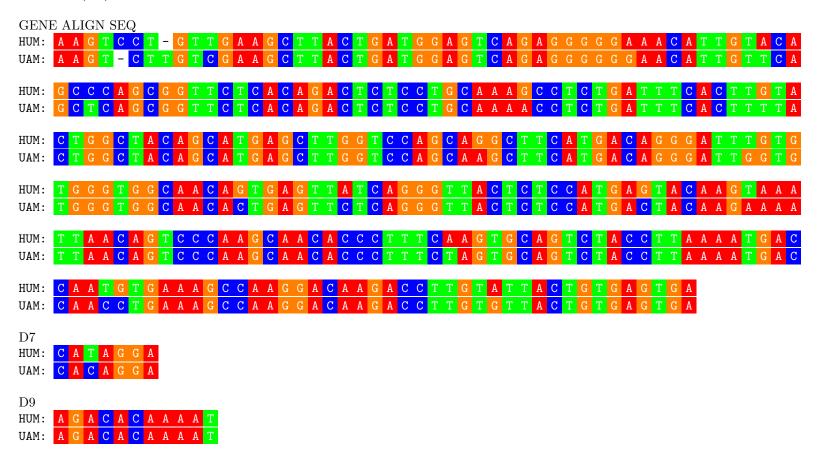
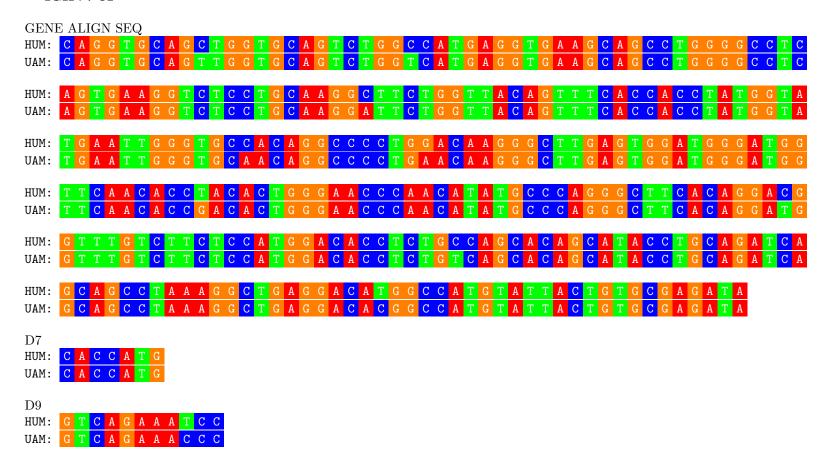
Human genes (HUM) and their mappings (UAMs) in Orangutans

IGHV(III)-82

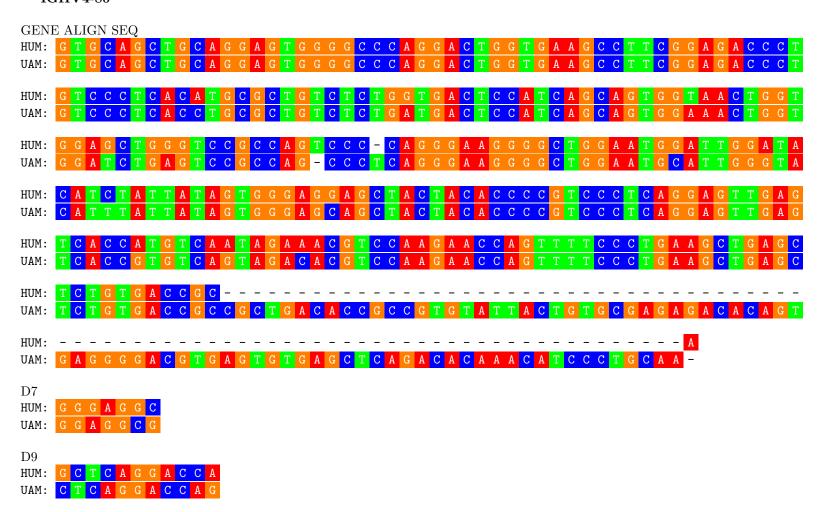


IGHV7-81



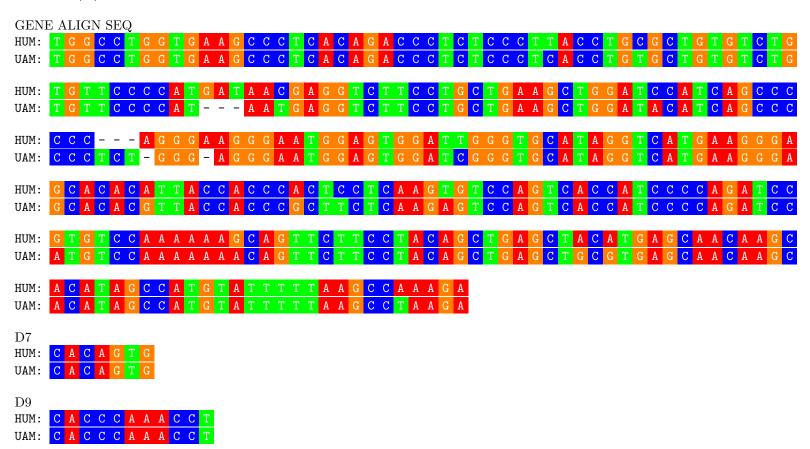
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IGHV4-80

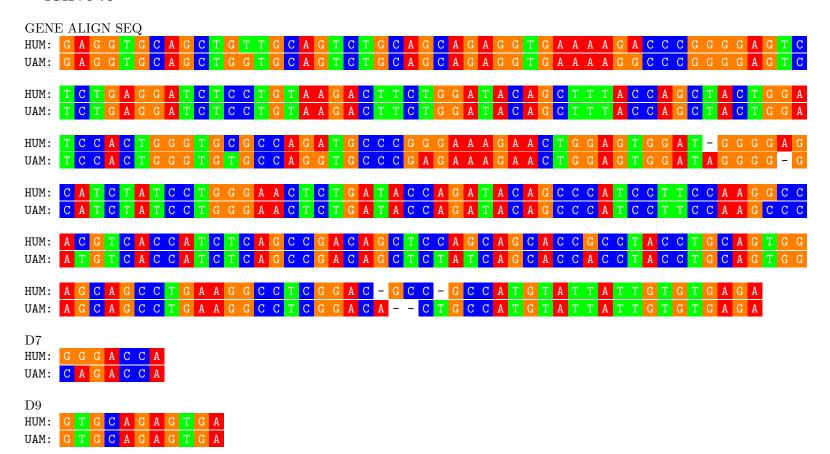


4

IGHV(II)-78-1

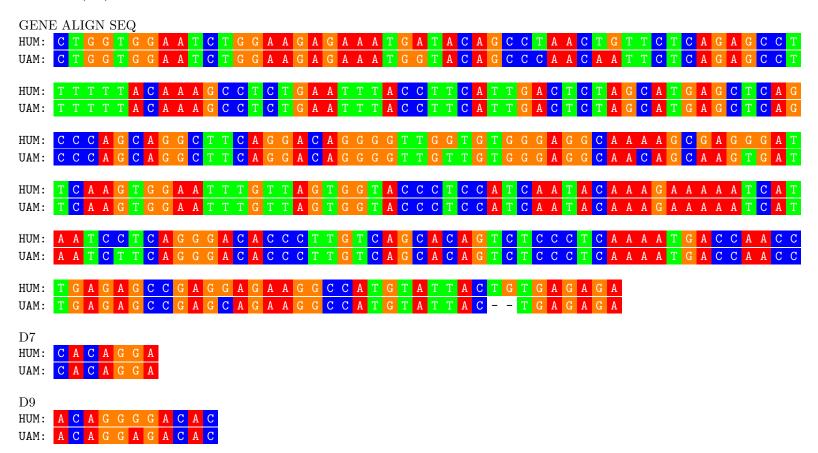


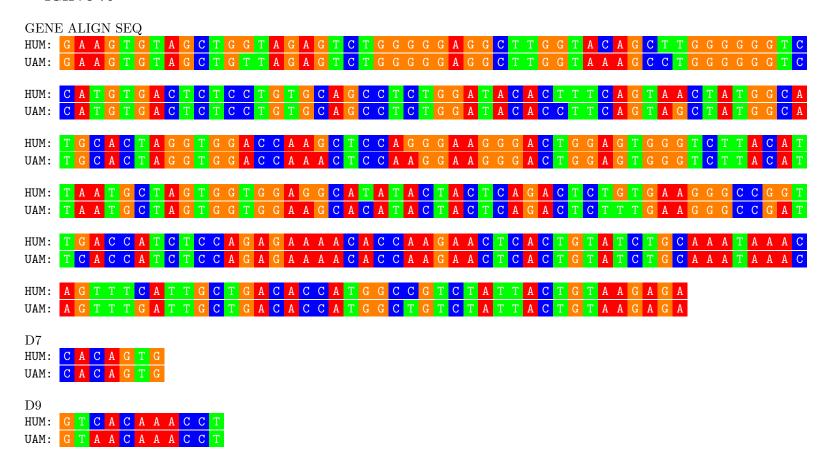
IGHV5-78



6

IGHV(III)-76-1

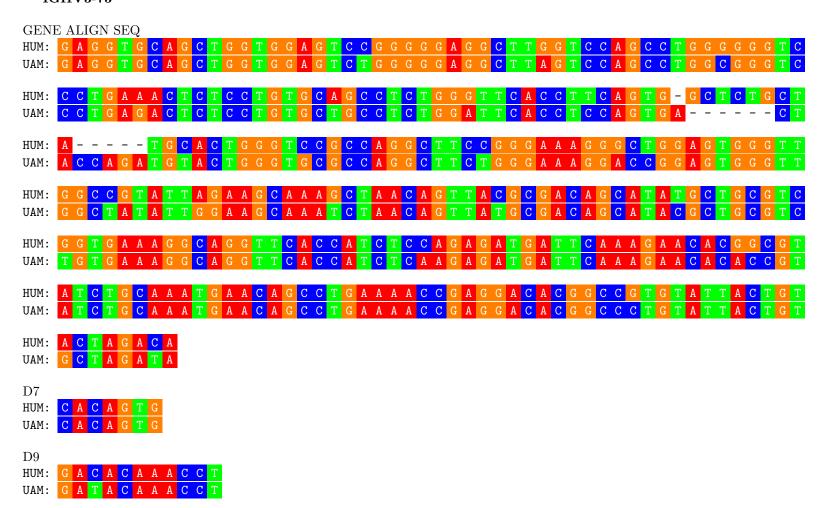




8

GENE ALIGN SEQ
HUM: G A G G T G C A G C T G G T G G A G T C C G G G G G G G T T A G T T C A G C C T G G G G G T C UAM: G A G G T G C A G C T G G G G G T C A G C T G T T G G G G G T C
HUM: C C T G A G A C T C T C T G T C T G T G T G T G T G T
HUM: - G G A T G C A C T G G G T C C G C A A G C T C G G T C G G T C G G T C T G G T C T C
HUM: T C A C G T A T T A A T A G T G A G A G A G T A T A
HUM: G G G G C C G A T T C A C C A T C T C A G A G A G A G A G A G A G A G A G A
HUM: A A A T G A A C A G T C T G A G C A G T C T G A G A C A G T C T G A G A G C C A G A G C A C A C A C A C
HUM: G A G A UAM: G A G A
D7 HUM: C A C A G T G UAM: C G C A G T G
D9 HUM: G A C A A A C C T UAM: G A C A A A C C T

9



GENE ALIGN SEQ	
HUM: GAGGTGCAGCTGGAGTCTGGAGGCTTGGAG	G G <mark>T C</mark>
UAM: G A G G T G C A G C T G G A G T C G A G C T G G G G T C T G G G G G T A G G C T T G G G C T T G G G G G G	G G <mark>T</mark> C
HUM: C C T G A G A C T C T C T G T G C A G C C T C T G A G C C T C C A C C T T C A G T G A C C A C	
UAM: C C T G A G A C T C T C T G T G C A G C C T C T G A C C T T C A G T G A C C A C	T A C A
HUM: TGGACTGGGCCAGCAGGCCAGGCAGGCAGGCAGGCAGGCA	C C G T
UAM: TGGACTGGGTCAGCAGCAGCAGGCAGGCAGGCAGGCTGGAAGGGGAAGTGGGAAGGAA	C C G T
HUM: A C T A G A A A C A A A G C T A A C A G T T A C A C A C A C A G A T A C G C C G C G T C T G	T G A A
UAM: A T T A G A A A C A A A G C T A A C A G T T A C A C C A C A G A A T A C G C C G C G T C T G	T G A A
HUM: A G G C A G A T T C A C C A T C T C A A G A G A T G A T T C A A G A A G A A C T C A C T G T A T	
UAM: A G G A A G A T T T A C C A T C T C A A G A G A T T C A A A G A A C A C A C T G T A T	C T G C
HUM: A A A T G A A C A G C C T G A A A A C C G A G G C C G T G T A T T A C T G T G T	
UAM: A A A T G A G C A G C T G A A A A C C G A G G A C A C G G C C G T A T T A C T G T G C	T A G A
HUM: G A	
UAM: GA	
D7	
HUM: C A C A G C G	
UAM: CACAGTG	
D9	
HUM: G A C A A A C C T	
UAM: GACAAACCT	

IGHV2-70

GENE ALIGN SEQ
HUM: CAGGTCACACCTTCACACCTCACACACACACACACACACA
UAM: CAGGTCACCTTGAAGGAGTCTGAGTCTGGTGCTGCTGCTGCTGCTGAAACCCAAACAAA
HUM: CCTCACACTGACCTTCACTTCTCTCTCTCTCACTCACTAGTGAA
UAM: C C T C A C G C T G A C C T G C A C C T T C T C T G G G T T C T C A C T A G T A G T G G A -
HUM: T G T G T G T G A G C T G G A T C C G T C A G C C C C A G G G A A G G C C C T G G A G T G G C
UAM: - G T G G G T G T G G G C T G G A T C C G T C A G C C C C A G G G A A G G C C C T G G A G T G G C
HUM: TTGCACTCATTGATTGGATTGATGATGATAAATACTACAGCAGCATCTGAAG
UAM: TTGCACTCATTGATTGGGATGATGATAAATACTACAGCAGCATCTGAAG
HUM: A C C A G G C T C A C C A T C T C A A G G A C C A A G G C C T C C A A A A A C C A G G T C C T T A C
UAM: A G C A G G C T C A C C A T C T C A A G G A C A T C T C C A A G G A C C T C C A A A A A C C A G G T G G T C G T T A C
HUM: A A T G A C C A A C A T G G A C C T G T G A C A C A C A C A C A C A C A C A C A
OAM. A A I G A C C A A C A I G G A C C C I G I G G A C A C A G C C A C A I A I I A C I G I G C A C G G A
HUM: TAC
UAM: T A C
D7 HUM: <mark>C A C A G A G</mark>
UAM: C A C A G A G
D9
HUM: TACAAGAACCC
UAM: TACAAGAACCC

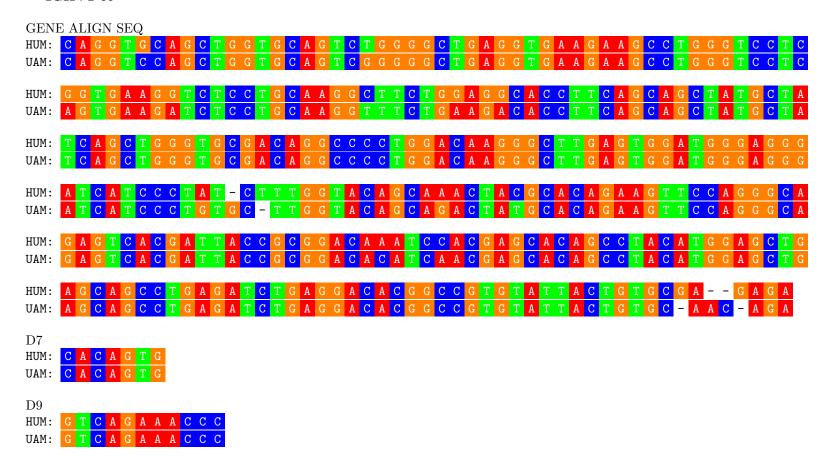
IGHV1-69D

GENE ALIGN SEQ	
HUM: CAGGTGCAGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTG	
UAM: CAGGTCAGGTGGTGCAGTGCAGTCTGAGGTGAGGTGAGG	A A G C C T G G G T C C T C
HUM: G G T G A A G G T C T C C T G C A A G G C T T C T G G A G G C T T	
UAM: A G T G A A G A T C T C C T G C A A G G T T T C T G A A G A C A C C T T	
HUM: T C A G C T G G G T G C A C A G G C C C T G G A C A A G G C T T G	
UAM: TCAGCTGGGTGCACAGGCCCCTGGACAAGGGCTTG	
HUM: A T C A - T C C T A T C T T - T G G T A C A G C A A A C T A C G C A	C A G A A G T T C C A G G G
UAM: A T C A T T C C T G T T G C T G G T A T A A C A A A C T A C G C A	
HUM: C A G A G T C A C G A T T A C C G C G G A C G A T C C A C G A	
UAM: C A G A G T C A C G A T T A C T G C G A C - A C A T C C A C G A G C A	
HUM: C T G A G C A G C T G A G T C T G A G T C T G A G G G G C C G T G T A T	
UAM: C T G A G C A G C T G A G A T C T G A G G A C A C G G C C G T G T A T	T A C T G T G C - A A C - A
HUM: G A	
UAM: G A	
D7	
HUM: C A C A G T G	
UAM: C A C A G T G	
D9	
HUM: G T C A G A A A C C C UAM: G T C A G A A A C C C	
UAM: G T C A G A A A C C C	

