

ConSurf Color-Coded MSA

<u>Human</u>	M	D	F	S	V	K	V	D	I	E	K	E	V	T	C	P	I	C	L	E	L	L	T	E	P	L	S	L	D	C	G	H	S	F	C	Q	A	C	I	T	A	K	I	K	E	-	-	S	V	I			
Panda	M	D	F	P	A	Q	V	N	I	Q	K	D	V	T	C	P	I	C	L	E	L	L	T	M	P	L	S	L	D	C	G	H	S	F	C	Q	A	C	I	T	A	K	S	K	E	-	-	S	G	T			
Baboon	M	D	F	S	V	K	V	D	I	E	K	E	V	T	C	P	I	C	L	E	L	L	T	E	P	L	S	L	D	C	G	H	S	F	C	Q	A	C	I	T	A	K	I	K	E	-	-	S	V	T			
Gibbon	M	D	F	S	V	K	V	D	I	E	K	E	V	T	C	P	I	C	L	E	L	L	T	E	P	L	S	L	D	C	G	H	S	F	C	Q	A	C	I	T	A	K	I	K	E	-	-	S	V	I			
SquirrelMonkey	M	E	L	S	V	K	V	D	I	G	K	E	V	T	C	P	I	C	L	E	L	L	T	E	D	P	L	S	I	D	C	G	H	S	F	C	H	A	C	I	T	A	K	N	K	-	-	S	V	I			
Rhino	M	D	L	Q	A	Q	V	N	L	Q	K	E	V	T	C	P	I	C	L	E	L	L	T	E	P	L	S	L	G	C	G	H	S	F	C	K	A	C	I	T	A	K	N	K	E	-	-	S	V	I			
Dog	M	D	F	P	A	Q	A	N	I	Q	K	D	V	T	C	P	I	C	L	E	L	L	T	M	P	L	S	L	D	C	G	H	S	F	C	Q	A	C	I	T	A	K	S	M	E	-	-	S	G	T			
Cat	M	D	F	L	A	Q	V	N	L	K	R	E	L	T	Y	P	I	C	L	E	L	L	T	E	P	L	S	L	X	C	G	H	T	F	C	X	D	C	I	T	A	K	N	R	D	-	-	-	S	-	-	-	S
Manatee	-	M	A	S	V	Q	A	N	I	E	K	E	V	T	C	P	I	C	L	E	L	L	T	K	P	L	S	L	N	C	G	H	S	F	C	Q	A	C	I	T	A	K	N	V	E	L	Q	T	V	I			
RhesusMacaque	M	D	F	S	V	K	V	D	I	E	K	E	V	T	C	P	I	C	L	E	L	L	T	E	P	L	S	L	D	C	G	H	S	F	C	Q	A	C	I	T	A	K	I	K	E	-	-	S	V	T			
Elephant	M	A	S	K	I	L	V	N	L	E	E	G	A	T	C	P	I	C	L	E	L	L	M	E	P	I	S	L	D	C	G	H	S	F	C	Q	A	C	I	T	A	D	N	K	K	-	-	S	M	V			
Orangutan	M	D	F	S	V	K	V	D	I	E	K	E	V	T	C	P	I	C	L	E	L	L	T	E	P	L	S	L	D	C	G	H	S	F	C	Q	A	C	I	T	A	K	I	K	E	-	-	S	V	I			
Gorilla	M	D	F	S	V	K	V	D	I	E	K	E	V	T	C	P	I	C	L	E	L	L	T	E	P	L	S	L	D	C	G	H	S	F	C	Q	A	C	I	T	A	K	I	K	E	-	-	S	V	I			
Chimpanzee	M	D	F	S	V	K	V	D	I	E	K	E	V	T	C	P	I	C	L	E	L	L	T	E	P	L	S	L	D	C	G	H	S	F	C	Q	A	C	I	T	T	K	I	K	E	-	-	S	V	I			

