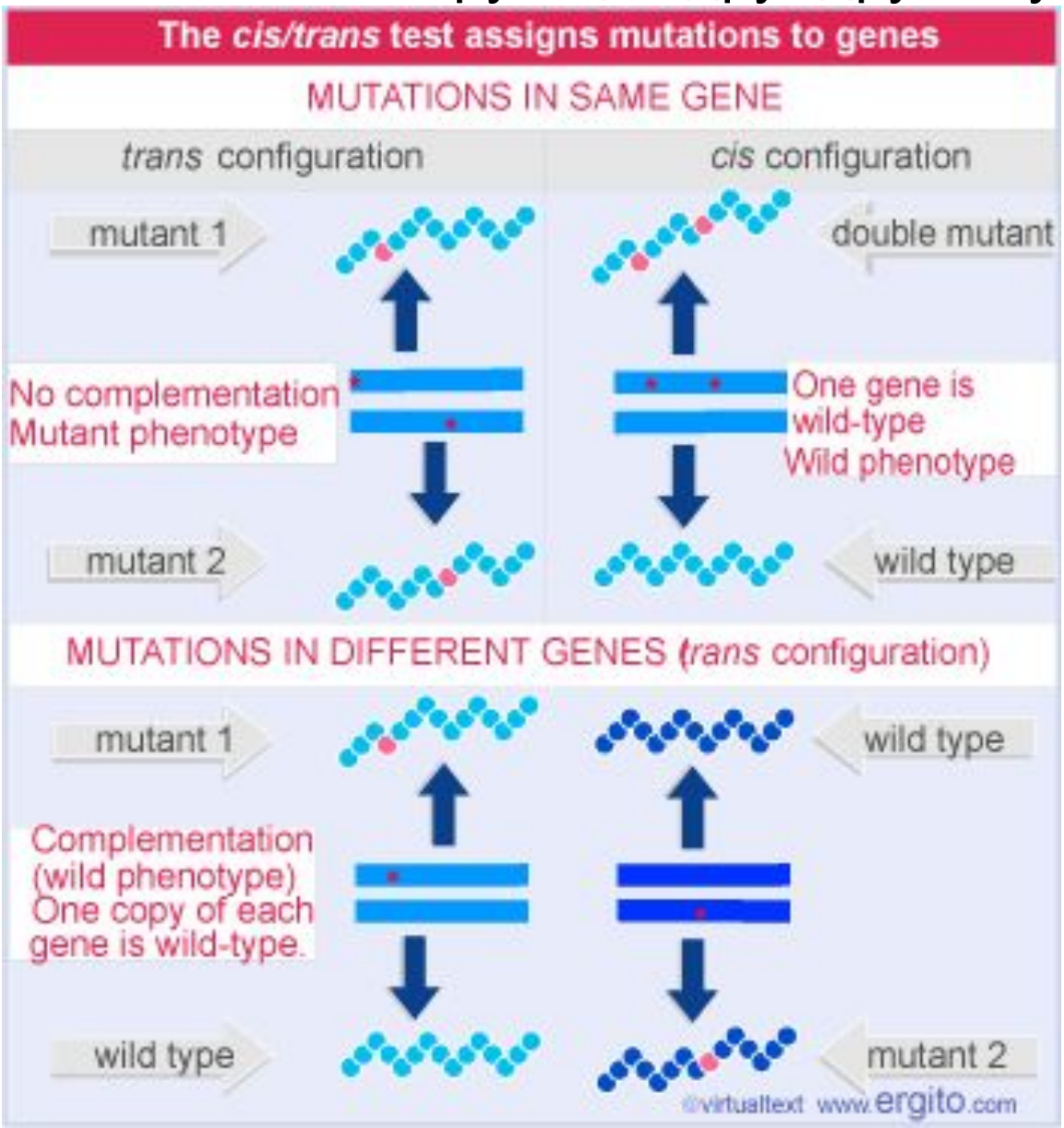
