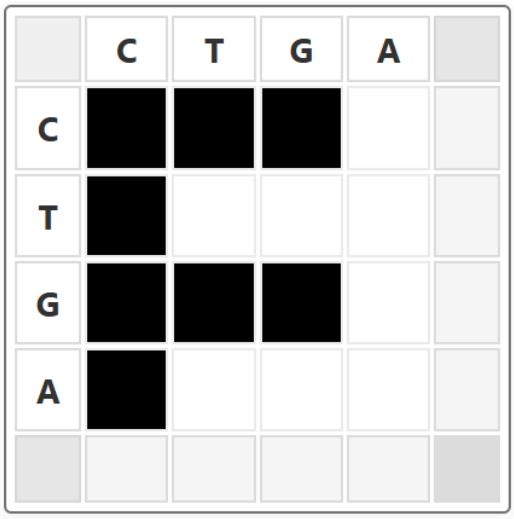
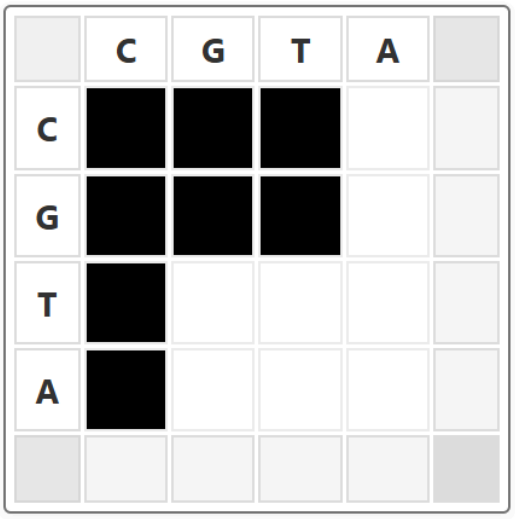
Topological Orbits of Codograms

(6 orbits of 4 codograms each under the Klein group {E, R, R1, R2})

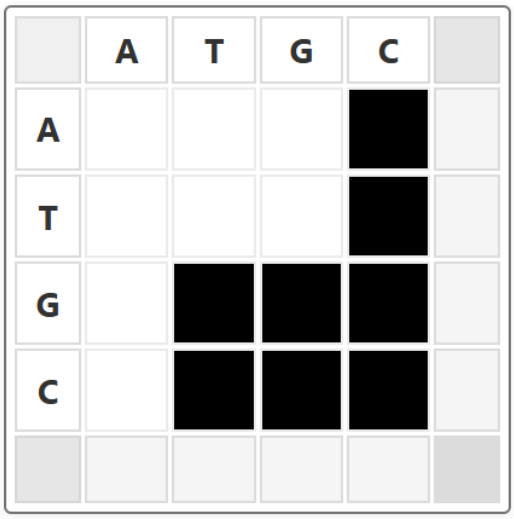
CTGA (E)



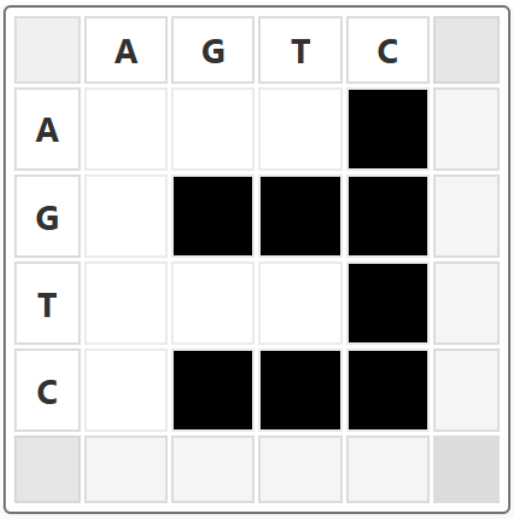
CGTA (R1)



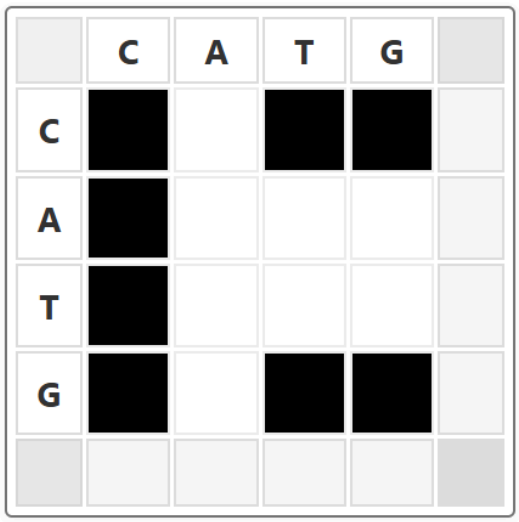
ATGC (R2)



