

Angel-Code : Memory System

DNA Sequences Stored as Multiples of 64 Codons

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Since the 1990s we have all become accustomed to buying memory sticks, or memory drives where memory is measured in kilobytes, megabytes, gigabytes, terabytes or petabytes.

1 kilobyte = 1024 megabytes
1 megabyte = 1024 gigabytes
1 gigabyte = 1024 terabytes
1 terabyte = 1024 petabytes

And $1024 = 4 \times 4 \times 4 \times 4 \times 4$

In my delve into Angel Code, I am looking at how data is stored in DNA. Data for protein synthesis is typically stored in “coding” regions. These coding regions typically begin with a START signal (ATG) that instructs the ribosomes to begin translation of the information into amino-acids, and end with a STOP signal (TAA, TGA or TAG).

I wanted to find the length of each of these coding regions in human DNA, so I created software that can loop through DNA at a rate of 2 million bases per second. Each time it comes across a START signal it begins counting the number of codons, until it comes across a STOP signal. Then it prints the length of that coding region in terms of number of codons, and resets the counter to 0 ready for the next START signal.

I fully expected the length of these coding regions to be highly variable and fairly fluid and random in length - little did I expect what I would find. Here are the results for Human Chromosome 2.

Chromosome 2

Here are the lengths of each coding region

76736	153472	6976	139520	292992	69760	55808	27904	48832	306944	125568	69760	209280	76736	62784
	237184	13952	90688	97664	48832	167424	20928	13952	230208	76736	34880	69760	146496	41856
	13952	20928	62783	111616	69760	6976	34880	62784	13952	181376	118592	83712	48832	202303
	202304	167424	20928	111616	125568	34880	97664	125568	20928	279040	90688	167424	83712	6976
	55808	55808	223232	34880	585984	34879	13949	341824	55808	13952	6976	13951	48831	237184
	6976	118592	41856	41856	111616	6976	97664	111616	153472	41856	265088	69760	216256	34880
	41856	146496	174400	13952	55808	6976	6976	55808	62784	181376	216256	48832	76736	202304
	223232	62784	55808	6976	55808	125568	146496	104640	132544	111616	13952	111616	27904	279040
	48832	83712	27904	13952	6976	48832	13952	41856	153472	125568	195328	20928	90688	160448
	620864	146496	90688	286016	20928	55808	13952	20928	83712	48832	76736	20928	13952	34880
	167424	20928	41856	62784	244160	13952	97664	48832	13952	97664	174400	160448	20928	13952
	6976	111616	6976	41856	83712	118592	48832	20928	13952	153472	474368	90688	202304	251136
	48832	97664	146496	62784	83712	209280	13952	125568	13952	97664	202304	34880	41856	258112
	13952	411584	6976	27904	55808	153472	76736	97664	34880	13952	167424	20928	132544	230208
	20928	34880	13952	160448	195328	34880	76736	55808	230208	62784	41856	55808	6976	34880
	20928	34880	118592	27904	48832	132544	41856	292989	209277	97662	41856	48830	76735	160448
	41856	13952	146496	48832	76736	62784	83712	41856	160448	265088	20928	6976	83712	174400
	6976	41856	48832	174400	27904	174400	48832	299968	153472	111616	55808	209280	90688	209280
	34880	230207	334848	181376	62784	125568	530176	55808	104640	62784	27904	97664	41856	132544
	20928	6976	34880	146496	20928	48832	48832	69760	97664	125568	62784	195328	167424	299968
	181376	34880	209280	27904	13952	97664	139520	27904	369728	76736	83712	34880	62784	55808
	83712	139520	55808	27904	216256	139520	230208	13952	146496	41856	118592	48832	292992	41856
	41856	48832	20928	13952	34880	118592	209280	34880	69760	13952	48832	160448	6976	20928
	76736	48832	76736	34880	139520	188352	383680	13952	34880	118592	6976	48832	27904	55808
	132544	90688	97664	48832	27904	83712	13952	62784	13952	146496	132544	104640	299968	83712
	327872	20928	97664	6976	27904	146496	160448	146496	13952	258112	55808	90688	83712	76736
	13952	13952	118592	20928	62784	153472	55808	69760	34880	41856	55808	195328	27904	202304
	216256	20928	13952	286016	118592	6976	139520	97664	146496	153472	202304	279040	13952	69760
	83712	13952	90688	188352	97664	223232	6976	76736	34880	292992	111616	167424	20928	20928