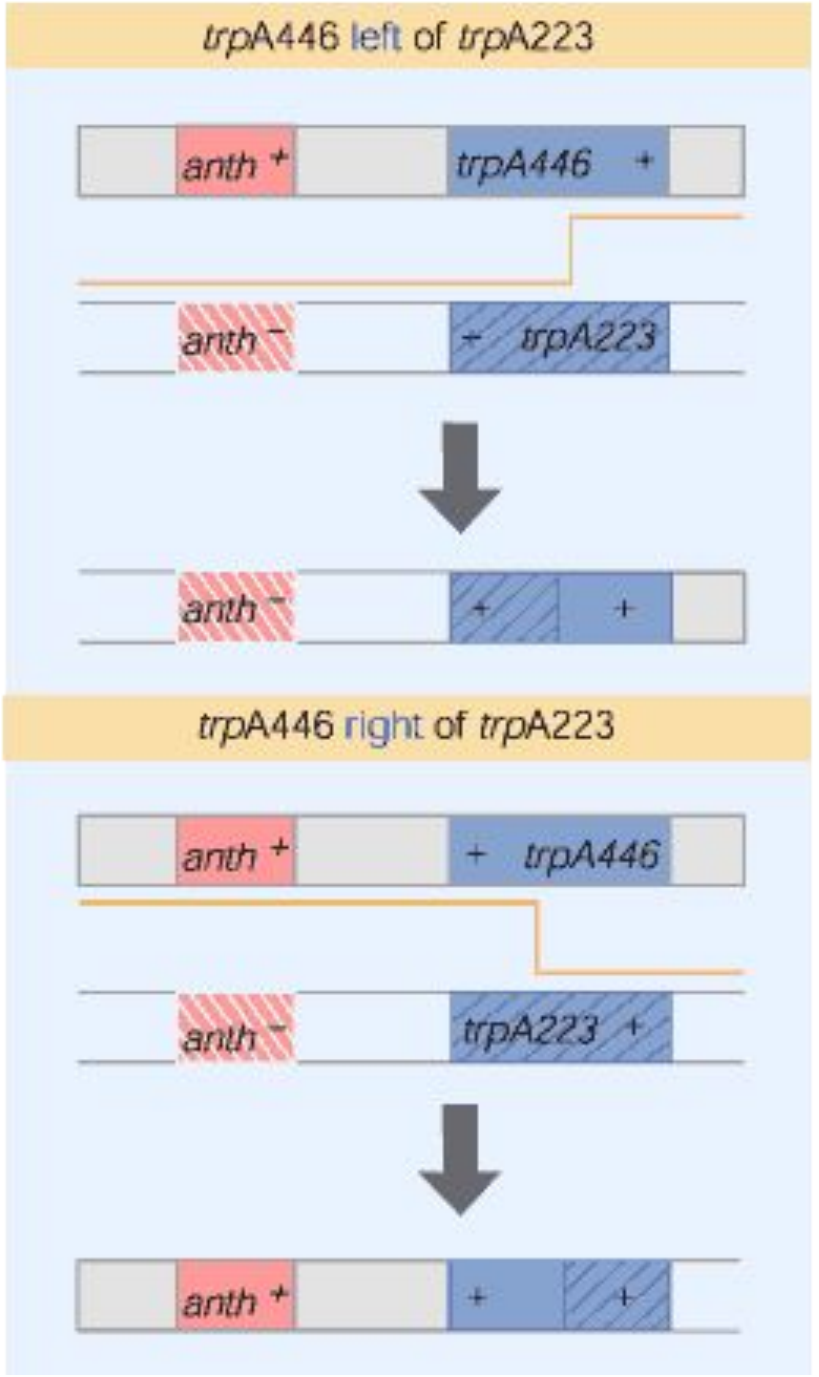
Поправки и Добавки