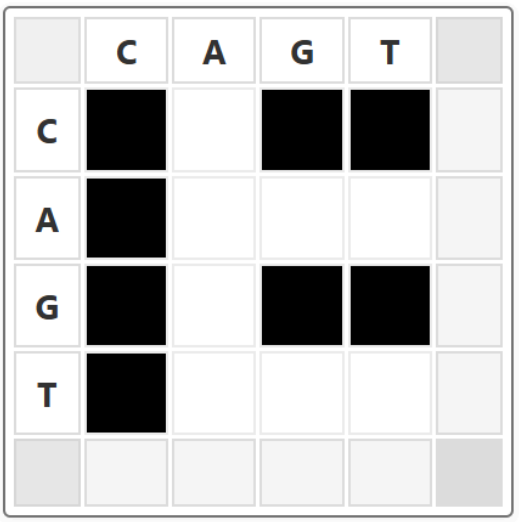
AGTC (R)



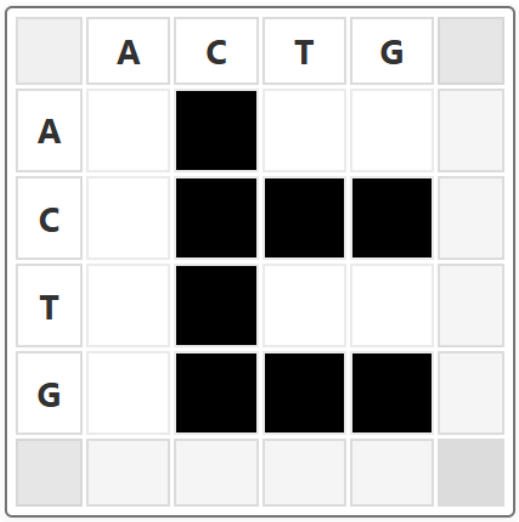
CATG (E)



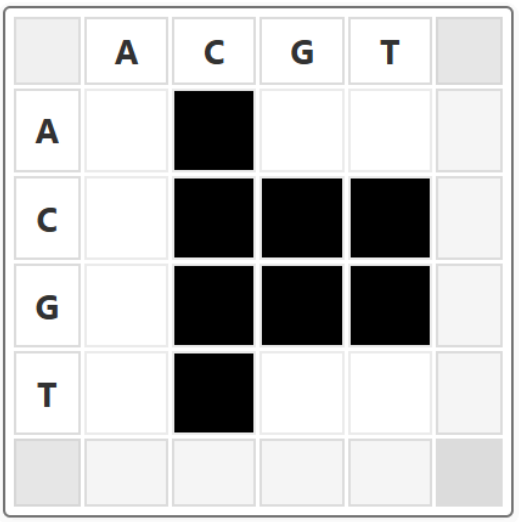
CAGT (R1)



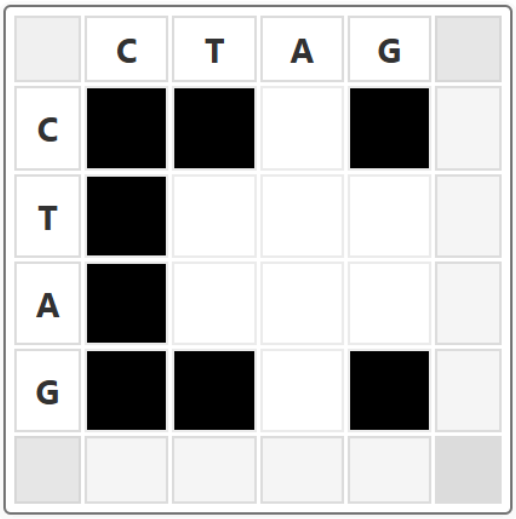
ACTG (R2)



