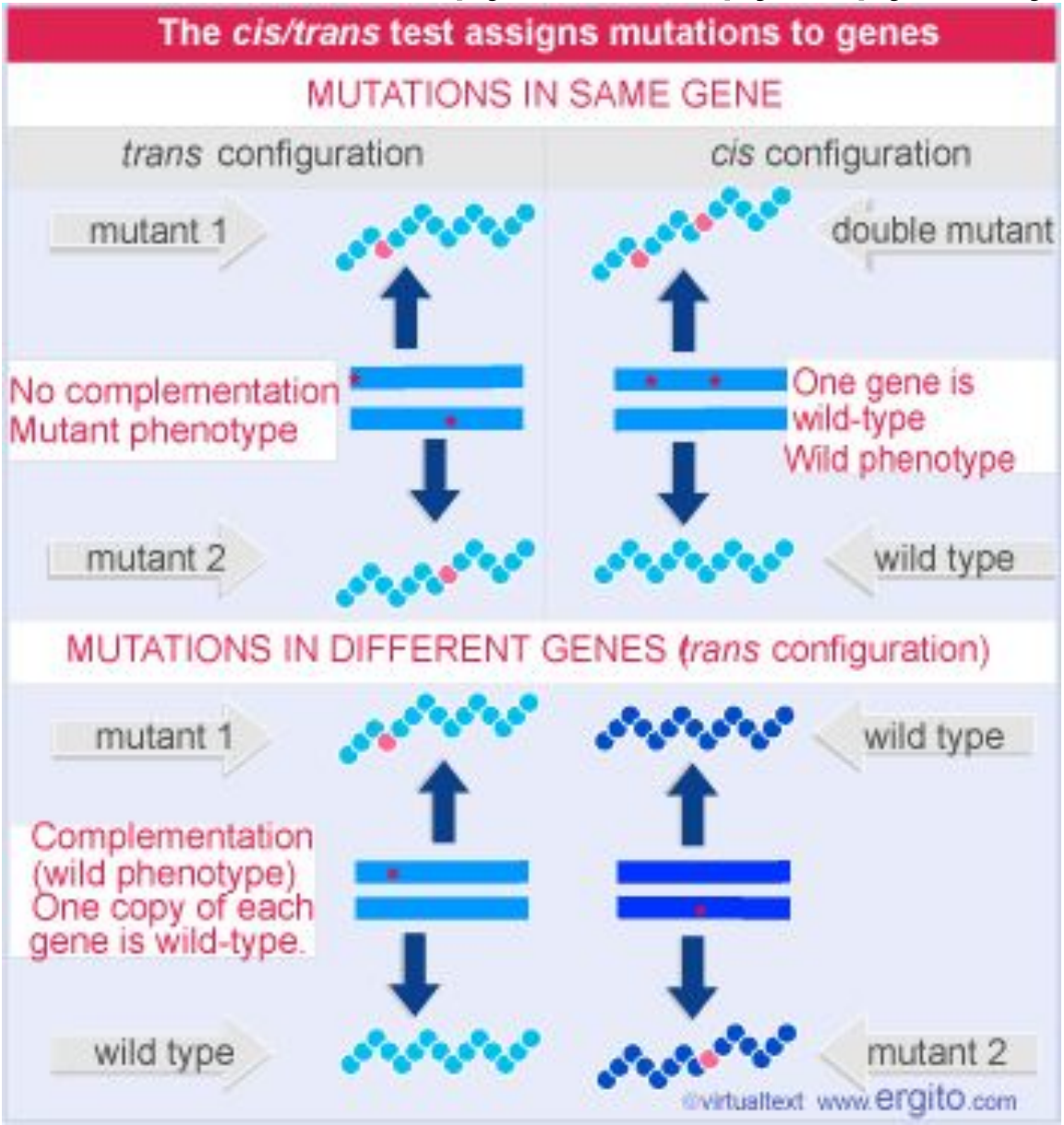
