYLRLFRKSNLKP ERDISTEIQAGSTPCNGVEGFNCYFPLQSYGFQPTNGVGYQ PYRVVLSFELLHAPATVCGPKKSTNLVKNKCVNFNFNGLTGT GVLTESNKKFLPFQFGRDIADTTDAVRDPQTLEILDITPCSFG GVSVITPGTNTSNQVAVLYQDVNCTEVPVAIHADQLTPTWRVY STGSNVFQTRAGCLIGAEHVNSYECDIPIGAGICASYQTQT SPRRARSVASQSIAYTMSLGAENSVAYSNNNSIAIPTNFTISV EILPVSMKTSVDCTMYICGDSTECNLLLQYGSFCTQLNRAL TGIAVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQILPDPSK PSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLCAQKF NGLTVLPPLLTDEMAQYTSALLAGTITSGWTFGAGAALQIPFA MQMAYRFNGIGVTQNVLYENQKLIANQFNSAIGKIQDLSSTA SALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLNDILSRDL KVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASANLAATKM SECVLGQSKRVDFCGKGYHLSFPAAPHGTVFLHVTYVPA QEKNTTAPAICHGKAHFPREGVFSNGTHWFTQRNFYEP QIITDNTFVSGNCDVVIGIVNNTVYDPLQPELDSFKEELDKYF KNHTSPDVLGDISGINASVVNIQKEIDRLNEVAKNLNESLIDLQ ELGKYEQYIKWPWYIWLGFIAGLIAIVMTIMLCCMTSCCSCCLK GCCSCGSCCKFDEDDSEPVLKGVKLHYT
3	SARS-CoV spike protein S1 subunit	SDLDRCCTFDDVQAPNYTQHTSSMRGVYYPDEIFRSDTLYLT QDLFLPFYSNVTGFHTINHTFDNPVIFPKDGIYFAATEKSNVVR GWVFGSTMNNKSQSVIIINNSTNVIRACNFELCDNPFFAVSK PMGTQHTMIFDNAFNCTFEYISDAFSLDVSEKSGNFKHLREF

		VFKNKDGLYVYKGYQPIDVVRDLPSGFNTLKPFIKPLPLGINITN FRAILTAFSPAQDTWGTSAAYFVGYLKPTTFMLKYDENGIT DAVDCSQNPLAELKCSVKSFEIDKGIYQTSNFRVVPDGVVRF PNITNLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLNST FFSTFKCYGVSATKLNLCFSNVYADSFVVKGDVVRQIAPGQ TGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNYKYRYL RHGKLRPFERDISNVFSPDGKPCPPALNCYWPLNDYGFYT TTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQCVNF NGLTGTGVLTPSSKRFQPFQFGRDVSDFDTSVRDPKTEIL DISPCSFGGVSVITPGTNASSEVAVLYQDVNCTDVSTAIHADQ LTPAWRIYSTGNNVFQTQAGCLIGAEHVDTSECDIPIGAGICA SYHTVSLLR
4	SARS-CoV spike protein RBD	RVVPSGDVVRFPNITNLCPFGEVFNATKFPSVYAWERKKISNC VADYSVLNSTFFSTFKCYGVSATKLNLCFSNVYADSFVVKG DDVRQIAPGQTGVIADYNYKLPDDFMGCVLAWNTRNIDATST GNYNYKYRYLRHGKLRPFERDISNVFSPDGKPCPPALNCY WPLNDYGFYTGTGIGYQPYRVVLSFELLNAPATVCGPKLST DLIKNQCVNF
5	SARS-CoV-2 spike protein S1 subunit	SQCVNLTTRTLPPAYTNSFTRGVYYPDKVFRSSVLHSTQDL FLPFFSNVTWFHAIHVSGTNGTKRFDNPVLPFNDGVYFASTEK SNIIRGWIFGTTLDLSTQSLIVNNATNVVIVKVECFQFCNDPFLG VYYHKNKSWMESEFRVYSSANNCTFEYVSQPFMDLEGKQ GNFKNLREFVFNIDGYFKIYKHTPINLVRLDLPQGFSALEPLV DLPIGINITRFQTLALHRSYLTGDSGSGWTAGAAAYYVGYLQ PRTFLLKYNENGTITDAVDCALDPLSETKCTLSFTVEKGIYQT SNFRVQPTESIVRFPNITNLCPFGEVFNATRFASVYAWNRKRI SNCVADYSVLNSASFSTFKCYGVSPTKLNLCFTNVYADSFV IRGDEVQRQIAPGQTGKIADYNYKLPDDFTGCVIAWNSNNLDSK VGGNYNYLYRLFRKSNLKPFERDISTEYQAGSTPCNGVEGFN CYFPLQSYGFQPTNGVGYQPYRVVLSFELLHAPATVCGPKK STNLVKNKCVNFNGLTGTGVLTESNKKFLPFQFGRDIADT TDAVRDPQTLEILDITPCSFSGGVSVITPGTNTSNQVAVLYQDVN CTEVPVAIHADQLTPTWRVYSTGSNVFQTRAGCLIGAEHVNN SYECDIPIGAGICASYQTQTNSPRRAR
6	SARS-CoV-2 spike protein RBD	RVQPTESIVRFPNITNLCPFGEVFNATRFASVYAWNRKRISNC VADYSVLNSASFSTFKCYGVSPTKLNLCFTNVYADSFVIRG DEVQRQIAPGQTGKIADYNYKLPDDFTGCVIAWNSNNLDSKVG GNYNYLYRLFRKSNLKPFERDISTEYQAGSTPCNGVEGFN CYFPLQSYGFQPTNGVGYQPYRVVLSFELLHAPATVCGPKKST NLVKNKCVNF
7	SARS-CoV-2 spike protein RBD	PNITNLCPFGEVFNATRFASVYAWNRKRISNCVADYSVLNSA SFSTFKCYGVSPTKLNLCFTNVYDSFVIRGDEVQRQIAPGQTG KIADYNYKLPDDFTGCVIAWNSNNLDSKVGGNYNYLYRLFRKS NLKPFERDISTEYQAGSTPCNGVEGFNCFPLQSYGFQPTNG VGYQPYRVVLSFELLHAPATVCGPKKS
8	SARS-CoV-2 spike protein S1 subunit	MLLVNQSHQGFNKEHTSKMVSAIVLYVLLAAAAHSAFAQCVNL TTRTLPPAYTNSFTRGVYYPDKVFRSSVLHSTQDLFLPFFSN VTWFHAIHVSGTNGTKRFDNPVLPFNDGVYFASTEKSNIRGW IFGTTLDLSTQSLIVNNATNVVIVKVECFQFCNDPFLGVYHKN NKSWMSESEFRVYSSANNCTFEYVSQPFMDLEGKQGNFKNL REFVFNIDGYFKIYKHTPINLVRLDLPQGFSALEPLVDLPIGINI TRFQTLALHRSYLTGDSGSGWTAGAAAYYVGYLQRPRTFLL KYNENGTITDAVDCALDPLSETKCTLSFTVEKGIYQTSNFRV QPTESIVRFPNITNLCPFGEVFNATRFASVYAWNRKRISNCVA

		DYSVLVNSASFSTFKCYGVSPTKLNLDLCFTNVYADSFVIRGDE VRQIAPGQTGKIADYNYKLPDDFTGCVIAWNSNNLDSKVGGN YNYLYRLFRKSNLKPFERDISTEIYQAGSTPCNGVEGFNCYFP LQSYGFQPTNGVGYQPYRVVLSFELLHAPATVCGPKKSTNL VKNKCVNFNFNGLTGTGVLTESNKKFLPFQQFGRDIADTTDAV RDPQTLEILDITPCSFSGGVSVITPGTNTSNQVAVLYQDVNCTEV PVAIHADQLTPTWRVYSTGSNVFQTRAGCLIGAEHVNNSEYEC DIPIGAGICASYQTQTNSPRRAR
9	SARS-CoV spike protein RBD	MNITNLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLNST FFSTFKCYGVSATKLNLDLCFSNVYADSFVVKGDDVRQIAPGQ TGVADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNKYRYL RHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLNDYGFTY TTGIGYQPYRVVLSFELLNAPATYLSLNTAAAL
10	Artificial Sarbecovirus spike consensus 1	MFIFLFFLTIVSGSTIEKCTTFDDVQPPNYTQFLSSHRGVYYP DIFRSDVLHLLTQDHLFPDSNVTGFITFGLNFDNPIIPFKDGIY AATEKSNVIRGWVFGSTMNNKSQSVIIMNNSTNVVIRACNFEL CDNPFFAVSKPNTQIPSYIFNNAFNCTFEYVSDDFNLDVGEK PGNFKHLREFVFNKNDGFLYVYSGYQPIDVASGLPSGFNALKP IFKLPLGINITNFRLLTAFPPRPDYWGTSAAAYFVGYLKPTTF MLKYDENGITDAVDCSQNPLAELKCSVKSFEIDKGIYQTSNF RVVPSGDVVRFPNITNLCPFGEVFNATKFPSVYAWERKRISNC VADYSVLNSTFFSTFKCYGVSATKLNLDLCFSNVYADSFVVKG DDVRQIAPGQTGVADYNYKLPDDFMGCVLAWNTRNIDATST GNYNKYRYLRHGKLRPFERDISNVPFSPDGKCTPPALNCY WPLNDYGFTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNQCVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDIPCSFSGGVSVITPGTNTSSEVAVLYQDVNCT DVPVAIHADQLTPAWRVYSTGNNVFQTQAGCLIGAEHVDTSY ECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGADSSIAYS NNTIAIPTNFSISITTEVMPVSMAKTSVDCNMICYGDDSTECANLL LQYGSFCTQLNRALSGIAVEQDRNTREVFAQVKQMYKTPTLK DFGGFNFSQILPDPLKPTKRSFIEDLLFNKVTADAGFMKQYG ECLGDINARDLCAQKFNGLTVLPLLTDDMIAAYTAALVSGTA TAGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKQIA NQFNKAISQIQESLTTTSTALGKLQDVVNQNAQALNTLVKQLS SNFGAISSVLNDILSRDPPEAEVQIDRLITGRLQSLQTYVTQQ LIRAAEIRASANLAATKMSECVLGQSKRVDFCGKGYHLMSFPQ AAPHGVLHVTVVPSQERNFTTAPAICHEGKAYFPREGVFVF NGTSWFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTVYDPLQ PELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKEIDRL NEVAKNLNESLIDLQELGKYEQYIKWPWYVWLGFIAGLIAIVMV TILLCCMTSCCCLKGACSCGSCCKFDEDDSEPVKGVKLHY T
11	Artificial Sarbecovirus spike consensus 2	MFIFLFFLTIVSGSDDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTLQDLFLPFYSNVTGFHTINHTFDNPIIPFKDGIY FAATEKSNVVRGWVFGSTMNNKSQSVIIMNNSTNVVIRACNFE LCDNPFFVSKPMGTRTHTMIFDNFNAFNCTFEYISDAFSLDVSE KSGNFKHLREFVFNKNDGFLYVYKGYQPIDVVRDLPSGFNTLK PIFKLPLGIKITNFRILTAFAAAGTWTGTSAAAYFVGYLKPTTF MLKYDENGITDAVDCSQNPLAELKCSVKSFEIDKGIYQTSNF RVVPSGDVVRFPNITNLCPFGEVFNATKFPSVYAWERKRISNC VADYSVLNSTSFSTFKCYGVSATKLNLDLCFSNVYADSFVVKG DDVRQIAPGQTGVADYNYKLPDDFMGCVLAWNTRNIDATST GNHNYKYRYLRHGKLRPFERDISNVPFSPDGKCTPPAPNCY

		WPLRGYGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNCQVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPRSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAEHVDTSYE CDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGADSSIAYSN NTIAIPTNFSISITTEVMPVSMKTTSVDCNMYICGDSTECANLLL QYGSFCRQLNRALSGIAAEQDRNTREVFVQVKQMYKTPTLKD FGGFNFSQILPDPLKPTKRSFIEDLLFNKVTLADAGFMKQYGE CLGDINARDLICAQKFNGLTVLPPLLTVDMIAAYTAALVSGTAT AGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKQIAN QFNKAISQIQESLTTTSTALGKLQDVVNQNAQALNTLVKQLSS NFGAISSVLNDILSRDPPEAEVQIDRLITGRLQSLQTYVTQQLI RAAEIRASANLAATKMSECVLGQSKRVGFCGKGYHLMSPFQA APHGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVS GTSWFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVYDPLQP ELDSFKEELDKYFKNHTSPDVLGDISGINASVWNIQEEIDRLN EVAKNLNESLIDLQELGKYEQYIKWPWYVWLGFIAGLIAIVMTI LLCCMTSCCSCLKGACSCGSCCKFDEDDSEPVLKGVKLHYT
12	Artificial Sarbecovirus spike consensus 3	MFIFLFFLTLVSGSDLESCCTTFDDVQAPNYPQHSSSRRGVYYP DEIFRSDTLYLTQDLFLPFDSNVTGFHTINHRFDNPVIFKDG YFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVIRACNF ELCDNPFFAVSKPTGTQHTMIFNNAFNCTFEYISDSFSLDVA EKSGNFKHLREFVFNKNDGFLYVYKGYQPIDVVRDLPSGFNL KPIFKLPLGINITNFRAILTAFLPAQDTWGTSAAYFVGYLKPAT FMLKYDENGITDAVDCSQNPLAELKCSVKSFEIDKGIYQTSNF RVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRISNC VADYSVLYNSTSFSTFKCYGVSATKLNDLCFSNVYADSFVVK DDVRQIAPGQTGVIADYNYKLPDDFTGCVLAWNTRNIDATQT GNYNKYRSLRHGKLRFERDISNVFSPDGKPCPTPPAFNCY WPLNDYGFYTTNGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNCQVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNTSSEVAVLYQDVNCT DVPVAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAEHVDTSYE CDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGADSSIAYSN NTIAIPTNFSISITTEVMPVSMKTTSVDCNMYICGDSTECANLLL QYGSFCTQLNRALSGIAVEQDRNTREVFVQVKQMYKTPTLKD FGGFNFSQILPDPLKPTKRSFIEDLLFNKVTLADAGFMKQYGE CLGDINARDLICAQKFNGLTVLPPLLTDMMIAAYTAALVSGTAT AGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKQIAN QFNKAISQIQESLTTTSTALGKLQDVVNQNAQALNTLVKQLSS NFGAISSVLNDILSRDPPEAEVQIDRLITGRLQSLQTYVTQQLI RAAEIRASANLAATKMSECVLGQSKRVDFCGKGYHLMSPFQA APHGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVN GTSWFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVYDPLQP ELDSFKEELDKYFKNHTSPDVLGDISGINASVWNIQKEIDRLN EVAKNLNESLIDLQELGKYEQYIKWPWYVWLGFIAGLIAIVMTI LLCCMTSCCSCLKGACSCGSCCKFDEDDSEPVLKGVKLHYT
13	Artificial Sarbecovirus spike consensus 4	MFIFLFFLTLVSGSTIEKCTTFDDVQPPNYTQFLSSHRGVYYP DIFRSDVLHLTQDHLFPFDSNVTGFITFGLNFDNPIIPFKDGIYF AATEKSNVIRGWVFGSTMNNKSQSVIIMNNSTNVIRACNFEL CDNPFFAVSKPNNTQIPSYIFNNAFNCTFEYVSDDFNLDVGEK PGNFKHLREFVFNKNDGFLYVYSGYQPIDVASGLPSGFNALKP IFKLPLGINITNFRLLTAFPPRPDYWGTSAAAYFVGYLKPTTF MLKYDENGITDAVDCSQNPLAELKCSVKSFEIDKGIYQTSNF

		RVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRISNC VADYSVLYNSTSFSTFKCYGVSATKLNLCFSNVYADSFVVKG DDVRQIAPGQTGVIADYNYKLPDDFMGCVLAWNTRNIDATST GNYNKYRSLRHGKLRRPFRDISNVPFSPDGKPCPTPAFNCY WPLNDYGFFTTNGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNQCVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNTSSEVAVLYQDVNCT DVPVAIHADQLTPAWRVYSTGNNVFQTAQAGCLIGAEHVDTSY ECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGADSSIAYS NNTIAIPTNFSISITTEVMPVSMAKTSVDCNMICGDSTECANLL LQYGSFCTQLNRALSGIAVEQDRNTREVFAQVKQMYKTPTLK DFGGFNFSQILPDPLKPTKRSFIEDLLFNKVTLADAGFMKQYG ECLGDINARDLICAQKFNGLTVLPPLTDMMIAAYTAALVSGTA TAGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKQIA NQFNKAISQIESLTTTSTALGKLQDVVNQNAQALNTLVKQLS SNFGAISSVLNDILSRDPPEAEVQIDRLITGRLQSLQTYVTQQ LIRAAEIRASANLAATKMSECVLGQSKRVDFCGKGYHLMSFPQ AAPHGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVF NGTSWFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTVYDPLQ PELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIKEIDRL NEVAKNLNESLIDLQELGKYEQYIKWPWYVWLGFIAGLIAIMV TILLCCMTSCCCLKGACSCGSCCKFDEDDSEPVLGKVKLHY T
14	Artificial Sarbecovirus spike consensus 5	MFVFLFLLPLVSSQCVNLTRTGIPPGYTNSSTRGVYYPDKVF RSSVLHLTQDLFLPFFSNVTWFNAINYQGGFKRFDNPVLPFND GVYFASTKSNIRGWIFGTTLTARTQSLIVNNATNWIKVCEF QFCTDPFLGVYHNNNKTWVENEFVYSSANNCTFEYVSQP FLMDLEGKQGNFKNLREFVFNVDGYFKIYSKHTPIDLVRDLP RGFSALEPLVDLPIGINITRFQTLALHRSYLTGKLESGWTTG AAAYYVGYLQPRFTLLSYNENGTTDAVDCALDPLSETKCTLK SLTVEKGIYQTSNFRVQPTISIVRFPNITNLCPFGEVFNATRFAS VYAWNRRKRISNCVADYSVLYNSTSFSTFKCYGVSPTKLNLCF TNVYADSFVVRGDEVVRQIAPGQTGVIADYNYKLPDDFTGCVIA WNSVKQDALTTGGNLYRLFRKSKLKPFRDISTEYQAGST PCNGVVLNLCYPLQRYGFHPTTGVGYPYRVVLSFELLNA PATVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTESNKKFLPF QQFGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSN QVAVLYQDVNCTEVPVAIHADQLTPTWRVYSTGNNVFQTRAG CLIGAEHVNNSECDIPIGAGICASYQTQTNPRRARSVNSQSI IAYTMSLGAENSVAYSNNIAIPTNFTISVTTEILPVSMTKTSVD CTMYICGDSIECSNLLLQYGSFCTQLNRALTGIAVEQDKNTQE VFAQVKQIYKTPPIKDFGGFNFSQILPDPSKPSKRSFIEDLLFNK VTLADAGFIKQYGDCLGDIAARDLICAQKFNGLTVLPPLTDEM IAQYTSALLAGTITSGWTFGAGAALQIPFAMQMAYRFNGIGVT QNVLYENQKLIANQFNSAIGKIQDSLSTASALGKLQDVVNQN AQALNTLVKQLSSNFGAISSVLNDILSRDPPEAEVQIDRLITGR LQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVDFC GKGYHLMSFPQSAPHGVVFLHVTYVPAQEKNFTTAPAICHEG KAHFPREGVVFVSNHTWVFTQRNFYEPQIITDNTFVSGSCD VVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISG INASVUNIKEIDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYI WLGFIAGLIAIMVTIMLCCMTSCCCLKGCCSCGSCCKFDED DSEPVLGKVKLHYT