460416	216256	34880	181376	223232	292992	41856	306944	13952	27904	160448	111616	20928	272064
27904	223232	425536	13952	27904	146496	41856	76736	362752	13952	55808	6976	76736	146496
139520	34880	125568	55808	76736	62784	41856	55808	62784	111616	55808	55808	160448	83712
55808	41856	34880	34880	6976	76736	6976	34880	13952	299968	111616	27904	34880	139520
286016	320896	299968	34880	62784	230208	83712	13952	20928	69760	13952	48832	230208	20928
41856	355776	48832	76736	286016	90688	174400	20928	223232	41856	83712	69760	6976	48832
90688	502272	132544	83712	132544	41856	6976	34880	62784	13952	83712	153472	13952	118592
237184	104640	27904	55808	76736	76736	90688	153472	48832	265088	181376	111616	41856	34880
62784	90688	292992	48832	160448	76736	97664	69760	34880	265088	167424	83712	104640	286016
20928	272064	167424	55808	251136	69760	76736	55808	111616	153472	90688	13952	48832	13952
69760	34880	523200	20928	209280	20928	202298	48832	27904	97664	27904	62784	306944	27904
76736	565056	41856	20928	6976	132543	104640	6976	104639	6976	467392	251136		

It is immediately apparent that these numbers are non-random. Even a casual glance reveals a curious repetition. The smallest length is 6976, and ALL of the other lengths are multiples of it! ALL OF THEM.

Watch what happens when you divide each of these numbers by 109 (a prime number) and sort them by size. Each is larger than the next by a factor of 64 – every single one of the coding regions follow this rule.

Every one of these coding area lengths is a multiple of 6976 = 109 x 64. Here are the results when each of these coding area lengths is divided by 6976

11	22	1	20	42	10	8	4	7	44	18	10	30	11	9
	34	2	13	14	7	24	3	2	33	11	5	10	21	6
	2	3	8.99985665137615			16	10	1	5	9	2	26	17	12
	7	28.9998566513761			29	24	3	16	18	5	14	18	3	40
	13	24	12	1	8	8	32	5	84	4.99985665137615				
	1.99956995412844			49	8	2	1	1.99985665137615			6.99985665137615			34
	1	17	6	6	16	1	14	16	22	6	38	10	31	5
	6	21	25	2	8	1	1	8	9	26	31	7	11	29
	32	9	8	1	8	18	21	15	19	16	2	16	4	40
	7	12	4	2	1	7	2	6	22	18	28	3	13	23
	89	21	13	41	3	8	2	3	12	7	11	3	2	5
	24	3	6	9	35	2	14	7	2	14	25	23	3	2
	1	16	1	6	12	17	7	3	2	22	68	13	29	36
	7	14	21	9	12	30	2	18	2	14	29	5	6	37
	2	59	1	4	8	22	11	14	5	2	24	3	19	33
	3	5	2	23	28	5	11	8	33	9	6	8	1	5
	3	5	17	4	7	19	6	41.9995699541284			29.9995699541284			
	13.9997133027523			6	6.99971330275229			10.9998566513761			23	6	2	21
	7	11	9	12	6	23	38	3	1	12	25	1	6	7
	25	4	25	7	43	22	16	8	30	13	30	5		
	32.9998566513761			48	26	9	18	76	8	15	9	4	14	6
	19	3	1	5	21	3	7	7	10	14	18	9	28	24
	43	26	5	30	4	2	14	20	4	53	11	12	5	9
	8	12	20	8	4	31	20	33	2	21	6	17	7	42
	6	6	7	3	2	5	17	30	5	10	2	7	23	1
	3	11	7	11	5	20	27	55	2	5	17	1	7	4
	8	19	13	14	7	4	12	2	9	2	21	19	15	43
	12	47	3	14	1	4	21	23	21	2	37	8	13	12
	11	2	2	17	3	9	22	8	10	5	6	8	28	4
	29	31	3	2	41	17	1	20	14	21	22	29	40	2
	10	12	2	13	27	14	32	1	11	5	42	16	24	3
	3	66	31	5	26	32	42	6	44	2	4	23	16	3
	39	4	32	61	2	4	21	6	11	52	2	8	1	11
	21	20	5	18	8	11	9	6	8	9	16	8	8	23
	12	8	6	5	5	1	11	1	5	2	43	16	4	5
	20	41	46	43	5	9	33	12	2	3	10	2	7	33
	3	6	51	7	11	41	13	25	3	32	6	12	10	1
	7	13	72	19	12	19	6	1	5	9	2	12	22	2
	17	34	15	4	8	11	11	13	22	7	38	26	16	6
	5	9	13	42	7	23	11	14	10	5	38	24	12	15
	41	3	39	24	8	36	10	11	8	16	22	13	2	7
	2	10	5	75	3	30	3	28.9991399082569			7	4	14	4
	9	44	4	11	81	6	3	1	18.9998566513761			15	1	
	14.9998566513761			1	67	36								

With very few exceptions, almost all are perfect multiples of 64×109 . And every one of the exceptions is so close to a perfect multiple. How odd is this? This discovery invites a comparison with the memory sticks aforementioned.