Ген как цистрон

(группа некомплементирующих друг друга мутаций)

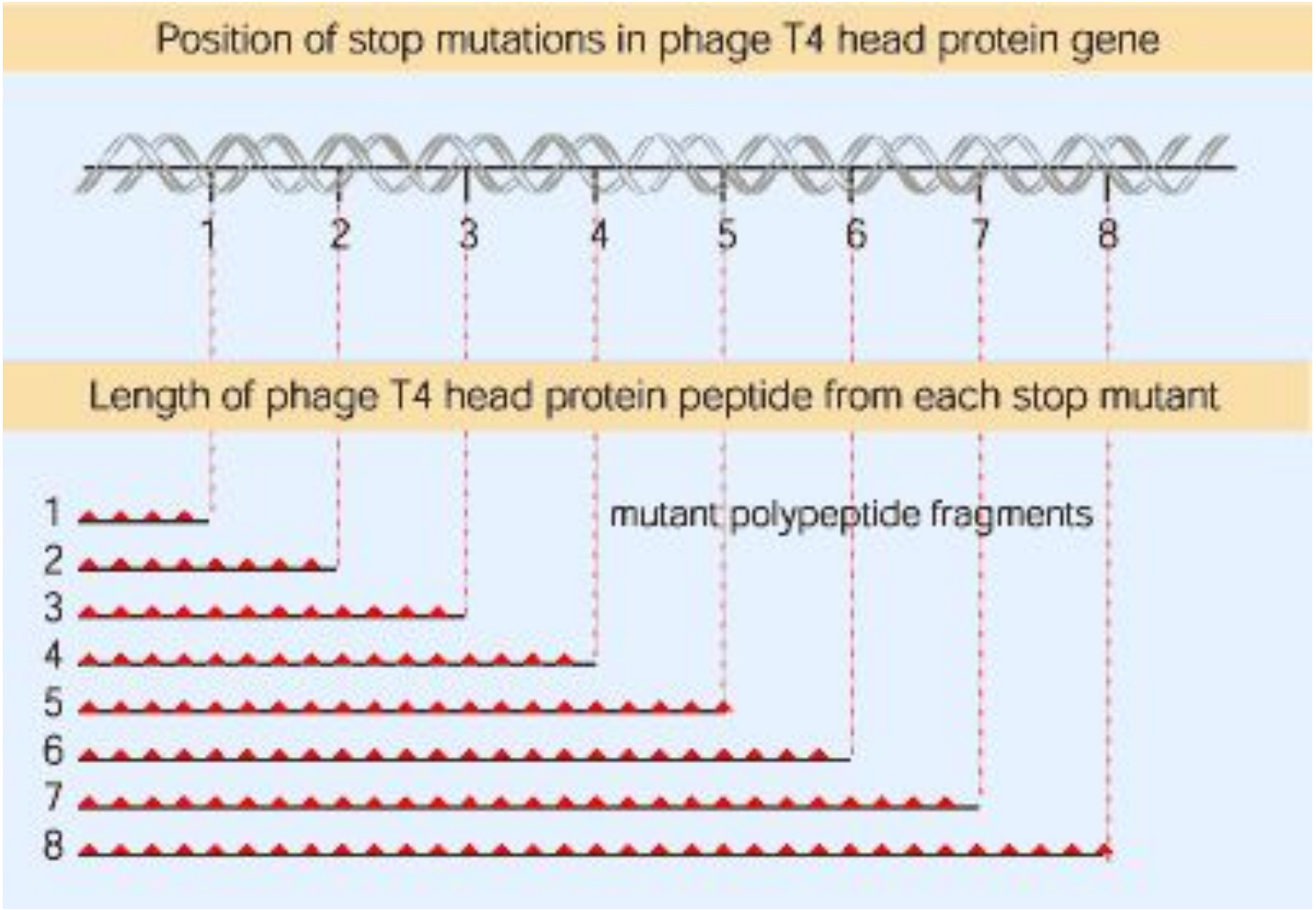