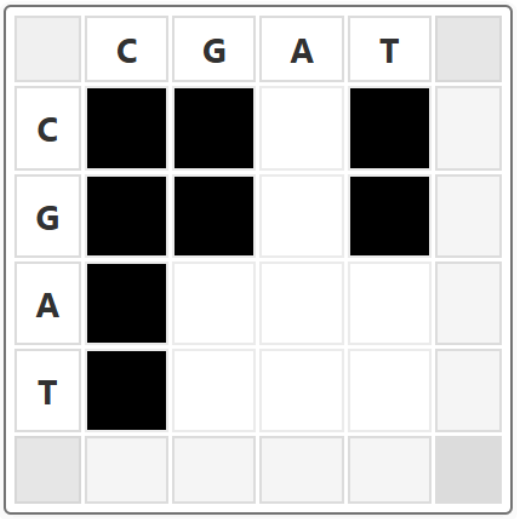
ACGT (R)



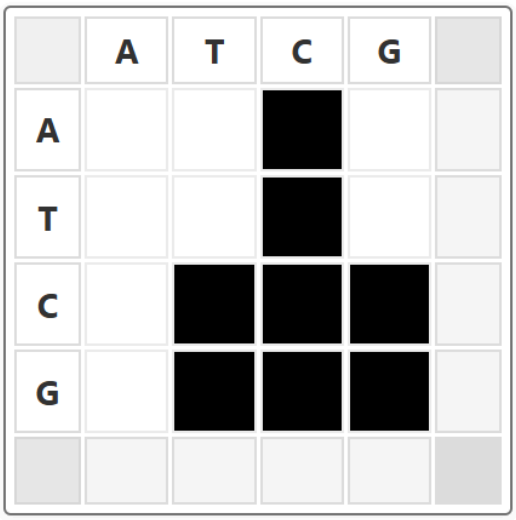
CTAG (E)



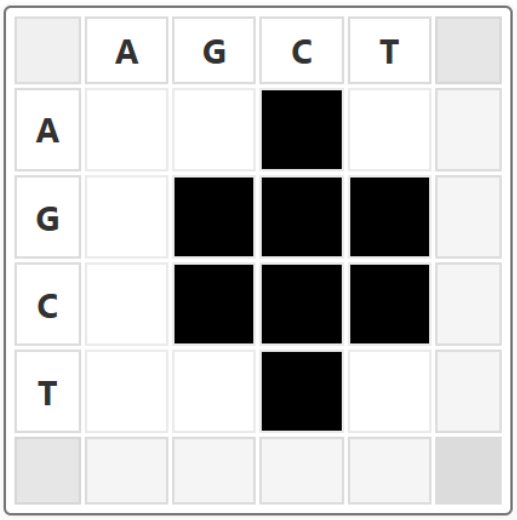
CGAT (R1)



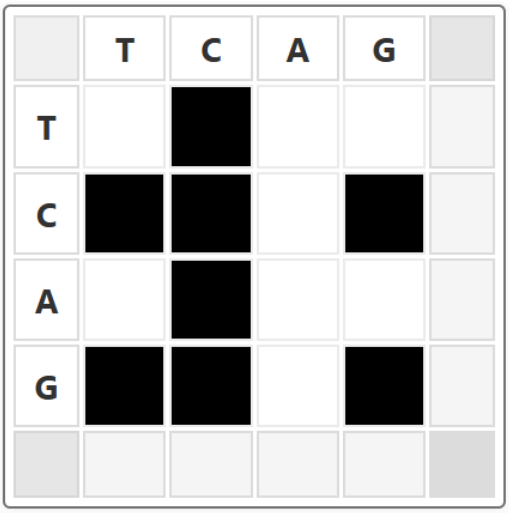
ATCG (R2)



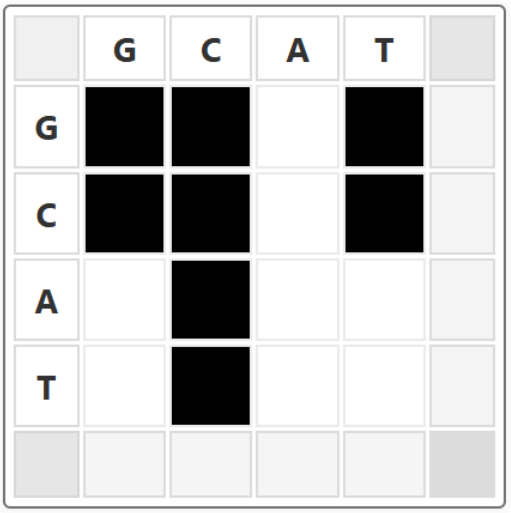
AGCT (R)