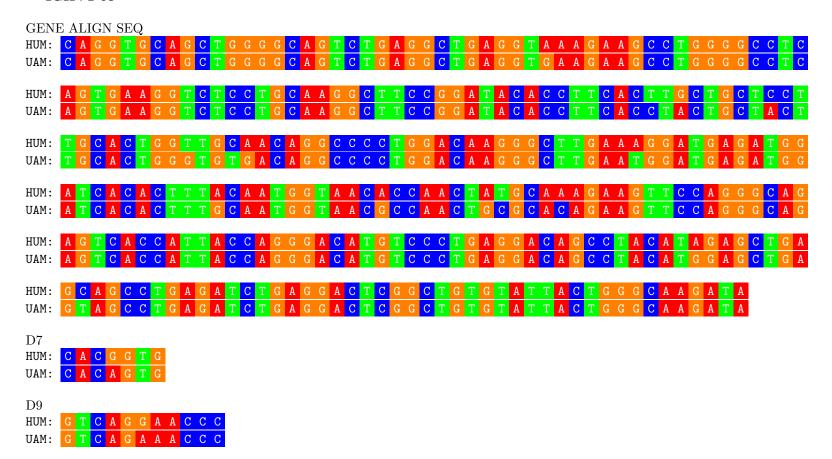
IGHV2-70D

GENE ALIGN SEQ
HUM: C A G G T C A C C T T G A A G G A G T C T G G T C T G G T C C T G C T G C T G C T G C T G A A A C C C A C A C A G A G A C C A C A
HUM: C C T C A C A C T G A C T G A C T T G A C C T T G C A C T T T C T C T G G G T T C T C A C T C A C T C A C T A G T G G A A UAM: C C T C A C T C A C T C A C T C A C T A G T G G A G
HUM: TGCGTGTGAGGATCGGTCAGGCCCCAGGGAAGGCCCTT
UAM: T G G G T G G G C T G G A T C C G T C A G C C C C C A G G G A A G G C C C T G G A G T G G C T T
HUM: G C A C G C A T T G A T T G G A T G A A T G A T G A T G A T G A T G A T A A A T T C T A C A G C A C A T C T G A A G A C
UAM: G C A A G C A T T G A T T G G G A T G A T G G A T G A T G A T G A T G A T G A T G A T G A T A A A T A A A T A C A G C C A T C T C T G A A G A G
HUM: CAGGCTCACCATCTCAAGGACACCTCCAAAAAACCAGGTGGTCAAAAA
UAM: C A G G C T C A C C A T C T C A A G G A C A T C T A A A A G G A C C T C C A A A A A C C A G G T C G T T A C A A
HUM: T G A C C A A C A T G G A C C T G T G T G G A C C T G T G T G G A C A C A C A G C A C G T A C T G T G C A C G A C G T A C T G T G T A C T G T G T A C T G T G T A C T G T A C T G T A C T G T A C T G T A C T G T A C T G T A C T G T A C T G T A C T A C T G T A C
UAM: T G A C C A A C A T G G A C C T G T G T G G A C C T G T G T G G A C A C A C A G C A T A T A C T G T G C A C A G A
HUM: C
UAM: C
D7 HUM: CACAGAG
UAM: C A C A G A G
D9
HUM: TACAAGAACCC UAM: TACAAGAACTC
UAM: TACAAGAACTC

IGHV1-69



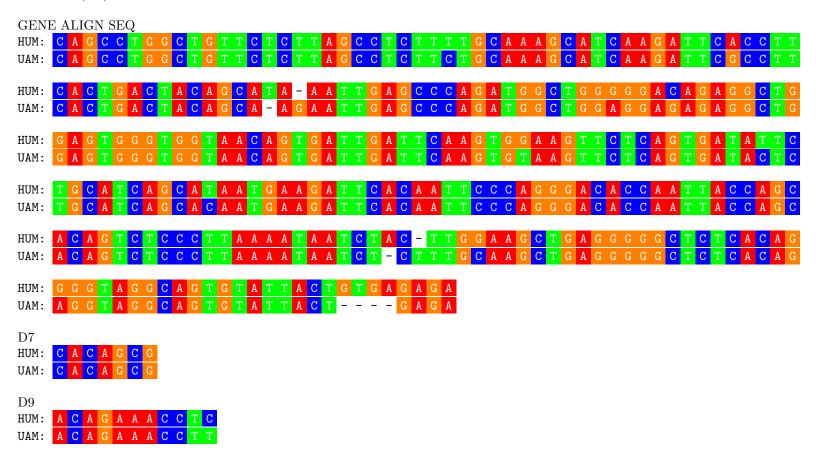
IGHV1-68



IGHV(III)-67-4

GENE ALIGN SEQ	
HUM: A A G T T C A G T G G T G G A G T C A G A G T C A G A G G G G T A A A C G T A G T A C A G C C C A G T G G T	T C
UAM: A A G T T C A G T G G T G G A G T C A G T A A A C G T T G T A C A G C C A G T G T	T C
HUM: A C T G A G A C T T T C T T G C A A A G C G T C T G G A T T C A C C T T T T C T G G C A A C A G	
UAM: A C T G A G A C T T T C T T G C A A A G C G T C T G G A T T C A C C T T T G C T G G C A A C A C	C C
HUM: T G A G G T T G G T C C A G C A G G C T T C A C A A C A G G G A T T G T G G T G G C T G G C A A	
UAM: TGAGGTTGGTCAGGCAGGCTTCACAGGAGGCATTGATAACAACAGGGACTGTTGTTGGGCCAAA	T A
HUM: G T G A G T C A A C A A G T G G G A G T G C T C A G G T T T A C T C T T C A T G A G T A C A A	T A
UAM: G T G A G T C A A G T G G G A G T G C T C A G G G T T A C T C T T C A T G A G T A C A A A	
OAM. GIGAGICAICAAGIGGGAGIGCICAGGGIIACICIICAIGAGIACAAA	1 A
HUM: A A T T A A C T G G T C C A G C G A C A C C C T T T C A C G T G C A C T C T A C C T T A C A A T	G A
UAM: A A T T A A C T G G T C C A G T G A C A C C C T T T C A C G T G C A G T C T A C C T T A C A A T	
HUM: CTAACCTGAAAGCAAAGCAAAGGAAGGTTGTGAAATACT	
UAM: CTAACCTGAAAGCCAAAGCAAAGG <mark>CCAAAGAAGGTTTGTAAATACT</mark> ACTGTGTG	
D7	
HUM: C A C A G G A	
UAM: C A C A G G A	
Do.	
D9 HUM: A G A C A A A A A	
UAM: A G A C A A A A A	
UAM: A G A G A A A A A A	

IGHV(III)-67-3



IGHV(III)-67-2

GENE ALIGN SEQ

HUM: G G G G G A T C T G T A A A C C A A G A C A A G A G A G A G A G A A G A

D7

HUM: C A C A T G A
UAM: C A C A T G A

D9

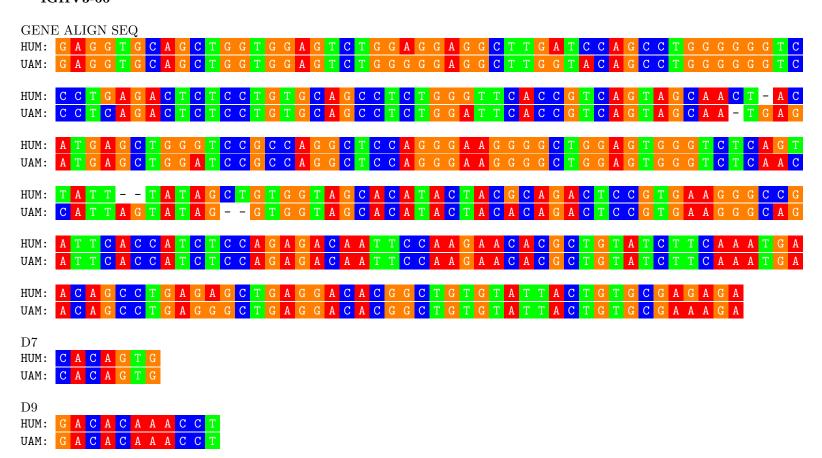
HUM: A C A T A A A C C T C
UAM: A C A T C A A C C T C

IGHV(II)-67-1

GENI HUM: UAM:	1	A (G	G	A	G (C	_	_					_	_														_				_		_	_	_								_				
HUM: UAM:	(A	C	С	C /	A	Γ	G	C	Т	G	T	С	Т	С	Т	G	G	С	С	A	С	Т	Т	С	A	Т	С	Α	C	A	A	C	C	A .	A I	i C	T	` Т	A	A	Τ	Α	Т	Т	G	G .	A
HUM: UAM:																																																	_
D7 HUM: UAM:					-	T (
			-		_	C (_	_	_																																								

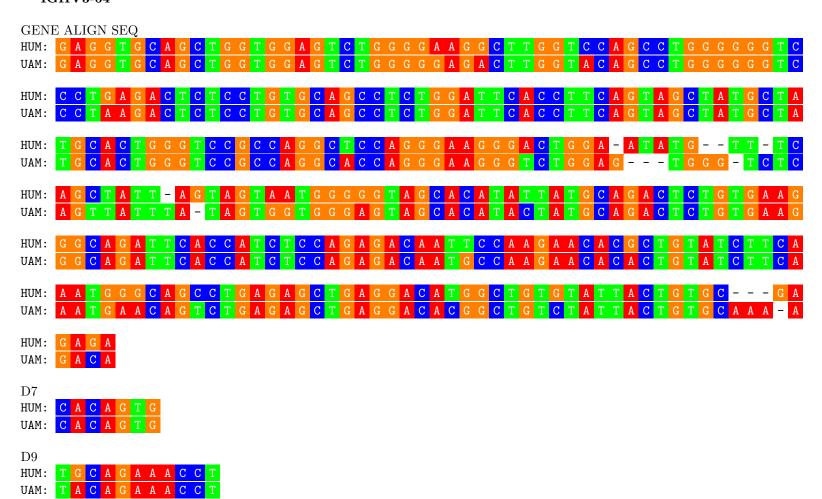
IGHV1-67

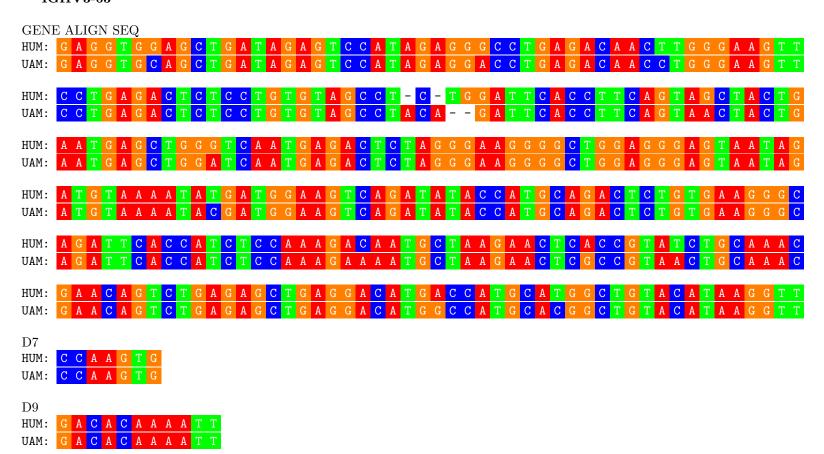
GENE ALIGN SEQ	
HUM: CAGG <mark>TGCAGCTGGTGCAGTCT</mark> GGGAGAGAGAAGAAGC <mark>CT</mark> G	
UAM: CAGGTACAGCCGGTGAAGTCTGAAGCTCTGCTGAAGATGAAGAAGCTT	G G G C
HUM: A T C A G T G A A A G T C T C C T G C A A G A C T T G T G G A T A C A C C T A C C T T C A C	C A G T
	C A G T
HUM: TACTGATATGATATGATATGATATGATATGATATGATAT	
	u u n 1
HUM: G G G A A G G A <mark>T G T G C C T A G T</mark> G A <mark>T G A T G A G C A G C A T A A G C T A C G C A G A G A G A G A G</mark>	T T C C
UAM: G G G A A G G A <mark>T G T G C C T A G T</mark> G A <mark>T G C A T A G C A G C A G C T A C G C A G A G C T A C G C A G A G A G A G A G A G A G A G</mark>	TTCC
HUM: A G G G C A G A G T C A C C A T G A C C A G G G A C A T C C A C G A G C A C A G C C T A	C A T G
	C A T G
HUM: G A G C T G A G C T G A G C C T G A G A T C T G A G A G C G G C A T G T A T T A C T G UAM: G A G C T G A G C T G A G C T G A G A T C T G A A G A C A C G G C A C G T A T T T A A C T G	
OAM. GAGOTGAGOTGAGATOTGAAGAGAGAGGGGGAGGTATTTAACTG	T G G G
HUM: A G A G A	
UAM: A G A G A	
$\mathrm{D}7$	
HUM: CACAGTG	
UAM: C A C A G T G	
D9	
HUM: GTCAGTAACCC	
UAM: GTCAGTAACCC	



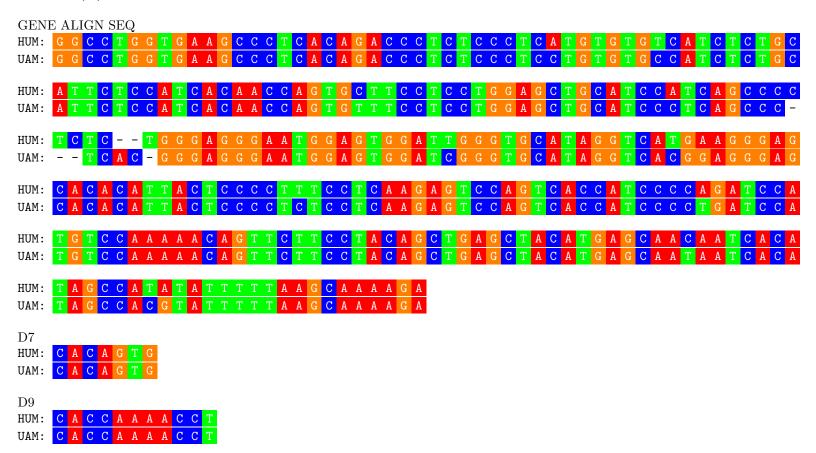
IGHV(II)-65-1

GENE ALIGN SEQ	
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UAM: CAACAACTGTGTTCTTCTCTCTCTCTTCTTCTTGGGGCTAGTGAAGCTCTCT	A C C G A C
HUM: C C T C T C T C T C A C C T G T G T G T G T C T C T C T C T C	
UAM: CCTCTCTCTCTCTCTCTCTCTCTCTCTCTCTCTCTCTC	GTG-TT
HUM: CCTGCTGGAGCTGCATCCATCACCCCCGCAAGGAAGGAAG	G A G C G A
UAM: CCTGGAAGGAACTGCATCCATCAGCACCCCTAAAGGAAGG	
HUM: A T C A G G T G C A C A G G T C A T G A G G G A G T G C A C A T T C C A A C C C A C T C C	
HUM: A T C A G G T G C A G G T C A G G T C A C A G G T C A T G A G G T C A T G A G G T G C A C A C A C A C A C C A C T C C C A C C T C C C A C C T C C C A C C T C C C A C C C C	
HUM: A G T C C A G T C A C T A T C T A T C T C A G T C A G T C A G T T T T C T A T C T C T A G A T C C A G A T C C A A A A A A A A A A A A G T G T T T C T A T T T C T A T C T A T T T T	
OAM: A G I C C A G I C A C C A I C I C C A G A I C C A C A I C C A A A A A A C A G I G I I I C	J C I A C A
HUM: G C T G A G C T A C C T G A G C A A C C T T T T T T	I A A T A C
UAM: G C T G A G C T A C C T G A A C A A C G A G T A C A A C C A T G A G T - T T T T	I A - T A C
HUM: A A A A G A	
UAM: A A A G A	
D7	
HUM: CACAACG	
UAM: TACAGCG	
D9	
HUM: GATACAAACCT	
UAM: GATACAAACCT	