Генетическая карта



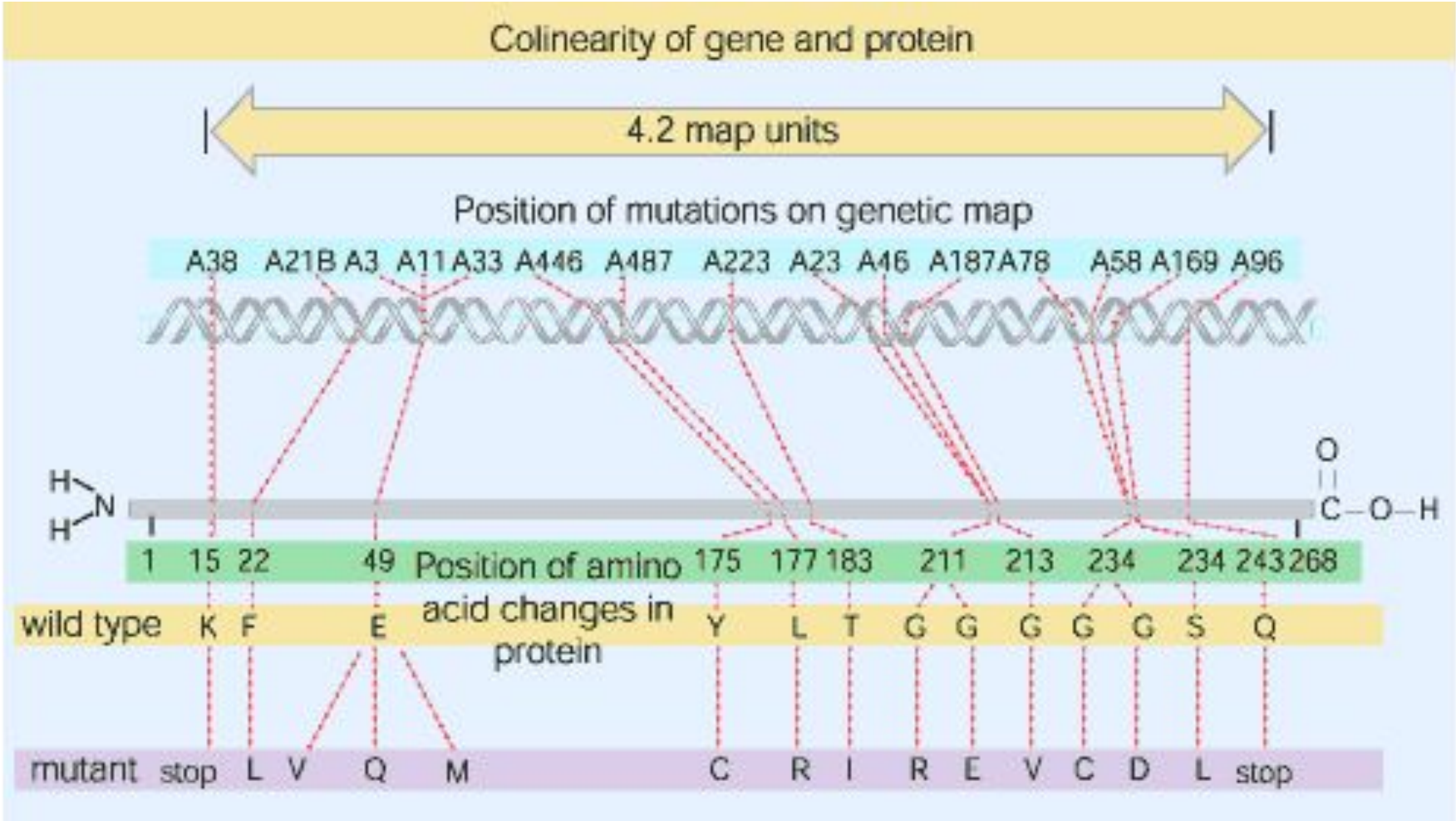
Коллинеарность гена и белка

(Brenner, 1964)

