The following mRNA sequences are used with the Seblastian program (<http://seblastian.crg.es>) in Parts II and III of the case study “Computers and Micronutrients: Using Bioinformatic Tools to Uncover Selenoproteins and Mutations” by Winyoo Chowanadisai and Bryant H. Keirns, Department of Nutritional Sciences, Oklahoma State University, Stillwater, OK. This document may be shared with students in case the links are broken, the students have trouble finding the sequences on the webpage, or if there are difficulties accessing the website by internet.

*Sequence 1:* Human Glutathione Peroxidase 1

*Source:* <https://www.ncbi.nlm.nih.gov/nuccore/NM_000581.4>

1 aaaaggaggc gcctgctggc ctccccttac agtgcttgtt cggggcgctc cgctggcttc

61 ttggacaatt gcgccatgtg tgctgctcgg ctagcggcgg cggcggcggc ggcccagtcg

121 gtgtatgcct tctcggcgcg cccgctggcc ggcggggagc ctgtgagcct gggctccctg

181 cggggcaagg tactacttat cgagaatgtg gcgtccctct gaggcaccac ggtccgggac

241 tacacccaga tgaacgagct gcagcggcgc ctcggacccc ggggcctggt ggtgctcggc

301 ttcccgtgca accagtttgg gcatcaggag aacgccaaga acgaagagat tctgaattcc

361 ctcaagtacg tccggcctgg tggtgggttc gagcccaact tcatgctctt cgagaagtgc

421 gaggtgaacg gtgcgggggc gcaccctctc ttcgccttcc tgcgggaggc cctgccagct

481 cccagcgacg acgccaccgc gcttatgacc gaccccaagc tcatcacctg gtctccggtg

541 tgtcgcaacg atgttgcctg gaactttgag aagttcctgg tgggccctga cggtgtgccc

601 ctacgcaggt acagccgccg cttccagacc attgacatcg agcctgacat cgaagccctg

661 ctgtctcaag ggcccagctg tgcctagggc gcccctccta ccccggctgc ttggcagttg

721 cagtgctgct gtctcggggg ggttttcatc tatgagggtg tttcctctaa acctacgagg

781 gaggaacacc tgatcttaca gaaaatacca cctcgagatg ggtgctggtc ctgttgatcc

841 cagtctctgc cagaccaagg cgagtttccc cactaataaa gtgccgggtg tcagcagaa

*Sequence 2:* Mouse Low Density Lipoprotein Receptor

*Source:* <https://www.ncbi.nlm.nih.gov/nuccore/NM_010700.3>

1 gcagactcct cccccgcctg gaaacctcgc ccctagtact gggaatgact ctgggcgtgc

61 ggcgtagttt gcagccggga caccgtgagg cttgcgagcc cagattcgca gccgagacac

121 cgtggggccc gcgatccagt gtttgcagcg ggaacatttc ggggtctgtg atccgagtga

181 ggacgcaacg cagaagctaa ggatgagcac cgcggatctg atgcgtcgct gggtcatcgc

241 cctgctcctg gctgctgccg gagttgcagc agaagactca tgcagcagga acgagttcca

301 gtgtagagac ggaaaatgca tcgctagcaa gtgggtgtgc gatggcagcc ccgagtgccc

361 ggatggctcc gatgagtccc cagagacatg catgtctgtc acctgtcagt ccaatcaatt

421 cagctgtgga ggccgtgtca gccgatgcat tcctgactcc tggagatgtg atggacaggt

481 agactgtgaa aatgactcag acgaacaagg ctgtcccccc aagacgtgct cccaggatga