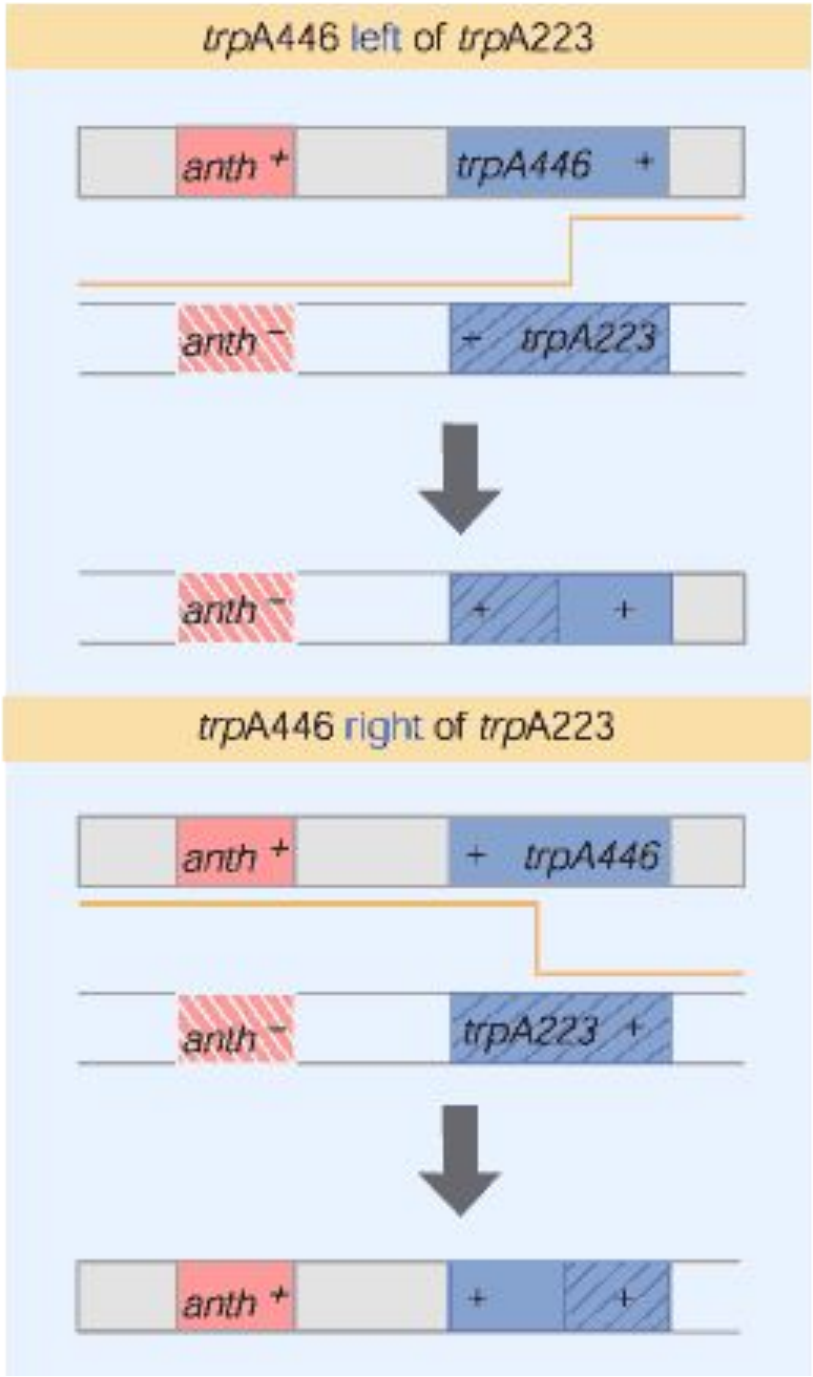
Поправки и Добавки