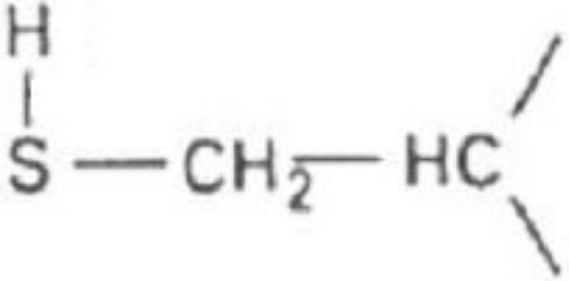


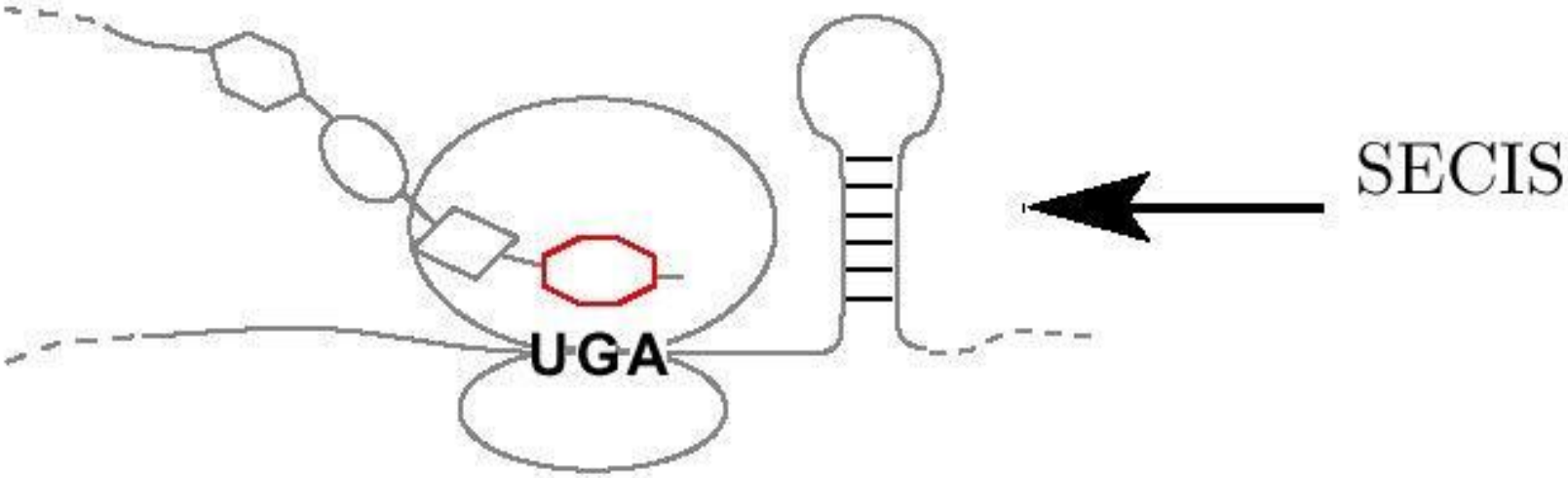
Коллинеарность гена и белка

(Yanofsky, 1967)