15	Artificial Sarbecovirus spike consensus 6	MFVFLFLLPLVSSQCVNLTRTGIPPGYTNSSTRGVVYYPDKVF RSSVLHLTQDLFLPFFSNVTWFNAINYQGGFKRFDNPVLPFND GVYFASTEKSNIIRGWIFGTTLTDLARTQSLIVNNATNVVIVKCEF QFCTDPFLGVYHNNNKTWVNEFRVYSSANNCTFEYVSQP FLMDLEGKQGNFKNLREFVFKNVDGYFKIYSKHTPIDLVRDLP RGFSALEPLVDLPIGINITRFQTLALHRSYLTGPKLESGWTTG AAAYYVGYLQPRTFLLSYNENGITDAVDCALDPLSETKCTLK SFTVEKGIYQTSNFRVQPTESIVRFPNITNLCPFGEVFNATRFA SVYAWNRRKRISNCVADYSVLYNSASFSTFKCYGVSPKTLNDL CFTNVYADSFVIRGDEVQRQIAPGQTGKIADYNYKLPDDFTGCVI AWNSNNLDSKVGGNYNLYRLFRKSNLKPFERDISTEIQAGS TPCNGVEGFNCYFPLQSYGFQPTNGVGYQPYRVVLSFELLH APATVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTESNKKFLPF QQFGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSN QVAVLYQDVNCTEVPVAIHADQLTPTWRVYSTGSNVFQTRAG CLIGAEHVNNSECDIPIGAGICASYQTQTNSPRRARSVNSQSI IAYTMSLGAENSVAYSNNIAIPTNFTISVTTEILPVSMKTSTVD CTMYICGDSIECSNLLLQYGSFCTQLNRALTGIAVEQDKNTQE VFAQVKQIYKTPPIKDFGGFNFSQILPDPSKPSKRSFIEDLLFNK VTLADAGFIKQYGDCLGDIAARDLCAQKFNGLTVLPPLTDEM IAQYTSALLAGTITSGWTFGAGAALQIPFAMQMAYRFNGIGVT QNVLYENQKLIANQFNASIGKIQDSLSSTASALGKLQDVVNQN AALNTLVKQLSSNFGAISSVLNDILSRDPPEAEVQIDRLITGR LQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVDFC GKGYHLMSFPQSAPHGVVFLHVTYVPAQEKNTTAPAICHEG KAHFPREGVFSNGTHWFTQRNFYEPQIITDNTFVSGSCD VVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDIG INASVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEYIKWPWYI WLGFIAGLIAIMVTIMLCCMTSCCCLKGCCSCGSCCKFDED DSEPVLKGVKLHYT
16	Artificial Sarbecovirus spike consensus 7	MFVFLFLLPLVSSQCVNLTRTGIPPGYTNSSTRGVVYYPDKVF RSSILHLTQDLFLPFFSNVTWFNNTINYQGGFKKFDNPVLPFND GVYFASTEKSNIIRGWIFGTTLTDLNTTQSLIVNNATNVVIVKCEF QFCTDPFLGVYHNNNKTWVNEFRVYSSANNCTFEYVSQP FLMDLEGKQGNFKNLREFVFKNVDGYFKIYSKHTPIDLVRDLP RGFSALEPLVDLPIGINITRFQTLALHRSYLTGPKLESGWTTG AAAYYVGYLQQRFTLLSYNENGITDAVDCSLDPLSETKCTLK SLTVEKGIYQTSNFRVQPTISIVRFPNITNLCPFGEVFNATKFS VYAWNRRKRISNCVADYSVLYNSTSFSTFKCYGVSPKTLNDLCF TNVYADSFVVRGDEVQRQIAPGQTGVIADYNYKLPDDFTGC VIAWNSVKQDAKTGGNYNLYRLFRKSKLKPFERDISTEIQQA GSTPCNGVVGLNCCYPLERYGFHTNGVGYQPYRVVLSFEL LNAPATVCGPKLSTTLVKNKCVNFNFNGLTGTGVLTTSKKKFL PFQQFGRDISDTTDAVRDPQTLEILDITPCSFGGVSVITPGTNT SNQVAVLYQDVNCTEVPMAIHADQLTPTWRVYSTGANVFQTR AGCLIGAEHVNNSECDIPIGAGICASYHTQTNRSRVNSQSIIA YTMSLGAENSVAYSNNIAIPTNFTISVTTEILPVSMKTSTVDCT MYICGDSIECSNLLLQYGSFCTQLNRALTGIAVEQDKNTQEVF AQVKQIYKTPPIKDFGGFNFSQILPDPSKPSKRSFIEDLLFNKVT LADAGFIKQYGDCLGDIAARDLCAQKFNGLTVLPPLTDEMIA QYTSALLAGTITSGWTFGAGAALQIPFAMQMAYRFNGIGVTQN VLYENQKLIANQFNASIGKIQDSLSSTASALGKLQDVVNQNAQ ALNTLVKQLSSNFGAISSVLNDILSRDPPEAEVQIDRLITGR SLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVDFCGK

		GYHLSFPQSAPHGVFLHVTYVPAQEKNTTAPAICHEGKA HFPREGVFSNGTHWFVTQRNFYEPQIITDNTFVSGCDVVI GIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISGINA SVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYIWL GFIAGLIAIIMVTIMLCCMTSCCSCCLKGCCSCGSCCKFDEDDSE PVLKGVKLHYT
17	Artificial Sarbecovirus spike consensus 8	MFIFLFFTLTVSSQCVNFDDRTPPPPTQTNSSTRGVVYPDDIF RSSVLHLTQDLFLPFFSNVTWFHTINYRFDNPVIFKDGYYFAA TEKSNVIRGWIFGSTMDNKSQSVIIVNNSTNVVIRVCNLFQLCDN PFFAVYNKTWTQIESRVYSNAFNCTFEYVSKSFLDLGEKQGN FKHLREFVFNKNDGFLKVYSGYTPIDLVRDLPSGFNALKPIFKL PLGINITNFRLLTAFRPGQSGWGTSAAYFVGYLKPRTFMLK YDENGITDAVDCSQDPLAELKCTLKSFEVEKGIYQTSNFRVQ PTKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRISNCVAD YSVLNSTSFSTFKCYGVSPTKLNDLCFSNVYADSFVVGDD VRQIAPGQTGVIADYNYKLPPDFTGCVLAWNTRNIDATTGGNY NYLYRLFRHSLKLPFERDISNVIYSPGGKCTPPGFNCYWPLN DYGFYPTNGVGYQPYRVVLSFELLNAPATVCGPKLSTDLVK NKCYNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFDTSVR DPKLTLEILDISPCSFGGVSVITPGTNTSSEVAVLYQDVNCTDVP VAIHADQLTPAWRVYSTGNNVFQTAQAGCLIGAEHVNNSYECDI PIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAENSIAYSNNIA IPTNFSISVTTEVLPVSMTKTSVDCTMYICGDSTECNLLQYG SFCTQLNRALSGIAVEQDKNTQEVFAQVKQIYKTPPIKDFGGF NFSQILPDSPSKPSKRSFIEDLLFNKVTADAGFMKQYGDCLGDI NARDLICAQKFNGLTVLPLLTDEMIAAYTAALVSGTATAGWT FGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKQIANQFNK AISQIQESLTTTSTALGKLQDVVNQNAQALNTLVKQLSSNFGAI SSVLNDILSRDPPEAEVQIDRLITGRLQSLQTYVTQQLIRAAEI RASANLAATKMSCEVLGQSKRVDFCGKGYHLSFPQAAPHG VFLHVTYVPSQERNFTTAPAICHEGKAHFPREGVFSNGTH WFITQRNFYSPQIITDNTFVSGCDVVIIVNNTVYDPLQPEL DSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKEIDRLNEV AKNLNESLIDLQELGKYEQYIKWPWYVWLFIAGLIAIIMVTIM LCCMTSCCSCCLKGCCSCGSCCKFDEDDSEPVLKGVKLHYT
18	Artificial Sarbecovirus RBD consensus 1	SNFRVVPSSGDVVRFPNITNLCPFGEVFNATKFPSVYAWERKRI SNCVADYSVLNSTSFSTFKCYGVSATKLNLCFSNVYADSFV VKGDDVRQIAPGQTGVIADYNYKLPPDFMGCVLAWNTRNIDA TSTGNHNYKYRYLRHGKLRPFERDISNVPFSPDGKCTPPAP NCYWPLRGYGYTTSGIGYQPYRVVLSFELLNAPATVCGPK LSTDLIKNQCVNFNFGLTGTGVLTPSSKRFQPFQFGRDVS DFTDSVRDPKTSEIL
19	Artificial Sarbecovirus RBD consensus 2	SNFRVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLNSTSFSTFKCYGVSATKLNLCFSNVYADSFV VKGDDVRQIAPGQTGVIADYNYKLPPDFTGCVLAWNTRNIDAT QTGNYNKYRSLRHGKLRPFERDISNVPFSPDGKCTPPAFN CYWPLNDYGYTTNGIGYQPYRVVLSFELLNAPATVCGPKLS TDLIKNQCVNFNFGLTGTGVLTPSSRFQPFQFGRDVSDFD DSVRDPKTSEIL
20	Artificial Sarbecovirus RBD consensus 3	SNFRVQPTISIVRFPNITNLCPFGEVFNATRFASVYAWNKRIS NCVADYSVLNSTSFSTFKCYGVSPTKLNDLCFTNVYADSFVV RGDEVVRQIAPGQTGVIADYNYKLPPDFTGCVIWNVSKQDAL TGGNYYLYRLFRKSKLPFERDISTEYIYQAGSTPCNGVGLN CYYPLQRYGFHPTTGVGYPYRVVLSFELLNAPATVCGPKK

		STNLVKNKCVNFNFNGLTGTGVLTESNKKFLPFQQFGRDIADT TDAVRDPQTLEIL
21	Artificial Sarbecovirus RBD consensus 4	SNFRVQPTISIVRFPNITNLCPFGEVFNATKFASVYAWNRKRIS NCVADYSVLNYSFSTFKCYGVSPTKLNDLCFTNVYADSFVV RGDEVQRQIAPGQTGVIADYNYKLPDDFTGCVIAWNSVKQDAK TGGNYNYLYRLFRKSKLPFERDISTEIQAGSTPCNGVVGLN CYYPLERYGFHTNGVGYQPYRVVLSFELLNAPATVCGPKL STTLVKNKCVNFNFNGLTGTGVLTTSKKKFLPFQQFGRDISDT TDAVRDPQTLEIL
22	Artificial Sarbecovirus RBD consensus 5	SNFRVQPTKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLNYSFSTFKCYGVSPTKLNDLCFSNVYADSFV VKGDDVRQIAPGQTGVIADYNYKLPDDFTGCVLAWNTRNIDAT TGGNYNYLYRLFRHSLKLPFERDISNVIYSPGKPCPTPPGFNC YWPLNDYGFYPTNGVGYQPYRVVLSFELLNAPATVCGPKLS TDLVKNKCVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFT TDSVRDPKLEIL
23	Coronavirus BtRs- BetaCoV/YN20 18B Spike protein (Genbank: QDF43825)	MKLLVLVFATLVSSYTIEKCTDFDDRTPPSNTQFLSSHRGVYY PDDIFRSNVLHLVQDHFLPFDSNVTRFITFGLNFDNP IIPFRDGYFAATEKSNVIRGWVFGSTMNNKSQSVIIMNNSTNL VIRACNFELCDNPFVFLRSNNTQIPSYIFNNAFNC TFEYVSKDFNLDIGEKGPNFKDLREFVFRNKDGLHVSQYQ PISAASGLPTGFNALKPIFKLPLGINITNFRLLTAF PNPGYWGTSAAAYFVGYLKPTTFMLKYDENGITDAVDCSQN PLAELKCSVKSFEIDKGIYQTSNFRVAPSKEVVRFPNI TNLCPFGEVFNATTFPSVYAWERKRISNCVADYSVLNYSFST TFKCYGVSATKLNDLCFSNVYADSFVKGDDVRQIAP GQTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNYKYR SLRHGKLRPFERDISNVPFSPDGKPCPTPPAFNCYWPLN DYGFFTTNGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKN QCVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFT DSVRDPKTSEILDIPCSFGGVSITPGTNTSSEAVLYQDVNC TDVPVAIHADQLTPAWRIYSTGNNVFQTQAGCLIGA EHVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGA DSSIAYSNTIAIPTNFSISITTEVMPVSMAKTSVD CNMYICGDSTECANLLLQYGSFCTQLNRALSGIAVEQDRNTR EVFAQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSF IEDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIP FAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTT TSTALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVL NDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASA NLAATKMSECVLGQSKRVDFCGKGYHLSFPQAAP HGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNG TSWFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTV YDPLQPELDSFKEELDKYFKNHTSPDVLGDIGINASVWNIQK EIDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVW LGFIAGLIAIVMTILLCCMTSCCCLKGACSCGSCCKFDEDD EPVLKGVKLHYT
24	Bat SARS-like coronavirus Spike protein (Genbank: ATO98218)	MKLLVLVFATLVSSYTIEKCLDFDDRTPPANTQFLSSHRGVYY PDDIFRSNVLHLVQDHFLPFDSNVTRFITFGLNFDNP IIPFRDGIYFAATEKSNVIRGWVFGSTMNNKSQSVIIMNNSTNL VIRACNFELCDNPFVFLKSNNNTQIPSYIFNNAFNC TFEYVSKDFNLDLGEKPGNFKDLREFVFRNKDGLHVSQYQ PISAASGLPTGFNALKPIFKLPLGINITNFRLLTAF

		PRPDYWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQN PLAELKCSVKSFEIDKGIYQTSNFRVAPSKEVVRFPNI TNLCPFGEVFNATTFPSVYAWERKRISNCVADYSVLYNSTSFS TFKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAP GQTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNKYR SLRHGKLRPFERDISNVPFSPDGKPCPPAFNCYWPLN DYGFFTTNGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKN QCVNFNFNGLTGTGVLTSSSKRFQPFQQFGRDVSDFT DSVRDPKTSEILDSPCSFGGVSVITPGTNTSSEVAVLYQDVNC TDVPVAIHADQLTPAWRIYSTGNNVFQTQAGCLIGA EHVDTSYECDIPGAGICASYHTVSSLRSTSQKSIVAYTMSLGA DSSIVYSNNTIAIPTNFSISITTEVMPVSMAKTSVD CNMYICGDSTECANLLLQYGSFCTQLNRALSGIAVEQDRNTR EVFAQVKQMYKTPTLKDFFGFFNFSQILPDPLKPTKRSF IEDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIP FAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTT TSTALGKLQDVVNQNAQALNTLVKQLSSNFGAIVSVL NDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASA NLAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAP HGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNG TSWFITQRNFFSPQIITDNTFVSGNCDVIGIINNTV YDPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQK EIDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVW LGFIAGLIAIVMTILLCCMTSCCCLKGACSCGSCCKFDEDDS EPVLKGVKLHYT
25	Bat SARS-like coronavirus Spike protein (Genbank: ATO98231)	MKLLVLVFATLVSSYTIEKCLDFDRTTPANTQFLSSHRGVYY PDDIFRSNVHLVQDHFLPFDSNVTRFITFGLNFDNP IIPFRDGIYFAATEKSNVIRGWVFGSTMNNKSQSVIIMNNSTNL VIRACNFELCDNPPFFVLKSNNTQIPSYIFNNAFNC TFEYVSKDFNLDLGEKPGNFKDLREFVFRNKDGLHVSQYQ PISAASGLPTGFNALKPIFKLPLGINITNFRLLTAFP PRPDYWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQN PLAELKCSVKSFEIDKGIYQTSNFRVAPSKEVVRFPNI TNLCPFGEVFNATTFPSVYAWERKRISNCVADYSVLYNSTSFS TFKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAP GQTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNKYR SLRHGKLRPFERDISNVPFSPDGKPCPPAFNCYWPLN DYGFFTTNGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKN QCVNFNFNGLTGTGVLTSSSKRFQPFQQFGRDVSDFT DSVRDPKTSEILDSPCSFGGVSVITPGTNTSSEVAVLYQDVNC TDVPVAIHADQLTPAWRIYSTGNNVFQTQAGCLIGA EHVDTSYECDIPGAGICASYHTVSSLRSTSQKSIVAYTMSLGA DSSIVYSNNTIAIPTNFSISITTEVMPVSMAKTSVD CNMYICGDSTECANLLLQYGSFCTQLNRALSGIAVEQDRNTR EVFAQVKQMYKTPTLKDFFGFFNFSQILPDPLKPTKRSF IEDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIP FAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTT TSTALGKLQDVVNQNAQALNTLVKQLSSNFGAIVSVL NDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASA NLAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAP HGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNG TSWFITQRNFFSPQIITDNTFVSGNCDVIGIINNTV

		YDPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVWNIQK EIDRLNEVAKNLNLSLIDLQELGKYEQYIKWPWYVW LGFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDP EPVLKGVKLHYT
26	Bat SARS-like coronavirus RsSHC014 Spike protein (Genbank: AGZ48806)	MKLLVLFATLVSSYIEKCLDFDDRTTPANTQFLSSHRGVYY PDDIFRSNVLHLVQDHFLPFDSNVTRFITFGLNFDNP IIPFRDGIYFAATEKSNVIRGWVFGSTMNNKSQSVIIMNNSTNL VIRACNFELCDNPFVVLKSNNTQIPSYIFNNAFNC TFEYVSKDFNLDLGEKPGNFKDLREFVFRNKDGLHVVSGYQ PISAASGLPTGFNALKPIFKLPLGINITNFRLLTAFP PRPDYWGTSAAAYFVGYLKPTTFMLKYDENGITITDAVDCSQN PLAELKCSVKSFEIDKGIYQTSNFRVAPSKEVVRFPNI TNLCPFGEVFNATTFPSVYAWERKRISNCVADYSVLNSTSFS TFKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAP GQTGVIADYNYKLPDDFLGCVLAWNTNSKDSSTSGNYNYLYR WVRRSKLNPYERDLNDIYSPGGQSCSAVGPNPCYNPLR PYGFFTTAGVGHQPYRVVLSFELLNAPATVCGPKLSTDLIKN QCVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDF DSVRDPKTSEILDISPCSFGGVSVITPGTNTSSEVAVLYQDVNC TDVPVAIHADQLTPSWRVYSTGNNVFQTAAGCLIGA EHVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGA DSSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVD CNMYICGDSTECANLLLQYGSFCTQLNRALSGIAVEQDRNTR EVFAQVKQMYKTPTLKDFFGFFNFSQILPDPLKPTKRSF IEDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIP FAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTT TSTALGKLQDVVNQNAQALNTLVKQLSSNFGAIVSVL NDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASA NLAATKMSECVLGQSKRVDGCGKGYHLSFPQAAP HGTVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNG TSWFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTV YDPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVWNIQK EIDRLNEVAKNLNLSLIDLQELGKYEQYIKWPWYVW LGFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDP EPVLKGVKLHYT
27	Bat SARS-like coronavirus Spike protein (Genbank: ATO98132)	MKLLVLFATLVSSYIEKCLDFDDRTTPANTQFLSSHRGVYY PDDIFRSNVLHLVQDHFLPFDSNVTRFITFGLNFDNP IIPFRDGIYFAATEKSNVIRGWVFGSTMNNKSQSVIIMNNSTNL VIRACNFELCDNPFVVLKSNNTQIPSYIFNNAFNC TFEYVSKDFNLDLGEKPGNFKDLREFVFRNKDGLHVVSGYQ PISAASGLPTGFNALKPIFKLPLGINITNFRLLTAFP PRPDYWGTSAAAYFVGYLKPTTFMLKYDENGITITDAVDCSQN PLAELKCSVKSFEIDKGIYQTSNFRVAPSKEVVRFPNI TNLCPFGEVFNATTFPSVYAWERKRISNCVADYSILYNSTSFS TFKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAP GQTGVIADYNYKLPDDFLGCVLAWNTNSKDSSTSGNYNYLYR WVRRSKLNPYERDLNDIYSPGGQSCSAVGPNPCYNPLR PYGFFTTAGVGHQPYRVVLSFELLNAPATVCGPKLSTDLIKN QCVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDF DSVRDPKTSEILDISPCSFGGVSVITPGTNTSSEVAVLYQDVNC TDVPVAIHADQLTPSWRVYSTGNNVFQTAAGCLIGA EHVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGA DSSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVD

		CNMYICGDSTECANLLLQYGSFCTQLNRALSGIAVEQDRNTR EVFAQVKQMYKTPTLKDFFGFFNFSQILPDPLKPTKRSF IEDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLL TDDMIAAYTAALVSGTATAGWTFGAGAALQIP FAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTT TSTALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVL NDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASA NLAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAP HGTVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNG TSWFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTV YDPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVWNIQK EIDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVW LGFIAGLIAIVMTILLCCMTSCCCLKGACSCGSCCKFDEDDSD EPVLKGVKLHYT
28	Bat SARS-like coronavirus Rs3367 Spike protein (Genbank: AGZ48818)	MKLLVLFATLVSSYIEKCLDFDRTTPANTQFLSSHRGVYY PDDIFRSNVHLVQDHFLPFDSNVTRFITFGLNFDNP IIPFKDGIYFAATEKSNVIRGWFGSTMNNKSQSVIIMNNSTNL VIRACNFELCDNPFFVVLKSNNTQIPSYIFNNAFNC TFEYVSKDFNLDLGEKPGNFKDLREFVFRNKDGFHVVSGYQ PISAASGLPTGFNALKPIFKLPLGINITNFRLLTAF PRPDYWGTSAAAYFVGYLKPTTFMLKYDENGITDAVDCSQN PLAELKCSVKSFEIDKGIYQTSNFRVAPSKEVVRFPNI TNLCPFGEVFNATTFPSVYAWERKRISNCVADYSVLNSTFS TFKCYGVSATKLNDLCSNVYADSFVVKGDDVRQIAP GQTGVIADYNYKLPDDFTGCVLAWNTRNIDATQTGNYNKYR SLRHGKLRFERDISNVPFSPDGKCTPPAFNCYWPLN DYGFIYITNGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDF DSVRDPKTSEILDSPCSFGGVSVITPGTNTSSEVAVLYQDVNC TDVPVAIHADQLTPSWRVYSTGNVVFQTAAGCLIGA EHVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGA DSSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVD CNMYICGDSTECANLLLQYGSFCTQLNRALSGIAVEQDRNTR EVFAQVKQMYKTPTLKDFFGFFNFSQILPDPLKPTKRSF IEDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLL TDDMIAAYTAALVSGTATAGWTFGAGAALQIP FAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTT TSTALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVL NDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASA NLAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAP HGTVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNG TSWFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTV YDPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVWNIQK EINRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVW LGFIAGLIAIVMTILLCCMTSCCCLKGACSCGSCCKFDEDDSD EPVLKGVKLHYT
29	Bat SARS-like coronavirus WIV1 Spike protein (Genbank: AGZ48828)	MKLLVLFATLVSSYIEKCLDFDRTTPANTQFLSSHRGVYY PDDIFRSNVHLVQDHFLPFDSNVTRFITFGLNFDNP IIPFKDGIYFAATEKSNVIRGWFGSTMNNKSQSVIIMNNSTNL VIRACNFELCDNPFFVVLKSNNTQIPSYIFNNAFNC TFEYVSKDFNLDLGEKPGNFKDLREFVFRNKDGFHVVSGYQ PISAASGLPTGFNALKPIFKLPLGINITNFRLLTAF PRPDYWGTSAAAYFVGYLKPTTFMLKYDENGITDAVDCSQN PLAELKCSVKSFEIDKGIYQTSNFRVAPSKEVVRFPNI

		TNLCPFGEVFNATTFPSVYAWERKRISNCVADYSVLYNSTSFS TFKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAP GQTGVIADYNYKLPDDFTGCVLAWNTRNIDATQTGNVNYKYR SLRHGKLRPFERDISNVPFSPDGKCTPPAFNCYWPLN DYGFYITNGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFD DSVRDPKTSEILDSPCSFGGVSIVITPGTNTSSEVAVLYQDVNC TDVPVAIHADQLTPSWRVHSTGNNVFQTQAGCLIGA EHVDTSECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGA DSSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVD CNMYICGDSTECANLLLQYGSFCTQLNRALSGIAVEQDRNTR EVFAQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSF IEDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIP FAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIESLTT TSTALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVL NDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASA NLAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAP HGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNG TSWFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTV YDPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQK EIDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVW LGFIAGLIAIVMTILLCCMTSCCSCSKGACSCGSCCKFDEDD EPVLKGVKLHYT
30	SARS coronavirus Tor2 Spike glycoprotein (Genbank: YP_00982505 1)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHMIFDNFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPVYAWERKKISNCVADYSVLYNSTFFST FKCYSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNVNYKYR LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFD SVRDPKTSEILDSPCAFGGVSIVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECIDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL

		GFIAGLIAIVMTILLCCMTSCCSCSLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
31	Bat SARS-like coronavirus Spike protein (Genbank: ATO98157)	MFIFLFFLTLTSGSDLESCCTTFDDVQAPNYPQHSSSRRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHRFDNPV IPFKDGVYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNV VIRACNFELCDNPFFAVSKPTGTQTHMIFDNAFNCT FEYISDSFSLDVAEKSGNFKHLREFVFKNKDGFYVYKGYQPI DVVRDLPSGFNILKPIFKLPLGINITNFRAILTAFLP AQDTWGTSAAYFVGYLKPATFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVAPSKEVVRFPNIT NLCPFGEVFNATTFFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPDDFLGCVLAWNTNSKDSSTSGNYNYLYRW VRRSKLNPYERDLSNDIYSPGGQSCSAIGPNCYNPLRP YGFFTTAGVGHQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTSKSRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNTSSEVAVLYQDVNCT DVPVAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAVEQDRNTREV FAQVKQMYKTPALKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDVNARDLICAQKFNGLTVL PPLLTDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTCPVPSQERNFTTAPAICHEGKAYFPREGVVFVNGT SWFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCSLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
32	SARS-like coronavirus WIV16 Spike protein (Genbank: ALK02457)	MFIFLFFLTLTSGSDLESCCTTFDDVQAPNYPQHSSSRRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHRFDNPV IPFKDGVYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNV VIRACNFELCDNPFFAVSKPTGTQTHMIFDNAFNCT FEYISDSFSLDVAEKSGNFKHLREFVFKNKDGFYVYKGYQPI DVVRDLPSGFNILKPIFKLPLGINITNFRAILTAFLP AQDTWGTSAAYFVGYLKPATFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVAPSKEVVRFPNIT NLCPFGEVFNATTFFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPDDFTGCVLAWNTRNIDATQTGNYNYKYRS LRHGKLRPFERDISNVPFSPDGKCTPPAFNCYWPLND YGFYITNGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVLDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNTSSEVAVLYQDVNCT DVPVAIHADQLTPSWRVYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAVEQDRNTREV FAQVKQMYKTPTLKDFFGGFNFSQILPDPLKPTKRSFI

		EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGTLVLP PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
33	Bat SARS-like coronavirus Spike protein (Genbank: ATO98205)	MFIFLFFLTLTSGSDLESCCTTFDDVQAPNYPQHSSSRRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHRFDNPV IPFKDGVYFAATEKSNVVRGWVFGSTMNNKSQSVIINNSTNV VIRACNFELCDNPFPAVSKPTGTQHTMIFDNAFNCT FEYISDSFSLDVAEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNLIKPIFKLPLGINITNFRAILTAFLP AQDTWGTSAAYFVGYLKPATFMLKYDENGITDAVDCSQNP LAELKCSVKSFEDKGIYQTSNFRVAPSKEVVRFPNIT NLCPFGEVFNATTFPSVYAWERKRISNCVADYSVLNYSFST FKCYGVSATKLNLCFSNVYADSFVVGDDVVRQIAPG QTGVIADYNYKLPDDFTGCVLAWNTRNIDATQTGNYNKYRS LRHGKLRPFERDISNVPFSPDGKPCPPAFNICYWPLND YGFYITNGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNTSSEVAVLYQDVNCT DVPVAIHADQLTPSWRVYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRLSGIAVEQDRNTREV FAQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGTLVLP PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
34	<i>Rhinolophus affinis</i> coronavirus Spike protein (Genbank: AHX37558)	MFLTCTFSLFSLFCVSGDSIDTCETFDVSPPPQQNLVSSSKRG VYYPDDIYRSDVHHLVQDLFLPFNSNVVGLMSFNRYR DNPIIPFKDGVYFAATEKSNVVRGWVFGSTMNNKSQSVIIMNN STNVVIRACNFQLCDNPFPAVIRPTSQQIETILFENA FNCTFEYVSDSFLMDVGEKPGNFKHLREFIFKNKDGFLNIYS FQNIIDVANGLP SGFSLKPLKPLGLNITNFRVLLT AFIPNIGTWGTSPVAYFVGYLKPTTFMLKYDNGTIVDAVDCS QHPLAELKCSVKSFEDKGIYQTSNFRVSPSKEVVR PNITNLCPFGEVFNATTFPSVYAWERKRISNCVADYSVLNYS SFSTFKCYGVSAILNLCFSNVYADSFVVGDDVVRQ

		IAPGQTGVIADYNYKLPDDFMGCVLAWNTRNIDATSSGNFNKY YRSLRHGKLRPFERDISNVPFSPDGKCTPPAFNCYW PLNDYGfYTTNGIGYQPYRVVLSFELLNAPATVCGPKLSTDLI TNQCVNFNFNGLTGTGVLTPSLKRFQPFQQFGRDFS DFTDSVRDPKTLEVLDISPCSFGGVSVITPGTNISSEVAVLYQD VNCTDVPTAIHADQLTPAWRIYSAGVNVFQTQAGCL IGAETHVNASYECDIPIGAGICASYHTASLLRNTDQKSIVAYTMS LGAENSIAYANNSIAIPTNFSISITTEVMPVSMKAT SVDCTMYICGDSQECSNLLLQYGSFCTQLNRALSGIAVEQDK NTQEVFAQVKQIYKTPAIKDFGGFNFSQILPDPSKPTK RSFIEDLLFNKVTLADAGFMKQYGECLGDISARDLICAQKFNGL TVLPPLLTDEMIAAYTAALVSGTATAGWTFGAGAAL QIPFAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQES LTTTSTALGKLQDVVNQNAQALNTLVKQLSSNFGAIS SVLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIR ASANLAATKMSECVLGQSKRVDFCGKGYHLMSPFQ AAPHGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVS NGTSWFITQRNFFSPQLITTDNTFVSGNCDVVIGIIN NTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISRINASVV NIQKEIDRLNEVAKNLNESLIDLQELGKYEQYIKWPW YVWLGFIAGLIAIVMATILLCCMTSCCSCCLKGACSCGSCCKFDE DDSEPVLKGVKLHYT
35	<i>Rhinolophus affinis</i> coronavirus Spike protein (Genbank: AHX37569)	MFLTCLIFSLFCVSGDSIDTCETFDVSPPPQNLVSSSKRGV YYPDDIYRSDAHLVQDLFLPFNSNVVGLMSFNRYF DNPIIPFKDGVYFAATEKSNVVRGWVFGSTMNNKSQSAIMNN STNVVIRACNFQLCDNPFFAVIRPTSQQIETILFENA FNCTFEYVSDSFLMDVGEKPGNFKHLREFIFKNKDGFLYISG FQNIIDVANGLPSPGFSLLKPLLKPLGLNITNFRVLLT AFIPNIGTWGTSPVAYFVGYLKPTTFMLKYDNGTIVDAVDCS QHPLAELKCSVKSFDIDKGIYQTSNFRVSPSREVVRF PNITNLCPFGEVFNATTFFPSVYAWERKRISNCVADYSVLNST SFSTFKCYGVSAIKLNDLCFSNVYADSFVVKGDVVRQ IAPGQTGVIADYNYKLPDDFMGCVLAWNTRNIDATSSGNFHYK YRSLRHGKLRPFERDISNVPFSPDGKCTPPAFNCYW PLNDYGfYTTNGIGYQPYRVVLSFELLNAPATVCGPKLSTDLI TNQCVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVS DFTDSVRDPKTLEVLDISPCSFGGVSVITPGTNISSEVAVLYQD VNCTDVPTAIHADQLTPAWRIYSAGENVFQTQAGCL IGAETHVNASYECDIPIGAGICASYHTASLLRNTGQKSIVAYTMS LGAENSIAYANNSIAIPTNFSISITTEVMPVSMKAT SVDCTMYICGDSQECSNLLLQYGSFCTQLNRALSGIAVEQDS NTQEVFAQVKQIYKTPAIKDFGGFNFSQILPDPSKPTK RSFIEDLLFNKVTLADAGFMKQYGECLGDISARDLICAQKFNGL TVLPPLLTDEMIAAYTAALVSGTATAGWTFGAGAAL QIPFAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQES LTTTSTALGKLQDVVNQNAQALNTLVKQLSSNFGAIS SVLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIR ASANLAATKMSECVLGQSKRVDFCGKGYHLMSPFQ AAPHGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVF NGTSWFITQRNFFSPQLITTDNTFVSGNCDVVIGIIN NTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISRINASVV NIQKEIDRLNEVAKNLNESLIDLQELGKYEQYIKWPW YVWLGFIAGLIAIVMATILLCCMTSCCSCCLKGACSCGSCCKFDE DDSEPVLKGVKLHYT