Ген как цистрон

(группа некомплементирующих друг друга мутаций)

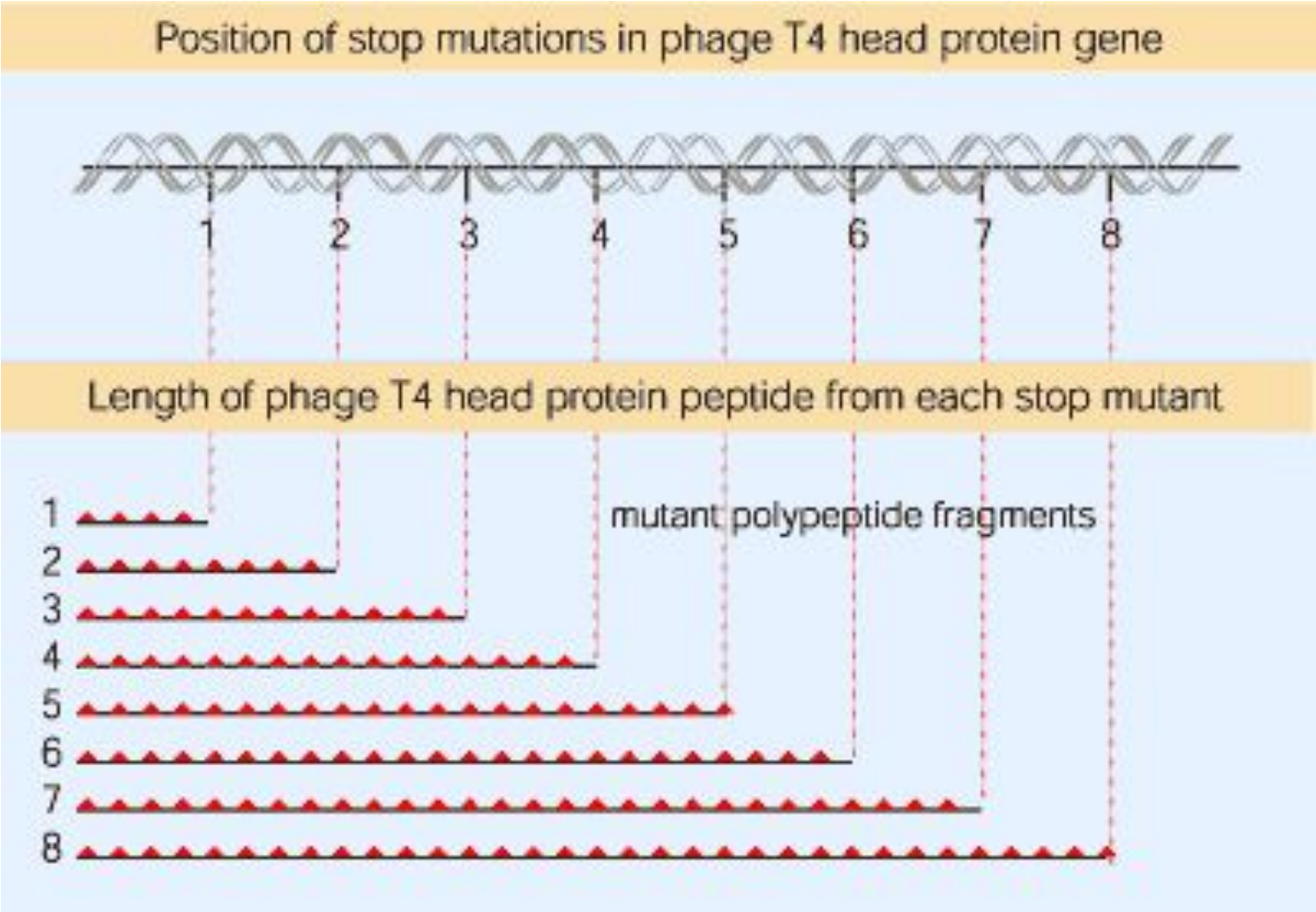