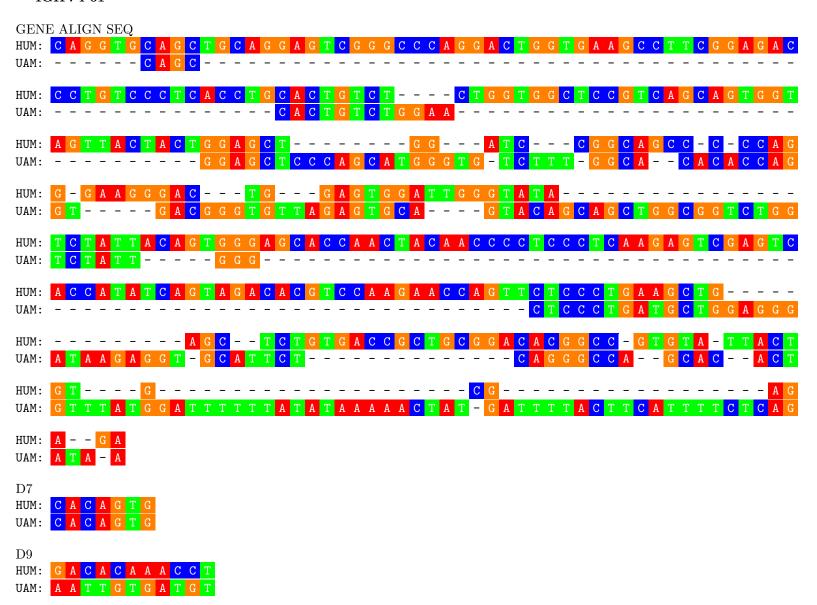




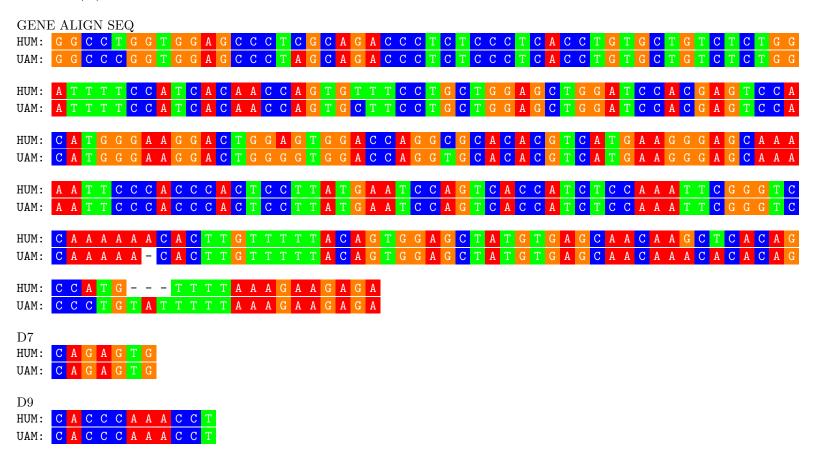
IGHV(II)-62-1

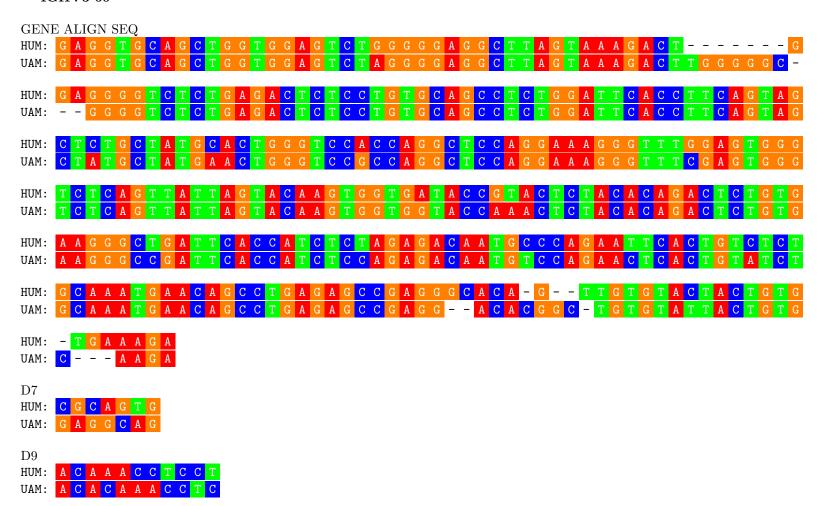


IGHV4-61

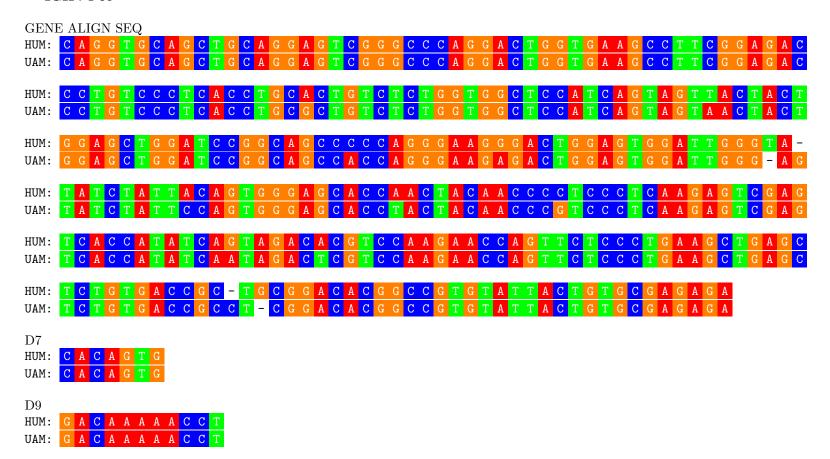


IGHV(II)-60-1

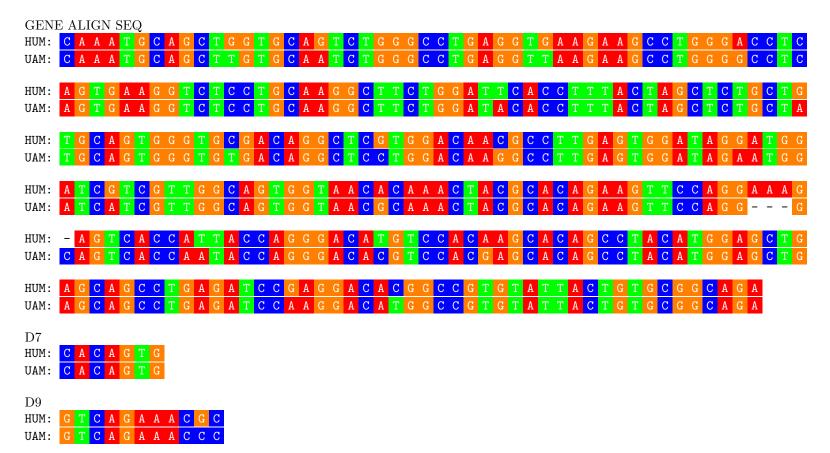


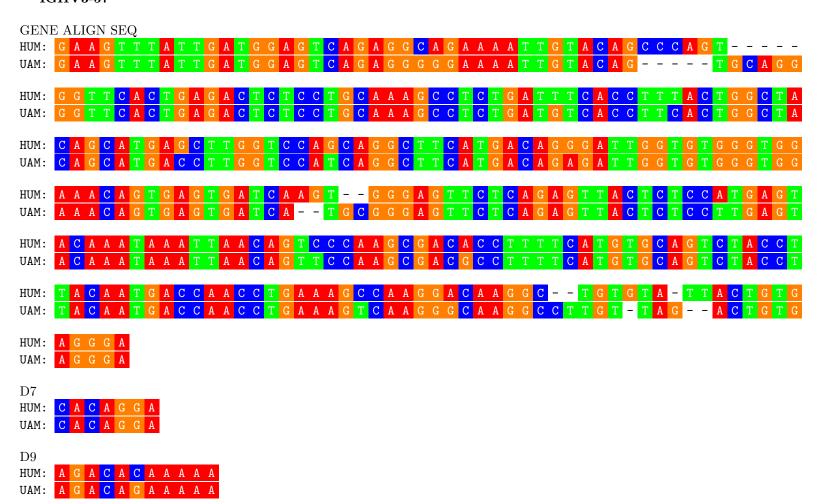


IGHV4-59

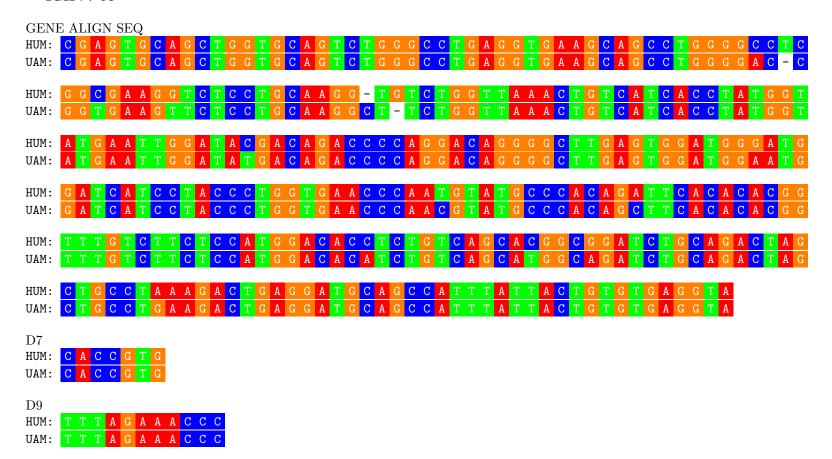


IGHV1-58

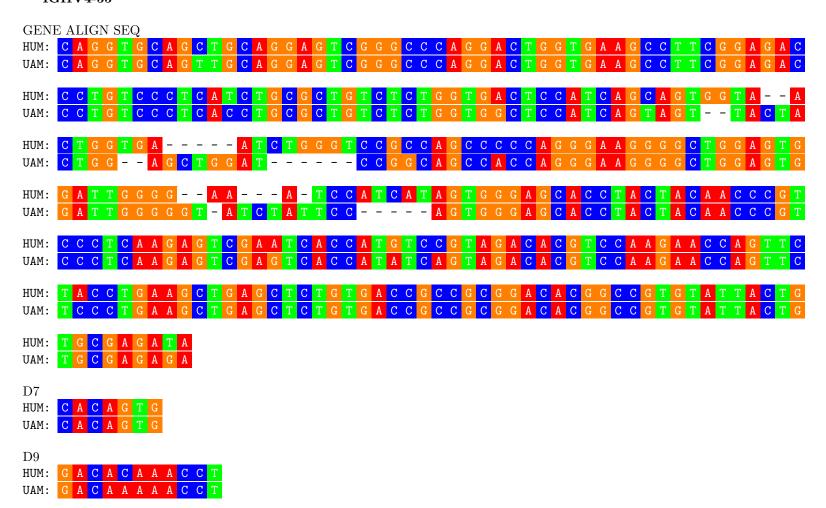


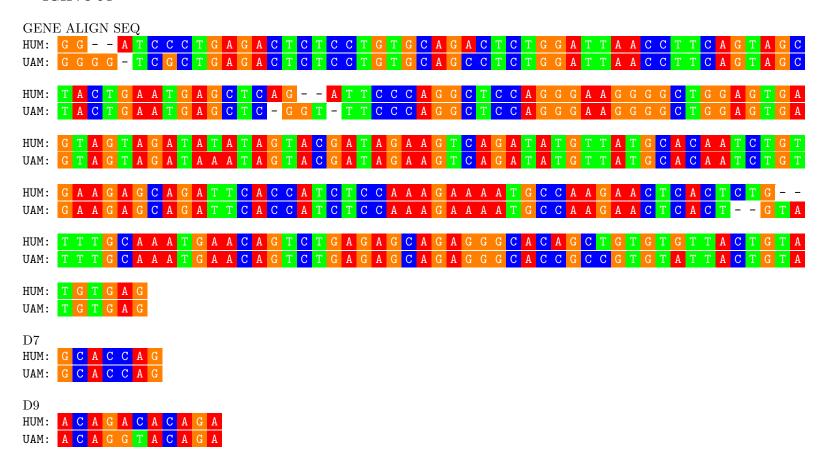


IGHV7-56

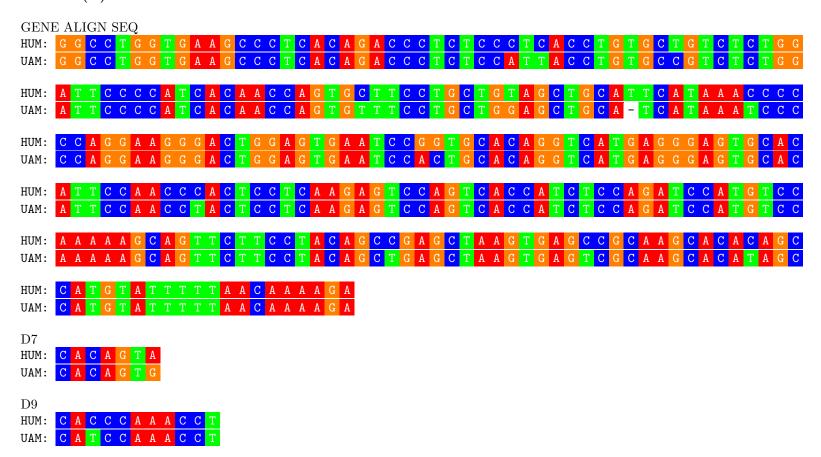


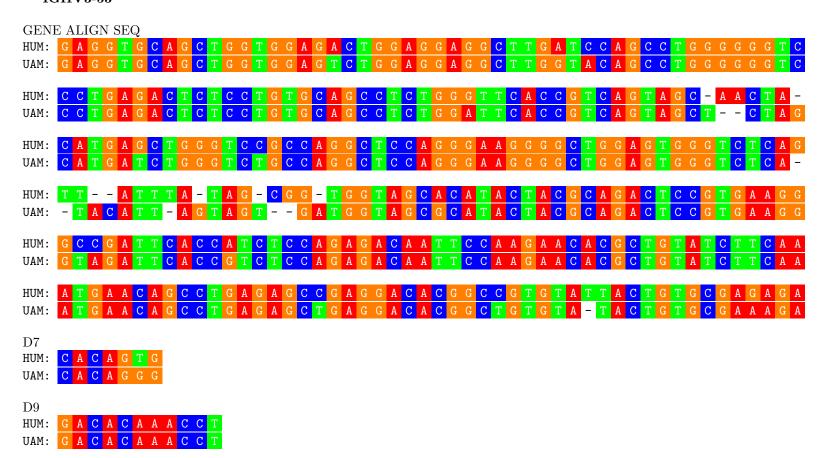
IGHV4-55

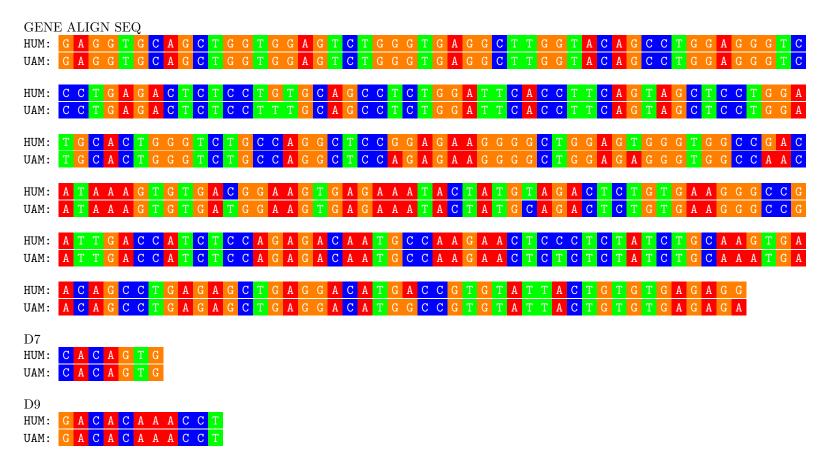




IGHV(II)-53-1



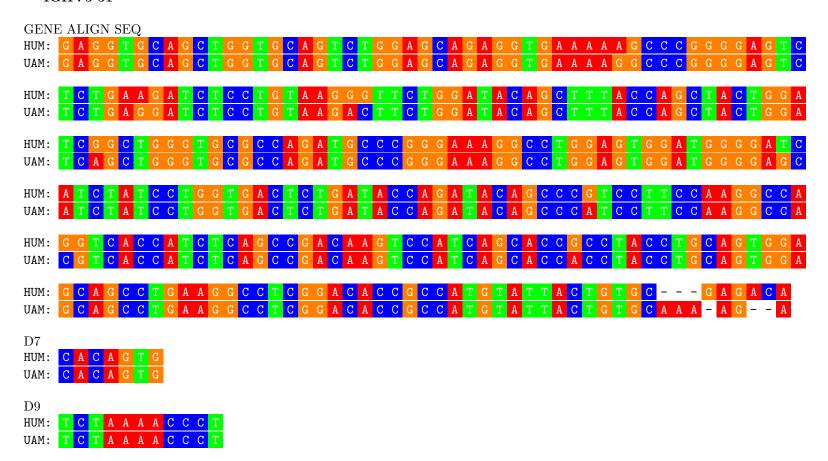


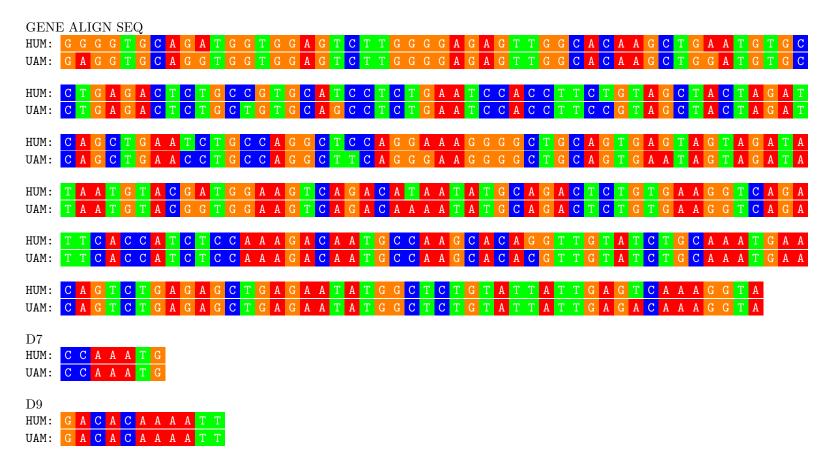


IGHV(II)-51-2

GENE ALIGN SEQ	
HUM: G G C C T G G T G A G G C C C T C A C - A G A C C C C T C C C T C A C C T G T G T G T G T C T C	T G
UAM: G G C C T G G T G A G G C C C T C - C G A G A C C C C T C C C T C A C C T G T G T G T T C T C	T G
HUM: GATTCTCATCATCATCATCATACTATATATATATATATAT	
UAM: GATTCTCATCACAACAACCAGCTTCCTAGCTAGCTAGCTTGCTT	C C
HUM: T C A G T C A A G G G A G T G G A T C A G G G C A T A G G T C A C G A G G G A G C A A A T T	СТ
UAM: T C A G T C A A G G A A G T G G A T C A G G G C A T A G G G T A A C G A G G G A G C A A A A T T	
ONI. I ON GIONN GIONN GIONN GON GON GON GON GON GON GINN III	U I
HUM: A A C C C A C T C C T C A T G A G C T C A G T C A G T C A G T C A G T C C A G A T C C A G A T C C A C G T C C A A G	A A
UAM: A A C C C A C T C C T C A T G A G C T C A G T C A G T C A G T C A G G T C C A G G T C C A C G T C C A A G	
HUM: CCAAATTTTCTTAGCTTTTAGCTTGAGTTGAGTTTCTGACCAACAATGCCAACAACAATGCCTT	
UAM: CCAAATTTTCTTTAGCTTTTCTTAGCTTGTGTGACACAACAACAACAACAACAACAACAACAACTT	G T
HUM: A T T A C T G T G A G A G G	
UAM: A T T A C T G T G A G A G G	
D7	
HUM: A A C A G A A	
UAM: A A C A G A G	
D9	
HUM: CAAACTTCC	
UAM: CAAACTTCC	