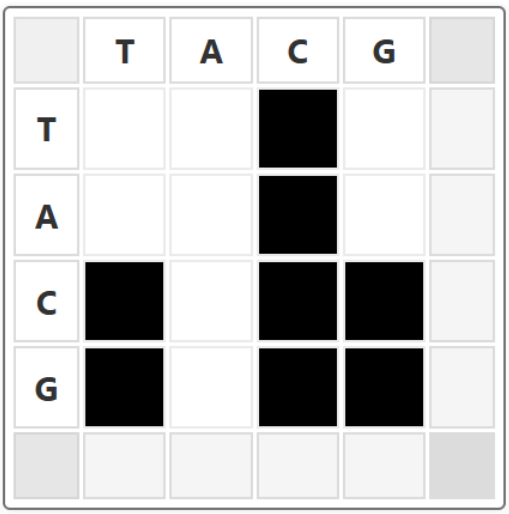
TCAG (E)



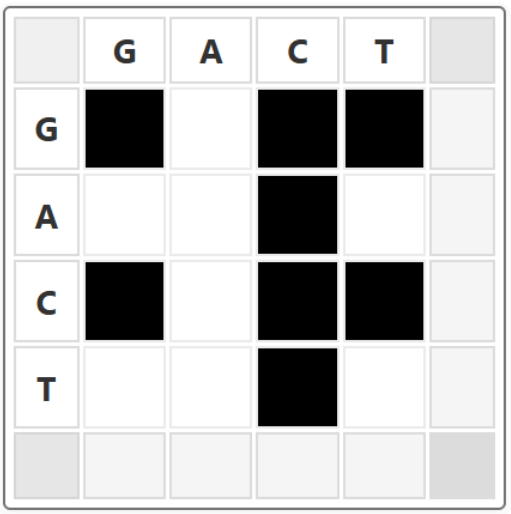
GCAT (R1)



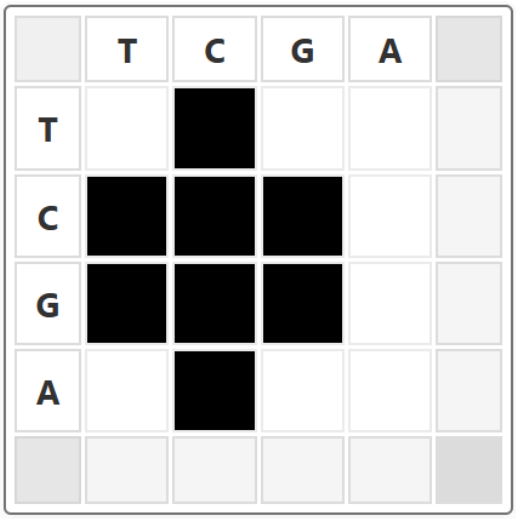
TACG (R2)



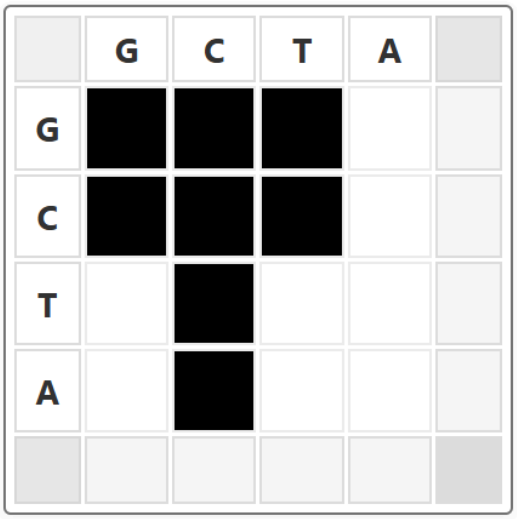
GACT (R)



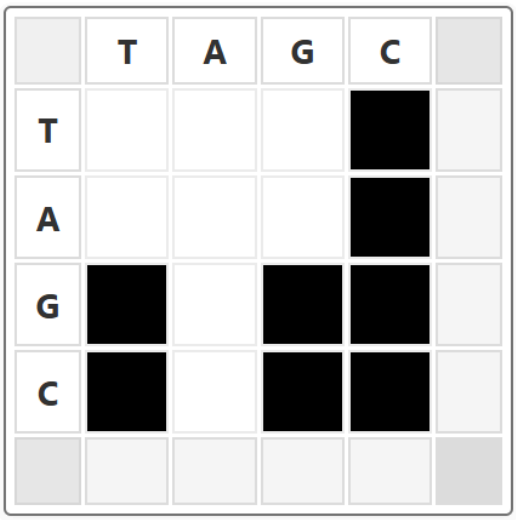
TCGA (E)