Генетическая карта



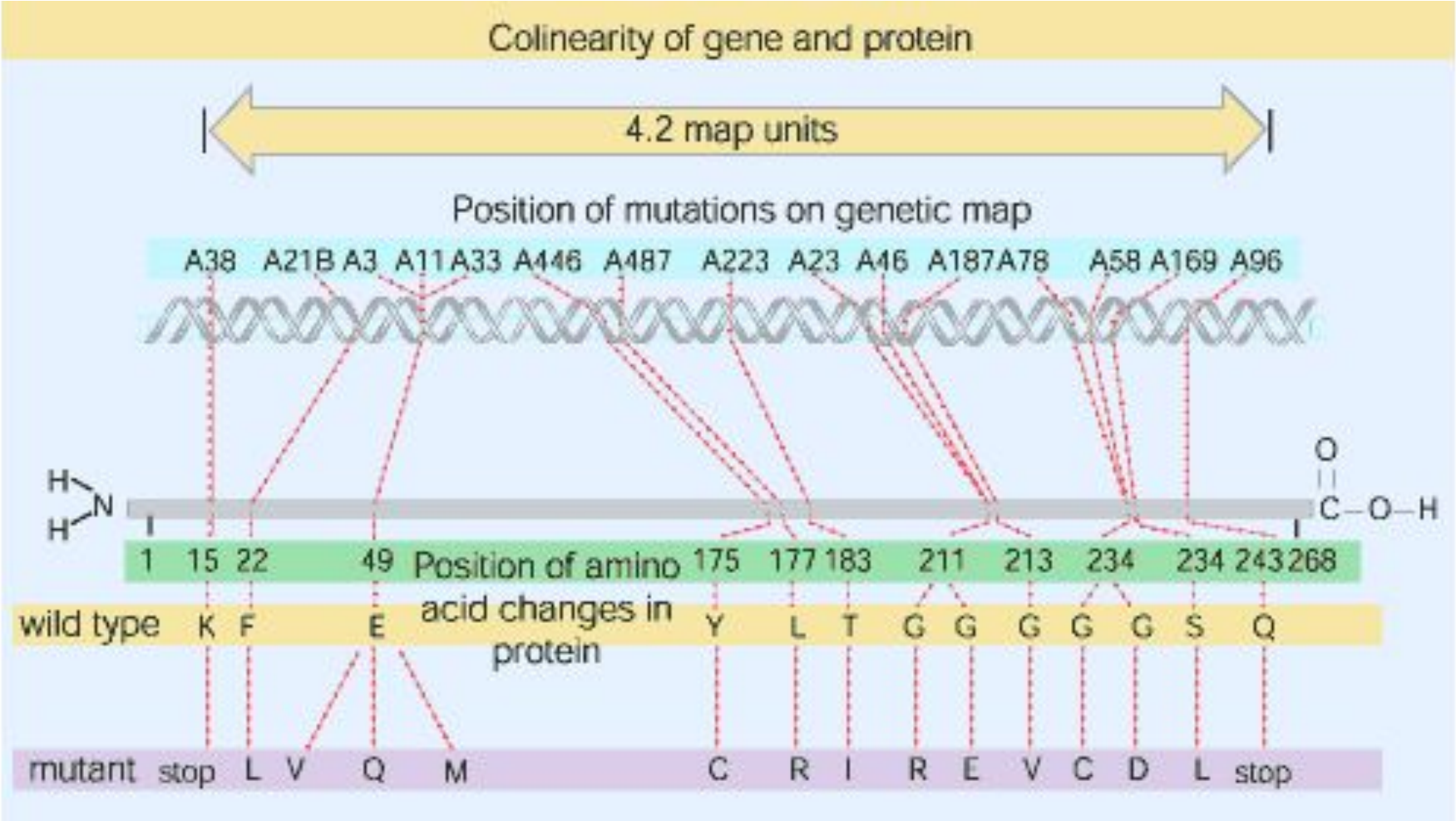
Коллинеарность гена и белка

(Brenner, 1964)