36	SARS-related coronavirus Spike protein (Genbank: APO40579)	MKFFILLSLLSFTTAQEGCGILSNKSNPALTQYFSSRRGFYYFD DTRSSVRVLTGGYFLPFNSNLTYSSRNSVTGRLI QFDNPNIPIKDGLYFAATERSNVIRGWIFGSTLDNTTQSAVLF NNGTHIVINVCNFCQDPMLAVANGSHFKSWVFLNA TNCTYNRVHGFIDPSPNTGSFIHLREHVFRNVDGFLYVYHNY ERVVDYDNFPQGFVSLKPIFKLPFGLNITQFKVIMTL FSPTTSSFNADASVYFVGHLKPLTMLAEFDENGITDAVDCSQ DPLSELKCTTKSLTVEKGIYQTSNFRVSPSTEVVRF NITNLCPPFGQVFNASNFPVYAWERLRISDCVADYAVLYNSSS SFSTFKCYGVSPTKLNDLCFSSVYADYFVVKGDDVRQ IAPAQTGVIADYNYKLPDDFTGCVLAWNTNSVDSKSGNNFY RLFRHGKIKPYERDISNVLYNSAGGTCSSISQLGCYEP LKSYGFTPTVGVGYPYRVVLSFELLNAPATVCGPKKSTELV KNKCVNFNFNGLTGTGVLTSSTKKFQPFQFGRDVS FTDSVRDPKTFEILDIPCSYGGVSVITPGTNTSKAVAVLYQDV NCTDVPTMIHVEQVSSDWRVYAFNSYGNMFQTQAGC LVGAIYENTTYECDIPGAGICAKFGSDKIRMGQESIVAYTMSIG EDQSIAYSNNIIAIPTNFSISVTTEVLPVSMTKTS VDCNMYICGDSTECNLLQYGSFCTQLNRALSGIAVEQDRN TRDVFAQTKSIYKTPNIKDFGGFNFSQILPDPKLSYR SFIEDLLYNKVTLSDPGFMKQYGDCLGGINARDLCAQKFNGL TVLPPLLTDDMIAAYTAALISGTATAGYTFGAGAAALQ IPFAMQMAYRFNGIGVTQNVLYENQKQIANQFNNAISKIQDSL TTSAALGKLQDVINQNAVALNTLVKQLSSNFGAISS VLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRA SANLAATKMSECVLGQSKRVDFCGKGYHLSFPQA APHGVVFLHVTYVPSQQQNFTTAPAICHNGKAYFPREGVFVM NGTHWFITQRNFYSPQVITDNTFESGSCDVVIGIINN TVYDPLQPELESFKQELDKYFNHTSPDVDFGDISGINASVVDI KKEIAHLNEIAKNLNEIDLQELGKYEQYVKWPWY VWLGFVAGIVAILMSVIMLCCMTNCCSCFKGMCSCGSCCKFD EDHSEPVSGVKLHYT
37	SARS-like coronavirus BatCoV/BB990 4/BGR/2008 Spike glycoprotein (Genbank: ALJ94036)	MKVLIFLSLLSLVSAQDGCDFSSKKTPLLTQFPSSKRGLYYF DDIFRSSTRVLTSGHFLPFNSNVTRYTTQHSAPGEWM IYFDNPNIITFGDGVYFGAAERSNALRGWIFGSTMDNTTQSAIL YNNGTHIVISVCNFCNLCEQPMIKVFAGRSYRSLIYN AANCYQRVHAFNITTATGNGNLIHFREHVFRNVDGFLYVYHN YELVNLSHTNPSFPAGFSVLKPIFKLPFGLNITFVRA IMTVFSASTSQFEADYSAYFVGHLKPLTMLVDFDENGITDAV DCSQDPLSELKCTTKSFTVEKGIYQTSNFRVTPTEV VRFPNITKLCPPFDQVFNASFPVYAWERVRITDCVANYAVLY NSSVSFSTFQCYGVSPTKLNDLCFSSVYADYFIVKGD DVRQIAPSQTGVIADYNYKLPDDFTGCVIAWNTNALDSNKDFY YRLFRHGKIKPYGRDLSNIPYSPSGTCSTINNLNCF PLKSYGFTQSSGISFQPYRVVLSFELLNAPATVCGPKQSTEL VKDKCVNFNFNGLTGTGVLTSSTKKFQPFQFGRDVS DFTDSVRDPKTEILDIAPCSYGGVSVITPGTNASNSVAVLYQD VNCTDVPTMLHAEQISHDWRVYTFSSDSNIYQTQAG CLIGAAYNSSYECDIPGAGICAKYGISSNTRLRSNSQSIVAYT MSLGEDQSIAYSNNIIAIPMNFISISVTTEVLPVSM TKTSVDCNMYICGDSTECNLLQYGSFCTQLNRALAGIAVEQ DRNTRDVFAQTKAMYKTPSLKDFGGFNFSQILPDPK PSSRSFIEDLLYNKVTLADPGFMKQYGDCLGGVNARDLCAQK FNGLTVLPPLLTDEMIAAYTAALVSGTATAGFTFGAG

		AALQIPFAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQI QDSLSTTTTALGKLQDVINQNAIALNTLVKQLSSNFG AISSVLNDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAA EIRASANIAATKMSECVLGQSKRVDFCGKGYHLMS FPQAAPHGVVFLHVTYVPSQEQNFTTAPAICHGGKAHFPREG VFVTNGTHWFITQRNFYSPQPITTDNTFVSGNCDVVIG IVNNTVYDPLQPELESFKEELDKYFKNHTSQNVSLDGLNNINA SVVDIKKEIEHLNEIAKSLNESLIDLQELGKYEQYIK WPWYVWLGFIAGLIAIVMATIMLCCMTSCCSCCLKGVCSASC CKFDEDHSEPVLTVGKLVHYT
38	Bat coronavirus BM48- 31/BGR/2008 Spike protein (Genbank: YP_00385858 4)	MKFLAFLCLLGFANAQDGKCGTLSNKSPLTQTPSSRRGFY YFDDIFRSSIRVLTTGHFLPFNTNLTWYLTLSNGKQR IYYDNPNIINFGDGVYFGLTEKSNVFRGWFGSTLDNTTQSAVL FNNGTHIVIDVCNFCADPMFAVNSGQPYKTIWYTS AANCYHRAHAFNISTNMNPGKFKHFREHLFKNVDGFLYVYH NYEPIDLNSGFPSPGFSVLKPKLPFGLNITYVKAIMT LFSSTQSNFDADASAYFVGHKPLTMLVDFDENGTIIDAIDCSQ DPLSELKCTTKSFTVEKGIYQTSNFRVTPTEVVR PNITQLCPFNEVFNITSFSPVYAWERMRTNCVADYSVLYNSS ASFSTFCYGVSPTKLNDLCFSSVYADYFVVKGDVVR QIAPAQTGVIADYNYKLPDDFTGCVIAWNTNSLDSSNEFFYRR FRHGKIKPYGRDLSNVLFNPSGGTCSAEGLNICYKPLA SYGFTQSSGIGFQPYRVVLSFELLNAPATVCGPKQSTELVKN KCVNFNFNGLTGTGVLNSTKKFQPFQGFGRDVSDF DSVRDPKLEILDIAPCSYGGVSVITPGTNASSSVAVLYQDVNC TDVPTMLHADQISHDWRVYAFRNDGNIFQTQAGCLI GAAYDNSSYECDIPIGAGICAKYTNVSSTLVRSGGHSILAYTMS LGDNDQDIVYSNNTIAIPMNFSISVTTEVLVPSMTKT SVDCNMYICGDSTECNLLLQYGSFCTQLNRALAGIAVEQDR NTRDVFQAQTKAMYKTPSLKDFGGFNFSQILPDPAPSS RSFIEDLLYNKVTLADPGFMKQYGDCLGGVNARDLICAQKFN GLTVLPPLTDEMIAAYTAALISGTATAGFTFGAGAAL QIPFAMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQDS LSTTTTALGKLQDVINQNAIALNTLVKQLSSNFGAIS SVLNDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIR ASANLAATKMSECVLGQSKRVDFCGKGYHLMSFPQ AAPHGVVFLHVTYVPSQEQNFTTAPAICHEGKAHFPREGV TNGTHWFITQRNFYSPQPITTDNTFVSGNCDVVIGIVN NTVYDPLQPELDSFKEELDKYFKNHTSQNVSLDGLNNINASV DIKKEIEHLNEIAKSLNESLIDLQELGKYEQYIKWPW YVWLGFIAGLIAIVMATIMLCCMTSCCSCCLKGVCSASCCKFD EDHSEPVLTVGKLVHYT
39	Pangolin coronavirus Surface glycoprotein (Genbank: QLR06867)	MLFFFFLHFALVNSQC VNLTGRAAIQPSFTNSSQRGVYYPDTI FRSNTLVLSQGYFLPFYSNVSWYYALTKTNSAEKRVD NPVLDFKDGIFYAATEKSNIVRGWIFGTTLDNSTQSLLIVNNAT NVIKVCNFCYQDPYLSGYYHNNKTWSTREFAVYS SYANCTFEYVSKSFMLDIAGKSGLFDTLREFVFRNVGDYFKIY SKYTPTVNVNSNLPIGFSALEPLVEIPAGINITKFRTL LTIHRGDPMPNNGWTVFSAAYYVGYLAPRTFMLNYNENGIT DAVDCALDPLSEAKCTLKSLTVEKGIYQTSNFRVQPT SIVRFPNITNLCPFGEVFNATTFASVYAWNRKRISNCVADYSVL YNSTSFSTFKCYGVSPTKLNDLCFTNVYADSFVVRG DEVQRQIAPGQTGRIADYNYKLPDDFTGCVIAWNSNNLDSKVG GNYNLYRLFRKSNLKPFERDISTEYQAGSTPCNGVE

		GFNCYFPLQSYGFHPTNGVGYQPYRVVLSFELLNAPATVCG PKQSTNLVKNKCVNFNGLTGTGVLTESSKKFLPFQQ FGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSNQV AVLYQDVNCTEVPVAIHADQLTPTWSVYSTGSNVFQ TRAGCLIGAEHVNNSECDIPGAGICASYQTQTNSRSVSSQAI IAYTMSLGAENSVAYANNSIAIPTNFTISVTTEILP VSMTKTSVDCTMYICGDSIECSNLLLQYGSFCTQLNRALTGIA VEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQILPD PSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLICA QKFNGLTVLPPLLDEMIAQYTSALLAGTITSGWTF GAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNSAI GKIQDSLSTASALGKLQDVVNQNAQALNTLVKQLSS NFGAISSVLNDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLI RAAEIRASANLAATKMSECVLGQSKRVDFCGKGYH LMSFPQSAPHGVVFLHVTYVPSQEKNFTTTTPAICHEGKAHFPR EGVFVSNGTHWVFTQRNFYEPQIITDNTFVSGSCDV VIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISGI NASVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEQ YIKWPWYIWLGFIAGLIAIMVTIMLCCMTSCCCLKGCCSCGS CCKFDEDDSEPVKGVKLHYT
40	Pangolin coronavirus Surface glycoprotein (Genbank: QLR06864)	MLFFFFLHFALVNSQCVNLTGRAAIQPSFTNSSQRGVYYPDTI FRSNLTVLSQGYFLPFYSNVSWYYALTKTNSAEKRVD NPVLDFKDGIFYAATEKSNIVRGWIFGTTLDNSTQSLLIVNNAT NVIIKVCNFCYQDPYLSGYYHNNKTWSTREFAVYS SYANCTFEYVSKSFMLDIAGKSGLFDTLREFVFRNVGDYFKIY SKYTPVNVNSNLPIGFSALEPLVEIPAGINITKFRTL LTIHRGDPMPNNGWTVFSAAYYVGYLAPRTFMLNYNENGIT DAVDCALDPLSEAKCTLKSLTVEKGIYQTSNFRVQPT SIVRFPNITNLCPFGEVFNATTFASVYAWNRKRISNCVADYSVL YNSTSFSTFKCYGVSPTKLNDLCFTNVYADSFVVRG DEVRQIAPGQTGRIADYNYKLPDDFTGCVIAWNSNNLDSKVG GNYNYLYRLFRKSNLKPFERDISTEYQAGSTPCNGVE GFNCYFPLQSYGFHPTNGVGYQPYRVVLSFELLNAPATVCG PKQSTNLVKNKCVNFNGLTGTGVLTESSKKFLPFQQ FGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSNQV AVLYQDVNCTEVPVAIHADQLTPTWRVYSTGSNVFQ TRAGCLIGAEHVNNSECDIPGAGICASYQTQTNSRSVSSQAI IAYTMSLGAENSVAYANNSIAIPTNFTISVTTEILP VSMTKTSVDCTMYICGDSIECSNLLLQYGSFCTQLNRALTGIA VEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQILPD PSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLICA QKFNGLTVLPPLLDEMIAQYTSALLAGTITSGWTF GAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNSAI GKIQDSLSTASALGKLQDVVNQNAQALNTLVKQLSS NFGAISSVLNDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLI RAAEIRASANLAATKMSECVLGQSKRVDFCGKGYH LMSFPQSAPHGVVFLHVTYVPSQEKNFTTTTPAICHEGKAHFPR EGVFVSNGTHWVFTQRNFYEPQIITDNTFVSGSCDV VIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISGI NASVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEQ YIKWPWYIWLGFIAGLIAIMVTIMLCCMTSCCCLKGCCSCGS CCKFDEDDSEPVKGVKLHYT
41	Pangolin coronavirus	MLFFFFLHFALVNSQCVNLTGRAAIQPSFTNSSQRGVYYPDTI FRSNLTVLSQGYFLPFYSNVSWYYALTKTNSAEKRVD

	Surface glycoprotein (Genbank: QLR06866)	NPVLDFKDGIFYAAATEKSNIVRGWIFGTTLDNTSQSLLIVNNAT NVIIKVCNFQFCYDPYLSGYYHNNKTWSTREFAVYS SYANCTFEYVSKSFMLDIAGKSGLFDTLREFVFRNVDGYFKIY SKYTPVNVNSNLPIGFSALEPLVEIPAGINITKFRTL LTIHRGDPMPNNGWTVFSAAYYVGYLAPRTFMLNYNENGTIT DAVECALDPLSEAKCTLKSLTVEKGIYQTSNFRVQPT SIVRFPNITNLCPPFGEVFNATTFASVYAWNRKRISNCVADYSVL YNSTSFSTFKCYGVSPTKLNDLCFTNVYADSFVVRG DEVRQIAPGQTGRIADYNYKLPPDFTGCVIAWNSNNLDSKVG GNYNYLYRLFRKSNLKPFERDISTEYQAGSTPCNGVE GFNCYFPLQSYGFHPTNGVGYQPYRVVLSFELLNAPATVCG PKQSTNLVKNKCVNFNFGTLTGTGVLTESSKKFLPFQ FGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSNQV AVLYQDVNCTEVPVAIHADQLTPTWRVYSTGSNVFQ TRAGCLIGAEHVNNITYECDIPGAGICASYQTQTNRSVSQAI IAYTMSLGAENSVAYANNSIAIPTNFTISVTTEILP VSMTKTSVDCTMYICGDSIECSNLLLQYGSFCTQLNRALTGIA VEQDKNTQEVFAQVKIYKTPPIKDFGGFNFSQILPD PSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLICA QKFNGTLVLPPLLTDEMIAQYTSALLAGTITSGWTF GAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNSAI GKIQDSLSTASALGKLQDVVNQNAQALNTLVKQLSS NFGAISSVLNDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLI RAAEIRASANLAATKMSECVLGQSKRVDFCGKGYH LMSFPQSAPHGVVFLHVTYVPSQEKNTTTPAICHEGKAHFPR EGVFVSNGTHWFVTQRNFYEPQIITDNTFVSGSCDV VIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISGI NASVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEQ YIKWPWYIWLGFIAGLIAIIMVTIMLCCMTSCCCLKGCCSCGS CCKFDEDDSEPVLKGVKLHYT
42	Bat coronavirus RaTG13 Spike glycoprotein (Genbank: QHR63300)	MFVFLVLLPLVSSQCVNLTTRTQLPPAYTNSSTRGVYYPDKVF RSSVLHLTQDLFLPFFSNVTWFHAIHVSGTNGIKRFD NPVLPFNDGVYFASTKSNIRGWIFGTTLDSTQSLIVNNAT NVVIKVCFCFQFCNDPFLGVYHKNKNSWMESEFRVY SSANNTFEYVSQPFMDLEGKQGNFKNLREFVFKNIDGYFKI YSKHTPINLVRDLPPGFSALEPLVDLPIGINITRFQT LLALHRSYLTGDSGWTAGAAAYYVGYLQPRTFLLKYEN GTITDAVDCALDPLSETKCTKSFTVEKGIYQTSNFRV QPTDSIVRFPNITNLCPPFGEVFNATTFASVYAWNRKRISNCVA DYSVLYNSTSFSTFKCYGVSPTKLNDLCFTNVYADSF VITGDEVQRQIAPGQTGKIADYNYKLPPDFTGCVIAWNSKHIDAK EGGNFNYLYRLFRKANLKPFERDISTEYQAGSKPC NGQTGLNCYYPYRYGFYPTDGVGHQPYRVVLSFELLNAPA TVCGPKKSTNLVKNKCVNFNFGTLTGTGVLTESNKKFL PFQQFGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNA SNQVAVLYQDVNCTEVPVAIHADQLTPTWRVYSTGS NVFQTRAGCLIGAEHVNNISYECDIPGAGICASYQTQTNRSV ASQSIIAYTMSLGAENSVAYSNNNSIAIPTNFTISVT EILPVSMKTSVDCTMYICGDSTECNLLLQYGSFCTQLNRAL TGIAVEQDKNTQEVFAQVKIYKTPPIKDFGGFNFSQ ILPDPSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDL ICAQKFNGTLVLPPLLTDEMIAQYTSALLAGTITS GWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQ FNSAIGKIQDSLSTASALGKLQDVVNQNAQALNTLVK