541 cttccgatgc caggatggca agtgcatctc cccgcagttt gtgtgtgatg gagaccgaga

601 ttgcctagat ggctctgatg aggcccactg ccaggccacc acttgtggcc ccgcccactt

661 ccgctgcaac tcatccatat gcatccccag tctttgggcc tgcgacgggg atgtcgactg

721 tgttgacggc tccgatgagt ggccacagaa ctgccagggc cgagacacgg cctccaaagg

781 cgttagcagc ccctgctcct ccctggagtt ccactgtggt agcagtgagt gtatccatcg

841 cagctgggtc tgtgacggcg aggcagactg caaggacaag tcagatgagg agcactgcgc

901 ggtggccacc tgccgacctg atgaattcca gtgtgcagat ggctcctgca ttcacggtag

961 ccgccagtgt gaccgtgaac atgactgcaa ggacatgagc gacgagctcg gctgcgtcaa

1021 tgtgacacag tgtgatggcc ccaacaagtt caagtgtcac agtggggagt gcatcagctt

1081 ggacaaggtg tgcgactccg cccgcgactg ccaggactgg tcggatgagc ccatcaagga

1141 gtgcaagacc aacgagtgtt tggacaacaa tggtggctgt tcccacatct gcaaggacct

1201 caagattggc tctgagtgcc tgtgtcccag cggcttccgg ttggtggacc tccacaggtg

1261 tgaagatatt gacgagtgtc aggagccaga cacctgcagc cagctctgtg tgaacctgga

1321 aggcagctac aagtgtgagt gccaggccgg cttccacatg gacccacaca ccagggtctg

1381 caaggctgtg ggctccatag gctatctgct cttcaccaac cgccacgagg tccggaagat

1441 gaccctggac cgcagcgagt acaccagtct gctccccaac ctgaagaatg tggtggctct

1501 cgacacggag gtgaccaaca atagaatcta ctggtccgac ctgtcccaaa aaaagatcta

1561 cagcgccctg atggaccagg cccctaactt gtcctacgac accatcatca gtgaggacct

1621 gcatgcccct gacgggctgg cggtagactg gatccaccgc aacatctact ggacagattc

1681 agtcccaggc agcgtatctg tggctgacac caagggcgta aagaggagga cactgttcca

1741 agaggcaggg tccagaccca gagccatcgt agtggaccct gtgcatggct tcatgtactg

1801 gacagattgg ggaacacccg ccaagatcaa gaaagggggt ttgaatggtg tggacatcca

1861 ctcactggtg accgaaaaca tccagtggcc aaatggcatc acactagatc tttccagtgg

1921 ccgtctctat tgggttgatt ccaaactcca ctctatctcc agcatcgatg tcaatggggg

1981 caatcggaaa accattttgg aggatgagaa ccggctggcc caccccttct ccttggccat

2041 ctatgaggac aaagtgtatt ggacagatgt cataaacgaa gccattttca gtgccaatcg

2101 actcacgggt tcagatgtga atttggtggc tgaaaacctc ttgtccccgg aggacattgt

2161 cctgttccac aaggtcacac agcctagagg ggtgaactgg tgtgagacaa cagccctcct

2221 ccccaatggt ggttgccagt acctgtgcct gcccgcccca cagatcggtc cccactcgcc

2281 caaattcacc tgcgcctgcc ctgatggcat gctgctggcc aaggacatgc ggagctgcct

2341 cacagaagtc gacactgtac tgaccaccca ggggacatcc gccgtccggc ctgtggtcac

2401 cgcatcagct accaggccac cgaagcacag tgaggatctc tcagctccca gtactcctag

2461 gcagcctgtg gacaccccag ggctcagcac agtggcgtca gtgacagtgt cccaccaagt

2521 ccagggtgac atggctggca gagggaatga ggagcagcca catggtatga ggttcctgtc