<u>Human</u>	I	S	R	G	E	S	S	C	P	V	C	Q	T	R	F	Q	P	G	N	L	R	P	N	R	H	L	A	N	I	V	E	R	V	K	E	V	K	M	S	P	Q	E	G	Q	K	R	D	V	C	E
Panda	H	K	G	G	E	S	N	C	P	V	C	Q	C	K	Y	Q	F	W	N	L	R	P	N	Q	P	L	A	N	I	V	K	K	V	R	E	N	M	-	-	-	S	P	Q	Q	K	K	L	C	K	
Baboon	I	S	R	G	E	S	S	C	P	V	C	Q	S	R	F	Q	P	G	K	L	R	P	N	R	H	L	A	N	I	V	E	R	V	K	E	V	K	M	S	P	Q	E	G	Q	K	R	D	I	C	E
Gibbon	I	S	R	G	E	S	S	C	P	V	C	Q	T	R	F	Q	P	G	N	L	R	P	N	R	H	L	A	N	I	V	E	R	V	K	E	V	K	M	S	P	Q	E	G	Q	K	R	D	V	C	E
SquirrelMonkey	I	S	G	G	Q	S	S	C	P	V	C	Q	T	R	F	Q	P	G	N	L	R	P	N	R	H	L	A	N	I	V	Q	R	V	R	E	V	K	M	G	P	E	D	G	Q	K	R	D	V	C	E
Rhino	H	P	G	G	E	C	S	C	P	V	C	Q	S	R	Y	Q	P	G	T	L	Q	P	N	R	H	L	A	T	I	V	E	R	V	R	E	I	N	T	N	P	R	K	Q	Q	K	E	F	C	E	
Dog	H	Q	G	E	E	G	T	C	P	V	C	Q	C	K	Y	Q	F	W	N	L	R	P	N	Q	P	L	A	N	I	A	K	K	V	R	E	N	M	-	-	-	S	P	Q	Q	K	K	L	C	E	
Cat	X	Q	G	G	E	S	N	C	P	V	C	Q	C	R	Y	Q	L	Q	N	L	X	P	N	H	P	L	A	G	I	V	E	R	V	R	E	N	R	-	-	-	S	P	Q	K	K	K	F	C	E	
Manatee	S	P	G	G	Q	K	S	C	P	V	C	H	A	S	Y	Q	P	G	N	L	W	P	N	Q	H	L	A	K	I	V	K	G	F	R	E	A	K	L	S	P	Q	E	G	Q	K	S	D	R	C	V
RhesusMacaque	I	S	R	G	E	S	S	C	P	V	C	Q	S	R	F	Q	P	G	K	L	R	P	N	R	H	L	A	N	I	V	E	R	V	K	E	V	K	M	S	P	Q	E	G	Q	K	R	D	I	C	E
Elephant	S	Q	E	K	E	S	S	C	P	V	C	R	I	K	Y	Q	P	G	N	L	R	S	N	Q	H	L	A	S	M	V	E	R	L	K	E	V	K	M	S	L	E	K	E	E	K	E	N	Y	C	V
Orangutan	I	S	R	G	E	S	S	C	P	V	C	Q	T	R	F	Q	P	G	N	L	R	P	N	R	H	L	A	N	I	V	E	R	V	K	E	V	K	M	S	P	Q	E	G	Q	K	R	D	V	C	E
Gorilla	I	S	R	G	E	S	S	C	P	V	C	Q	T	R	F	Q	P	G	N	L	R	P	N	R	H	L	A	N	I	V	E	R	V	K	E	V	K	M	S	P	Q	E	G	Q	K	R	D	V	C	E
Chimpanzee	I	S	R	G	E	S	S	C	P	V	C	Q	T	R	F	Q	P	G	N	L	R	P	N	R	H	L	A	N	I	V	E	R	V	K	E	V	K	M	S	P	Q	E	G	Q	K	R	D	V	C	E