		QLSSNFGAISSVLNDILSRDKVEAEVQIDRLITGRLQSLQTYVT QQLIRAAEIRASANLAATKMSECVLGQSKRVDFCG KGYHLMSFPQSAPHGVVFLHVTYVPAQEKNTTAPAICHGDK AHFPREGVFSNGTHWFVTQRNFYEPQIITDNTFVSG SCDVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLG DISGINASVVNIQKEIDRLNEVAKNLNESLIDLQELG KYEQYIKWPWYIWLGFIAGLIAIMVTIMLCCMTSCCSCCKGCC SCGSCCKFDEDDSEPVLKGVKLHYT
43	SARS-CoV2 Surface glycoprotein (Genbank: YP_00972439 0)	MFVFLVLLPLVSSQCVNLTTTRTQLPPAYTNSFTRGVYYPDKVF RSSVLHSTQDLFLPFFSNVTWFHAIHVSGTNGTKRFD NPVLPFNDGVYFASTEKSNIRGWIFGTTLDSTQSLIVNNAT NVVIKVFCEFCNDPFLGVYHKNKSWMESEFRVY SSANNCTFEYVVSQPFMDLEGKQGNFKNLREFVFKNIDGYFKI YSKHTPINLVRDLPPQGFSALEPLVDLPIGINITRFQT LLALHRSYLTGPDSSSGWTAGAAAYYVGYLQPRTFLLKYEN GTITDAVDCALDPLSETKCTLKSTVEKGIYQTSNFRV QPTESIVRFPNITNLCPFGEVFNATRFASVYAWNKRKISNCVA DYSLVYNSASFSTFKCYGVSPTKLNDLCFTNVYADSF VIRGDEVQRQIAPGQTGKIADYNYKLDDFTGCVIAWNSNNLDS KVGGNYNLYRLFRKSNLKPFERDISTEIQAGSTPC NGVEGFNCYFPLQSYGFQPTNGVGYQPYRVVLSFELLHAPA TVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTESNKKFL PFQQFGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNT SNQVAVLYQDVNCTEVPVAIHADQLTPTWRVYSTGS NVFQTRAGCLIGAEHVNSYECDIPIGAGICASYQTQTNPRR ARSVASQSIIAYTMSLGAENSVAYSNNIAIPTNFTI SVTTEILPVSMTKTSVDCTMYICGDSTECNLLLQYGSFCTQL NRALTGIAVEQDKNTQEVFAQVKQIYKTPPIKDFGGF NFSQILPDPSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDI AARDLICAQKFNGLTVLPPLLTDEMIAQYTSALLAG TITSGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLI ANQFNSAIGKIQDSLSSASALGKLQDVVNQNAQALN TLVKQLSSNFGAISSVLNDILSRDKVEAEVQIDRLITGRLQSLQ TYVTQQLIRAAEIRASANLAATKMSECVLGQSKRV DFCGKGYHLMSFPQSAPHGVVFLHVTYVPAQEKNTTAPAIC HDGKAHFPREGVFSNGTHWFVTQRNFYEPQIITDNT FVSGNCDVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPD VDLGDISGINASVVNIQKEIDRLNEVAKNLNESLIDL QELGKYEQYIKWPWYIWLGFIAGLIAIMVTIMLCCMTSCCSCCKGCC SCGSCCKFDEDDSEPVLKGVKLHYT
44	SARS-CoV2 VOC_May_01	MFVFFVLLPLVFIQCVSFTNIIHLPSSYINSFTRGVYYPDKVFRS SVLYSIRDFFLPFFSNVTWFHVIRTNVIKRFANPV LPFNDGVYFAFIDKFNIIRGWIFGTTLDSTQSLIVNNATNVVIK VCEFQFCNYPFYKNNKSCCKSESRYSSATNCTF EYVSKPFFIDLVKQGNFKNFSEFVFKNIDGYFKIYKHTPNLV RGFPQGFVLVLEPLVDLPIGINITRFQILYRSYLTG GFFLGLTAGSAAYYVGYLQLRTFLLKYNENGITDAVDCALDP LSEIKCTLKSFIEKGIYQTSNFRVQPTESIVRFPNI TNLCPFGEVFNATRFASVYAWNKRKISNCVADYSFLYNSASF STFKCYGVSLTKLNDLCFTNVYADSFVIRGDEVQRQIAP GKTGNIADYNYKLDDFTGCVIAWNSKKLDSKVGGNKYRFR LFRKSNLKPFERDISTEIQAGNKPCNGVKGFNCYSPL QPYGFQPTYGVGYQPYRVVLSFELLHSPSTVCGPKKSTNLV KNKCVNFNFNGLIGTGVLTESNKNFLPFQQFGRDIDDI

		TDAVRDPQTL DILDITPCSFGGVSVITPGTNTSNQVAVLYHGV NCTEVPFAIHSDQLTPTWRVYSTGFNVFQTRAGCLIG VEYVNNSEYECDIPIGAGICATYHTHTKSHRRARSVVSQSIIAYT MSLGVENLVVYSNNSIAIPINFITISVITEILPV SMA KTSVDCTMYICGDSTEC SNLLLQYGSFCTQLNRALT VIAIEQDK NTQQVFAQVKQIYKIPPIKYFGGFNFSQILPDSSKS SKRSFIEDLFFNKVTLADAGFIKQYGDCLGDISARDLICAQKFN GLNVLPPLL TDEMIAQYTSALLSGTITSGWTLGAGA ALQIPFSMQMAYRFNGIGVTQNVLYENQKLIANQFN SAIGKIQY SFFFTAPALGKLQHVVNQNARALNTLVKQLSSNFGA ISSVLNDILARLDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEI RSSANLAAIKMSECVLGQSKRVDFCGKGYHLM SF PQSAPHGVVFFHVTVYVPALENNFTTSPAICHYGAHFPREGVF VSNGTYWFLTQRNFYEPQIITIHNTFLSGNCDVVIGI VNNTVYDPLQPELDSFKEELDKYFKNHTSSYVDLVDISGINASF VNIQKEIDRLNEVANNNL NESLIDLQQLGKYEYIKW PWYIWLCFIAGLIAILIVTIMLCCITSCC SCLKGCCSCGF CCKFD EDDSELLKGVKLHYT
45	SARS-CoV2 VOC Whole VOC surface glycoprotein (Genbank: YP_00972439 0)	MFVFFVLLPLVFIQCVNFTIIHLPSSYINSFTRGVYYPDKVFRSS VLYSIRDFFLPFFSNVTWFHVIRTNVIKRFANPV LPFNDGVYFASIDKFNIIRGWIFGTTLDSKTQSLLIVNNATNVVI KVCEFCFCNYPFYKNNKSCTESESRYSSATNCTF EYVSKPFFIDL VVKQGNFKNFSEFVFKNIDGYFKIYSKHTPNLV RGFPQGFLVLEPLVDLPIGINITRFQTLYRSYLTGP GFFLGLTAGSAAYYVGYLQLRTFLLKYNENGTITDAVDCALDP LSEIKCTLKSFILEKGIYQTSNFRVQPTESIVRFPNI TNLCPFGEVFNATRFASVYAWNKRISNCVADYSFLYNSASF STFKCYGVSLTKLNDLCFTNVYADSFVIRGDEVRIQAP GKTGNIADYNYKL PDDFTGCVIAWNSKKLDSKVGGNYYRFR LFRKSNLKPFERDISTEIYQAGNKP CNGVKGFCNYSPL QPYGFQPTYGVGYQPYRVVLSFELLHSPSTVCGPKKSTNLV KNKCVNFNFNGLIGTGVLTESNKNFLPFQQFGRDIDDI TDAVRDPQTL DILDITPCSFGGVSVITPGTNTSNQVAVLYHGV NCTEVPFAIHSDQLTPTWRVYSTGFNVFQTRAGCLIG VQYVNNSEYECDIPIGAGICATYHTHTKSHRRARSVVSQSIIAYT MSLGVENLVVYSNNSIAIPINFITISVITEILPV SMA KTSVDCTMYICGDSTEC SNLLLQYGSFCTQLNRALT VIAIEQDK NTQQVFAQVKQIYKIPPIKYFGGFNFSQILPDSSKS SKRSFIEDLFFNKVTLADAGFIKQYGDCLGDISARDLICAQKFN GLNVLPPLL TDEMIAQYTSALLSGTITSGWTLGAGA ALQIPFSMQMAYRFNGIGVTQNVLYENQKLIANQFN SAIGKIQY SFFFTASALGKLQHVVNQNARALNTLVKQLSSNFGA ISSVLNDILARLDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEI RSSANLAAIKMSECVLGQSKRVDFCGKGYHLM SF PQSAPHGVVFFHVTVYVPALENNFTTSPAICHYGAHFPREGVF VSNGTHWFLTQRNFYEPQIITIHNTFLSGNCDVVIGI VNNTVYDPLQPELDSFKEELDKYFKNHTSSYVDLVDISGINASF VNIQKEIDRLNEVANNNL NESLIDLQQLGKYEYIKW PWYIWLCFIAGFIAILIVTIMLCCITSCC SCLKGCCSCGF CCKFD EDDSELLKGVKLHYT
46	Pangolin coronavirus Spike protein	MFVFLFVLPVSSQCVNLTTRTGIPPGYTNSSTRGVYYPDKVF RSSILHLTQDLFLPFFSNVTWFNTINYQGGFKKFDNP VLPFNDGVYFAST EKSNIIRGWIFGTTL DARTQSLLIVNNATNV VIKVCEFCFCTDPFLGVYYHNNNKTW WENEFVYSS

	(Genbank: QIA48614)	ANNCTFEYISQPFLMDLEGKQGNFKNLREFVFNVDGYFKIYS KHTPIDLVRDLPRGFAALEPLVDLPIGINITRFQTL ALHRSYLTGPNLESGWTTGAAAYYVGYLQQRFTLLSYNQNGT ITDAVDCSLDPLSETKCTLKSLTVEKGIYQTSNFRVQP TISIVRFPNITNLCPPGEVFNASKFASVYAWNRKRISNCVADYS VLYNSTSFSTFKCYGVSPTKLNDLCFTNVYADSFVV KGDEVQRQIAPGQTGVIADYNYKLPDDFTGCVIAWNSVKQDAL TGGNYGYLYRLFRKSKLKPFERDISTEIYQAGSTPCNG QVGLNCYYPLERYGFHPTTG VNYQPFRRVVLSFELLNGPATV CGPKLSTTLVKDKCVNFNFNGLTGTGVLTTSSKKQFLPF QQFGRDISDTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSN QVAVLYQDVNCTEVPMAIHAEQLTPAWRVYSAGANV FQTRAGCLVGAEHVNNSECDIPVGAGICASYHSMSSLRSVN QRSIIAYTMSLGAENSVAYSNNNSIAIPTNFTISVTTEI LPVSMTKTSVDCTMYICGDSIECSNLLLQYGSFCTQLNRALTGI AVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQIL PDPSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLI CAQKFNGLTVLPPLLTDEMIAQYTSALLAGTITSGW TFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNS AIGKIQDSLSSTASALGKLQDVVNQNAQALNTLVKQL SSNFGAISSVLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVTQ QLIRAAEIRASANLAATKMSECVLGQSKRVDFCGKG YHLMSPQSAHPGVVFLHVTYVPAQEKNFTTAPAICHEGKAH FPREGVFSNGTHWFITQRNFYEPQIITDNTFVSGSC DVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDIS GINASVVNIQKEIDRLNEVAKNLNESPIDLQELGKY EQYIKWPWYIWLGFIAGLIAIMVTIMLCCMTSCCSCCLKGCCSC GSCCKFDEDDSEPVVLKGVLHYT
47	Pangolin coronavirus Spike protein (Genbank: QIA48623)	MFVFLFVLPLVSSQCVNLTRTGIQPGYTNSSTRGVYYPDKVF RSSILHLTQDLFLPFFSNVTWFNTINYQGGFKFDNP VLPFNDGVYFASTEKSNIIRGWIFGTTLTDLARTQSLIVNNATNV VIKVCEQFQCTDPFLGVYYHNNNKTWVENEFRVYSS ANNCTFEYISQPFLMDLEGKQGNFKNLREFVFNVDGYFKIYS KHTPIDLVRDLPRGFAALEPLVDLPIGINITRFQTL ALHRSYLTGPNLESGWTTGAAAYYVGYLQQRFTLLSYNQNGT ITDAVDCSLDPLSETKCTLKSLTVEKGIYQTSNFRVQP TISIVRFPNITNLCPPGEVFNASKFASVYAWNRKRISNCVADYS VLYNSTSFSTFKCYGVSPTKLNDLCFTNVYADSFVV KGDEVQRQIAPGQTGVIADYNYKLPDDFTGCVIAWNSVKQDAL TGGNYLYRLFRKSKLKPFERDISTEIYQAGSTPCNGQV GLNCYYPLERYGFHPTTG VNYQPFRRVVLSFELLNGPATVCG PKLSTTLVKDKCVNFNFNGLTGTGVLTTSSKKQFLPFQ FGRDISDTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSNQV AVLYQDVNCTEVPMAIHAEQLTPAWRVYSAGANVFQ TRAGCLVGAEHVNNSECDIPVGAGICASYHSMSSLRSVNQ RSIAYTMSLGAENSVAYSNNNSIAIPTNFTISVTTEILP VSMTKTSVDCTMYICGDSIECSNLLLQYGSFCTQLNRALTGIA VEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQILPD PSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLICA QKFNGLTVLPPLLTDEMIAQYTSALLAGTITSGWTF GAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNSAI GKIQDSLSSTASALGKLQDVVNQNAQALNTLVKQLSS NFGAISSVLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVTQQLI RAAEIRASANLAATKMSECVLGQSKRVDFCGKGYH

		LMSFPQSAPHGVVFLHVTYVPAQEKNFTTAPAICHEGKAHFP REGVVFVSNNGTHWFITQRNFYEPQIITTDNTFVSGSCDV VIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISGI NASVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEQ YIKWPWYIWLGFIAGLIAIIMVTIMLCCMTSCCSCCLKGCCSCGS CCKFDEDDSEPVLKGVKLHYT
48	Pangolin coronavirus Spike protein (Genbank: QIA48641)	MFVFLFVLPLVSSQCVNLTTTRTGIPPGYTNSSTRGVVYPDKVF RSSILHLTQDLFLPFFSNVTWFNTITYQGGSKKFDNP VLPFNDGVYFASTEKSNIIRGWIFGTTLTARTQSLIVNNATNV VIKVECFQFCTDPFLGVYYHNNNKTWVENEFRVYSS ANNCTFEYISQPFLMDLEGKQGNFKNLREFVFKNVDGYFKIYS KHTPIDLVRDLPRGFAALEPLVDLPIGINITRFQTL ALHRSYLTGKLESGWTTGAAAYYVGYLQQRFTLLSYNQNGT ITDAVDCSLDPLSETKCTLKSLTVEKGIYQTSNFRVQP TISIVRFPNITNLCPFGEVFNASKFASVYAWNRKRISNCVADYS VLYNSTSFSTFKCYGVSPTKLNDLCFTNVYADSFVV KGDEVQRQIAPGQTGVIADYNYKLPPDFTGCVIWNNSVKQDALT GDNYGYLYRLFRKSKLKPFERDISTEIQAGSTPCNG QVGLNCYYPLERYGFHPTTG VNYQPFVVLVSELLNGPATV CGPKLSTTLVKDKCVNFNFNGLTGTGVLTTSSKKQFLPF QQFGRDISDTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSN QVAVLYQDVNCTEVPMAIHAEQLTPAWRVYSAGANV FQTRAGCLVGAHVNNSECDIPVGAGICASYHSMSSFRSVN QRSIIAYTMSLGAENSVAYSNNIAIPTNFTISVTTEI LPVSMTKTSVDCTMYICGDSIECSNLLQYGSFCTQLNRALTGI AVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQIL PDPSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLI CAQKFNGLTVLPLLTDEMIAQYTSALLAGTITSGW TFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNS AIGKIQDSLSTASALGKLQDVVNQNAQALNTLVKQL SSNFGAISSVLNDILSRDKVEAEVQIDRLITGRLQSLQTYVTQ QLIRAAEIRASANLAATKMSECVLGQSKRVDFCGKG YHLSFPQSAPHGVVFLHVTYVPAQEKNFTTAPAICHEGKAH FPREGVVFVSNNGTHWFITQRNFYEPQIITTDNTFVSGSC DVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDIS GINASVVNIQKEIDRLNEVAKNLNESLIDLQELGKY EQYIKWPWYIWLGFIAGLIAIIMVTIMLCCMTSCCSCCLKGCCSC GSCCKFDEDDSEPVLKGVKLHYT
49	Pangolin coronavirus Spike protein (Genbank: QIA48632)	MFVFLFVLPLVSSQCVNLTTTRTGIPPGYTNSSTRGVVYPDKVF RSSILHLTQDLFLPFFSNVTWFNTINYQGGFKKFDNP VLPFNDGVYFASTEKSNIIRGWIFGTTLTARTQSLIVNNATNV VIKVECFQFCTDPFLGVYYHNNNKTWVENEFRVYSS ANNCTFEYISQPFLMDLEGKQGNFKNLREFVFKNVDGYFKIYS KHTPIDLVRDLPRGFAALEPLVDLPIGINITRFQTL ALHRSYLTGKLESGWTTGAAAYYVGYLQQRFTLLSYNQNGT ITDAVDCSLDPLSETKCTLKSLTVEKGIYQTSNFRVQP TISIVRFPNITNLCPFGEVFNASKFASVYAWNRKRISNCVADYS VLYNSTSFSTFKCYGVSPTKLNDLCFTNVYADSFVV KGDEVQRQIAPGQTGVIADYNYKLPPDFTGCVIWNNSVKQDALT GGNYGYLYRLFRKSKLKPFERDISTEIQAGSTPCNG QVGLNCYYPLERYGFHPTTG VNYQPFVVLVSELLNGPATV CGPKLSTTLVKDKCVNFNFNGLTGTGVLTTSSKKQFLPF QQFGRDISDTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSN QVAVLYQDVNCTEVPMAIHAEQLTPAWRVYSAGANV