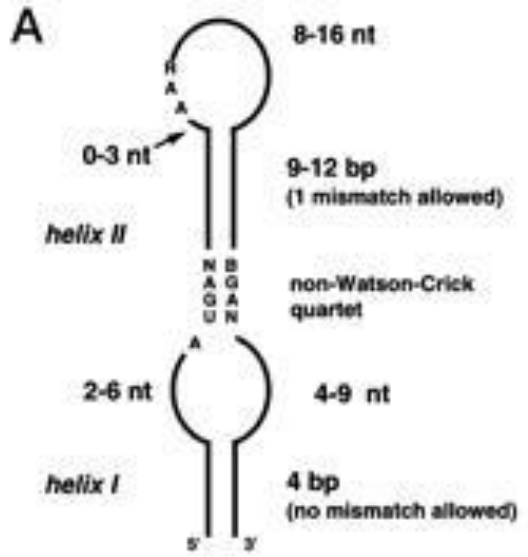
SECIS - схема





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

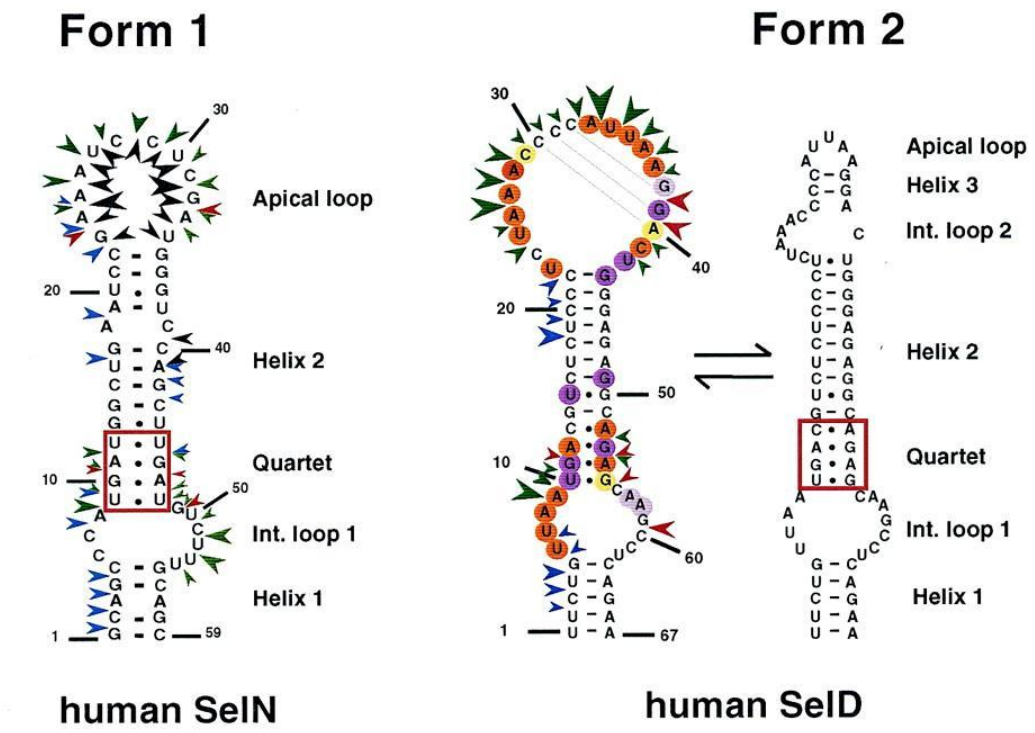
SECIS – выравни-вание и консенсус

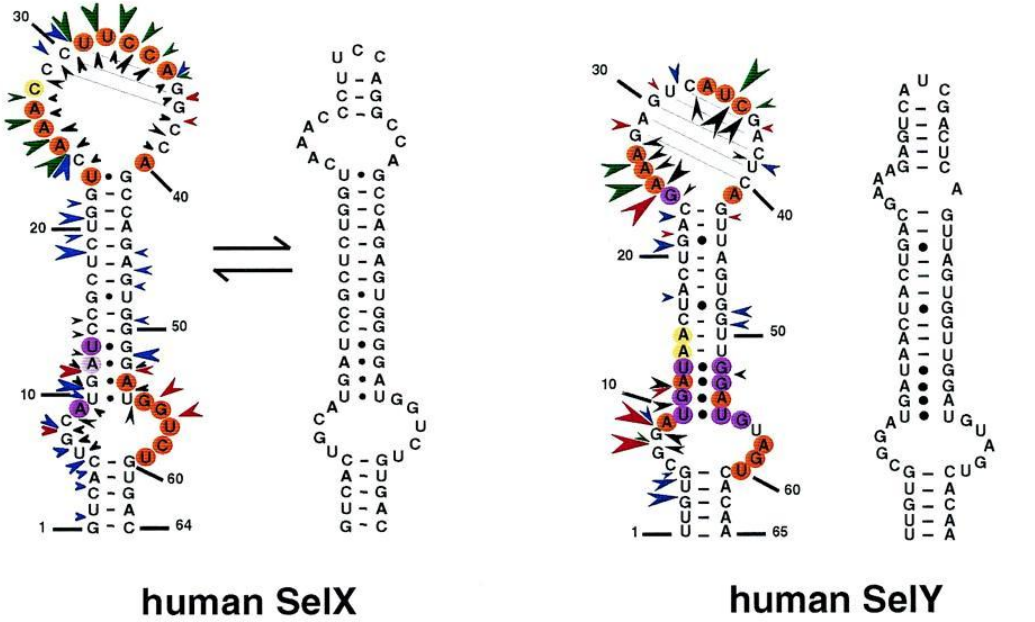


C

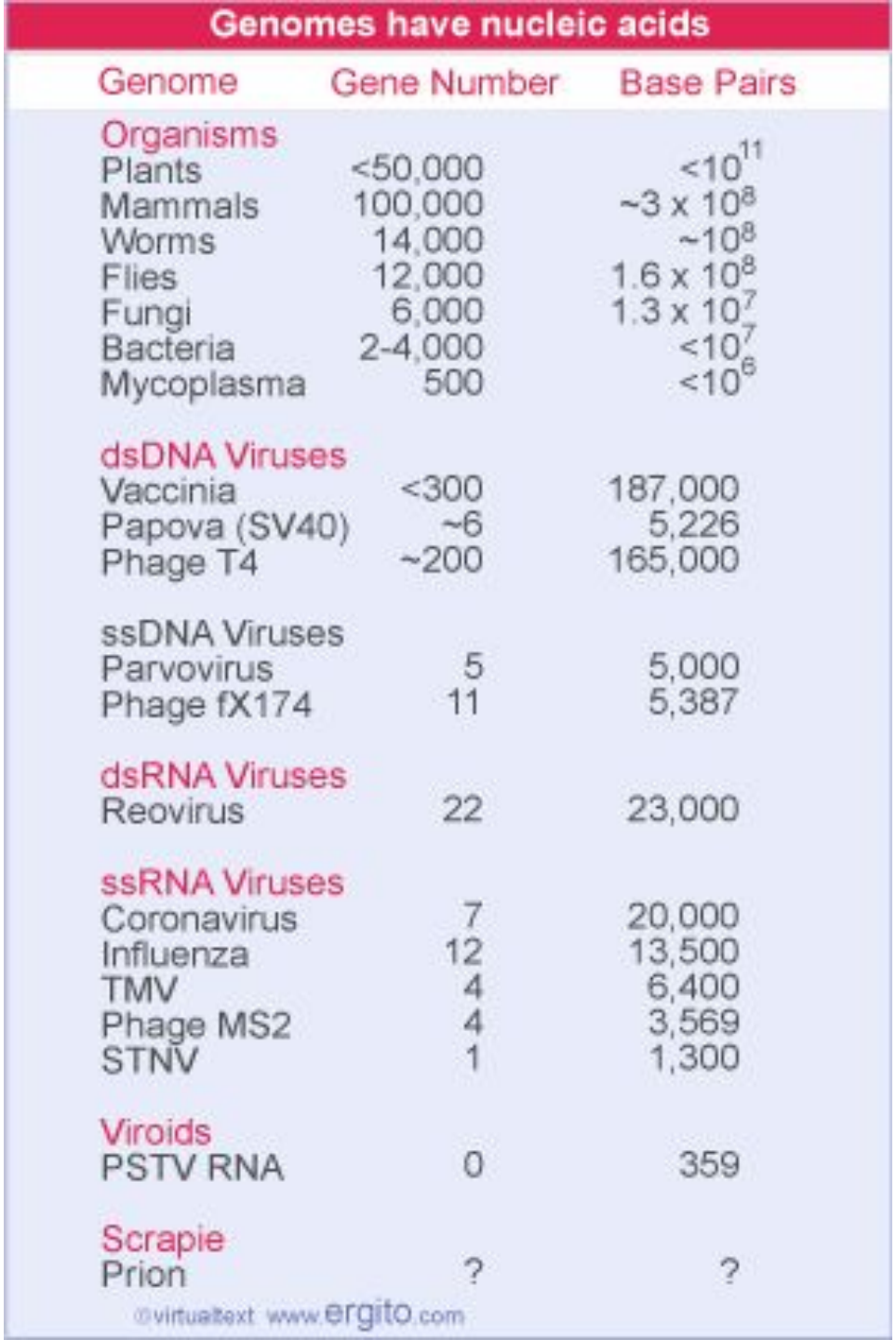
	Accession number		Helix I	Internal loop	Helix II	Apical loop	Helix II	Internal loop	Helix I	
cDNA	M35391	671	TGTT	-GACTAA A	TGAG	TGGTTTAT--	-TCAAGGACTAGGTAC-------	---ATAAACCA	TGAT	GTAAGCA-- AATA 611
EST	R16491	116	GCTG	----GTT A	TGAG	TCCATGTGCA	--GAAAACCCATGTGTGTG---	-TGAGTATGGA	AGAA	ACATTT--- CAGC 53
STS	L18002	172	TCTA	-----AG A	TGAG	ATGCATCCAT	--GAAACATTGCAACTGTGG---	-ATGGATGCAC	AGAT	GGATGGA-- TGGA 101