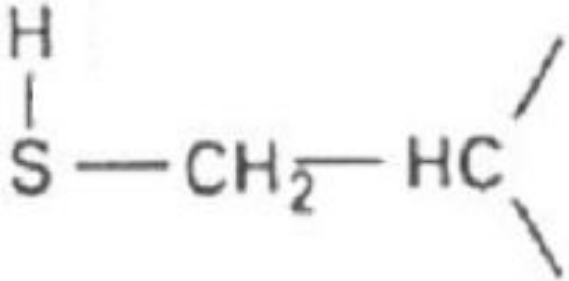


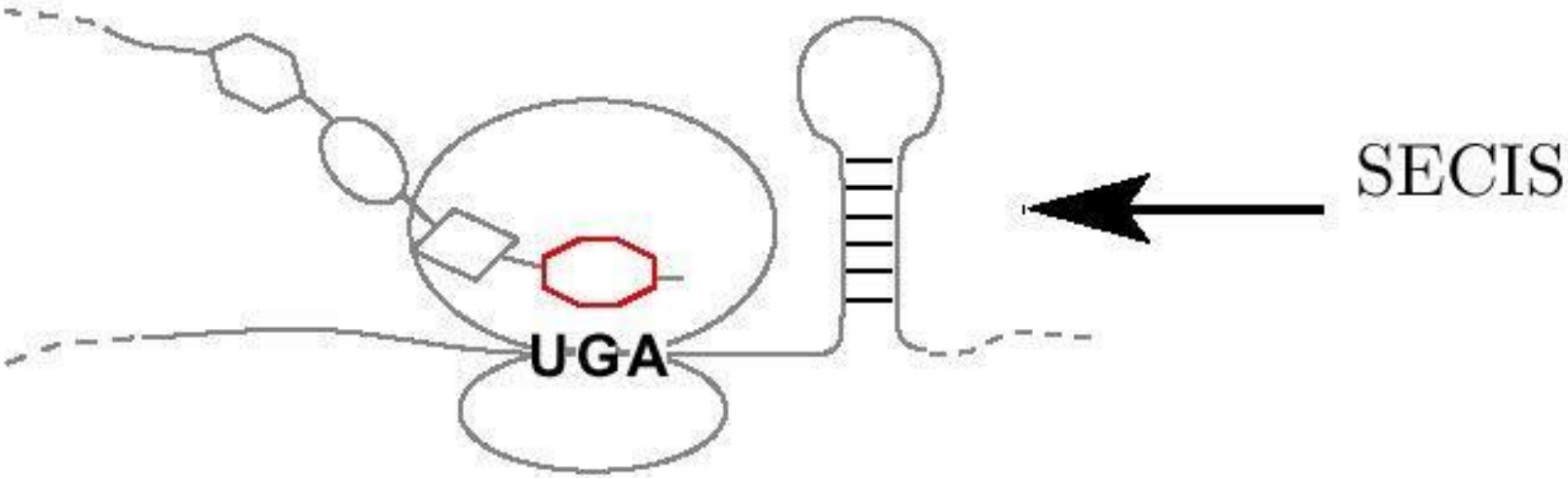
Коллинеарность гена и белка

(Yanofsky, 1967)