		FQTRAGCLVGAEHVNNSYEC DIPVGAGICASYHSMSSFRSVN QRSIIAYTMSLGAENSVAYSNNNSIAIPTNFTISVTTEI LPVSMTKTSVDCTMYICGDSIECSNLLLQYGSFCTQLNRALTGI AVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQIL PDPSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLI CAQKFNGLTVLPPLLTDEMIAQYTSALLAGTITSGW TFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNS AIGKIQDSLSSSTASALGKLQDVVNQNAQALNTLVKQL SSNFGAISSVLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVTQ QLIRAAEIRASANLAATKMSECVLGQSKRVDFCGKG YHLSMFPQSAPHGVVFLHVTYVPAQEKNFTTAPAICHEGKAH FPREGVFVSNNGTHWFITQRNFYEPQIITTDNTFVSGSC DVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDIS GINASVVNIQKEIDRLNEVAKNLNESLIDLQELGKY EQYIKWPWYIWLGFIAGLIAIMVTIMLCCMTSCCSCCLKGCCSC GSCCKFDEDDSEPV LKGVLHYT
50	Pangolin coronavirus Spike protein (Genbank: QIQ54048)	MFVFLFVLPLVSSQCVNLTRTGIPPGYTNSSSTRGVVYPDKVF RSSILHLTQDLFLPFFSNVTWFTNIHLNYQGGFKKFD NPVLPXNDGVYFASTEKSNIIRGWIFGTTL DARTQSLIIVNNAT NVVIKVFCEQFCTDPFLGVYYHNNNKTWVENEFRVY SSANNCTFEYISQPFLMDLEGKQGNFKNLREFVFKNVGDYFKI YSKHTPIDLVRDLPRGFAALEPLVDLPIGINITRFQT LLALHRSYLTGKLESGWTTGAAAYYVGYLQQRTFLLSYNQN GTITDAVDCSLDPLSETKCTLKSLTVEKGIYQTSNFRV QPTISIVRFPNITNLCPFGEVFNASKFASVYAWNRKRISNCVAD YSVLYNSTSFSTFKCYGVSPTKLNDLCFTNVYADSF VVKGDEVQRQIAPGQTGVIADYNYKLPDDFTGCVIAWNSVKQD ALTGGNYGYLYRLFRKSKLKPFERDISTEYQAGSTPC NGQVGLNCYYPLERYGFHPTTG VNYQPFRRVVLSXELLNGPA TVCGPKLSTTLVKDKCVNFNFNGLTGTGVLTTSKKQFL PFQQFGRDISDTTDAVRDPQTLEILDITPCSFGGVSVITPGTNT SNQVAVLYQDVNCTEVPMAIHAEQLTPAWRVYSAGA NVFQTRAGCLVGAEHVNNSYEC DIPVGAGICASYHSMSSFRS VNQRSIIAYTMSLGAENSVAYSNNNSIAIPTNFTISVTT EILPVSMTKTSVDCTMYICGDSIECSNLLLQYGSFCTQLNRALT GIAVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFLQ ILPDPSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDL ICAQKFNGLTVLPPLLTDEMIAQYTSALLAGTITS GWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQ FNSAIGKIQDSLSSSTASALGKLQDVVNQNAQALNTLVK QLSSNFGAISSVLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVT QQLIRAAEIRASANLAATKMSECVLGQSKRVDFCG KGYHLSMFPQSAPHGVVFLHVTYVPAQEKNFTTAPAICHEGK AHFPREGVFVSNNGTHWFITQRNFYEPQIITTDNTFVSG SCDVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLG DISGINASVVNIQKEIDRLNEVAKNLNESLIDLQELG KYEYIKWPWYIWLGFIAGLIAIMVTIMLCCMTSCCSCCLKGCC SCGSCCKFDEDDSEPV LKGVLHYT
51	SC2r-CoV batACE2 Spike	MFILVLLNVL SVYGCVNITYGSHHLYVSSRTRGVVYPDDAFRS STNVLHEGFFLPFDSNVTWYSFVNQKYSVATSPFGDG VYFSTIDKSNVVRGWVFGTTLDNDTQSVLLYNDGTHVRVEVC TFHFCPTPVFSASSPHLYSSAFNCTLN YTLASVRADFT EVDGSFKTIREFVFKLQDGSLNVYASTSYVLAIGATSQLPSG VTPLVPLWKIPIGLNITNFKTLVYLRSDNTPLQAAYV

		VGHLKRRTMMFKYDENGITIVDAIDCALDPLSETKCTLRSFIVEK GIYQTSNFRVQPQDTVVRFPNITNLCPFSEVFNATT FASVYAWNRRKRISNCVADYSVLYNSTSFSTFQCYGVSSTKLN DLCFTNVYADSFVVRGDEVQRQIAPGQTGVIADYNYKLP DDFTGCVLAWNSRNQDASTSGNFNYYYRIWRSEKLRPFERDI AHYDYQVGTQFKSSLKNYGFYSSAGDSHQPYRVVLSF ELLNAPATVCGPKQSTELIKNCVNFNFNGLTGTGVLTDSSNKK FQSFQQFGRDVSDFTDSVKDPKTLEVLDITPCSYGGV SVITPGTNASTQVAVLYQDVNCTDVPTAIHAEQLTPSWRVYST GTNMFQTQAGCLIGAEHVNNSYDCDIPIGAGICATYH TPSMLRSANNKRIVAYVMSLGAENSVAYSNNIAIPTNFTISV TTEVMPVSMTKTSVDCTMYICGDSVECSTLLLQYGS FCTQLNRALTGIAVEQDKNTQEVFAQVKQIYKTPDIKDFGGFN FSQILPDPSKPSKRSFIEDLLFNKVTLADAGFVKQYG DCLGDIQARDLICAQKFNGLTVPPLLTDEMIAAYTAALISGTAT AGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYE NQKLIANQFNSAIGKIQESLTSTASALGKLQDVVNQNAQALNTL VKQLSSNFGAISSVLNDIISRLDKVEAEVQIDRLIT GRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVD FCGKGYHLMSPQAAPHGVVFLHVTYIPSQERNFTTA PAICHEGKAHFPREGVFVSNNGTHWFITQRNFYEPQIITDNTFV SGTCDVVIGIVNNTVYDPLQPELESFKDELDKYFKN HTSPDIDLGDISGINASVVDIQKEIDILKDVAKNLNLSLINLQELG KYEYQIKWPWYVWLGFIAGLIAIIMVTIMLCCMT SCCSCCLKGCCSCGSCCKFDEDDSEPVLKGVLHHT
52	Bats SARS coronavirus Rc-0319 Spike (Genbank: QIQ54048)	MFILVLLNVLSVYGCVNITYGSHHLYVSSRTRGVYYPDDAFRS STNVLHEGFLLPFDNSVTWYSFWNQKYSVATSPFGDG VYFSTIDKSNVVRGWVFGTTLDNDTQSVLLYNDGTHVRVEVC TFHFCPTPVFSASSPHLYSSAFNCTLNITLASVRADFT EVDGSFKTIREFVFKLQDGLNVYYASTSYVLAIGATSQPSG VTPLVPLWKIPIGLNITNFKTLVYLRSDNTPLQAAVY VGHLKRRTMMFKYDENGITIVDAIDCALDPLSETKCTLRSFIVEK GIYQTSNFRVQPQDTVVRFPNITNLCPFSEVFNATT FASVYAWNRRKRISNCVADYSVLYNSTSFSTFQCYGVSSTKLN DLCFTNVYADSFVVRGDEVQRQIAPGQTGVIADYNYKLP DDFTGCVLAWNSRNQDASTSGNFNYYYRIWRSEKLRPFERDI AHYDYQVGTQFKSSLKNYGFYSSAGDSHQPYRVVLSF ELLNAPATVCGPKQSTELIKNCVNFNFNGLTGTGVLTDSSNKK FQSFQQFGRDVSDFTDSVKDPKTLEVLDITPCSYGGV SVITPGTNASTQVAVLYQDVNCTDVPTAIHAEQLTPSWRVYST GTNMFQTQAGCLIGAEHVNNSYDCDIPIGAGICATYH TPSMLRSANNKRIVAYVMSLGAENSVAYSNNIAIPTNFTISV TTEVMPVSMTKTSVDCTMYICGDSVECSTLLLQYGS FCTQLNRALTGIAVEQDKNTQEVFAQVKQIYKTPDIKDFGGFN FSQILPDPSKPSKRSFIEDLLFNKVTLADAGFVKQYG DCLGDIQARDLICAQKFNGLTVPPLLTDEMIAAYTAALISGTAT AGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYE NQKLIANQFNSAIGKIQESLTSTASALGKLQDVVNQNAQALNTL VKQLSSNFGAISSVLNDIISRLDKVEAEVQIDRLIT GRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVD FCGKGYHLMSPQAAPHGVVFLHVTYIPSQERNFTTA PAICHEGKAHFPREGVFVSNNGTHWFITQRNFYEPQIITDNTFV SGTCDVVIGIVNNTVYDPLQPELESFKDELDKYFKN

		HTSPDIDLGDISGINASVVDIQKEIDILKDVAKNLNESLINLQELG KYEYIKWPWYVWLGFIAIIIMVTIMLCCMT SCCSCLKGCCSCGSCCKFDEDDSEPVLKGVKLHYT
53	Bat SARS-like coronavirus Rs7327 S protein RBD (Genbank: ATO98218)	SNFRVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLYNSTSFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLDDFMGCVLAWN TRNIDATSTGNINYKYRSLRHGKLRPFERDISNVPFSP DGKPCTPPAFNCYWPLNDYGFFTTNGIGYQPYRVVLSFELL NAPATVCGPKLSTDILKNQCVNFNFNGLTGTGVLTPSS KRFQPFQQFGRDVSDFTDSVRDPKTSEIL
54	Coronavirus BtRs- BetaCoV/YN20 18B S protein RBD (Genbank: QDF43825)	SNFRVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLYNSTSFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLDDFMGCVLAWN TRNIDATSTGNINYKYRSLRHGKLRPFERDISNVPFSP DGKPCTPPAFNCYWPLNDYGFFTTNGIGYQPYRVVLSFELL NAPATVCGPKLSTDILKNQCVNFNFNGLTGTGVLTPSS KRFQPFQQFGRDVSDFTDSVRDPKTSEIL
55	Rhinolophus affinis coronavirus LYRa11 S protein RBD (Genbank: AHX37558)	SNFRVSPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLYNSTSFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLDDFMGCVLAWN TRNIDATSSGNFNYKYRSLRHGKLRPFERDISNVPFSP DGKPCTPPAFNCYWPLNDYGFFTTNGIGYQPYRVVLSFELL NAPATVCGPKLSTDILITNQCVMNFNFNGLTGTGVLTPSL KRFQPFQQFGRDVSDFDTSVRDPKTLEVL
56	Rhinolophus affinis coronavirus LYRa3 S protein RBD (Genbank: AHX37569)	SNFRVSPSREVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLYNSTSFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLDDFMGCVLAWN TRNIDATSSGNFHYKYRSLRHGKLRPFERDISNVPFSP DGKPCTPPAFNCYWPLNDYGFFTTNGIGYQPYRVVLSFELL NAPATVCGPKLSTDILITNQCVMNFNFNGLTGTGVLTPSS KRFQPFQQFGRDVSDFTDSVRDPKTLEVL
57	SARS coronavirus Tor2 Spike glycoprotein RBD (Genbank: YP_00982505 1)	SNFRVPSGDVVRFPNITNLCPFGEVFNATKFPSVYAWERKKI SNCVADYSVLYNSTFFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLDDFMGCVLAWN TRNIDATSTGNINYKYRYLRHGKLRPFERDISNVPFSP DGKPCTPPALNCYWPLNDYGFFTTTGIGYQPYRVVLSFELL NAPATVCGPKLSTDILKNQCVNFNFNGLTGTGVLTPSS KRFQPFQQFGRDVSDFTDSVRDPKTSEIL
58	Bat SARS-like coronavirus Rs3367 S protein RBD (Genbank: AGZ48818)	SNFRVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLYNSTSFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLDDFTGCVLAWN TRNIDATQTGNINYKYRSLRHGKLRPFERDISNVPFSP DGKPCTPPAFNCYWPLNDYGFFITNGIGYQPYRVVLSFELLN APATVCGPKLSTDILKNQCVNFNFNGLTGTGVLTPSS KRFQPFQQFGRDVSDFTDSVRDPKTSEIL
59	SARS-like coronavirus WIV16 S protein	SNFRVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLYNSTSFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLDDFTGCVLAWN TRNIDATQTGNINYKYRSLRHGKLRPFERDISNVPFSP

	RBD (Genbank: ALK02457)	DGKPCTPPAFNCYWPLNDYGFYITNGIGYQPYRVVLSFELLN APATVCGPKLSTDLIKNCVNFNFNGLTGTGVLTPSS KRFQPFQQFGRDVSDFDTSVRDPKTSEIL
60	Bat SARS-like coronavirus Rs4231 S protein RBD (Genbank: ATO98157)	SNFRVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLNYSSTSFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLPDDFLGCVLAWN TNSKDSSTSGNYYLYRWVRRSKLNPYERDLSNDIYSP GGQSCSAIGPNCYNPLRPYGFFTTAGVGHQPYRVVLSFELL NAPATVCGPKLSTDLIKNCVNFNFNGLTGTGVLTPSS KRFQPFQQFGRDVSDFDTSVRDPKTSEIL
61	Bat SARS-like coronavirus RsSHC014 S protein RBD (Genbank: AGZ48806)	SNFRVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSVLNYSSTSFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLPDDFLGCVLAWN TNSKDSSTSGNYYLYRWVRRSKLNPYERDLSNDIYSP GGQSCSAVGPNPCYNPLRPYGFFTTAGVGHQPYRVVLSFELL NAPATVCGPKLSTDLIKNCVNFNFNGLTGTGVLTPSS KRFQPFQQFGRDVSDFDTSVRDPKTSEIL
62	Bat SARS-like coronavirus Rs4084 S protein RBD (Genbank: ATO98132)	SNFRVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRI SNCVADYSILYNYSSTSFSTFKCYGVSATKLNLCFSNV YADSFVVKGDDVRQIAPGQTGVIADYNYKLPDDFLGCVLAWN TNSKDSSTSGNYYLYRWVRRSKLNPYERDLSNDIYSP GGQSCSAVGPNPCYNPLRPYGFFTTAGVGHQPYRVVLSFELL NAPATVCGPKLSTDLIKNCVNFNFNGLTGTGVLTPSS KRFQPFQQFGRDVSDFDTSVRDPKTSEIL
63	Bat SARS coronavirus BtKY72 S protein RBD (Genbank: APO40579)	SNFRVSPSTEVRFPNITNLCPFQGVFNASNFPSVYAWERLRI SDCVADYAVLYNSSSSSFSTFKCYGVSPTKLNLCFSS VYADYFVVKGDDVRQIAPAQTGVIADYNYKLPDDFTGCVLAW NTNSVDSKSGNNFYRLFRHGKIKPYERDISNVLNLSA GGTCSSISQLGCYEPLKSYGFTPTVGVGYPYRVVLSFELLN APATVCGPKKSTELVKNKCVNFNFNGLTGTGVLTSST KKFQPFQQFGRDVSDFDTSVRDPKTSEIL
64	SARS-like coronavirus BatCoV/BB990 4/BGR/2008 S protein RBD (Genbank: ALJ94036)	SNFRVTPTEVVRFPNITKLCPFQGVFNASSFPSVYAWERVRI TDCVANYAVLYNSSVSFSTFQCYGVSPTKLNLCFSS VYADYFIVKGDDVRQIAPSQTGVIADYNYKLPDDFTGCVIAWN TNALDSNKDFYYRLFRHGKIKPYGRDLSNIPYSPSGT CSTINNLNCFAPLKSYGFTQSSGISFQPYRVVLSFELLNAPAT VCGPKQSTELVKDKCVNFNFNGLTGTGVLTPSSKKF QPFQPFQFGRDVSDFDTSVRDPKTLEIL
65	Bat coronavirus BM48- 31/BGR/2008 S protein RBD (Genbank: YP_00385858 4)	SNFRVTPTEVVRFPNITQLCPFNEVFNITSFPSVYAWERMRI NCVADYSVLNYSSTSFSTFQCYGVSPTKLNLCFSS VYADYFVVKGDDVRQIAPAQTGVIADYNYKLPDDFTGCVIAWN TNSLDSSNEFFYRRFRHGKIKPYGRDLSNVLNPNSSG TCSAEGNLNCKPLASYGFTQSSGIGFQPYRVVLSFELLNAPA TVCGPKQSTELVKNKCVNFNFNGLTGTGVLTPSSKKF QPFQPFQFGRDVSDFDTSVRDPKTLEIL
66	Pangolin coronavirus cDNA8-S S protein RBD	SNFRVQPTESIVRFPNITNLCPFGEVFNATTFASVYAWNRRKRI NCVADYSVLNYSSTSFSTFKCYGVSPTKLNLCFTNV YADSFVVRGDEVVRQIAPGQTGRIADYNYKLPDDFTGCVIAWN SNNLDSKVGNNYYLYRLFRKSNLKPFRDISTEIQQA GSTPCNGVEGFNCFPLQSYGFHPTNGVGYPYRVVLSFEL LNAPATVCGPKQSTNLVKNKCVNFNFNGLTGTGVLTPSS