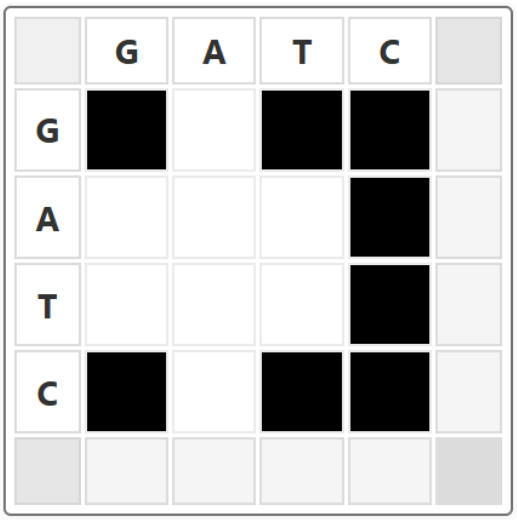
GCTA (R1)



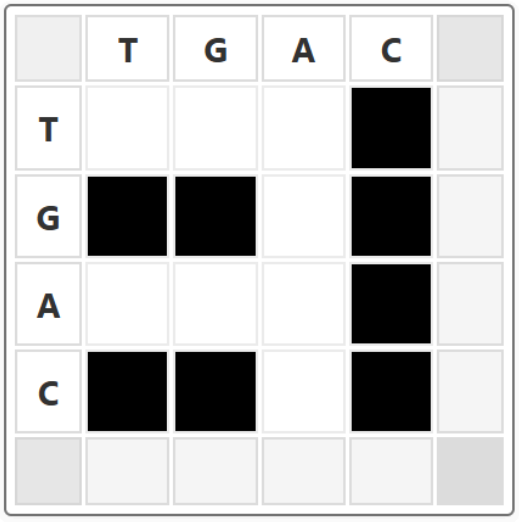
TAGC (R2)



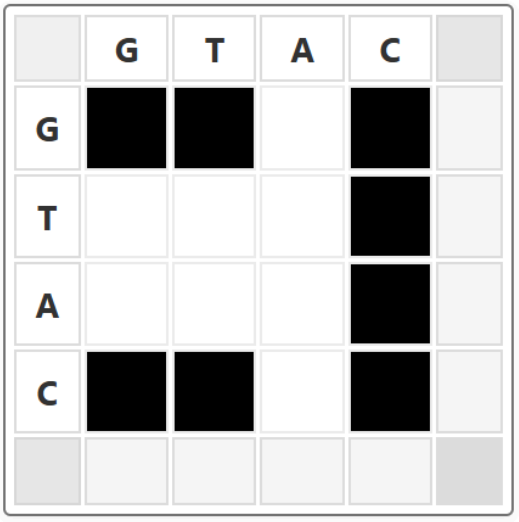
GATC (R)



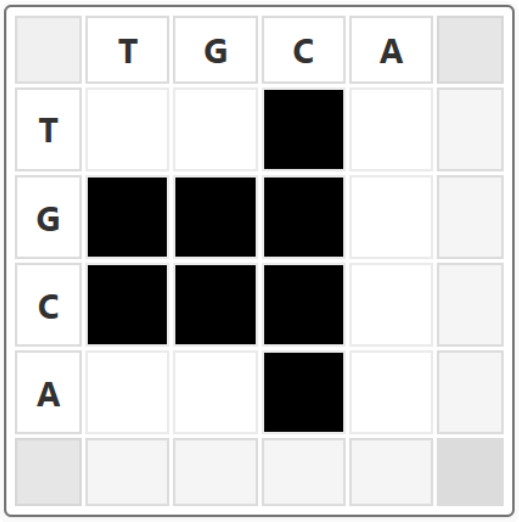
TGAC (E)



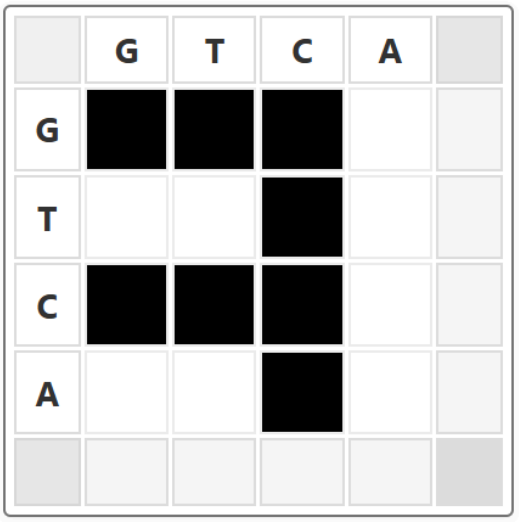
GTAC (R1)