2581 catcttcttc cctattgcac tggttgccct ccttgtcctt ggggccgtcc tgctgtggag

2641 gaactggcgg ctgaagaaca tcaacagcat aaactttgac aacccagtct accagaagac

2701 cacagaggac gagctccaca tttgccgaag ccaggatggc tatacctacc cctcaagaca

2761 gatggtcagc ctggaggacg atgtggcatg agcagccggg agagccgtct ctttccggga

2821 tccattgcca agcttaggca gaaaagacac tctctccaga cctccccatc cagcactggt

2881 cctgccacct ccctgggctc tgtgttgctc aaagcaagat aagagcaaag ctgggctggg

2941 ggccaagctc agctgcctgt ctgccccagg ttctgtttta tatatttatt gtctggggac

3001 agaaaaggct actggctgtg cttgaaattc gaattctgcc tgggaatttt tttttttctc

3061 ccatcttcat ttccttggaa gccaaatagg ctgtcccaga agcttctgaa ttctactctt

3121 ttcaacacta acacggagga ggaagagacc cacccaggca gagagaagcc tgctggacat

3181 gagacagcag gtactactga ccgggtcctg ggtaccatag ccagtcccta acctcaggac

3241 ttcctgcatt gaccttcatc ccagagcctt cctgcctgac tctgccgccc ccatcagaag

3301 ccaggaaagt gactcgtgac attcggtact gatcttgctg gatcttgagg ccggcagctg

3361 ccagtgatgg atacccgctc atgcctttgc caaaacgtca cccgttcctg gagggacaag

3421 cccaagtcgc cattctccct taatatttat caagtgcctg agacaactgg ttgccttgct

3481 caggagtcct ggcctgctca gtgtcctgct gctcaggggt ggccggcagg acccctgtcc

3541 tgtgcccagc ccccgagtct ccgagtgagg cttgcacttc tctctgcgca cttttcccgt

3601 tctgtgctgg gcacccacgt ggtccacatt tgtactccta ggttgcactg accctggtgc

3661 attggatggg acctcaggcc ggaagtggcc ccgaatcatt gaccacagaa gataattgcc

3721 aggctccaag catccattgc cttcttcagt actgggggga actcagggcc tctgtctggt

3781 gtttagttag tctgtttgtt tgtttgtttg tttgtttgtt tggtggtttc tggctctgca

3841 cagcagagtt gtttagctcc tctggtaacg tcatcctctc tcacagagac atccagcctg

3901 ctgaagggga gagatggggc gaggggaggg atacacgcat ggtttctcag gtgtggtggc

3961 acttggcttt aatcctatgc tcaagaggaa gaggtgggca catgtctgag gtccaagcct

4021 acatagtgag accttatata tctaaaaacc aaaagaaatc ccagactatt tggtgggact

4081 tggaagaata cttagaaatt gccacagatt tgtcacatgg gtaacctaag aagacagtgg

4141 tggccttact tggattcctg ggtagatcca cctgtccact actcaagaca caagggcaca

4201 ctgcccagcc cactgggaca cttgtaaaga gctctgtaat gtgccgatgg cacctggctc

4261 ggttttcatt ctgtatattc aaggatatca cacatatgta ttaaatctat ttatttttgc

4321 aaaccctgat tgctgcacct ctctgcaatt tctccaggtt aggctggggt gatactctgg

4381 gatgctctgt atacaaagat gatttgaatg ggctgatctc aggcctgtcc tgtgcgttgc

4441 tttgagtggg tgggaactgc tttgaaaccc ttgttcagat gtttttatag gctgaaaata

4501 tcatactgtg atggattaaa ttcttttttg gaaaaaaaaa aaaaaaaaa

*Sequence 3:* Human Superoxide Dismutase 1 (SOD1)