<u>Human</u>	H	H	G	K	K	L	Q	I	F	C	K	E	D	G	K	V	I	C	W	V	C	R	L	S	Q	E	H	Q	G	H	Q	T	F	R	I	N	E	V	V	K	E	C	Q	E	K	L	Q	V	A	L
Panda	H	H	G	E	K	L	V	I	F	C	K	E	D	G	K	A	I	C	Q	R	C	A	Q	S	V	E	H	H	G	H	Q	I	F	F	M	E	K	V	I	K	E	C	Q	E	K	L	Q	A	A	L
Baboon	H	H	G	K	K	L	Q	I	F	C	K	E	D	G	K	V	I	C	W	V	C	E	L	S	Q	E	H	Q	G	H	Q	T	F	R	I	N	E	V	V	K	E	C	Q	E	K	L	Q	A	A	L
Gibbon	Q	H	G	K	K	L	Q	I	F	C	K	E	D	G	K	V	I	C	W	V	C	E	L	S	Q	E	H	Q	G	H	Q	T	F	R	I	N	E	V	V	K	E	C	Q	E	R	L	Q	A	A	L
SquirrelMonkey	H	H	G	K	K	L	Q	Y	F	C	K	E	D	G	K	V	I	C	W	V	C	R	L	S	Q	E	H	Q	G	H	Q	T	F	L	I	H	E	V	V	K	E	C	Q	E	R	L	Q	A	A	L
Rhino	H	H	G	E	K	L	H	M	F	C	K	D	E	E	Q	A	I	C	R	L	C	V	L	S	R	E	H	Q	G	H	Q	I	F	C	M	E	E	V	M	K	I	Q	E	K	L	Q	E	A	L	
Dog	V	H	G	E	K	L	L	T	F	C	K	E	D	G	K	A	I	C	Q	H	C	A	Q	S	A	E	H	R	G	H	Q	I	F	F	I	E	K	V	I	K	E	Y	Q	E	K	L	Q	A	A	L
Cat	N	H	G	K	T	L	G	V	F	C	K	E	H	G	K	A	G	C	Q	H	T	A	V	S	Q	E	Y	H	G	H	H	I	F	L	T	E	K	V	V	K	E	C	Q	E	K	L	Q	A	T	L
Manatee	H	H	G	E	K	L	L	L	F	C	K	N	D	E	K	V	I	C	W	L	C	V	R	S	Q	E	H	C	G	H	Q	T	F	L	V	E	E	V	V	K	E	C	Q	E	K	L	Q	E	T	L
RhesusMacaque	H	H	G	E	K	L	Q	I	F	C	K	E	D	G	K	V	I	C	W	V	C	E	L	S	Q	E	H	Q	G	H	Q	T	F	R	I	N	E	V	V	K	E	C	Q	E	K	L	Q	A	A	L
Elephant	H	H	G	E	K	L	R	L	F	C	K	L	D	G	K	F	I	C	W	L	C	E	S	Q	E	H	G	H	P	T	F	L	V	E	E	V	V	P	E	Y	Q	E	K	N	L	Q	A	A	F	
Orangutan	H	H	G	K	K	L	Q	I	F	C	K	E	D	G	K	V	I	C	W	V	C	E	L	S	Q	E	H	Q	G	H	Q	T	F	R	I	N	E	V	V	K	E	C	Q	E	K	L	Q	V	A	L
Gorilla	H	H	G	K	K	L	Q	I	F	C	K	E	D	G	K	V	I	C	W	V	C	E	L	S	Q	E	H	Q	G	H	Q	T	F	R	I	N	E	V	V	K	E	C	Q	E	K	L	Q	V	A	L
Chimpanzee	F	H	G	K	K	L	Q	I	F	C	K	E	D	G	K	V	I	C	W	V	C	E	L	S	P	E	H	Q	G	H	Q	T	F	R	I	N	E	V	V	K	E	C	Q	E	K	L	Q	V	A	L

<u>Human</u>	Q	R	L	I	K	E	D	Q	E	A	E	K	L	E	D	D	I	R	Q	E	R	T	A	W	K	N	Y	I	Q	I	E	R	Q	K	I	L	K	G	F	N	E	M	R	V	I	L	D	N	E	E
Panda	K	K	L	R	K	E	E	P	K	M	E	E	W	E	A	D	I	R	E	E	K	A	S	W	K	N	H	M	Q	T	E	R	Q	R	I	L	K	G	F	N	E	M	K	A	I	L	D	S	E	E
Baboon	Q	K	L	T	K	E	D	Q	E	A	E	K	L	E	D	D	I	R	Q	E	R	T	I	W	K	N	Y	I	Q	I	E	R	Q	K	I	L	K	G	F	N	E	M	R	V	I	L	D	S	E	E
Gibbon	Q																																																	