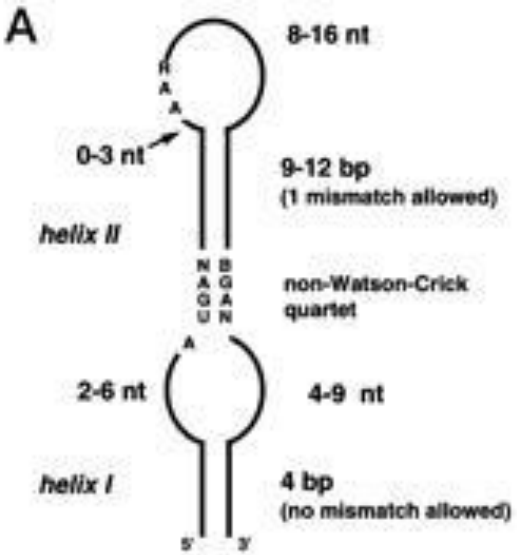
SECIS - схема





- у прокариот – сразу за кодоном
- у эукариот – в 3’-UTR

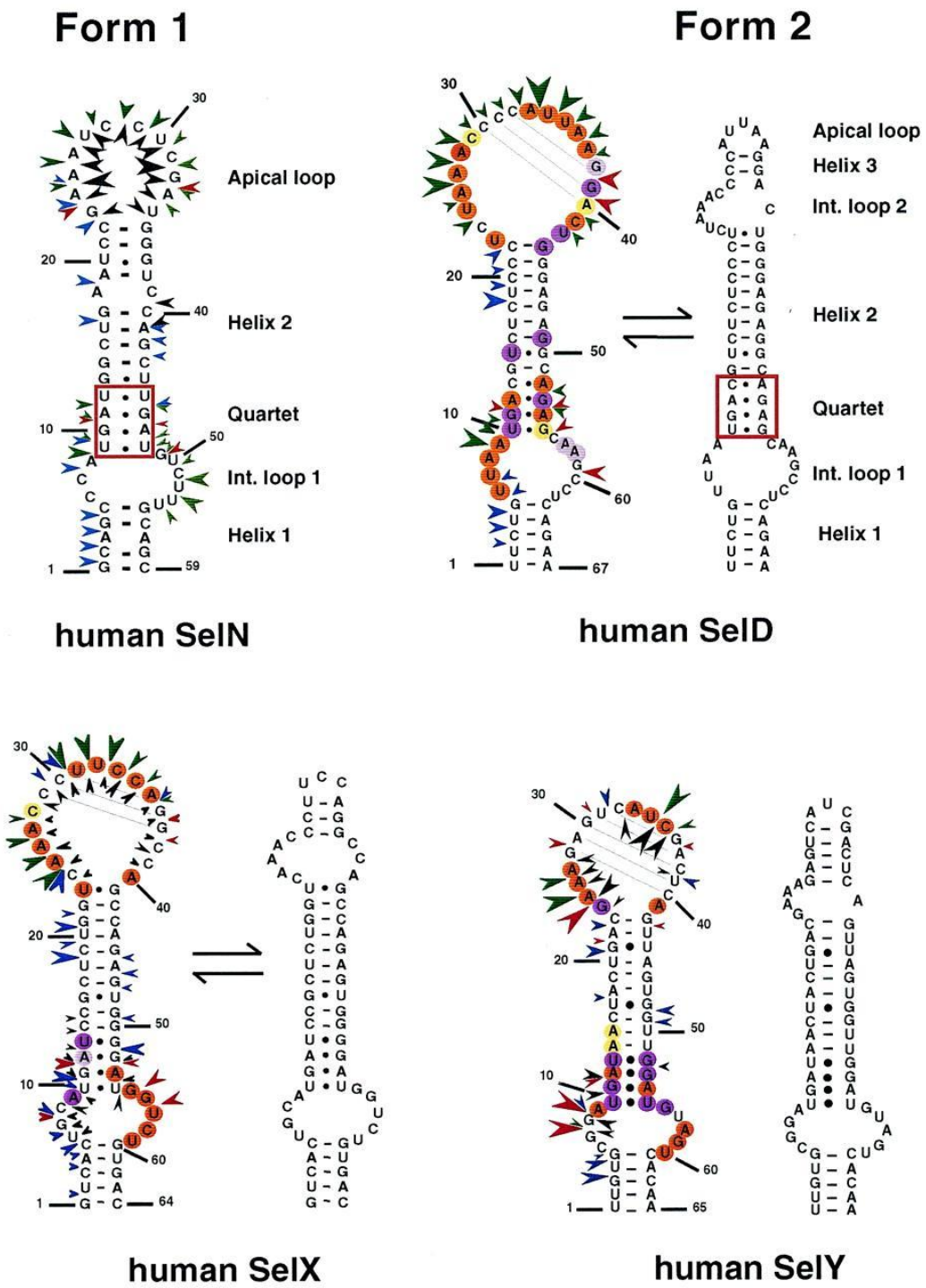
SECIS – выравни-вание и консенсус



C

	Accession number		Helix I	Internal loop		Helix II		Apical loop		Helix II		Internal loop	Helix I	
cDNA	M35391	671	TGTT	-GACTAA	A	TGAG	TGGTTTAT--	-TCAAGGACTAGGTAC-------		---ATAAACCA	TGAT	GTAAGCA--	AATA	611
EST	R16491	116	GCTG	----GTT	A	TGAG	TCCATGTGCA	--GAAAAACCCATGTGTGTG---		-TGAGTATGGA	GGAA	ACATTT---	CAGC	53
STS	L18002	172	TCTA	-----AG	A	TGAG	ATGCATCCAT	--GAAACATTGCAACTGTGG---		-ATGGATGCAC	GGAT	GGATGGA--	TGGA	101
STS	Z16689	264	GTAT	-----TC	A	TGAT	TCTGGAGGA-	---AAGGAATGAAGAAC------		--TCTTCCAAA	GGAC	GAGCCTG--	ATGC	321
EST	R71722	49	GCAG	----CCC	A	TGAT	GGCTGAATCC	--GAAATCCTCGAT---------		-GGGTCCAGCT	TGAT	GTCTTTG--	CAGC	107
EST	R23284	66	CTCT	-----AC	A	TGAG	GTGGGGTCT-	--CAAGGGACTGGAGGTCCCAC-		-AGACATCACT	GAGA	CAACTAGC-	AGGG	1
EST	AA057045	136	TCAC	----TGC	A	TGAT	CCGCTCTGGT	--CAAACCCTTCCAGGCCA----		-GCCAGAGTGG	GGAT	GGTCT----	GTGA	197
EST	AA109465	277	ATAT	-----AG	A	TGAA	TGAATGAAAG	--AAAACATAGTACAACAA----		-TTTTTATGCA	TGAT	ATATTTAAG	ATAT	341
cDNA	EP82	2055	TCTG	----TTA	A	TGAG	GTCTCTCCC-	TCTAAACCCCATTAAGGACT---		--GGGAGAGGC	AGAG	CAAGCCT--	CAGA	2119
EST	AA280511	150	AATG	-GTTTCC	A	TGAA	AATATGTGCA	--GAAGCAGAAATG---------		-TGTACATATC	TGAA	AACATCTT-	CATT	212
EST	AA107841	56	TTTG	--CATTA	A	TGAG	GATTACACAG	--AAAACCTTTGTTAAGGAC---		TTGTGTAGATC	TGAT	AATTGG---	CAAA	122
EST	R47643	46	GGGG	ACAGATT	A	TGAA	TATGGGGTT-	-TTAAATATTCATCT--------		--GACTGCATA	TGAT	ATGA-----	CCCT	105
EST	N76465	363	ATCT	----ATT	A	TGAT	ACAAAAATGT	--AAAGGGTAAATA---------		-GCATCTTTGT	TGAC	AAAGTAGG-	AGGT	304