IGHV5-51

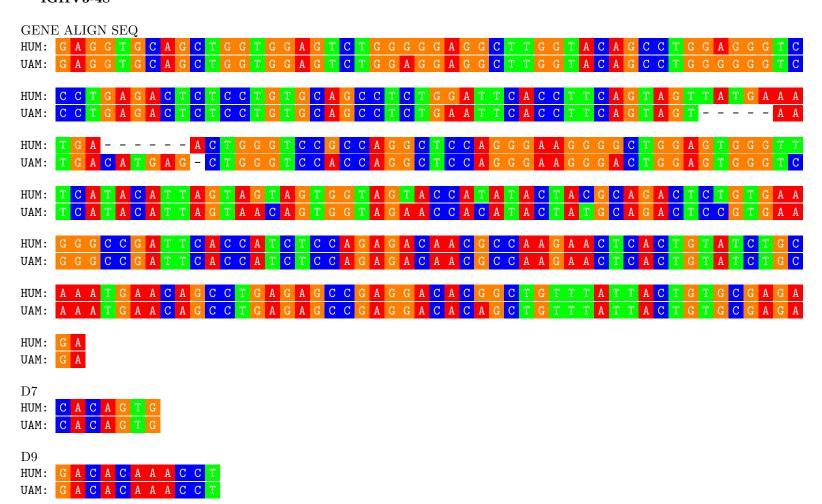




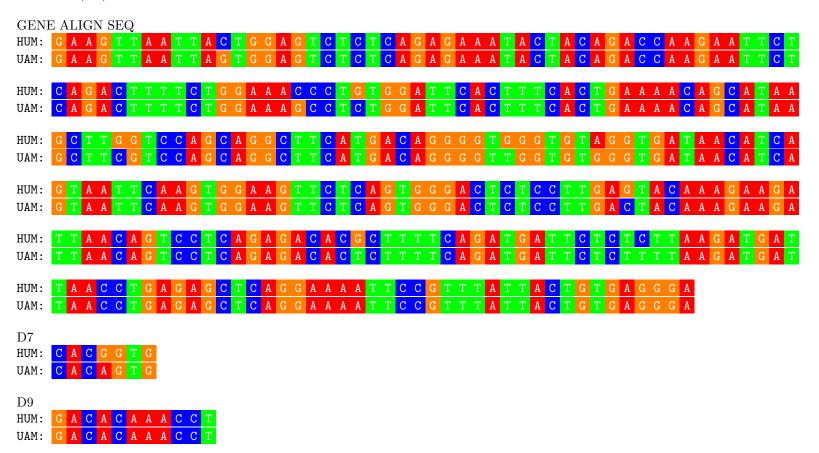
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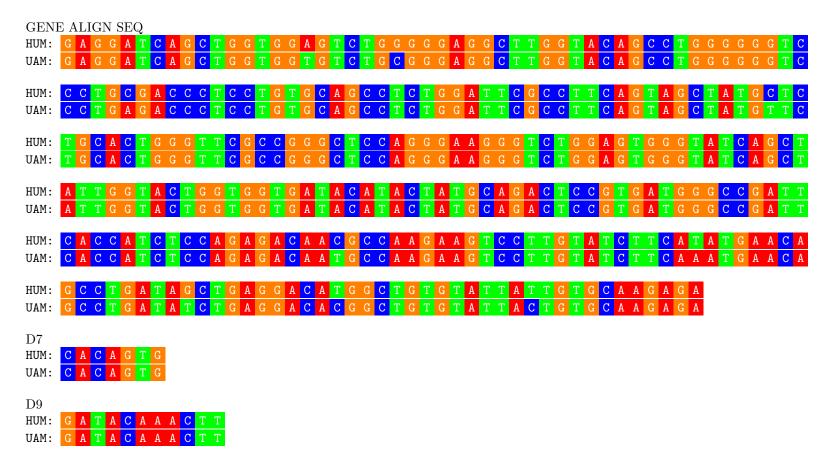
GENE ALIGN SEQ	
HUM: C G A C A T C T G T A T T T C T C T C T G T G T A T T T C T C T C G T G C T T G G C C T G G C G A A G C C T C A C A G	
UAM: C G A C A T C T G T G T T T C T C T C G T G T G T	A C
HUM: C C T C T C C C T C A T C T G T G C T C T C T C T C T C C A T C A C C A G T G C	тт
UAM: C C T C T C C C C C A T C T G T G C T G T C T C T C T G C A T T T C A A A C A G T G C	
HUM: C C T G C T G C A G C T G G A G C T G G A T C C C T C A G C T C C A G G G A A G G G A C T G G A G T G A	
UAM: C C T G C T G G A G C T G G A T C C A T C A G C T C C C A G G G A A G G G A C T G G A G C A G C A	A T
	A C
HUM: C A G G T G C A C A G G T C A G G T C A G G T C A G G T C A G G T C A G G G G G G G G G G G G G G G G G G	
OAM. CAGGIGCACAGGICAIGAGGAGAGAGCAACCCAACICAAG	A G
HUM: T C C A G T C A C C A T C T C C A G T C C A G T C T C T C T C T C T T C T C T T T C T T T C T T T C T	A C
UAM: T C C A G T C A C A T C A T C A T C T C A G T C A T C T T C T T C T T T T T T T T T	A C
HUM: A G C T G A G C T A C T G A G C T A C C T G A G C A A C G A C A A C G A A C A A C A A C A A C C A T G A A T T T T T A C A C A A C A A C A A C C C A C C A C C A C C A C C A C C A C C A C C A C C A C C A C C A C C A C C A C C A C C C C A C C C A C C C C A C C C C A C C C C A C C C C A C C C C A C C C C A C C C C A C C C C A C C C C A C C C C A C C C C C A C C C C C A C C C C C A C	
UAM: A G C T G A G C T A C C T G A G C A A C G A G T A C A C A C A A C C A T G A A T T T T T A C A C A A	A A
HUM: G A	
UAM: G A	
D7	
HUM: T A C A G C A	
UAM: TACAGCG	
D9	
HUM: G A A A C A A A C C T	
UAM: G A A A C A A A T C C	

GENE ALIGN SEQ	
	GGGGGAGG <mark>CTT</mark> GG <mark>T</mark> ACAG <mark>CC</mark> AGGG <mark>C</mark> GG
UAM: G A G G T G C A G C T G G T G G A G T C T G	G G G G A G G C T T G G T C C A C C C A G G G G G
	CTTCTGGATTGCACTGACCTTTTGGTTGATGC
UAM: T C C C T G A G A C T C T C C T G T A C A G	CTTCTGACTGACCTTTTGGTGATTACC
HUM: TATGAGCTGGGTCCAGGCT	CCAGGGAAGGGG <mark>C</mark> TGGAG <mark>T</mark> GGG <mark>T</mark> AGG <mark>T</mark> T
	CCAGGGAAGGGG <mark>CT</mark> GGAG <mark>T</mark> GGG <mark>T</mark> AGG <mark>T</mark> T
HUM: T C A T T A G A A G C A A A G C T T A T G G	
UAM: T C A T T A G A A G C A A A G C T T A T G G	T G G G A C A A C A G A A T A C G C G C G T C T G T G T G G G G T C T G T G
UAM. I C A I I A G A A G C A A A G C I I A I G G	
HUM: A A A G G C A G A T T C A C C A T C T C A A	. G A G A <mark>T G A T T C C</mark> A A A A G <mark>C A T C G C C T A T C T</mark>
UAM: A A A G G C A G A T T C A C C A T C T C A A	. G A G A T G A T T C C A A A A G C A T C G C C T A T C T
HUM: G C A A A T G A A C A G C C T G A A A A C C	GAGGACACAG <mark>CCGTGTATTACTG</mark> TA <mark>C</mark> TA
UAM: G C A A A T G A A C A G C C T G A A A A C C	
HUM: G A G A	
UAM: G A G A	
D7	
HUM: C A C A G T G	
UAM: C A C A G T G	
D9	
HUM: GACAAACCT	
UAM: G A C A C A A C C T	



IGHV(III)-47-1

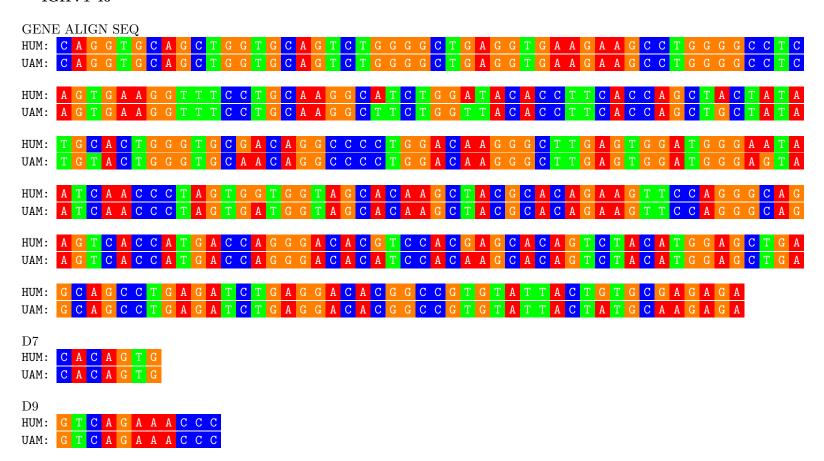




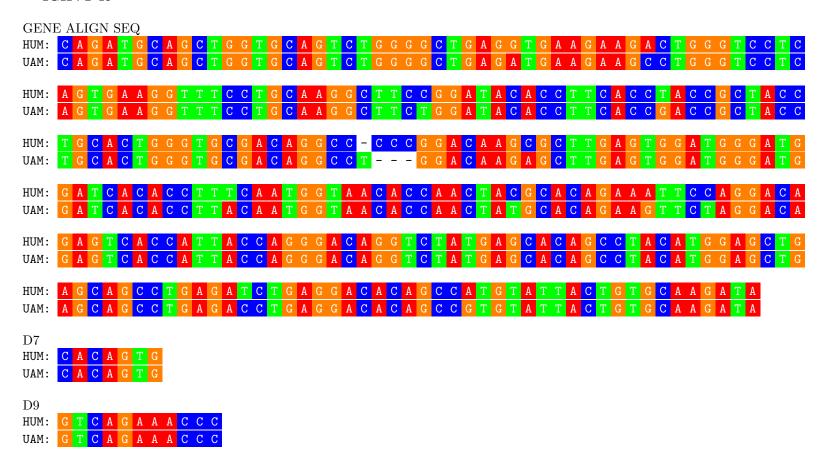
IGHV(II)-46-1

GENI	E ALI	GN S	SEÇ)																																						
HUM:	C A	G G	Α	G C	Α	G	C	Γ G	C	Α	G	G A	A G	Т	С	A	G	C	C (7	G	G	Α	C	С	T	G A	A A	Т	Α	G	C	A	C .	A C	A	C	Τ	Т	A (C C	
UAM:	C A	G G	A	GC	A	G	C	r G	C	A	G	G A	A G	T	С	A	G	C	C (7	G	G	A	C	C	T	G A	A A	T	A	G	C	A	C .	A C	A	C	T	T	A (C C	
HUM:	C T	C T	G	C C	Т	С	A	C C	Т	A	С	Α (T	G	Т	Т	A	C	T (; (C	C	A	С	Т	С	C	T	C	Α	C	A	A	C (C A	G	Т	С	C	Т :	ГА	À
UAM:	C T	C T	G	C C	T	C	A	C C	Т	A	C	A (C C	G	Т	T	T	C	T	; (C	C	Α	C	T	С	C A	1	C	Α	C	A	A	C	C A	G	Т	C	C	Т :	ΓΑ	
HUM:	C T	A G	Т	G G	A	C	C	r G	G	Α	Т	C	r G	С	С	G	G	C	T (7 7	' C	Α	G	G	G	A	G (; G	G	С	Т	G	C	A .	A T	G	G	Α	Т			
UAM:																																										
D7																																										
HUM:	A A	A A	Т	C C																																						
UAM:	A A	A A	Т	G C																																						
D9																																										
HUM:	C A	ТТ	T	G T	С	T	T	G																																		
UAM:	C A	C T	G	G T	С	Т	T	G																																		

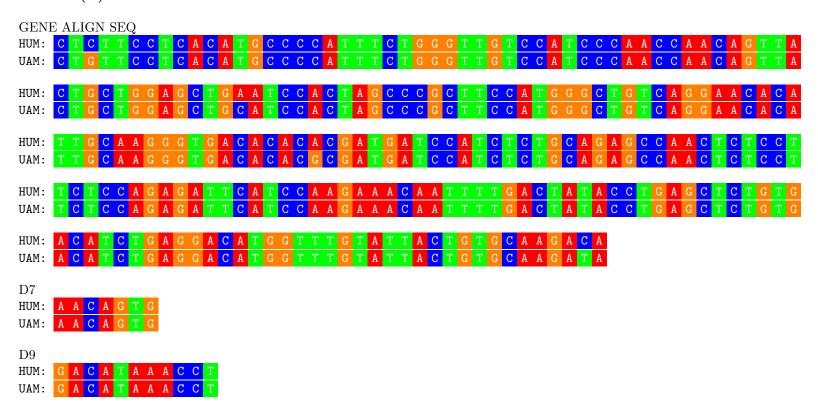
IGHV1-46



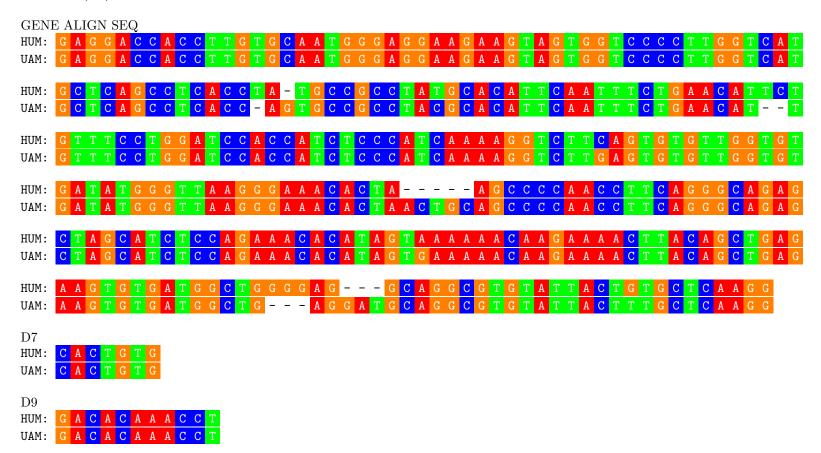
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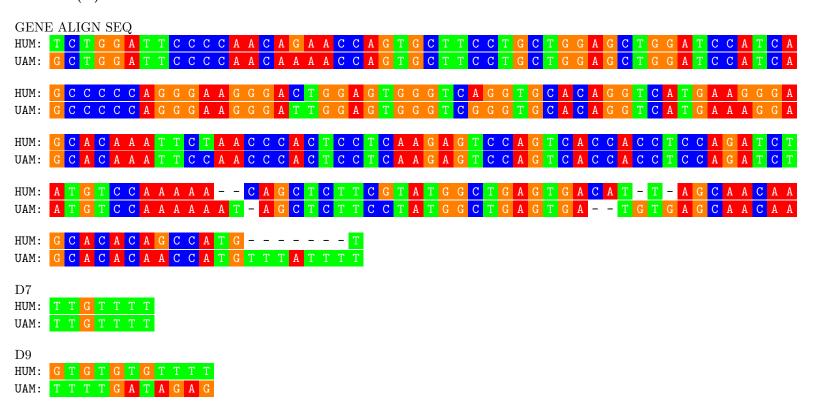
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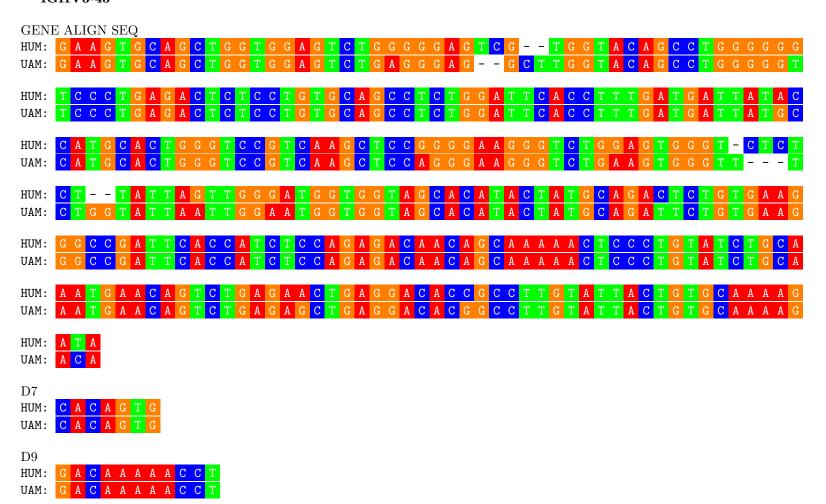