Chimpanzee

Q R L I K E D Q E A E K L E D D I R Q E R T A W K N Y I Q I E R Q K I L K G F N E M R V I L D N E E

Human

Q R E L Q K L E E G E V N V L D N L A A A T D Q L V Q Q R Q D A S T L I S D L Q R R L R G S S V E M

Panda

K R V L Q K L E E D E V N V L D N L V V A K D Q L A R Q Q C L R E L I S A V E H Q I W G S S V D T

Baboon

Q R E L Q K L E E G E V N V L D N L A A A S D Q L V Q Q R Q D A S K L I S D L Q R R L R G S S I E M

Gibbon

Q R E L Q K L E E G E V N V L D N L A A A T D Q L V Q Q R Q D A S K L I S D L Q R R L R G S S V E M

SquirrelMonkey

Q R E L Q K L E E G E V N V L D N L A E A K D Q L V Q Q R Q Y A S K L I S D L Q R R I K G S S V E M

Rhino

Q K E L Q K L E E D E V N V L D N L V A A K D Q L V Q Q S Q Y M R E L I S D L E R Q M W G S S I D T

Dog

K K V L Q K L E E D E V N V L D N L I V A R D Q L D W Q R Q Y L R G L I S H I E H Q I W G S S V D T

Cat

K R V L Q K L E E D K V N V L D N L V V A R D Q L D W Q R Q Y L R G L I S H I E H Q I W G S S E D M

Manatee

K R E L Q K L E E E E V N V L D N L A E V K Y Q L I Q Q Y Q D L S D L I S D V E H R M Q W S S V D T

RhesusMacaque

Q R E L Q K L E E G E V N V L D N L A A A R D Q L V Q Q R Q D A S K L I S D L Q R R L R G S S I E M

Elephant

Q K E L E E L K S E E E S V M Q N L S E A E N E L G Q Q S D D V K K L M S D L Q H R L Q G T T M E M

Orangutan

Q R E L Q K L E E G E V N V L D N L A A A T D Q L V Q Q R Q D A S T L I S D L Q R R L R G S S V E M

Gorilla

Q R E L Q K L E E G E V N V L D N L A A A T D Q L V Q Q R Q D A S T L I S D L Q R R L R G S S V E M

Chimpanzee

Q R E L Q K L E E G E V N V L D N L A A A T D Q L V Q Q R Q D A S T L I S D L Q R R L R G S S V E M

Human

L Q D V I D V M K R S E S W T L K K P K S V S K K L K S V F R V P D L S G M L Q V L K E L T D V Q Y

Panda

V Q D M I N V M K R S E S W T L K K P N T A S K K L K S V F R V P D L S G M L Q V F K E L T E V Q R

Baboon

L Q D V I D V M K R S E S W T L K K P K P V S K K L K S V F R A P D L S R M L Q V H K E L T D V Q C

Gibbon

L Q D V I D V M K R S E S W T L K K P K S V S K K L K S V F R V P D L S G M L Q V L K E L T D V Q Y

SquirrelMonkey

L Q D V I D V M R S E T W I L K K P K S V S K K L K S I F Q M P D L S G M L Q I L R E L T D V Q C

Rhino

L R D V I N L I R R S E T W T L K K P K M V S K K Q K S A F R V P D L S G M L Q V F K E L T E V Q C

Dog

V Q D M I N V M K R S E S W T L K K P N I V S K K L K S T F L I P D L S G M L Q V F K E L T E V Q C

Cat

L Q D L I N V M R K S E S W I L K K P H I V S K K S K S T Y Q I P D L K G T L Q M F K E L T E V Q R

Manatee

M Q D V I D I V K R S E S W T L K K P T I V S K K L K N V C R V P D L K E I L Q V F R E L T D V Q C

RhesusMacaque

L Q D V I D V M K R S E S W T L K K P K P V S K K L K S V F R A P D L S R M L Q V H K E L T D V Q C

Elephant

L Q D V N D V I Q G S K N T I L E K P K T L P Q K P R R I F Q V P D M S L I L C V M R E L E D V Q R

Orangutan

L Q D V I D V M K R S E S W T L K K P K S V S K K L K S V F R V P D L S G M L Q V L K E L T D V Q Y

Gorilla