EST	X85650	227	GGGA	--ACGAG	A	TGAT	GAAGGGCAG-	--CAAGTCCCATTGTA-------		--CTTTCCTTT	TGAA	TGACCTTTC	TCTC	165
EST	R46598	323	TGTG	----CGG	A	TGAT	AACTACTGAC	--GAAAGAGTCATCGACTCA---		-GTTAGTGGTT	GGAT	GTAGT----	CACA	261
EST	R44842	109	CCGG	----ATG	A	TGAG	GACCTGGGTG	--GAAACCTACCCTGTGGG----		-CACCCATGTC	CGAG	CCCC-----	CTGG	49
EST	AA100850	317	CTAT	----GTG	A	TGAT	GATGCCATT-	--TAAACGACAGGCTCT------		--AGTGGAATT	TGAA	AACATAG--	ATAG	376
EST	R12491	216	GTTC	----ACA	A	TGAT	TGACAATCT-	---AAGTATGGCAGA--------		--AGATTGTTA	GGAA	AATGG----	GAGT	162
EST	R90452	200	TTCT	--GACAT	A	TGAT	TAGACTGTTT	--CAAATGCTGGCA---------		-AAATGGTTAA	TGAA	GTAAG----	AGAA	258
EST	N85974	271	CTGG	----TTA	A	TGAT	ACAATGCATC	-GTAAACCTTCAGAAGGAAGGAG		--ATGTTTTGG	GGAC	ACT------	TTGG	334
EST	AA121352	149	CGGA	----TGG	A	TGAG	TTTGGCTTCA	-AGAATGTGCTCGTGC-------		-TGGTGCCAAG	GGAG	TGAGTTTTC	TCTG	86

SECIS - эксперимент



the Zoo

Genomes have nucleic acids

Genome	Gene Number	Base Pairs
Organisms		
Plants	<50,000	$<10^{11}$
Mammals	100,000	$\sim 3 \times 10^{8}$
Worms	14,000	$\sim 10^{8}$
Flies	12,000	1.6×10^{8}
Fungi	6,000	1.3×10^{7}
Bacteria	2-4,000	$<10^{7}$
Mycoplasma	500	$<10^{6}$
dsDNA Viruses		
Vaccinia	<300	187,000
Papova (SV40)	~6	5,226
Phage T4	~200	165,000
ssDNA Viruses		
Parvovirus	5	5,000
Phage fX174	11	5,387
dsRNA Viruses		
Reovirus	22	23,000
ssRNA Viruses		
Coronavirus	7	20,000
Influenza	12	13,500
TMV	4	6,400
Phage MS2	4	3,569
STNV	1	1,300
Viroids		
PSTV RNA	0	359
Scrapie		
Prion	?	?

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Одноцепочечные РНК-вирусы

- положительные (полиовирус)
- отрицательные (вирус гриппа)
- ретровирусы (вирус СПИДа)
  - обратная транскриптаза

Генная инженерия

- рестриктазы и сайты рестрикции
- лигаза
- обратная транскриптаза