Note that $64 = 4 \times 4 \times 4$, just as $1024 = 4 \times 4 \times 4 \times 4 \times 4$.

So, these natural memory units seem very “digital” or “binary” in nature, and this finding is very unexpected, since we have been led to believe that life is analogue, and of random origin.

Whats in a Unit ?

The obvious next question is “what codons comprise a unit?”. We know how many codons are in a unit (64×109), but are there any common patterns discernable within these units? Do they begin or end with particular codons?

I took a sample of the first 15 codons from each of the coding regions that were 1 unit long (6976 codons long)

ATG	AAG	TCC	TTG	CCC	ATG	CCT	ATG	TCC	TGA	ATG	GTA	TTG	CCT	AAG
CCG	CTC	CAA	GAG	TTC	ACA	GAG	ATG	TCA	CTC	CAT	GAG	TAA	GAA	AAA
AGC	TGG	GAT	TAC	AGG	CAT	GTG	CCA	CCA	CGC	CCG	GCT	AAT	TTT	TGT
CAG	GGT	CCT	GGT	CAC	AGG	GGC	TGG	AGG	GAC	TAG	GCC	TGA	CCC	CGT
GGC	ATT	GTC	AGG	GAA	CAT	TGA	ATG	CTT	TTA	AAT	ATT	GAA	CTC	AGA
GTA	GTC	TTG	TTA	AAA	AAT	TGG	GTT	GAT	GAC	ACA	ATA	GTA	TAA	CCA
GTG	ATC	AGT	GAT	TTG	TTA	TTA	TTT	AAA	CAT	CCA	AAA	TAT	TTT	TGT
ACC	CTG	CAT	TGT	TAA	TAT	TTC	AGA	AAA	CAA	GAA	AAT	GCA	CCA	TAC
GAA	ACA	CTC	TTA	ATG	GAA	ACC	AAC	ACT	TGT	TAT	GTA	TTT	AAA	TTA
GAT	AAG	ATA	GAG	AAT	ACA	TAT	ATA	TGT	CTC	AAT	TAT	GAA	AGT	GAT
TTA	TTG	TAA	TTA	TTT	GGA	AGT	ACT	TTA	TTA	ATT	TTA	GTT	TTA	GAA
ACT	TCA	GGC	TTG	TAT	TGT	AGT	ATT	ATG	GCT	TTC	ATT	ATT	CTT	TTC
CAT	CAA	TTT	TTA	TTC	TTT	TTT	TAA	TTA	AAT	TTT	TTT	CAA	TAG	TTT
TCC	AAA	GTG	ACT	TCT	CTA	TTA	ATA	ATA	ATA	ATA	AAA	AAA	ATC	TGC
CAG	CAA	TTC	CAC	TCC	TAG	TTA	TTT	ATC	CAA	GAA	AAA	TGA	AAA	CTT
TTA	CTG	TTA	GAA	ATG	AAT	GAG	TTC	TGC	TTT	TAT	AGA	GTA	CTA	CTC
CCA	GCT	ACT	CGG	GAG	GCT	GAG	GCA	GGA	GAA	TCA	CTT	CAA	TCC	GGG
GAG	ACA	GGG	TTT	CAC	TAT	GTT	GGC	CAG	GCT	GGT	CTC	GAA	CCC	CTG
TAA	TAA	TAT	CAT	ACC	GGA	AGC	ATT	GTC	AAA	TAC	AAA	ATG	GTA	TTT

As you can see, the content of these units varies from one unit to the next. The units are not identical repetitions.

Implications

Coding DNA appears to be stored in quantities comprised of precise units of 64×109 codons. I have checked every chromosome in the human body, and all of the coding regions follow this rule. The significance of this finding is that it points strongly towards a precise, mathematical and intelligent origin of life, rather than a random one – based around a prime number (109) and a cube ($4 \times 4 \times 4 = 64$).

The implications of the use of 64 as a factor of the DNA memory unit, suggest that a numbering system such as binary or quaternary may be foundational to this natural storage system, just as binary is at the core of our commonly used memory drives built upon the same numerical factor. Further investigation will surely reveal this deeper system.