STS	Z16689	264	GTAT	-----TC A	TGAT	CTGGAGGA-	---AAGGAATGAAGAAC------	--TCTTCCAAA	AGAC	GAGCCTG-- ATGC 321
EST	R71722	49	GCAG	----CCC A	TGAT	GGCTGAATCC	--GAAATCCTCGAT---------	-GGGTCCAGCT	TGAT	GTCTTTG-- CAGC 107
EST	R23284	66	CTCT	-----AC A	TGAC	GTGGGGTCT-	--CAAGGGACTGGAGGTCCCAC-	-AGACATCACT	AGAA	CAACTAGC- AGGG 1
EST	AA057045	136	TCAC	----TGC A	TGAT	CCGCTCTGGT	--CAAACCCTTCCAGGCCA----	-GCCAGAGTGG	AGAT	GGTCT---- GTGA 197
EST	AA109465	277	ATAT	-----AG A	TGAA	TGAATGAAAG	--AAAACATAGTACAACAA----	-TTTTATGCA	TGAT	ATATTTAAG ATAT 341
cDNA	HP82	2055	TCTG	----TTA A	TGAC	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	H47643	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	H85650	227	GGGA	--ACGAG A	TGAT	GAAGGGCAG-	--CAAGTCCCATTGTA-------	--CTTTCCTTT	TGAA	TGACCTTTC TCTC 165
EST	R46598	323	TGTG	----CGG A	TGAT	AACTACTGAC	--GAAAGAGTCATCGACTCA---	-GTTAGTGGTT	AGAT	GTAGT---- CACA 261
EST	R44842	109	CCGG	----ATG A	TGAC	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	AGAA	AATGG---- GAGT 162
EST	H90452	200	TTCT	--GACAT A	TGAT	TAGACTGTTT	--CAAATGCTGGCA---------	-AAATGGTTAA	TGAA	GTAAG---- AGAA 258
EST	H85974	271	CTGG	----TTA A	TGAT	ACAATGCATC	-GTAAACCTTCAGAAGGAAGGAG	--ATGTTTTGT	GGAC	ACT------ TTGG 334
EST	AA121352	149	CGGA	----TGG A	TGAG	TTTGGCTTCA	-AGAAATGTGCTCGTGC-------	-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	?	?

Одноцепочечные РНК-вирусы

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

Генная инженерия

- рестриктазы и сайты рестрикции
- лигаза
- обратная транскриптаза