*Source:* <https://www.ncbi.nlm.nih.gov/nuccore/NM_000454.4>

1 gtttggggcc agagtgggcg aggcgcggag gtctggccta taaagtagtc gcggagacgg

61 ggtgctggtt tgcgtcgtag tctcctgcag cgtctggggt ttccgttgca gtcctcggaa

121 ccaggacctc ggcgtggcct agcgagttat ggcgacgaag gccgtgtgcg tgctgaaggg

181 cgacggccca gtgcagggca tcatcaattt cgagcagaag gaaagtaatg gaccagtgaa

241 ggtgtgggga agcattaaag gactgactga aggcctgcat ggattccatg ttcatgagtt

301 tggagataat acagcaggct gtaccagtgc aggtcctcac tttaatcctc tatccagaaa

361 acacggtggg ccaaaggatg aagagaggca tgttggagac ttgggcaatg tgactgctga

421 caaagatggt gtggccgatg tgtctattga agattctgtg atctcactct caggagacca

481 ttgcatcatt ggccgcacac tggtggtcca tgaaaaagca gatgacttgg gcaaaggtgg

541 aaatgaagaa agtacaaaga caggaaacgc tggaagtcgt ttggcttgtg gtgtaattgg

601 gatcgcccaa taaacattcc cttggatgta gtctgaggcc ccttaactca tctgttatcc

661 tgctagctgt agaaatgtat cctgataaac attaaacact gtaatcttaa aagtgtaatt

721 gtgtgacttt ttcagagttg ctttaaagta cctgtagtga gaaactgatt tatgatcact

781 tggaagattt gtatagtttt ataaaactca gttaaaatgt ctgtttcaat gacctgtatt

841 ttgccagact taaatcacag atgggtatta aacttgtcag aatttctttg tcattcaagc

901 ctgtgaataa aaaccctgta tggcacttat tatgaggcta ttaaaagaat ccaaattcaa

961 actaaaaaaa aaaaaaaaaa a

*Sequence 4:* Human Iodothyronine Deiodinase 1

*Source:* <https://www.ncbi.nlm.nih.gov/nuccore/NM_000792.6>

1 agagcttact ctggctttgc cgagatgggg ctgccccagc cagggctgtg gctgaagagg

61 ctctgggtgc tcttggaggt ggctgtgcat gtggtcgtgg gtaaagtgct tctgatattg

121 tttccagaca gagtcaagcg gaacatcctg gccatgggcg agaagacggg tatgaccagg

181 aacccccatt tcagccacga caactggata ccaacctttt tcagcaccca gtatttctgg

241 ttcgtcttga aggtccgttg gcagcgacta gaggacacga ctgagctagg gggtctggcc

301 ccaaactgcc cggtggtccg cctctcagga cagaggtgca acatttggga gtttatgcaa

361 ggtaataggc cactggtgct gaattttgga agttgtacct gaccttcatt tatgttcaaa

421 tttgaccagt tcaagaggct tattgaagac tttagttcca tagcagattt tcttgtcatt

481 tacattgaag aagcacatgc atcagatggc tgggctttta agaacaacat ggacatcaga

541 aatcaccaga accttcagga tcgcctgcag gcagcccatc tactgctggc caggagcccc

601 cagtgccctg tggtggtgga caccatgcag aaccagagca gccagctcta cgcagcactg

661 cctgagaggc tctacataat ccaggagggc aggatcctct acaagggtaa atctggccct

721 tggaactaca acccagagga agttcgtgct gttctggaaa agctccacag ttaatctgga

781 cagatacctc aattctaggt gaccaacggg agggcttctc aaggcttagc tctccctgag

841 acccagctgg cttttaccct tgacctgtgt ccctagctga atcactagct cagatttttc

901 tgatctaagc aaacaactcc cagctgagga atgcaggcca cagcacccaa tcaagacaaa

961 ttgttattat cagaaaatga agcaacactt gagctgttca ggccagttcc ctgttgaaga

1021 aacagttccc tgttgaagaa agtagagcct gacactgctc ccactttgga gaccacattc

1081 cctgcacacg gtctttgaga gagcagttgc actctacagg cacacttctg aggtacggta

1141 tctctctcca gccactctga taccaagtaa ttcaagctgg cattccttct attagggaaa

1201 ttcattttac ccaatttgca tttatggaat tgatcattta agacactaaa ttagttttta

1261 gaaccaatta tgggaagaat tccagttgtt aggaagagat gaggagttgg aagaggaggg

1321 attagaaaca ggaggaggca gtcatcctct ccttgccaaa agatttaaac ctgtccacat

1381 tggtggtgat gatgggtgag tttccatggt aacacatccc taattttacc agggaagagg

1441 agagtactca ctttaccatc tttgaatata tttcatagaa atctagctct ctgtaccctg

1501 aaatcttcca ctagcctcac ttttcaacag agtcatctag aagggagggt tggcttccca

1561 aaagcataac cttgaccaaa ccaaacaata ggcaccagca atgctgtcat tcagttatgc

1621 agaagctcat ttgtgaaatt ctgtttctct gatttcttcg caagtctctt aatggtcatt

1681 tgtgttagat tacatcaaac tgatggatag ccattggtat tcatctattt taactctgtg

1741 tctttacata tttgtttatg atggccacag cctaaagtac acacggctgt gacttgattc

1801 aaaagaaaat gttataagat gcagtaaact aataacagaa ttattaaaat atatcaggct

1861 aaaaaaaaa

*Sequence 5:* Human Selenoprotein N1 (SEPN1, Reference Sequence)