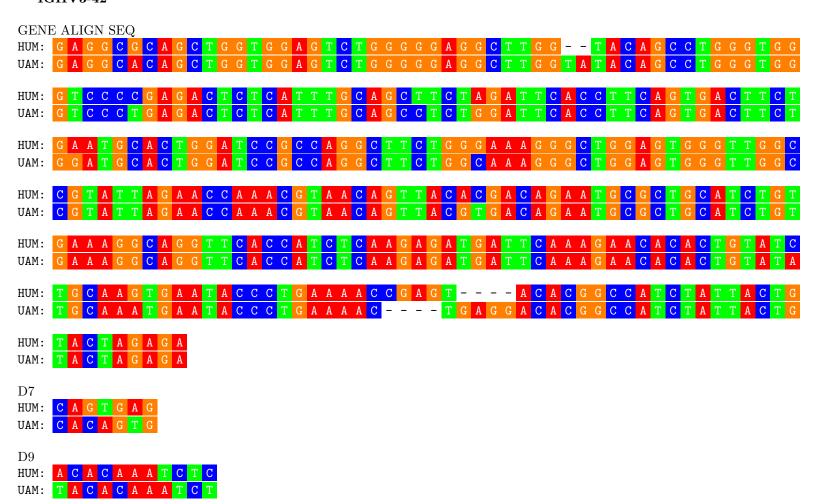
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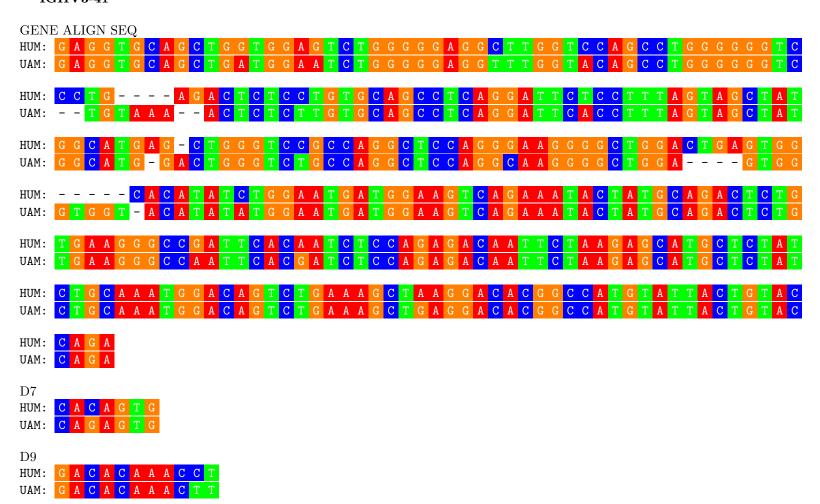


IGHV(II)-43-1









IGHV(II)-40-1

GENE ALIGN SEQ

D7

HUM: T A G G C A C
UAM: T A G G C A C

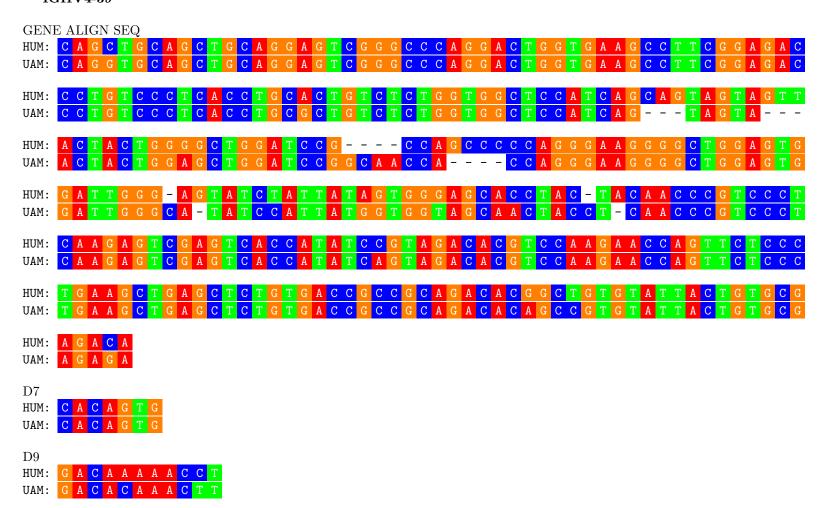
D9

HUM: G T C A G G T G C A T UAM: G T C A G G T G C A T

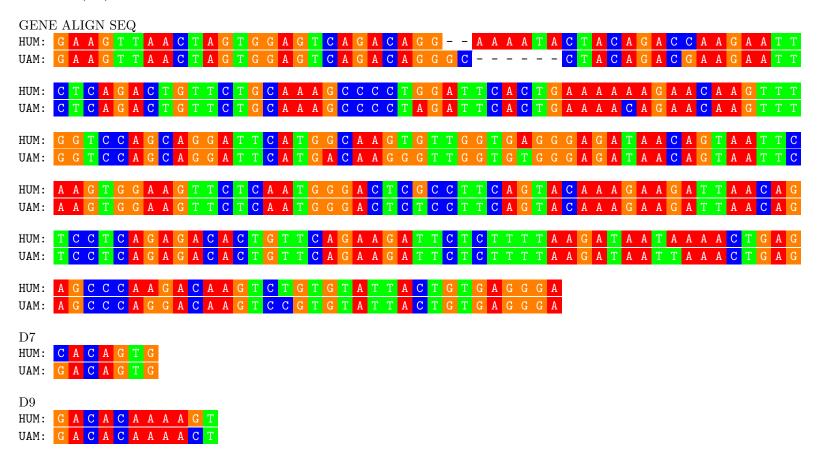
IGHV7-40

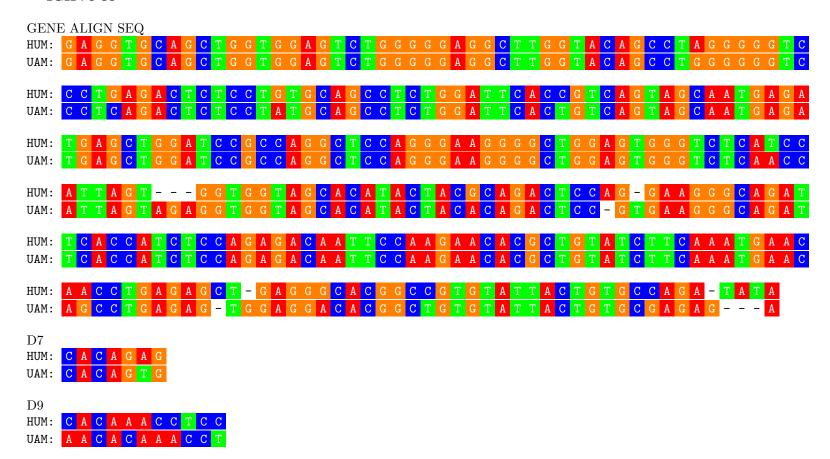
GENI HUM: UAM:	T A	IGN T (G G	T A	_		_			_					_	_	_					_				_			_			T T
HUM: UAM:		G A																														
HUM: UAM:	C C	C A	_									_						_		_		_			_	_	_			G T	T	C
HUM: UAM:	T G	C A	A G	_				_	_		_		_	_		_	_		_				_			_	_					
HUM: UAM:		A C																														
D7 HUM: UAM:	C A	C A																														
D9 HUM: UAM:		C A	_																													

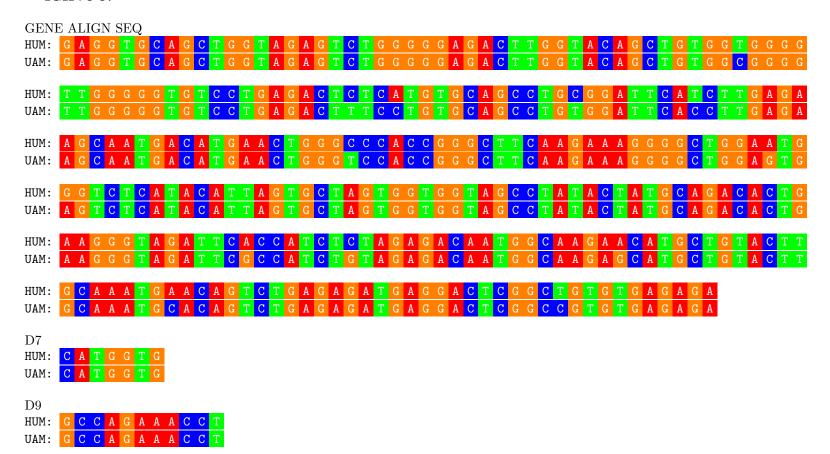
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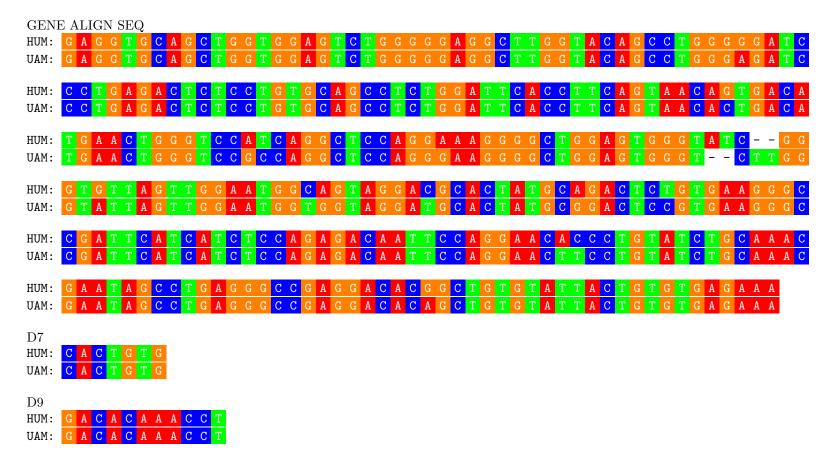
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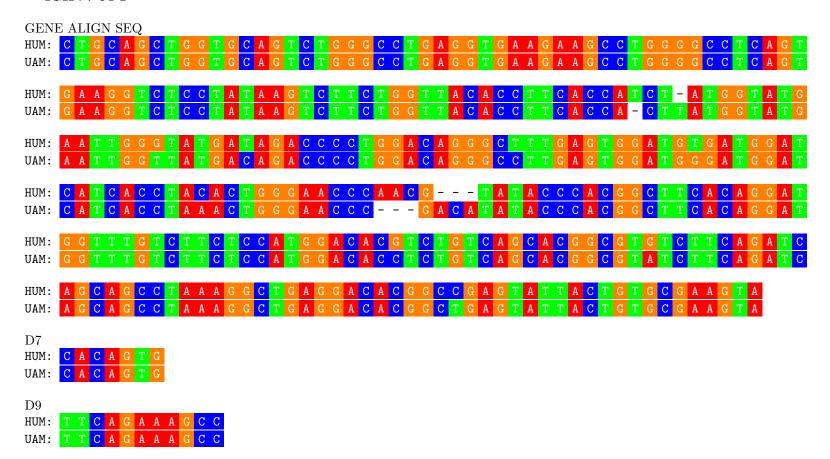




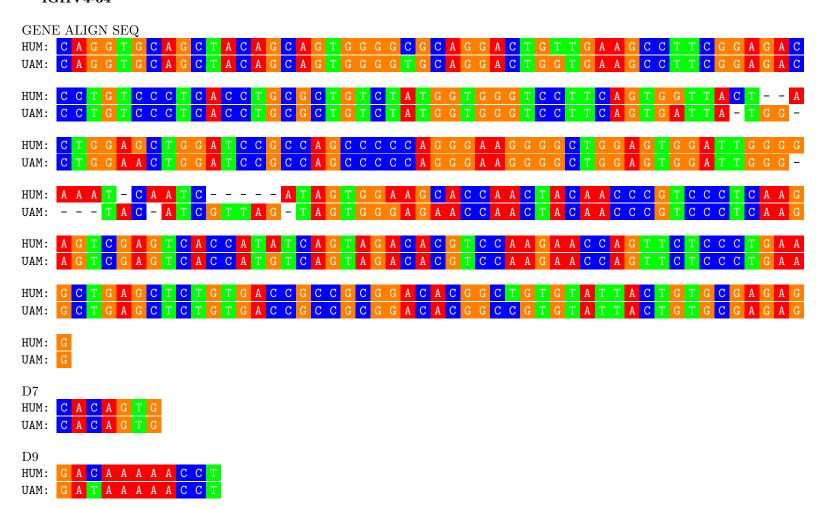
GENE ALIGN SEQ	
HUM: G A G G T G C A G C T G G T G G A G T G G A G T T T T G G G A G T T T T	
UAM: GAGGTGCTTGGTGGAGGTGGAGTGGTTGGTTTGGGAGGCTTTGTTGGTTATGGGGG	C C
HUM: CTGAGACTTTTCTTTGCAGCAGCCTTTTCACTTTAGCTTTTACTT	Δα
UAM: C T G A G A C T T T C T T T T G C A G C C T C T G G A T T C A C C T T T A G T A C C T T T A G T	
HUM: G T A C T G G A T G A G C T G - G G T C C A T C A G C T G G A A A G G G C T G G A A A G G G C T G G A G	
UAM: G T A C T G G A T G A G C T G C C - G T C C A T C A A G C T G G G A A A G G G C T G C A G	T A
HUM: G G T C T C A T T T A T G A G T T G T G T G T A G G T A G C A C A A G C T A T G C A G A C T C	T C
UAM: G G T C T C A T T T A T G A G T T G T G T G T A G G T A G C A C A A A C T A T G C A G A C T C	
	<u> </u>
HUM: TGAAGGGTCACACAAGAATTCACACTCTCTCAAGAGAATCACTCTCTCT	A T
UAM: T G A A G G G T C G A T T C A C C G T C A C T C A G A G A T T C A C C G T C T C C A G A G A G A T G C C A A G A A T C A C T G T	A T
	0 0
HUM: C T G C A A A T G A A C A G C G T C A G A G C G T A G G G A G G G A T A G G T C T G T A T T A C T G T UAM: C T G C A A A T G A A C A G C G T G A G A G C C T A G G A T A G G T C T G T G T A T T A C T G T	
OAM. CIGCAAAIGAACAGCGIGAGAGCCIAGGAIAGGICIGIGIAIIACIGI	A G
HUM: T G G	
UAM: T G G	
D7 HUM: CATTGTG	
UAM: C A T T C T G	
D9	
HUM: GCAGAGATGCT	
UAM: G C A G A G A T G C T	



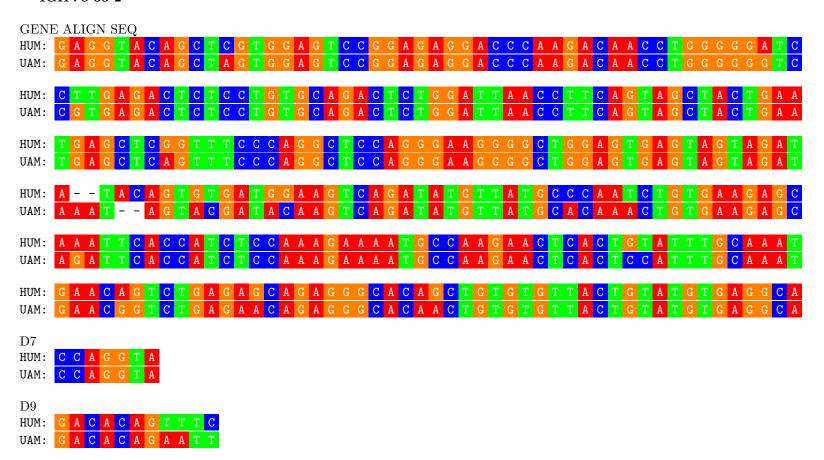
IGHV7-34-1



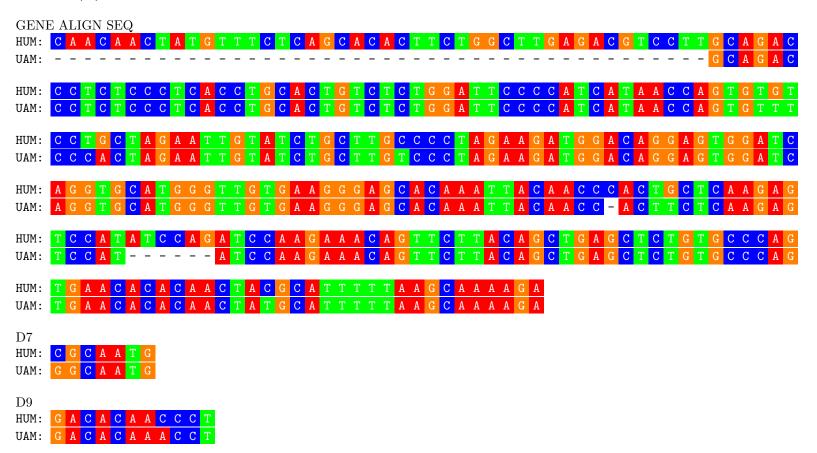
IGHV4-34



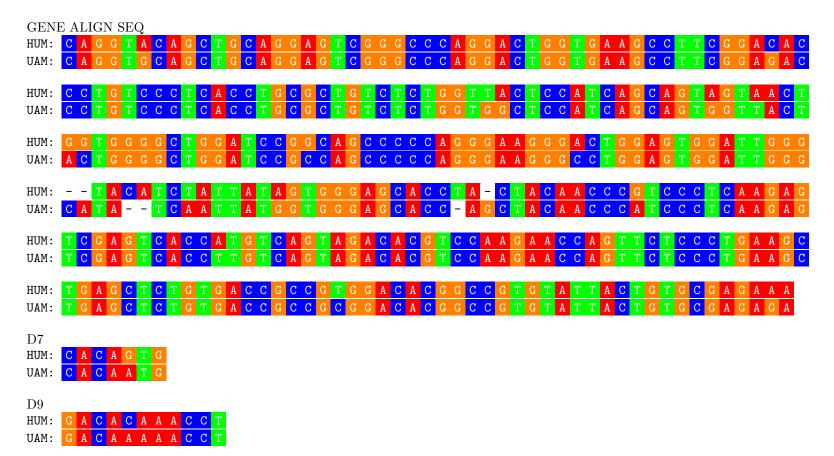
IGHV3-33-2



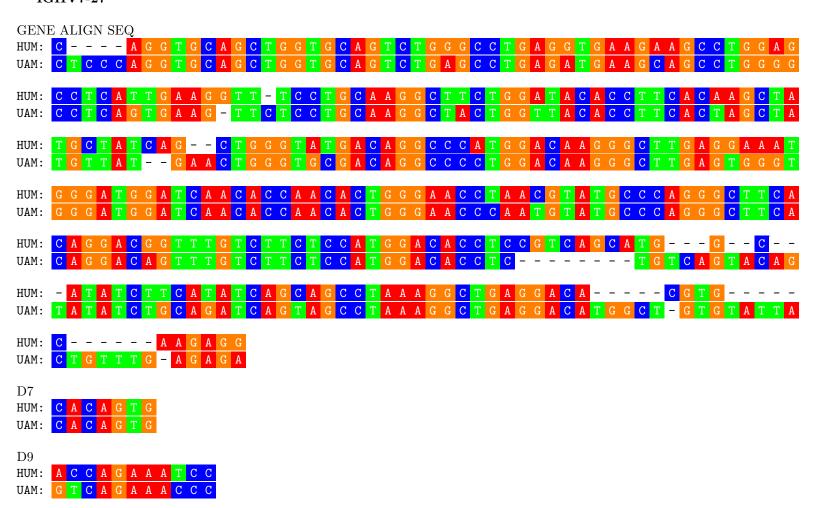
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IGHV4-28