L Q D V I D V M K R S E S W T L K K P K S V S K K L K S V F R V P D L S G M L Q V L K E L T D V Q Y

Chimpanzee

L Q D V I D V M K R S E S W T L K K P K S V S K K L K S V F R V P D L S G M L Q V L K E L T D V Q Y

Human

Y W V D V M L N P G S A T S N V A I S V D Q R Q V K T V R T C T F K N S N - P C D F S A F G V F G C

Panda

Y W V D V M L K P V N A I S N I A I S A D K R Q V T A V H N L S L K N I F - L C D F S A F D I L G C

Baboon

H W V D V M L N P N S T I S N V A V S V D Q R Q V A T V R T F A F K N S N - P R D F S D F G V L G C

Gibbon

Y W V D V M L N P V S A T S N V A V S A D Q R Q V K T V R T C T F K N S N - P C D F S A F G V F G C

SquirrelMonkey

Y W V D V M L N P D S A T L N V A V S A D Q R Q V A T V H T S T F K N S N - P R D F S A F G V L G C

Rhino

Y W V D V M L N P V N A I S N I V I S A D Q R Q V K I L H P F T F R N V Y - P C D F S A F D V L G C

Dog

Y W V D V M L K P V N A I S N I T I S A D K R Q V T V V H N F P L K S I Y - P F D F S A F D I L G C

Cat

Y W V D V M L K P V N A I L N I T I S A D K R Q V K G I Q D F S L Q N I H - L C S F P L F D V L G C

Manatee

Y W V D V T L N Q V N T S S N V V I S A D Q R Q V A V L R I P N F R N S D - Q H D F S A F D V L G C

RhesusMacaque

Y W V D V M L N P N S T I S N V A V S V D Q R Q V A T V R T F T F K N S N - P R D F S D F G V L G C

Elephant

Y W V N M T L N P I N P I S N V V I S E G G R Q A R I V P N S K S R N F C W S G S N D D D G I V G C

Orangutan

Y W V D V M L N P G S A T S N V A V S V D Q R Q V K T V R T C T F K N S N - P C D F S A F G V F G C

Gorilla

Y W V D V M L N P G S A T S N V A I S V D Q R Q V K T V H T C T F K N S N - P C D F S A F G V F G C

Chimpanzee

Y W V D V M L N P G S A T S N V A I S V D Q R Q V K T V R T C T F K N S N - P C D F S A F G V F G C

Human

Q Y F S S G K Y Y W E V D V S G K I A W I L G V H S K I S S L N K R K S S G F A F D P S V N Y S K V

Panda

Q H F S S G K Y Y W E V D V S E K T A W I L G V Y S K A R N L K R K G S S G F V F D P N V N H P D V

Baboon

Q H F S S G K Y Y W E V D V S G K I A W I L G V Y S K I S S P N K R K S S G F V F D P S V N Y A N V

Gibbon

Q Y F S S G K Y Y W E V D V S G K I A W I L G V H S K I S S L N K R K S S G F A F D P S V N Y S K V

SquirrelMonkey

Q H F S S G K Y Y W E V D V S G K S A W I L G V H S K I S N P N K R K S S G F T F D T S T N Y S S I

Rhino

Q C F S S G K Y Y W E V D V S G K I A W I L G V C S N K R C F N R T K S S G F T F D P N L N H S N V

Dog

Q H F S S G K Y Y W E V D V S G K I A W I L G V Y S K G R S L K R K G D S G F F F D P K V N H L D V

Cat

Q H F S X G K Y Y W E V D V S E K I S W I L G V N S K A R S P K R K G S S G F V F D P N V N Y L P D V

Manatee

Q Y F S S G K H Y W E V D V S R K T A W I L G V Y C R A K D P H E R W A S V F A F G L N V S S Q N V

RhesusMacaque

Q Y F S S G K Y Y W E V D V S G K I A W I L G V Y S K I S S P N K R K S S G F V F D P S V N Y A N V

Elephant

L Y I A S G K H Y W E V D V S G K T S W I L G V C S D R C P E - - - F S M L G A K Q G V Y L Q N D

Orangutan

Q Y F S S G K Y Y W E V D V S G K I A W I L G V H S K I S S L N K R K S S G L A F D P S V N Y S K V