	(Genbank: QLR06864)	SKKFLPFQQFGRDIADTTDAVRDPQTLEIL
67	SARS-CoV2 S protein RBD (Genbank: YP_009724390)	SNFRVQPTESIVRFPNITNLCPFGEVFNATRFASVYAWNKRIS SNCVADYSVLNYSASFSTFKCYGVSPKLNLCFTNV YADSFVIRGDEVQRQIAPGQTGKIADYNYKLPDDFTGCVIAWNS NNLDSKVGGNYNYLRLFRKSNLKPFERDISTEIQAGS GSTPCNGVVEGFNCFYPLQSYGFQPTNGVGYQPYRVVLSFE LLHAPATVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTS NKKFLPFQQFGRDIADTTDAVRDPQTLEIL
68	SARS-CoV2 VOC May 01 RBD	SNFRVQPTESIVRFPNITNLCPFGEVFNATRFASVYAWNKRIS SNCVADYSFLYNYSASFSTFKCYGVSLTKLNLCFTNV YADSFVIRGDEVQRQIAPGKTGNIADYNYKLPDDFTGCVIAWNS KKLDSKVGGNYKYRFRRLFRKSNLKPFERDISTEIQAGS GNKPCNGVKGFNCFYPLQPYGFQPTYGVGYQPYRVVLSFE LLHSPSTVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTS NKNFLPFQQFGRDIDITDAVRDPQTLDIL
69	SARS-CoV2 VOC S protein RBD (Genbank: YP_009724390)	SNFRVQPTESIVRFPNITNLCPFGEVFNATRFASVYAWNKRIS SNCVADYSFLYNYSASFSTFKCYGVSLTKLNLCFTNV YADSFVIRGDEVQRQIAPGQTGNIADYNYKLPDDFTGCVIAWNS KKLDSKVGGNYNYRFRRLFRKSNLKPFERDISTEIQAGS GNKPCNGVKGFNCFYPLQPYGFQPTYGVGYQPYRVVLSFE LLHSPSTVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTS NKKFLPFQQFGRDIDITDAVRDPQTLEIL
70	Bat coronavirus RaTG13 S protein RBD (Genbank: QHR63300)	SNFRVQPTDSIVRFPNITNLCPFGEVFNATTFASVYAWNKRIS SNCVADYSVLNYSSTSFSTFKCYGVSPKLNLCFTNV YADSFVITGDEVQRQIAPGQTGKIADYNYKLPDDFTGCVIAWNS KHIDAKEGGNFNYLRLFRKANLKPFERDISTEIQAGS GSKPCNGQTGLNCFYPLRYGFYPTDGVGHQPYRVVLSFE LLNAPATVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTS NKKFLPFQQFGRDIADTTDAVRDPQTLEIL
71	Pangolin coronavirus GX-P1E S protein RBD (Genbank: QIA48623)	SNFRVQPTISIVRFPNITNLCPFGEVFNASKFASVYAWNKRIS NCVADYSVLNYSSTSFSTFKCYGVSPKLNLCFTNV YADSFVVKGDEVQRQIAPGQTGVIADYNYKLPDDFTGCVIAWNS VKQDALTTGGNYLRLFRKSKLKPFERDISTEIQAGS TPCNGQVGLNCFYPLERYGFHPTTGVDNYQPFVVVLSFELLN GPATVCGPKLSTTLVKDKCVNFNFNGLTGTGVLTTSSK QFLPFQQFGRDISDTTDAVRDPQTLEIL
72	Pangolin coronavirus GX-P2V S protein RBD (Genbank: QIA54048)	SNFRVQPTISIVRFPNITNLCPFGEVFNASKFASVYAWNKRIS NCVADYSVLNYSSTSFSTFKCYGVSPKLNLCFTNV YADSFVVKGDEVQRQIAPGQTGVIADYNYKLPDDFTGCVIAWNS VKQDALTTGGNYGYLRLFRKSKLKPFERDISTEIQAGS GSTPCNGQVGLNCFYPLERYGFHPTTGVDNYQPFVVVLSXEL LNGPATVCGPKLSTTLVKDKCVNFNFNGLTGTGVLTTSS KKQFLPFQQFGRDISDTTDAVRDPQTLEIL
73	Pangolin coronavirus GX-P4L S protein RBD (Genbank: QIA48614)	SNFRVQPTISIVRFPNITNLCPFGEVFNASKFASVYAWNKRIS NCVADYSVLNYSSTSFSTFKCYGVSPKLNLCFTNV YADSFVVKGDEVQRQIAPGQTGVIADYNYKLPDDFTGCVIAWNS VKQDALTTGGNYGYLRLFRKSKLKPFERDISTEIQAGS GSTPCNGQVGLNCFYPLERYGFHPTTGVDNYQPFVVVLSFEL LNGPATVCGPKLSTTLVKDKCVNFNFNGLTGTGVLTTSS KKQFLPFQQFGRDISDTTDAVRDPQTLEIL
74	Pangolin coronavirus GX-P5E	SNFRVQPTISIVRFPNITNLCPFGEVFNASKFASVYAWNKRIS NCVADYSVLNYSSTSFSTFKCYGVSPKLNLCFTNV

	S protein RBD (Genbank: QIA48641)	YADSFVVKGDEVQRQIAPGQTGVIADYNYKLPDDFTGCVIAWNS VKQDALTGDNYGYYLRLFRKSKLPFERDISTEYQA GSTPCNGQVGLNLCYPLERYGFHPTTGVNYQPFRVWVLSFEL LNGPATVCGPKLSTTLVKDKCVNFNFNGLTGTGVLTTTS KKQFLPFQQFGRDISDITDAVRDPQTLEIL
75	Bat SARS coronavirus Rc-o319 S protein RBD (Genbank: BCG66627)	SNFRVQPQDTVVRFPNITNLCPFSEVFNATTFASVYAWNRRRI SNCVADYSVLYNSTSFSTFCYGVSSTKLNDLCFTNV YADSFVVRGDEVQRQIAPGQTGVIADYNYKLPDDFTGCVLAWN SRNQDASTSGNFNYYYRIWRSEKLRPFERDIAHYDYQV GTQFKSSLKNYGfySSAGDSHQPYRVVLSFELLNAPATVCG PKQSTELIKNKCvnfnfngltgtgvltdsnkkfqsqq FGRDVSDFDTSVKDPKTEVL
76	Bat SARS CoV RShSTT182 S protein RBD (Genbank: RShSTT182/2 010 EPI_ISL_8 52604)	SNFRVQPQDTVVRFPNITNLCPFSEVFNATTFASVYAWNRRRI SNCVADYSVLYNSTSFSTFCYGVSSTKLNDLCFTNV YADSFVVRGDEVQRQIAPGQTGVIADYNYKLPDDFMGCVIAWN SISLDAGGSYYYRLFRKSVLKPFERDISTQLYQAGDKP CSVEGPDCYYPLQSYFQSTNGVGYQPYRVVLSFELLNAPA TVCGPKKSTHLVVNKCvnfnfngltgtgvltsstkkfl PFQQFGRDVADTTNAVRDPQTLEVL
77	SARS-related coronavirus Spike glycoprotein (Genbank: ABD72984)	MFIFILFLTSTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVVYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFPAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNDLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDIGINASVUNIKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAVMVTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT

78	SARS coronavirus wtic-MB Spike glycoprotein precursor (Genbank: ACZ72093)	MFIFLLFLTSLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFFGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTAAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNLSLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
79	SARS coronavirus Shanghai LY Spike glycoprotein (Genbank: AAP82968)	MFIFLLFLTSLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV RACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTGNIDATSTGNYDYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTAAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLPFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF

		AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAGIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
80	SARS coronavirus HKU-39849 Spike glycoprotein precursor (Genbank: ADC35483)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQLPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGIATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
81	SARS-related coronavirus Spike glycoprotein (Genbank: ABD72982)	MLIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND

		YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVT LADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLL TDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
82	SARS coronavirus Tor2 Spike glycoprotein precursor (Genbank: AFR58672)	MFIFLLFLTSGSDLDRCCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFIKLPLGINITNFRAILTA FSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLDLCSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKL PDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCXFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVT LADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLL TDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT

83	SARS coronavirus Tor2 Spike glycoprotein precursor (Genbank: AFR58714)	MFIFLLFLTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LXHGKLRFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCXFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTAAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNLSLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCKGACSCGSCCKFDEDDSE PVLKGVKLHYT
84	SARS coronavirus Tor2 Spike glycoprotein (Genbank: YP_00982505 1)	MFIFLLFLTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCAFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTAAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF

		AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
85	SARS coronavirus ShanghaiQXC 1 Spike (Genbank: AAR86788)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNCQ VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDISPCAFGGVSVITPGTNASSEVAVLYQDVNCT NVSAAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQLPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKGELDKYFKNHTSPDVLGDISGINASVVNIQK EIDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
86	SARS Coronavirus CDC#2003011 57 S protein (Genbank: AAU81608)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND

		YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPVGAGICASYHTVSLLRSTSQKSIVAYTMSLGA DSSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
87	SARS coronavirus P2 Spike glycoprotein precursor (Genbank: ACQ82725)	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPPFAVSKPMGTQTHTMIFDNFNAFNT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFIKPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQGVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPVGAGICASYHTVSLLRSTSQKSIVAYTMSLGA DSSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
88	SARS coronavirus AS	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV

	Spike protein S (Genbank: AAQ94060)	IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAESP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNICYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNQTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCKGACSCGSCCKFDEDDSE PVLKGVKLHYT
89	SARS coronavirus ExoN1 Spike glycoprotein precursor (Genbank: AFM43867)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAESP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNICYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE YVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN

		DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
90	SARS coronavirus ExoN1 Spike glycoprotein (Genbank: AGT21078)	MFIFLLFLTTLTSGSDDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVWVPSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGDDVVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRS LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE YVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISIADEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQLPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTVTAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
91	SARS coronavirus Frankfurt 1 Spike protein S (Genbank: AAP33697)	MFIFLLFLTTLTSGSDDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVWVPSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGDDVVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD

		SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNGETS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVDFGDISGINASVVNIQKE IDRLNEVAKNLNLSLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
92	SARS coronavirus Frankfurt1-v01 Spike glycoprotein (Genbank: BAF42873)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVMIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPFIKPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFPSPDGKPTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE YVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLSADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSFNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNGETS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVDFGDISGINASVVNIQKE IDRLNEVAKNLNLSLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
93	SARS coronavirus Frankfurt 1 Spike protein	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVMIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT

	(Genbank: BAE93401)	FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRC LRHGKLRPFERDISNVPFSPDGKCTPPAFNICYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEFAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE YVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKSTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAIQSIESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDLKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVDFGDISGINASVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCKGACSCGSCCKFDEDDSE PVLKGVKLHYT
94	SARS-related coronavirus Spike glycoprotein (Genbank: ABD72969)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDANFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYVDSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNICYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAIQSIESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDLKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH

		GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
95	SARS coronavirus BJ182-12 Spike glycoprotein S (Genbank: ACB69905)	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPPGEVFNATKFPSVYAWERKKISNCVADYSVLNSTFFST FKCYGVSATKLNLDLCSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFDGFNFSQILPDPLKPIKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINAPVVNIQKE IDRLNEVAKNLNESLIDLRELKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
96	SARS coronavirus BJ182a Spike glycoprotein S (Genbank: ACB69860)	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPI IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPPGEVFNATKFPSVYAWERKKISNCVADYSVLNSTFFST FKCYGVSATKLNLDLCSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE

		HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFDGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWAFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRQLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIKE IDRLNEVAKNLNESLIDLRELKGYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
97	SARS coronavirus BJ182-8 Spike glycoprotein S (Genbank: ACB69894)	MFIFLLFLTSGSDLRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVMIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPFIKLPLGINITNFRAILTAFFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPBGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFDGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRQLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIKE IDRLNEVAKNLNESLIDLRELKGYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
98	SARS coronavirus BJ182-4 Spike glycoprotein S	MFIFLLFLTSGSDLRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTLGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVMIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPFIKLPLGINITNFRAILTAFFSP

	(Genbank: ACB69883)	AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSEIDKGIYQTSNFRVVPBGDVRFPNIT NLCPFGEVFNATKFPVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGKDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDILKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFDGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLRELKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCKGACSCGSCCKFDEDDSE PVLKGVKLHYT
99	SARS coronavirus Sino1-11 Spike protein (Genbank: AAR23250)	MFIFLLFLTSTSGSDDLRCCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIINNSTNVV IRACNFELCDNPFPAVSKPMGTQTHMTMIFDANFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPFLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSEIDKGIYQTSNFRVVPBGDVRFPNIT NLCPFGEVFNATKFPVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGKDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRS LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDILKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY

		DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCKGACSCGSCCKFDEDDSE PVLKGVKLHYT
100	SARS coronavirus ExoN1 Spike glycoprotein precursor (Genbank: ACZ71797)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPFIKPLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEDKGIYQTSNFRVVPVSDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDVVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFPSPDGKPCPPALNCYWPPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNAFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMTKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTVQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRQLSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGGSKRVDVFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINTSVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCKGACSCGSCCKFDEDDSE PVLKGVKLHYT
101	SARS coronavirus ExoN1 Spike glycoprotein precursor (Genbank: ACZ72020)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPFIKPLPLGINITNFRAILTAFPP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDVVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFPSPDGKPCPPALNCYWPPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMTKTSVDC

		NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLL TDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCKGACSCGSCCKFDEDDSE PVLKGVKLHYT
102	SARS coronavirus ExoN1 Spike glycoprotein precursor (Genbank: ACZ71976)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFIDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMTKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLL TDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCKGACSCGSCCKFDEDDSE PVLKGVKLHYT
103	SARS coronavirus ExoN1 Spike glycoprotein precursor (Genbank: ACZ71961)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFIDKGIYQTSNFRVVPVSGDVVRFPNIT

		NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMTKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESFTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELNSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAVMVTILLCCMTSCCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
104	SARS coronavirus ExoN1 Spike glycoprotein precursor (Genbank: ACZ72195)	MFIFLLFLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQHTMIFDNFNCNT FEXISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRALTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMTKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL

		GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
105	SARS coronavirus ExoN1 Spike glycoprotein precursor (Genbank: ACZ72108)	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFYVYKGYQPI DVVRDLPSGFNTLKPFLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVVYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMTKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVQKMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRQLSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
106	SARS coronavirus ExoN1 Spike glycoprotein precursor (Genbank: ACZ71826)	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFYVYKGYQPI DVVRDLPSGFNTLKPFLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMTKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVQKMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI

		EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGTLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
107	SARS coronavirus ExoN1 Spike glycoprotein precursor (Genbank: ACZ72254)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFPAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPBGDVVRFPNIT NLCPFGEVFNATKFPVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGKDDVVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRLSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGTLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKIHTSPDVLGDISGINASVVNIQKEI DRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
108	SARS-related coronavirus Spike glycoprotein (Genbank: ABD72972)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFPAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPBGDVVRFPNIT NLCPFGEVFNATKFPVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGKDDVVRQIAPG

		QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFSPNGKPCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
109	SARS coronavirus MA15 ExoN1 Spike glycoprotein precursor (Genbank: ACZ71991)	MFIFLLFLTSTSGSDDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFPLFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFVVSFKPMGTQTHMTIFDFAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLFYVYKGYQPI DVVRDLPSGFNTLKPFIKPLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPBGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNHNYKYRY LRHGKLRPFERDISNVFSPDGKPCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQMLPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT

110	SARS coronavirus MA15 ExoN1 Spike glycoprotein precursor (Genbank: ACZ72122)	MFIFLLFLTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNHNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTAQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQMLPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTVQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNLSLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
111	SARS coronavirus MA15 ExoN1 Spike glycoprotein precursor (Genbank: AEA10443)	MFIFLLFLTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNHNYKYRY LXHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTAQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF

		AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
112	SARS coronavirus MA15 Spike glycoprotein precursor (Genbank: ACZ72035)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNHNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQLPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
113	SARS coronavirus MA15 ExoN1 Spike glycoprotein precursor (GenBank: AEA10473)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNHNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND

		YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAXSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
114	SARS-related coronavirus Spike glycoprotein (GenBank: ABD73001)	MFIFLLFLTTLTSGSDLDRCCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQS VIIINNSTNVV IRACNFELCDNPFIAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFIKPLGINITNFRILTA FSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLNSTFFST FKCYGVSATKLNLDLCSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAXTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIVIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
115	SARS-related coronavirus	MFIFLLFLTTLTSGSDLDRCCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV

	Spike glycoprotein (GenBank: ABD72970)	IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAfsp AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPsgdVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIVVMVTILLCCMTSCCSCCKGACSCGSCCKFDEDDSE PVLKGVKLHYT
116	SARS-related coronavirus Spike glycoprotein (GenBank: ABD72988)	MFIFLLFLTLTNGSDLDRCCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAfsp AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPsgdVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN

		DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIVIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
117	SARS-related coronavirus Spike glycoprotein (GenBank: ABD72985)	MFIFLLFLTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFIAVSKPMGTQHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEDKGIYQTSNFRVWVPSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
118	SARS-related coronavirus Spike glycoprotein (GenBank: ABD72977)	MFIFLLFLTLTTRGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFIAVSKPMGTQHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEDKGIYQTSNFRVWVPSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD

		SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNGETS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
119	SARS-related coronavirus Spike glycoprotein (GenBank: ABD72979)	MFIFLLFLTTRGSDLDRCCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVMIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPFIKPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFPSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNGETS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
120	SARS-related coronavirus Spike glycoprotein	MFIFLLFLTTRGSDLDRCCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVMIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT

	(GenBank: ABD72995)	FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPVYAWERKKISNCVVDYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDISPCSFSGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAIQSIESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAVMVTILLCCMTSCCSCCKGACSCGSCCKFDEDDSE PVLKGVKLHYT
121	SARS coronavirus BJ302 Spike glycoprotein (GenBank: AAR07630)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHMIFDNFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDISPCSFSGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAIQSIESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH

		GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
122	SARS coronavirus TJF Spike glycoprotein (GenBank: AAT76147)	MFIFLLFLTTLTSGSDLDRCCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFS AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPPGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLDLCSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRNTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDLKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGKCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
123	SARS coronavirus NS-1 Spike glycoprotein S (GenBank: AAR91586)	MFIFLLFLTTLTSGSDLDRCCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFS AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPPGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLDLCSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE

		HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIMASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
124	SARS coronavirus BJ01 Spike glycoprotein S (GenBank: AAP30030)	MFIFLLFLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFIKPLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
125	SARS coronavirus HHS-2004 Spike protein (GenBank: AAT74874)	MAIFLLFLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPFIKPLPLGINITNFRILTAFTSP

		AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGKDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LKHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDILKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DVLSRLDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASA NLAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
126	SARS coronavirus WH20 Spike glycoprotein S (GenBank: AAX16192)	MFIFLLFLTSTSGSDDLRCCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFPAVSKPMGTQTHTMIFDFAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPFLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGKDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDILKNQC VNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRLDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY

		DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLMAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE EPVLKGVKLHYT
127	SARS coronavirus BJ302 Spike glycoprotein (GenBank: AAR07624)	MFIFLLFFTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPFIKPLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEDKGIYQTSNFRVVPDGDVVRFPNIT NLCPPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGDDVVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFPSPDGKPTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGTLVL PPLLTDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDLKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVGFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNST WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
128	SARS coronavirus BJ302 Spike glycoprotein (GenBank: AAR07626)	MFIFLLFFTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPFIKPLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEDKGIYQTSNFRVVPDGDVVRFPNIT NLCPPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGDDVVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFPSPDGKPTPPALNCYWPLSD YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPRSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC

		NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLL TDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVGFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
129	SARS coronavirus BJ302 Spike glycoprotein (GenBank: AAR07629)	MFIFLLFFTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLSD YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLL TVDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVGFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
130	SARS coronavirus BJ302 Spike glycoprotein (GenBank: AAR07625)	MFIFLLFFTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT

		NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLSD YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPRSFSGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTVDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVGFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
131	SARS coronavirus BJ302 Spike glycoprotein (GenBank: AAR07627)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLSD YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPRSFSGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTVDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVGFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL

		GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
132	SARS coronavirus BJ302 Spike glycoprotein (GenBank: AAR07628)	MFIFLLFFTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACIFELCDNPFFAVSKPMGTQTHMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPDGVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPTPALNCYWPLSD YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFGTLTGTVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPRSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTVDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVGFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
133	SARS coronavirus BJ302 Spike glycoprotein (GenBank: AAR07631)	MFIFLLFLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACIFELCDNPFFAVSKPMGTQTHMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPDGVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPCPTPALNCYWPLSD YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQC VNFNFGTLTGTVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPRSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI

		EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGTLTVL PPLLTVDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVGFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNQTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNLSLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVITILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
134	SARS coronavirus CS21 Spike glycoprotein (GenBank: ABF68958)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFPAVSKPMGTQTHTMIFDANFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP LAELKCSVKSFEDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVGKDDVVRQIAPG QTGVIADYNYKLPDDFMGCVLAWNTRNIDATSTGNVYKYRY LRHGKLRPFERDISNVPFSPDGKPCPTPPAPNCYWPLNG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRLSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGTLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNQTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNLSLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
135	SARS coronavirus ES260 Spike glycoprotein (GenBank: ABF68957)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTQDLFLPFYSNVTGFHTINHTFGNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFPAVSKPMGTQTHTMIFDANFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP AELKCSVKSFEDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVGKDDVVRQIAPG

		QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFSPDGKPCPPAPNCYWPLNG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKQ CVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFD SVRDPKTSEILDISPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCVTSCCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
136	SARS coronavirus CS24 Spike glycoprotein (GenBank: ABF68959)	MFIFLLFLTSTSGSDDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFPLFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFYVYKGYQPI DVVRDLPSGFNTLKPFIKPLPLGINITNFRILTAFTSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNPL AELKCSVKSFEIDKGIYQTSNFRVVPBGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFSPDGKPCPPAPNCYWPLND YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKQ CVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFD SVRDPKTSEILDISPCAFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCVTSCCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT

137	SARS coronavirus ES191 Spike glycoprotein (GenBank: ABF68956)	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDIWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNPL AELKCSVKSFIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDILKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTAAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSIGITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTVQNVLYENQKQIANQFNKAISQIESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNLSLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCVTSCCSCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
138	SARS coronavirus WF188 Spike glycoprotein (GenBank: ABF68955)	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDILKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTAAGCLIGAE HVDTSYECDTPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGA DSSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKYFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF

		AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCVTSCCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
139	SARS coronavirus PC4-137 Spike glycoprotein (GenBank: AAV49720)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTRTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLKG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFAQVKQMYKTPTLKDFGGFNFSQILPDLPKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
140	SARS coronavirus PC4-199 Spike glycoprotein (GenBank: AAV49722)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTRTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLRG

		YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFQRLNRLSGIAAEQDRNTRE VFAQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
141	SARS coronavirus PC4-241 Spike glycoprotein (GenBank: AAV49723)	MFIFLLFLTSGSDLDRCCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVVSXKPMGTRTHMTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLDLCSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLNG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRLSGIAAEQDRNTREV FVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT

142	SARS coronavirus PC4-115 Spike glycoprotein (GenBank: AAV49719)	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFVVSXKPMGTRTHMTIFDFAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP LAELKCSVKSFEDKGIYQTSNFRVVPSTGVVRFNPIT NLCPFGEVFNATKFPVYAWERKRISNCVADYSVLNYSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLNG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDILKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTVQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNST WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNLSLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCKGACSCGSCCKFDEDDSE PVLKGVKLHYT
143	SARS coronavirus GD03T0013 Spike glycoprotein (GenBank: AAS10463)	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDDPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFVVSXKPMGTRTHMTIFDFAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP LAELKCSVKSFEDKGIYQTSNFRVVPSTGVVRFNPIT NLCPFGEVFNATKFPVYAWERKRISNCVADYSVLNYSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLNG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDILKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF

		AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
144	SARS coronavirus B012 Spike glycoprotein (GenBank: AAV97989)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTRTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVGDDVVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLNG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNG CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDLPKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNALTVL TPLLTDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
145	SARS coronavirus civet020 Spike glycoprotein (GenBank: AAU04664)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTRTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVGDDVVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLRG

		YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGTLVL PPLLTDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
146	SARS coronavirus B033 Spike glycoprotein (GenBank: AAV97992)	MFIFLLFLTLTSGSDLDRCCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVVSXKPMGTRTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLDLCSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKHRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGTLVL PPLLTDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT

147	SARS coronavirus PC4-205 Spike glycoprotein (GenBank: AAU93319)	MFIFLLFLTTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQTVIIINNSTNVVI RACNFELCDNPFFVVSXKPMGTRTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSTGDDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDILKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTVQNVLYENQKQIANQFNKAISQIESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNST WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNLSLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCKGACSCGSCCKFDEDDSE PVLKGVKLHYT
148	SARS coronavirus C028 Spike glycoprotein (GenBank: AAV98001)	MFIFLLFLTTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVVSXKPMGTRTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSTGDDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKPTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDILKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTAGCLIGAE HVDTSYDCDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF

		AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVDLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
149	SARS coronavirus A013 Spike glycoprotein (GenBank: AAV97985)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTRTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFFGFFNSQILPDLPKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYDNQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVDLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
150	SARS coronavirus civet014 Spike glycoprotein (GenBank: AAU04661)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLKG

		YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKQ CVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVVIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
151	SARS coronavirus A001 Spike glycoprotein (GenBank: AAV97984)	MFIFLLFLTLTSGSDLDRCCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPVSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLDLCSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKXRY LRHGKLRPFERDISNVPFSPXGKPCPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKQ CVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLICAQKFNGLTVL PPLLTDDMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNCTS WFITQRNFFSPQIITDNTFVSGNCDVVIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT

152	SARS coronavirus C013 Spike glycoprotein (GenBank: AAV97995)	MFIFLLFLTTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVVSXKPMGTQTHTMIFDFAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSTGDDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKFRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDILKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTAAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTVQNVLYENQKQIANQFNKAISQIESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNLSLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
153	SARS coronavirus C029 Spike glycoprotein (GenBank: AAV98002)	MFIFLLFLTTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNDKSQSVIIINNSTNVV IRACNFELCDNPFFVVSXKPMGTQTHTMIFDFAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSTGDDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDILKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTAAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF

		AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFNGETS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
154	SARS coronavirus civet019 Spike glycoprotein (GenBank: AAU04662)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSSDGKCTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFSGETS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
155	SARS coronavirus A021 Spike glycoprotein (GenBank: AAV97986)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFSP AQGTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLNG

		YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKQ CVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTVIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFSGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCGACSCGSCCKFDEDDSE PVLKGVKLHYT
156	SARS coronavirus C018 Spike glycoprotein (GenBank: AAV97998)	MFIFLLFLTLTSGSDLDRCCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLTLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTRTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRILTAFTSP AQGTWGTSAAYFVGYLKPTTFMLKYDENGITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLDLCSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKQ CVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPFQERNFTTAPAICHEGKAYFPREGVFVFNST WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCGACSCGSCCKFDEDDSE PVLKGVKLHYT

157	SARS coronavirus B024 Spike glycoprotein (GenBank: AAV97990)	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVVSXKPMGTQTHTMIFDFAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGIKITNFRAILTAFAFP AQGTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSTGDDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFSPDGKPTPPAPNCYWPLNG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHADQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTVQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPFQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNLSLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
158	SARS coronavirus C025 Spike glycoprotein (GenBank: AAV98000)	MFIFLLFLTTLTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVVSXKPMGTQTHTMIFDFAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGIKITNFRAILTAFAFP AQGTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSTGDDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVFSPDGKPTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDSSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF

		AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
159	SARS coronavirus civet010 Spike glycoprotein (GenBank: AAU04649)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGIKITNFRAILTAFSP AQGTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSSDGKCTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVGTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFNGTS WFITQRNFFSPQIITDNTFVSGNCDVVGIIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
160	Civet SARS CoV 007/2004 Spike glycoprotein (GenBank: AAU04646)	MFIFLLFLTSTSGSGLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGIKITNFRAILTAFSP AQGTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSSGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLNSTSFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVVRQIAPG QTGVIADYNYKLPPDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSSDGKCTPPAPNCYWPLRG

		YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFSGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCGACSCGSCCKFDEDDSE PVLKGVKLHYT
161	SARS coronavirus A022 Spike glycoprotein (GenBank: AAV91631)	MFIFLLFLTLTSGSDLDRCCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFVSKPMGTQTHTMIFDNFNAFNT FEYISDAFSLDVSEKSGNFKHLREFVFNKNDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGIKITNFRAILTAFFSP AQGTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEIDKGIYQTSNFRVVPSPGDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTSFST FKCYGVSATKLNLDLCSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKLDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSSDGKCTPPAPNCYWPLRG YGFYTTSGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTLIHAEQLTPAWRIYSTGNNVFQTQAGCLIGAE HVDTSYECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGAD SSIAYSNNITAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCRQLNRALSGIAAEQDRNTRE VFVQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLICAQKFNGTLVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVFVFSGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCGACSCGSCCKFDEDDSE PVLKGVKLHYT

162	SARS coronavirus GD01 Spike glycoprotein S (GenBank: AAP51227)	MFIFLLFLTTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFLP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEDKGIYQTSNFRVVP SRDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKL PDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSYELLNAPATVCGPKLSTDLIKNQ CVNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTAAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKDFGGFNFSQILPDPLKSTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF AMQMAYRFNGIGVTVQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKE IDRLNEVAKNLNLSLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
163	SARS coronavirus GZ02 Spike glycoprotein (GenBank: AAS00003)	MFIFLLFLTTLTSGSDLDRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTQDLFLPFYSNVTGFHTINHTFDNPV IPFKDGIYFAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVV IRACNFELCDNPFFAVSKPMGTQTHTMIFDNAFNCT FEYISDAFSLDVSEKSGNFKHLREFVFKNKDGFLYVYKGYQPI DVVRDLPSGFNTLKPIFKLPLGINITNFRAILTAFLP AQDTWGTSAAYFVGYLKPTTFMLKYDENGITITDAVDCSQNP LAELKCSVKSFEDKGIYQTSNFRVVP SRDVVRFPNIT NLCPFGEVFNATKFPSVYAWERKRISNCVADYSVLYNSTFFST FKCYGVSATKLNLCFSNVYADSFVVKGDDVRQIAPG QTGVIADYNYKL PDDFMGCVLAWNTRNIDATSTGNYNYKYRY LRHGKLRPFERDISNVPFSPDGKCTPPALNCYWPLND YGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTDLIKNQ VNFNFNGLTGTGVLTPSSKRFQPFQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTAAGCLIGAE HVDTSYECDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGAD SSIAYSNNTIAIPTNFSISITTEVMPVSMAKTSVDC NMYICGDSTECANLLLQYGSFCTQLNRALSGIAAEQDRNTREV FAQVKQMYKTPTLKDFGGFNFSQILPDPLKPTKRSFI EDLLFNKVTLADAGFMKQYGECLGDINARDLCAQKFNGLTVL PPLLTDMMIAAYTAALVSGTATAGWTFGAGAALQIPF

		AMQMAYRFNGIGVTQNVLYENQKQIANQFNKAISQIQESLTTT STALGKLQDVVNQNAQALNTLVKQLSSNFGAISSVLN DILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASAN LAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH GVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS WFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVY DPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQEE IDRLNEVAKNLNESLIDLQELGKYEQYIKWPWYVWL GFIAGLIAIVMTILLCCMTSCCSCLKGACSCGSCCKFDEDDSE PVLKGVKLHYT
164	SARS-CoV spike protein with foldon and linker	MFIFLFFLTLVSGSDLRCTTFDDVQAPNYTQHTSSMRGVYYP DEIFRSDTLYLTDQLFLPFYSNVTGFHTINHTFDNPVIFKDGIIY FAATEKSNVVRGWVFGSTMNNKSQSVIIINNSTNVVIRACNFE LCDNPFFAVSKPMGTQTHMIFDNFNAFCTFEYISDAFSLDVSE KSGNFKHLREFVFKNKDGFLYVYKGYQPIDVVRDLPSGFNTLK PIFKLPLGINITNFRALTAQSPAQDTWGTSAAYFVGYLKPTTF MLKYDENGITDAVDCSQNPLAELKCSVKSFEIDKGIYQTSNF RVVPSGDVVRFPNITNLCPFGEVFNATKFPVYAWERKKISNC VADYSVLNSTFFSTFKCYGVSATKLNLCFSNVYADSFVVKG DDVRQIAPGQTGVIADYNYKLPPDFMGCVLAWNTRNIDATST GNYNYKYRYLRHGKLRPFERDISNVPFSPDGKPCPTPALNCY WPLNDYGFYTTTGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNQCVNFNFGTLTGTVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNASSEVAVLYQDVNCT DVSTAIHADQLTPAWRIYSTGNNVFQTQAGCLIGAEHVDTSYE CDIPIGAGICASYHTVSLRSTSQKSIVAYTMSLGADSSAIYSNN TIAIPTNFSISITTEVMPVSMAKTSVDCNMYICGDSTECANLLLQ YGSFCTQLNRLSGIAAEQDRNTREVFAQVKQMYKTPTLKYF GGFNFSQILPDPLKPTKRSFIEDLLFNKVTADAGFMKQYGE LGDINARDLICAQKFNGTLVLPPLLTDMMIAAYTAALVSGTATA GWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKQIANQ FNKAISQIQESLTTTSTALGKLQDVVNQNAQALNTLVKQLSSNFGA ISSVLNDILSRDPPEAEVQIDRLITGRLQSLQTYVTQQLIRAA EIRASANLAATKMSECVLGQSKRVDFCGKGYHLMSFPQAAPH HGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVFVNGTS TSWFITQRNFFSPQIITDNTFVSGNCDVIGIINNTVYDPLQPE LDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKEIDRLNE VAKNLNESLIDLQELGKYEQYIKWP LVPRGSGYIPEAPRDGQAYVRKDGWVLLSTFLEHHHHHHHH HHH
165	Artificial Sarbecovirus spike consensus 4 with foldon and linker	MFIFLFFLTLVSGSTIEKCTTFDDVQPPNYTQFLSSHRGVYYP DIFRSDVLHLTQDHLFPFDSNVTGFITFGLNFDNPIIPFKDGIYF AATEKSNVIRGWVFGSTMNNKSQSVIIMNNSTNVVIRACNFEL CDNPFFAVSKPNNTQIPSYIFNNAFNAFCTFEYVSDDFNLVDGEK PGNFKHLREFVFKNKDGFLYVYSGYQPIDVASGLPSGFNALKP IFKLPLGINITNFRLLTAFFPRPDYWGTSAAAYFVGYLKPTTF MLKYDENGITDAVDCSQNPLAELKCSVKSFEIDKGIYQTSNF RVAPSKEVVRFPNITNLCPFGEVFNATTFPSVYAWERKRISNC VADYSVLNSTSFSTFKCYGVSATKLNLCFSNVYADSFVVKG DDVRQIAPGQTGVIADYNYKLPPDFMGCVLAWNTRNIDATST GNYNYKYRSLRHGKLRPFERDISNVPFSPDGKPCPTPPAFNCY WPLNDYGFFTTNGIGYQPYRVVLSFELLNAPATVCGPKLSTD LIKNQCVNFNFGTLTGTVLTPSSKRFQPFQQFGRDVSDFTD SVRDPKTSEILDSPCSFGGVSVITPGTNTSSEVAVLYQDVNCT

		DVPVAIHADQLTPAWRVYSTGNNVFQTQAGCLIGAEHVDTSY ECDIPIGAGICASYHTVSSLRSTSQKSIVAYTMSLGADSSIAYS NNTIAIPTNFSISITTEVMPVSMAKTSVDCNMYICGDSTECANLL LQYGSFCTQLNRALSGIAVEQDRNTREVFAQVKQMYKTPTLK DFGGFNFSQILPDPLKPTKRSFIEDLLFNKVTLADAGFMKQYG ECLGDINARDLICAQKFNGLTVPPLLDDMIAAYTAALVSGTA TAGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKQIA NQFNKAISQIQESLTSTALGKLQDVVNQNAQALNTLVKQLS SNFGAISSVLNDILSRDPPEAEVQIDRLITGRLQSLQTYVTQQ LIRAAEIRASANLAATKMSECVLGQSKRVDFCGKGYHLMSFPQ AAPHGVVFLHVTYVPSQERNFTTAPAICHEGKAYFPREGVVF NGTSWFITQRNFFSPQIITDNTFVSGSCDVVIGIINNTVYDPLQ PELDSFKEELDKYFKNHTSPDVLGDISGINASVNIQKEIDRL NEVAKNLNESLIDLQELGKYEQYIKWPLVPRGSGYIPEAPRDG QAYVRKDG EWVLLSTFLEHHHHHHHHHH
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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; e) 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.