IGHV7-27



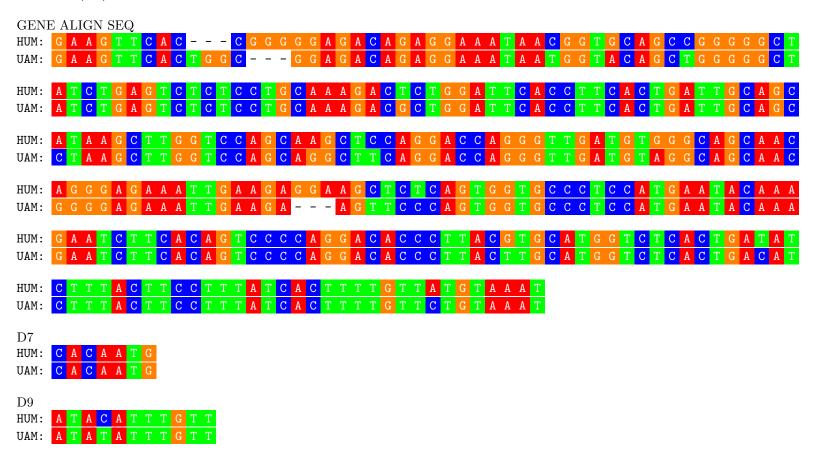
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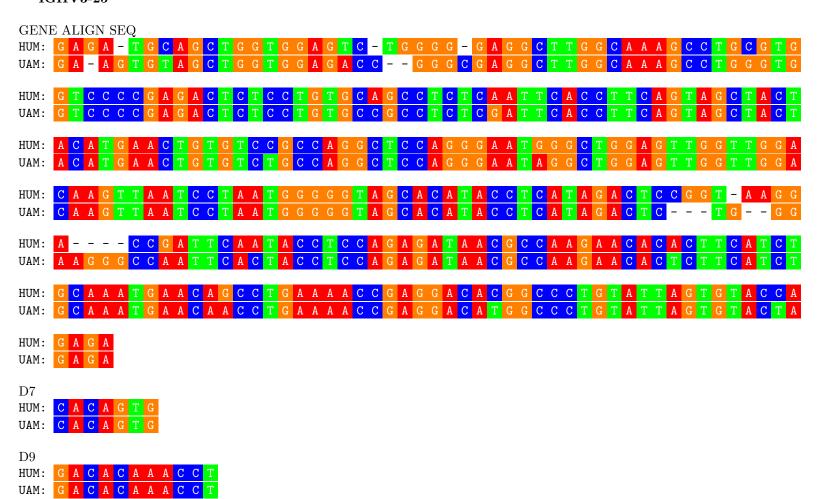
GENE ALIGN SEQ
HUM: G A T G T T T A C T G A T G A T G A A G A G A G T C A G A A G A A A A A A T T - T A A C A G C C A G C A G T UAM: G A T G A T A C A G T A C A G C C A G C C A G C C A G T C A G T C A G A A A A A A A A A A A A A A A A A
HUM: T C A C T G A G A C T G A C T G A C T G T C T G T C T G T G T G T G T G T
HUM: C A T G A G C T T G G T C A G C T T G G T C A G C T T A G G T C A G C T A G C A G C T A G C A G C A G C A G C A G C A G C A G C A G C A G C A G C A G C A G C A A C A G C A A C A G C A A C A G C A A C A G C A G C A A T T G G T G T G A T A
HUM: G C A A C A G T G A G A G A G A T C A T A T G A T A T G G G A G T T C T A G G G T T A C T C T C A T G A G T A G T A G A G T A G A G T A G A G
HUM: C A G A T A A A T C A A C A T T C C C A A G T T C C C A A G T T C C C A A G T T T C A A G T C T T T C A A G T C T A G C T T T C A A G T C T A C C T T T C A A G T C T A C C T T T C A A G T C T A C C T T T C A A G T C T A C C T T T C A A G T C T A C C T T T C A A G T C T A C C T T T C A A G T C T A C C T T T C A A C T C T A C C T T T C A A C T C T
HUM: A C A A G G A C C A A C C T G A A G C C A A G C T G A A G C C C A A G C C A A G C C C A A G C C C A A G C C C A A G C C C C
HUM: A LANGE A
D7 HUM: C A C A G G G UAM: C A C A G G A
D9 HUM: A G A C A A A A A A UAM: A G A C A C A A A A A

IGHV2-26

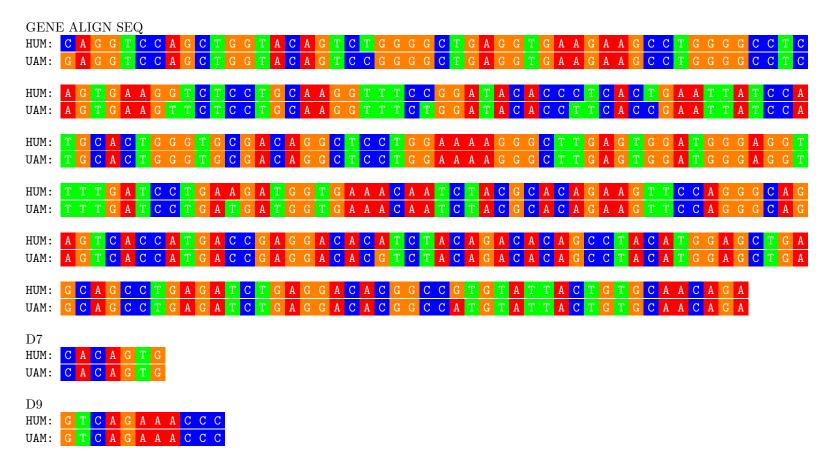
GENE ALIGN SEQ
HUM: CAGGTCACCTTGAAGGAGTCTGAGGAGTCTTGTGTGTGTG
UAM: CAGGTCACATAGAAGGAGTCTGCTGCTGCTGCTGCTGCTGCTGAAACCCAAGAGAGAG
HUM: CCTCACGCTGACCTGCACCGTCTCTCTCTCACCTCAGCAATGCTAGAA
UAM: C C T C A C G C T G A C C T G C A C C G T C T C T G G G T T C T C A C T C A G C A A T T C T A A A A
HUM: TGGGTGTGAGCTGGATCCGTCAGGCCCAGGGAAGGCCCT
UAM: TGGGTGTGAGCTGGATCCGTCAGCCCAGGGAAGGCCCTGAGGAAGGCCCTGGAGTGGAGTTGG
HUM: G C A C A C A T T T T T C G A A T G A C G A A A A A T C C T A C A G C A T C T C T G A A G A G
UAM: G C A C A C A T T T T T T C G A A T G A C G A A A A A A T C C T A C A G C A C A T C T C T G A A G A G
HUM: CAGGC <mark>TCACATCAT</mark> CACAAGGAACACAAAAGCAAAAGCAAAAGCAAAAAGCAAAAGAAAGAAAAAA
UAM: CAGGC <mark>TCACATCAT</mark> CAACCAAGGACACC <mark>T</mark> CCAAAGGAAAAG <mark>CCAGGT</mark> CCAAAAAG
HUM: T G A C C A A C A T G G A C C C T G T G G A C A C A G C C A C A T A T T A C T G T G C A C G G A
UAM: T G A C C A A C A T G G A C C C T G T G G A C A C A G C C A C G T A T T A C T G T G C A C G G A
HUM: T A C
UAM: G A G
D7
HUM: CACAGAG
UAM: C A C A G A G
D9
HUM: T A C A A G A A C C T
UAM: TACAAGAACCC

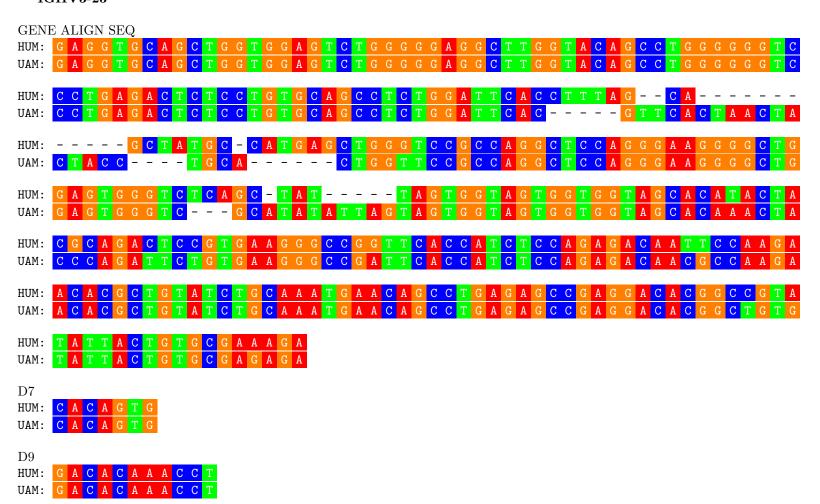
IGHV(III)-25-1





IGHV1-24





IGHV(III)-22-2

GENE ALIGN SEQ

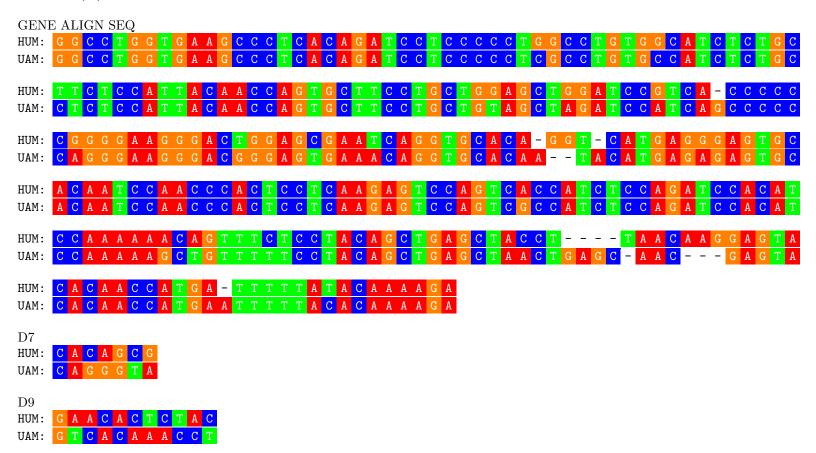
D7

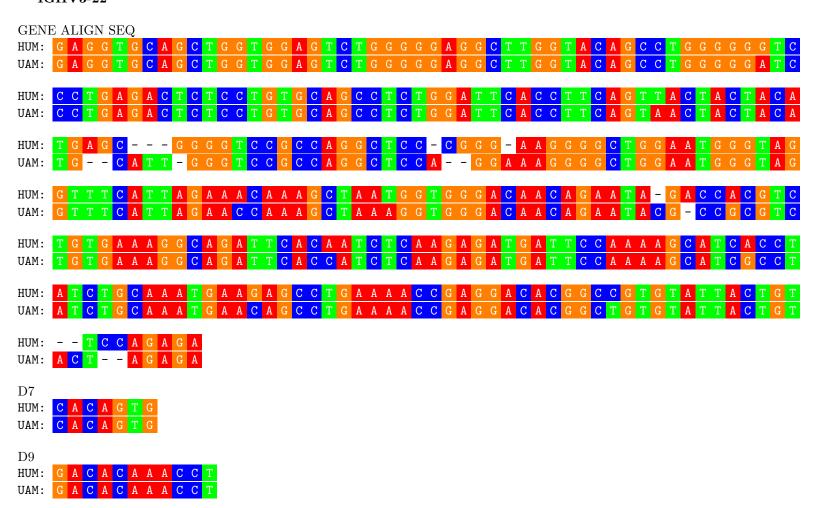
HUM: A C A A G A G
UAM: G C A A G A G

D9

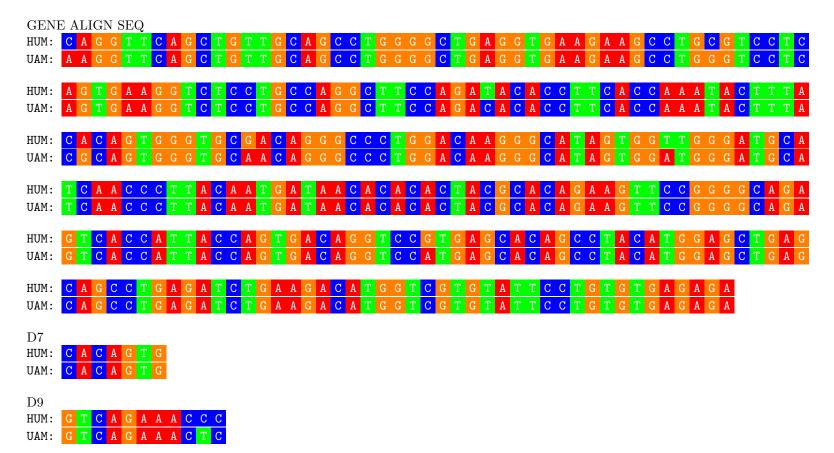
HUM: G G G T G A G G C T G
UAM: G G G T G A G C T G