TGCA (R2)



GTCA (R)



Quartets of XY-boxes

(Partition into Octet I with full 4-fold degeneracy vs Octet II with partial degeneracy; symmetry preserved under R, R1, R2 transformations)

	T		C		A		G	
T	TTT	Phe 91	TCT	Ser 31	TAT	Tyr 107	TGT	Cys 47
	TTC	Phe 91	TCC	Ser 31	TAC	Tyr 107	TGC	Cys 47
	TTA	Leu 57	TCA	Ser 31	TAA	STOP 0	TGA	STOP 0
	TTG	Leu 57	TCG	Ser 31	TAG	STOP 0	TGG	Trp 130
C	CTT	Leu 57	CCT	Pro 41	CAT	His 81	CGT	Arg 100
	CTC	Leu 57	CCC	Pro 41	CAC	His 81	CGC	Arg 100
	CTA	Leu 57	CCA	Pro 41	CAA	Gln 72	CGA	Arg 100
	CTG	Leu 57	CCG	Pro 41	CAG	Gln 72	CGG	Arg 100
A	ATT	Ile 57	ACT	Thr 45	AAT	Asn 58	AGT	Ser 31
	ATC	Ile 57	ACC	Thr 45	AAC	Asn 58	AGC	Ser 31
	ATA	Ile 57	ACA	Thr 45	AAA	Lys 72	AGA	Arg 100
	ATG	Met 75	ACG	Thr 45	AAG	Lys 72	AGG	Arg 100
G	GTT	Val 43	GCT	Ala 15	GAT	Asp 59	GGT	Gly 1
	GTC	Val 43	GCC	Ala 15	GAC	Asp 59	GGC	Gly 1
	GTA	Val 43	GCA	Ala 15	GAA	Glu 73	GGA	Gly 1
	GTG	Val 43	GCG	Ala 15	GAG	Glu 73	GGG	Gly 1

Purine–Pyrimidine Symmetries of the Genetic Code

(Purines = A/G, Pyrimidines = C/U; complementary partitions across Octet I and Octet II, balanced under activation keys)

	T		C		A		G	
T	TTT	**Phe** 91	TCT	**Ser** 31	TAT	**Tyr** 107	TGT	**Cys** 47
	TTC	**Phe** 91	TCC	**Ser** 31	TAC	**Tyr** 107	TGC	**Cys** 47
	TTA	**Leu** 57	TCA	**Ser** 31	TAA	**STOP** 0	TGA	**STOP** 0
	TTG	**Leu** 57	TCG	**Ser** 31	TAG	**STOP** 0	TGG	**Trp** 130
C	CTT	**Leu** 57	CCT	**Pro** 41	CAT	**His** 81	CGT	**Arg** 100
	CTC	**Leu** 57	CCC	**Pro** 41	CAC	**His** 81	CGC	**Arg** 100
	CTA	**Leu** 57	CCA	**Pro** 41	CAA	**Gln** 72	CGA	**Arg** 100
	CTG	**Leu** 57	CCG	**Pro** 41	CAG	**Gln** 72	CGG	**Arg** 100
A	ATT	**Ile** 57	ACT	**Thr** 45	AAT	**Asn** 58	AGT	**Ser** 31
	ATC	**Ile** 57	ACC	**Thr** 45	AAC	**Asn** 58	AGC	**Ser** 31
	ATA	**Ile** 57	ACA	**Thr** 45	AAA	**Lys** 72	AGA	**Arg** 100
	ATG	**Met** 75	ACG	**Thr** 45	AAG	**Lys** 72	AGG	**Arg** 100
G	GTT	**Val** 43	GCT	**Ala** 15	GAT	**Asp** 59	GGT	**Gly** 1
	GTC	**Val** 43	GCC	**Ala** 15	GAC	**Asp** 59	GGC	**Gly** 1
	GTA	**Val** 43	GCA	**Ala** 15	GAA	**Glu** 73	GGA	**Gly** 1
	GTG	**Val** 43	GCG	**Ala** 15	GAG	**Glu** 73	GGG	**Gly** 1