IGHV(II)-22-1



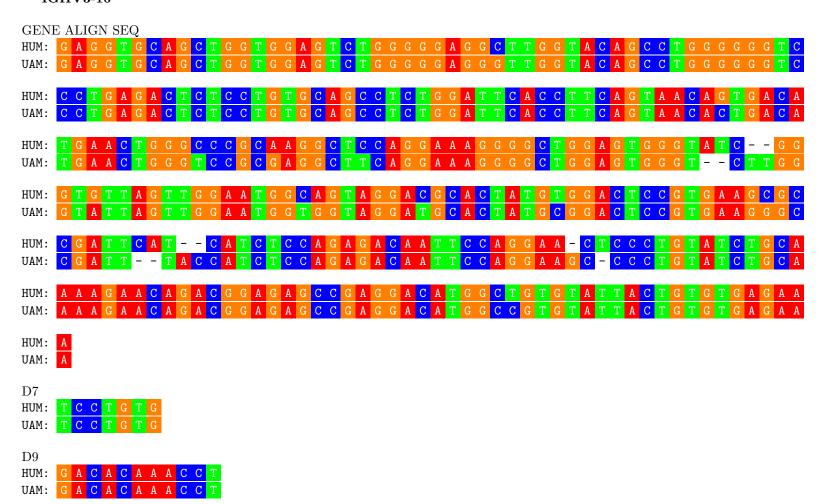


IGHV1-17

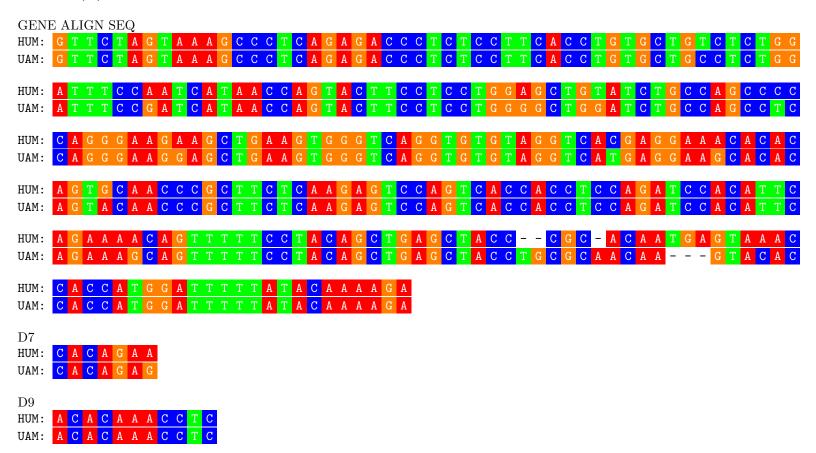


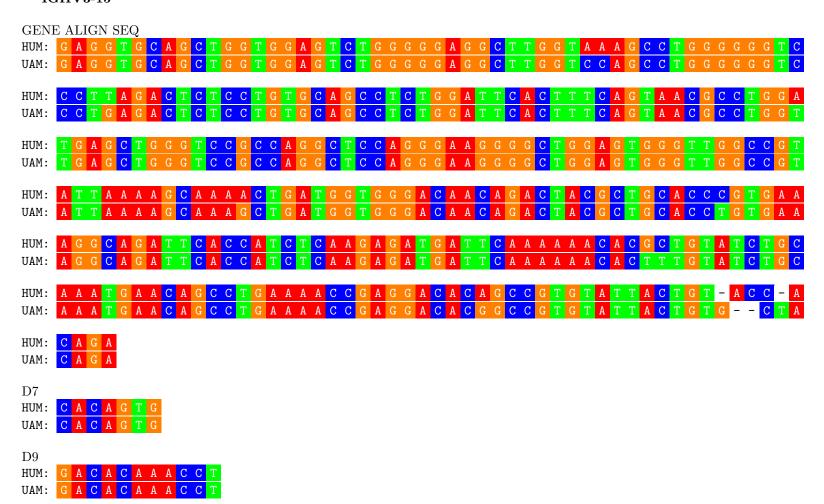
IGHV(III)-16-1

GENE ALIGN SEQ
HUM: GAAG <mark>T CCTGTGTGAAATTTTACTGAAGTCAGAGTCAGGGGGAAAATTT</mark> G <mark>TAC</mark>
UAM: G A A G T C C T G T A A A A T T T A T T G A T G A T C A G A G G G A A A A A T T G A C
HUM: A G C C C A G T G G T T C A C T G A G A C T C T C A T G C A A G C T C T C T C T C T C T C T C T C T C
UAM: A G C C C A G T G G T T C A C T G A G A C T C T C A T G C A A A G C C T C T G A T T T C A C C T T T
HUM: A C T G G C T A C A G C A T G A G C T T G G T C C A G G C T T C A T G A C A G G G A T T G G T
UAM: A C T G G C T A C A G C A T G A G C T T G C T C C A G C C T T C A T G A C A G G G A T T T G T
HUM: G T G G G T G G A A A C A G T G A G T C A G T G A G T G A G T G G G A G T T C T C A G A G T T A C T C T C
UAM: G T G G G T G G A A A C A G T G A G T C A G T G A G T G G G A G T T C T C A G A G T T A C T C T C C
HUM: A T G A G T A C A A A T A A A T A A C A G T C C C A A G T G A C C T T T T C A T G C A G T
UAM: A T G A G T A C A A A T A A A T A A C A A G T A A C A G T C C C A A G C G A C A C C T T T T A A T G C A G T
HUM: C T A C C T T A A A G G G A C C A A A C T G A A G G A C C A A A C T G A A G G A C A A G G C C T T G T A A T A C T UAM: C T A C C T T C A A G G A C A A G G C C T T G T A A T A C T
UAM: CIACCII A A A G G G A C C A A A CI G A A A G I C A A G G A C A A G G C C I I G I A A I A C I
HUM: GTGA
UAM: G T G A
D7
HUM: GAGACAC
UAM: GAGACAC
D9
HUM: GCCCAGAGACAGA
UAM: G C C C A G A C A G A

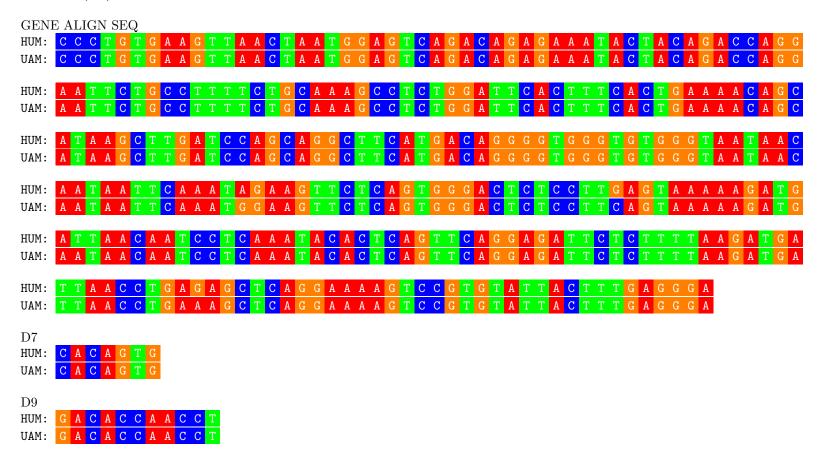


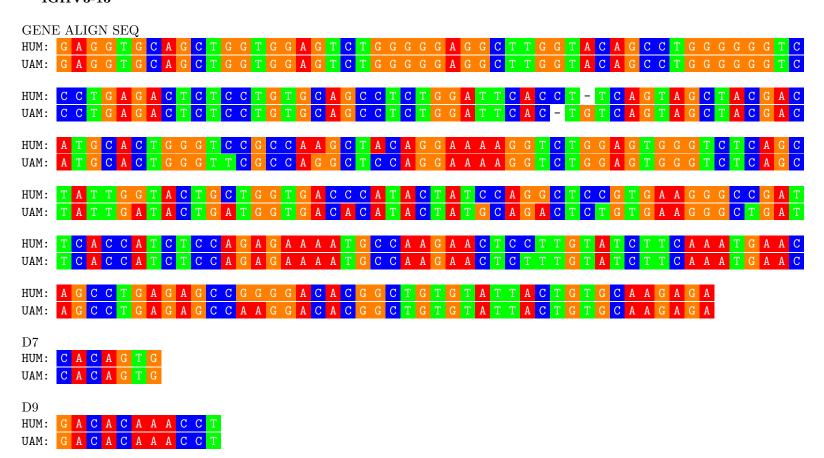
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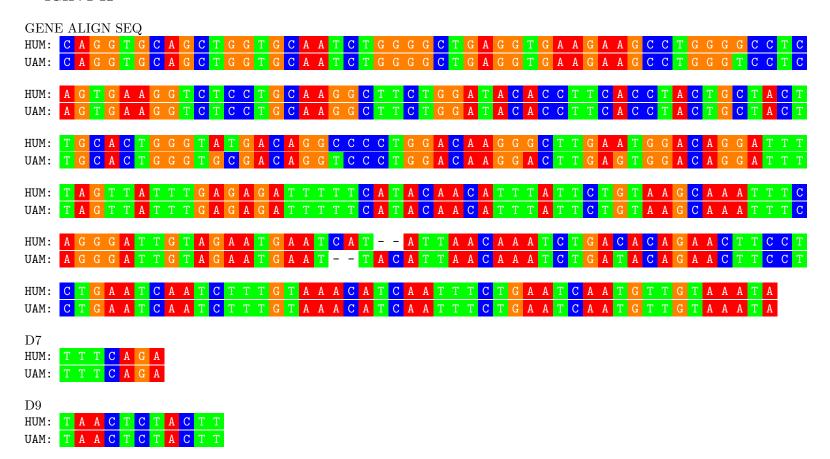


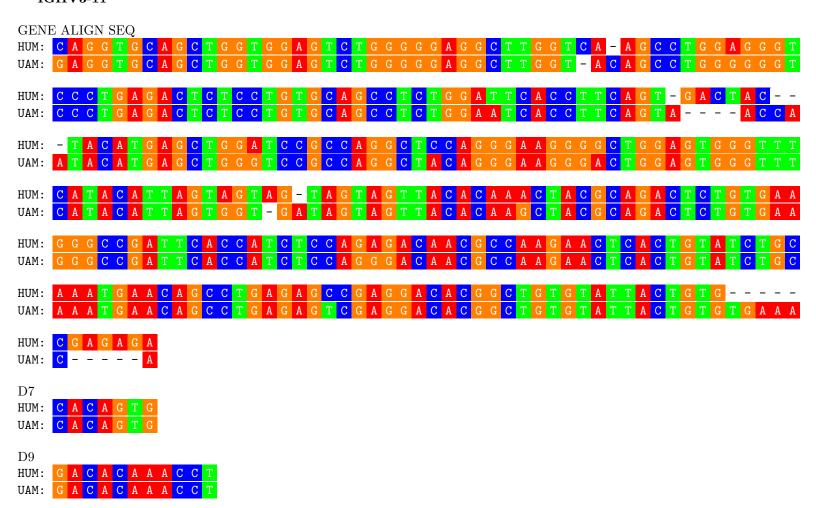
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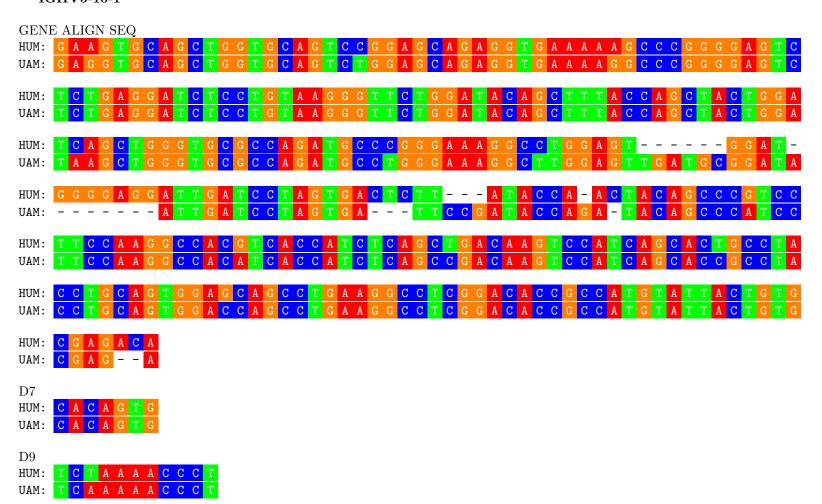


IGHV1-12



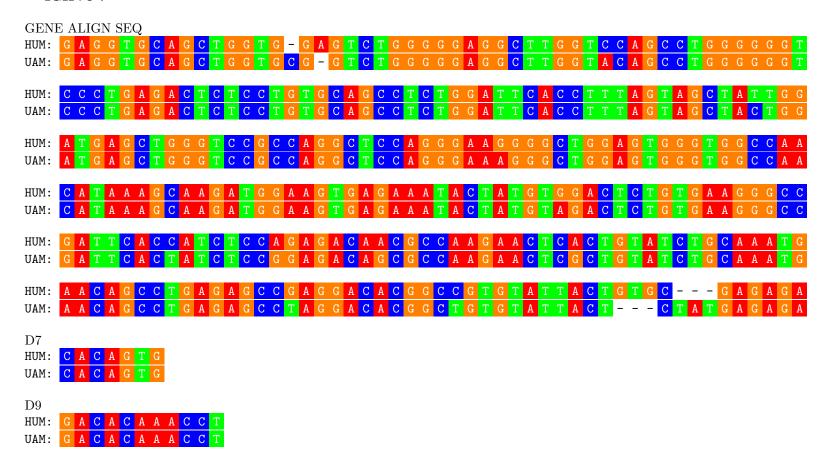


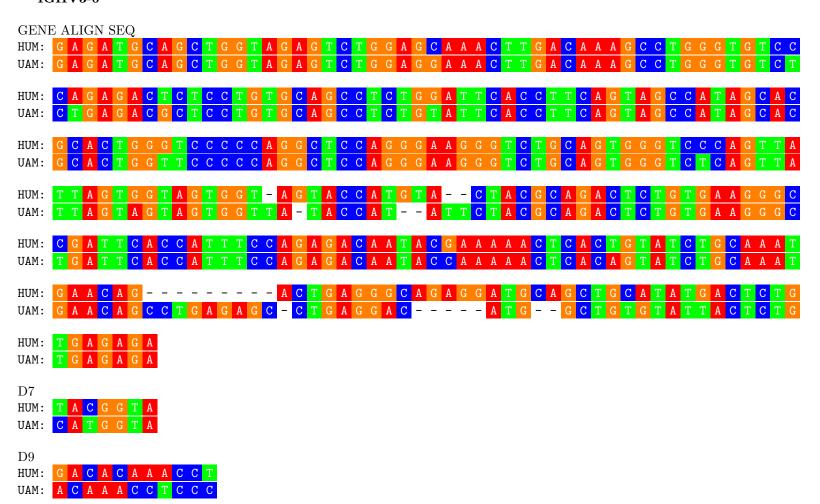
IGHV5-10-1



IGHV3-64D

GENE ALIGN SEQ HUM: A T G G A G T T C T G G C T G A G C T G A G C T G A G C T G G G T T C T C T C T C T T G T T G C A T T T T A A A A A A A A A A A A A A	
HUM: T T C A T G G A G A A C T A G A G A T A G T A G A G T G A G T G A G T G A G T G A G T G A G A	
HUM: G G A T A T G T G T G G C A G T T T C T G A C C T T G G T C T C T T T G C A C A C A C A C A C A C A C A C A C	
HUM: C A G T G T G A G T G C A G T G C A G C T G G T G C A G C T G G A G T C T G G A G T C T G G G G G G A G G C T T G G T C A C UAM: C A G T G A G T G A G T T G G T A C A G C T T G G T A C A C	
HUM: G G G G T C C C T G A G A C T C T C T C T C T C T C T C T C T C	
HUM: A T G C T A T G C A C T G G G T C C G C C A G G C T C C A G G G A C T G G A A G G G A C T G G A A G G G A A G G G A C T G G A A G G G A C T G G A A G G G A C T G G A A G G G A A G G G A C T G G A A G G G A C T G G A A G G G A C T G G A A G G G A C T G G A A G G G A C T G G A A G G G A C T G G A A G G G A A G G G A C T G G A A G G G A A G G G A C T G G A A G G G A A G G G A C T G G A A G G G A A G G G A C T G G A A G G G A A G G G A C T G G A A G G	
HUM: T C A G C T A T T A G T A	
HUM: G G G G C A G A T T C A C C A T C T C A G A G A T T C A C C A T C T C C A G A G A A T T C C A A G A A C A C G C T G T A UAM: G G G G C A G A G A G A G A C A C A C A	
HUM: A A A T G A G C A G T C T G A G C T G A G T C T G A G C T G A G C T G A G G C T G T G T A T T A C T G T G T G T G T G T G T G T G T G T	
HUM: GAUUAM: GAUUAM:	
D7 HUM: C A C A G T G UAM: C A C A G T G	
D9 HUM: G A C A A A C C T UAM: T A C A G A A A C C T	





IGHV(III)-5-1

GENE ALIGN SEQ

D7

HUM: C A C A T G A
UAM: C G C A T G A

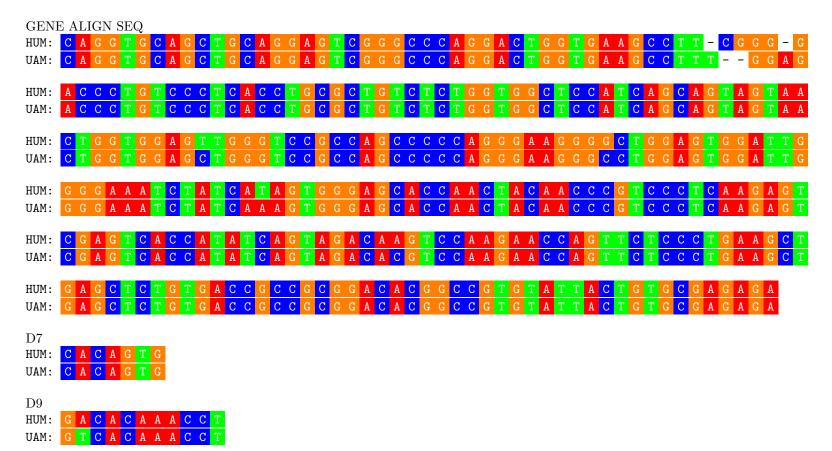
D9

HUM: A A C C T C C A G G A UAM: A A A C T C C A G G G

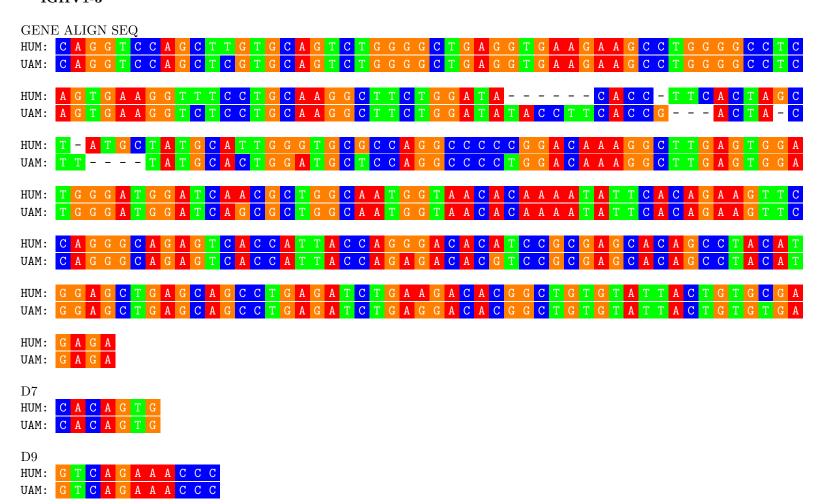
IGHV2-5

GENE ALIGN SEQ
HUM: CAGAGATCACACAAGAGGAGTCTAGAAGGAGTCTAGGTCCTAACGTACAACACAAACCCAACACAAAC
UAM: CAGGTCACATAGAGGAGTCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT
HUM: CCTCACGCTGACCTTGCTCTCTCTCTCACCTACTAGTGGAC
UAM: C C T C A C G C T G A C C T G C A C C T T C T C T C T G G G T T C T C A C T C A G C A C T A G T G G A A
HUM: TGGGTGTGGGGATGGATGGATGCGTCCCCCA-GGAAAGGCCCCT
UAM: T G G G T G T G G G C T G G A T C C G T C A G C C C C A A G G G C C C T G G A G T G G C T
HUM: T G C A C T C A T T T A T T G G G A T G A T A A G C G C T A C A G C C C A T C T G A A G A
UAM: T G C A G T C A T T T A T T G G G A T G A T A A G C G C T A C A G C C C A T C T C T G A A G A
HUM: G C A G G C T C A C C A T C A C C A A G G A C C C A C C T C C A A A A A C C A G G T G G T C C T T A C A
UAM: G C A G A C T C A C C A T C T C C A A G G A C A C C T C C A A A A A C C A G G T G G T C C T T A C A
HUM: A T G A C C A A C A T G G A C C T G T G G A C A C A G C C A C A T A T T A C T G T G C A C A G
UAM: A T G A C C A A C A T G G A C C C T G T G G A C A C A G C C A C A T A T T A C T G T G C A C A G G G A G A G A G A G A G A G
HUM: A C
UAM: A C
D7
HUM: CACAAAG
UAM: C A C A G A G
D9
HUM: T A C A A A A A C C C
UAM: TACAAGAACCC

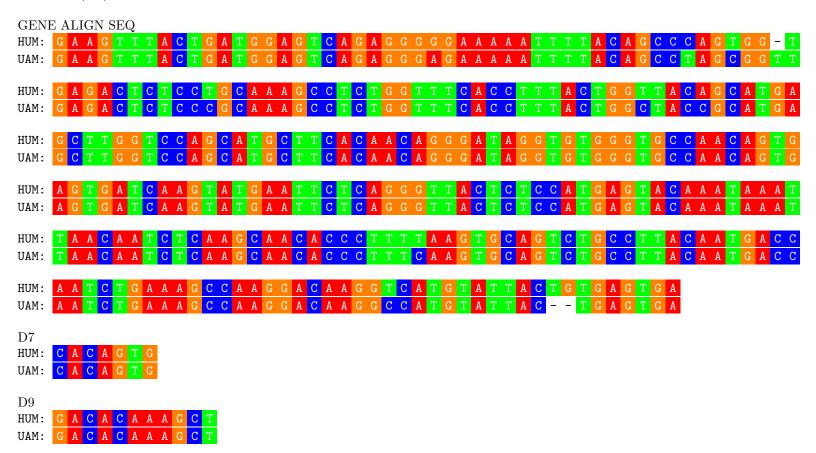
IGHV4-4



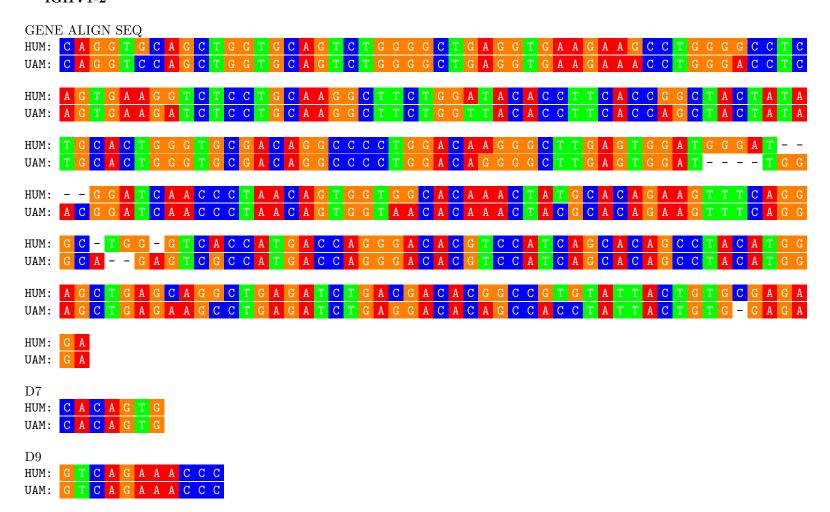
IGHV1-3



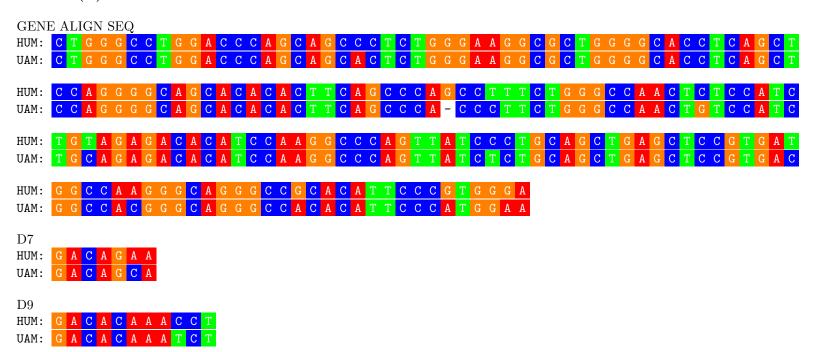
IGHV(III)-2-1



IGHV1-2



IGHV(II)-1-1



IGHD1-1

IGHD3-3

U9
HUM: A G G T T T G G G G T
UAM: A G G T T T G G G G T
UAM: A G G T T T G G G G T

UT
HUM: C A C T G T G
UAM: C A C T G T G
UAM: C A C T G T G

GENE ALIGN SEQ
HUM: G T A T T A C G A T - T T T T G G - A G T G G T T A T T A T A C C
UAM: G T A T T A C T A T A G G - - T G G T A G T G G T T A T T A T A A C

D7
HUM: C A C A G T G
UAM: C A C A G T G
UAM: A T C A A A A A C C C
UAM: A T C A A A A A C C C

IGHD4-4

U9
HUM: G G C T T T T T G T G
UAM: G A C T T T T T G T G
UAM: T A C T G T G
UAM: T A C T G T G
UAM: T G A C T A C A G T A A C T A C
UAM: T G A C T A C A G T G
UAM: T G A C T G T G
UAM: T G A C T A C A G T A C T A C
UAM: T G A C T A C A G T G
UAM: C A C A G T G

IGHD5-5

U9
HUM: T G G T T A T T G T C
UAM: T G G T T A T T G T C

U7
HUM: G A C T G T G
UAM: G T G G A T A C A G C T A T G G C T A C G G T T A C
UAM: G T G G A T A C A G C T A T G G C T A C G G T T A C

D7
HUM: C A C A G T G
UAM: C A C A G T G
UAM: C A C A G T G
UAM: A G C A G C A A C C A
UAM: A G C A G C A A C C A

IGHD6-6

U9
HUM: A A G T T T C T G A A
UAM: A A G T T T C T G A A
UAM: C A C A G T G
UAM: C A C A G T G

HUM: G A G T A T A G C A G T G
UAM: G A G T A T A G C A G T G

D7
HUM: C A C A G T G
UAM: C A C A G T G
UAM: G A G T A T A G C A G C T G G T A C

D7
HUM: C A C A G T G
UAM: C A C A G T G
UAM: C A C A G T G
UAM: C A C A G T G

UAM: G C C A G A A A C C C

IGHD1-7

U9
HUM: C G G A T T C T G A A
UAM: C G G A T T C T G A A

UAM: C A C A G T G
UAM: C A C A G T G
UAM: C A C A G T G

UAM: G G T A T A A C T G G A A C T A C
UAM: G G T A T A A C T G G A A C T A C

D7
HUM: C A C T G T G
UAM: C A C T G T G

UAM: G T C C A A A A C T G

IGHD2-8

U9
HUM: A G G A T T T T G T G
UAM: A G G A T T T T G T G
UAM: C A C A C T G T G
UAM: A G G A T A T T G T A C T A A T G G T G T A C T A C C
UAM: A G G A T A T T G T A G T C T A A T G G T G T A G C T G C T A C G C C
UAM: C A C A G T G
UAM: T T C C C A A A G C C
UAM: T T C C C A A A G C C

IGHD3-10

U9
HUM: A G G T T T G G G G T
UAM: A G G T T T G G G G T

UAM: A G G T T T G G G G T

UAM: A G G T T T G G G G T

UAM: C A C T G T G

UAM: C A C T G T G

UAM: C A C T G T G

UAM: G T A T T A C T A T G G T T C G G G G A G T - - - - - - - T A T T A T A A C

UAM: G T A T T A C T A T G G T G

UAM: C A C A G T G

UAM: C A C A G T G

UAM: C A C A G T G

UAM: A T C A A A A A C C C

UAM: A T C A A A A A A C C C

IGHD4-11

U9
HUM: G G C T T T T T G T G
UAM: G G C T T T T T G T G
UAM: T G C T G T G
UAM: T A C T G T G
UAM: T G A C T A C A G T - - - A A C T A C
UAM: T G A C T A C T G
UAM: T G A C T A C T G
UAM: T G A C T A C T G
UAM: T G A C T A C T G
UAM: T G A C T A C T G
UAM: T G A C T A C T G
UAM: A G C A A A A A A C T G
UAM: C A C A A A A A A C T G
UAM: A G C A A A A A A C T G

IGHD5-12

U9
HUM: T G G T T A T T G T C
UAM: T G G T T A T T G T C
UAM: T G G T T A T T G T C

UAM: G A C T G T G
UAM: G G C C G T G

UAM: G T G G A T A T A T A G T G
UAM: G T G G A T A T A T A G T G
UAM: G T G G A T A T A T A G T G
UAM: G T G G A T A T A T A G T G
UAM: G T G G A T A T A T A G T G
UAM: G T G G A T A T A T A G
UAM: A G C A G T G

D9
HUM: A G C A G C A A C C A
UAM: A G C A G C A A C C A

IGHD6-13

U9
HUM: A G G T T T C T G A A
UAM: A G G T T T C T G A A

UAM: A G G T T T C T G A A

UT

HUM: C A C A G T G

UAM: C A C A G T G

UAM: G G G T A T A G C A G C A G C A G C T G T A C

UAM: G G G T A T A G C A G C A G C A G C T G T A C

D7
HUM: C A C A G T G

UAM: C A C A G T G

IGHD1-14

UAM: G T C A A A A A C T G

IGHD2-15

U9
HUM: A G G A T T T T G T G
UAM: A G G A T T T T T G T G
UAM: A G G A T T T T T G T G
UAM: C A C T G T G
UAM: A G G A T A T T G T A G T G G T G G T A - - - G C T G C T A C T C C
UAM: A G G A T A T T G T A G T G G T - - - A G T G G C T G C T A C G C C

D7
HUM: C A C A G T G
UAM: C A C A G T G
UAM: C T C C C A A A G C C
UAM: C T C C C A A A G C C

IGHD3-16

IGHD4-17

U9
HUM: G G C T T T T T G T G
UAM: G G C T T T T T G T G
UAM: T A C T G T G
UAM: T A C T G T G
UAM: T G A C T A C G G T G A C T A C
UAM: T G G C T A C A G T G
UAM: C A C A G T G

IGHD5-18

U9
HUM: T G G T T A T T G T C
UAM: T G G T T A T T G T C

U7
HUM: G A C T G T G
UAM: G A C T G T G
UAM: G T G G A T A C A - - - G C T A T G G T T A C
UAM: G T G G A T A C A - - - G C T A C G T T A C
UAM: G T G G A T A C A C T G C T A C G T T A C
UAM: G T G G A T A T A C T G G C T A C G T T A C

D7
HUM: C A C A G T G
UAM: C A C A G T G
UAM: A G C A G C A A C C A
UAM: A G C G G C A A C C A

IGHD6-19

U9
HUM: A G G T T T C T G A A
UAM: A G G T T T C T G A A

UAM: C A C A G T G

UAM: C A C A G T G

HUM: G G G T A T A G C A G T G C T G G T C C

D7
HUM: C A C A G T G

UAM: C A C A G T G

UAM: G G G T A T A G C A G C G G C T G G T C C

D7
HUM: C A C A G T G

UAM: G C C A G A A A C C C

IGHD1-20

U9
HUM: C G G A T T C T G A A
UAM: C A G A T T C T G A A

UAM: C A C A G T G

UAM: C A C A G T G

UAM: C A C A G T G

GENE ALIGN SEQ

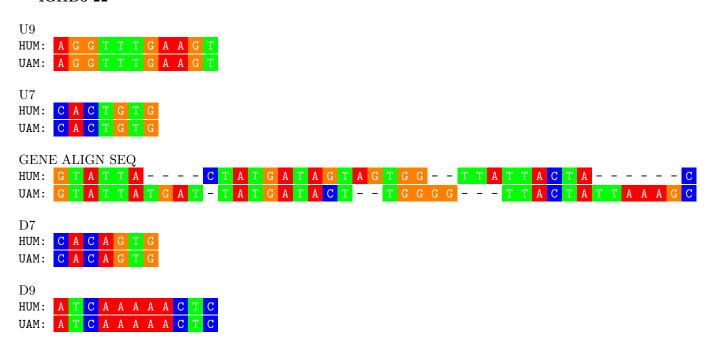
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UAM: C A C C G T G

UAM: C A C T G T G

UAM: A T C C A A A A C T G

IGHD2-21

IGHD3-22



IGHD4-23

U9
HUM: G G C T T T T T G T G
UAM: G G C T T T T T T G T G
UAM: T G C T G T G
UAM: T A C T G T T

GENE ALIGN SEQ
HUM: T G A C T A C G G T G T A A C T C C
UAM: T G A C T A C G G T G T A A C T C C
UAM: T G A C T A C G G T G T A A C T C C

D7
HUM: C A C A G T G
UAM: T A C A G T G

IGHD5-24

U9
HUM: T G G T T A T T G T C
UAM: T T A T T G T C
UAM: C A T G G T G
UAM: C A T G G T G

HUM: G T A G A G A T G C T A C A A T T A C
UAM: C A T G G T G

HUM: C A T G G T G

HUM: C A G T A G A G A T G G C T A C A A T T A C

D7
HUM: C A C A G T G
UAM: C A C A G T G
UAM: C A C A G T G
UAM: C A C A G T G

UAM: C A C A G T G

UAM: C A C A G T G

IGHD6-25

U9
HUM: A G G T T T C T G A A
UAM: A G G T T T C C G A A

UAM: A G G T T T C C G A A

UT
HUM: C A C A G T C
UAM: C A C A G T G

GENE ALIGN SEQ
HUM: G G G T A T A G C A G C G C T A C
UAM: G G G T A T A G C A G T G C

D7
HUM: C A C A A T G
UAM: C A C A A T G
UAM: C A C A A T G

UAM: G A C A G A A A C C C

IGHD1-26

U9
HUM: T G G A T T C T G A A
UAM: T G G A T T C T G A A

UAM: T G G A T T C T G A A

UAM: C A C G G T G
UAM: C A T G G T G

UAM: G G T A T A G T G G G A G C T A C T A C

D7
HUM: G G T A T A G T G G G A G C T A C T A C

D7
HUM: C A C T G T G
UAM: G T C C A A A A A C T G
UAM: G T C C A A A A A C T G

IGHJ1P

U9

HUM: C G C G T G T T T T G

UAM: C G T G T G T T T T G

U7

HUM: C A C T G G C UAM: C A C T G G C

GENE ALIGN SEQ

HUM: A T C A
UAM: A C C A

IGHD7-27

U9
HUM: G G G T T T T T G G C T
UAM: G G G T T T T T G G C T
UAM: G G G T T T T T G G C T

U7
HUM: C A C T G T G
UAM: C T A A C T G G G A
UAM: C T A A C T G G G G A

D7
HUM: C T A A C T G G G G A

D7
HUM: C A G A G T G
UAM: C A G A G T G
UAM: C A G A G T G
UAM: C A G A G T G

D9
HUM: T A C A A A A A C C A

UAM: T A C A A A A A C C A

U9

HUM: T G G G T T T C T G T UAM: T G G G T T T C T G C

U7

HUM: C A C C G T G
UAM: C A C C G T G

GENE ALIGN SEQ

HUM: G C T G A A T A C T T C A A G C

HUM: A G
UAM: A G

U9

HUM: T G T G T T T T G T UAM: T G T G T T T T T G T

U7

HUM: G G C T G T G UAM: G G C T G T G

GENE ALIGN SEQ

HUM: C A G UAM: C A G

IGHJ2P

U9

HUM: G C T G T T C A T G T

UAM: G C T G T T C A T G T

U7

HUM: T A G T G T G UAM: T A G T G T G

GENE ALIGN SEQ

HUM: C T G G G A A C G T C A

UAM: C T G G G A A C T T C A

U9

HUM: A G G T T T A T G T C
UAM: G G G T T T G T G T C

U7

HUM: C C C T G T G
UAM: C C C T G T G

GENE ALIGN SEQ

HUM: C A G UAM: C A G

U9

HUM: A G G T T T T T G T G

UAM: A G G T T T T T G T G

U7

HUM: C A A T G T G
UAM: C A A T G T G

GENE ALIGN SEQ

U9

HUM: C A G T T C T G C C
UAM: C A G T T C T C C C

U7

HUM: C A A T G T G UAM: C A A T G T G

HUM: G UAM: G

IGHJ3P

U9

HUM: G G G G T T T T T G G UAM: A G G A T T T T T G G

U7

HUM: C C G T C T G
UAM: C C G T C T G

GENE ALIGN SEQ

U9
HUM: T G G G T T T T T G T
UAM: T G G G T T T T T G T
UAM: T G G G T T T T T G T
UAM: C A T T G T G
UAM: A T T A C T A C G T C T C C T C A G
UAM: A T T A C T A C G T C T C T C A G
UAM: A T T A C T A C C G T C T C A G
UAM: T G G T C A C C G T C T C A G