*Source:* <https://www.ncbi.nlm.nih.gov/nuccore/NM_206926.2>

1 gcttcccggg ccgccggcag ccgccgccag ccgcagccat gggccgggcc cggccgggcc

61 aacgcgggcc gcccagcccc ggccccgccg cgcagcctcc cgcgccaccg cgccgccgcg

121 cccgttccct ggcgctgctc ggagccctgc tggccgccgc cgctgccgcc gccgtccggg

181 tctgcgcccg ccacgccgag gcccaggcgg ccgcgcggca ggaactggcg ctgaagaccc

241 tggggacaga tggccttttt ctcttttcct ccttggacac tgacggggat atgtacatca

301 gccctgagga gttcaaaccc attgctgaga agctaacagg gtcaactccc gcggccagct

361 gcgaggagga ggagttgccc cctgacccta gcgaggagac gctcaccata gaagcccgat

421 tccagcctct gctcccggag accatgacca agagcaaaga tggcttccta ggggtctccc

481 gcctcgccct gtccggcctc cgaaactgga cagccgccgc ctcaccaagt gcagtgtttg

541 ccacccgcca cttccagccc ttccttcccc cgccaggcca ggagctgggt gagccctggt

601 ggatcatccc cagtgagctg agcatgttca ctggctacct gtccaacaac cgcttctatc

661 caccgccgcc caagggcaag gaggtcatca tccaccggct cctgagcatg ttccaccctc

721 ggccctttgt gaagacccgc tttgcccctc agggagctgt ggcctgcctg actgccatca

781 gcgacttcta ctacactgtg atgttccgga tccatgccga gttccagctc agtgagccgc

841 ccgacttccc cttttggttc tcccctgctc agttcaccgg ccacatcatc ctctccaaag

901 acgccaccca cgtccgcgac ttccggctct tcgtgcccaa ccacaggtct ctgaatgtgg

961 acatggagtg gctttacggg gccagtgaaa gcagcaacat ggaggtggac atcggctaca

1021 taccccagat ggagctggag gccacgggcc cctctgtgcc ctccgtgatc ctggatgagg

1081 atggcagcat gatcgacagc cacctgcctt caggggagcc cctgcagttt gtgtttgagg

1141 agatcaagtg gcagcaggag ctgagctggg aggaggctgc ccggcgcctg gaggtggcca

1201 tgtacccctt caagaaggtc tcctacttgc cgttcactga ggccttcgac cgagccaagg

1261 ctgagaacaa gctggtgcac tcaatcctgc tgtggggggc cctggatgac cagtcctgct

1321 gaggttcagg gcggactctc cgggagactg tcctggaaag ttcgcccatc ctcaccctgc

1381 tcaacgagag cttcatcagc acctggtccc tggtgaagga gctggaggaa ctgcagaaca

1441 accaggagaa ctcgtcccac cagaagctgg ctggcctgca cctggagaag tacagcttcc

1501 ccgtggagat gatgatctgc ctgcccaatg gcaccgtggt ccatcacatc aatgccaact

1561 acttcttgga catcacctcc gtgaagcccg aggaaatcga gagcaatctc ttcagcttct

1621 catccacctt tgaagacccg tccacggcca cctacatgca gttcctgaag gagggactcc

1681 ggcgtggcct gcccctcctc cagccctaga gtgcctggac gggatctgat gcacaggccc

1741 ccacgcctca gagccagagt ggtcctcagc ccatttcaga ctgcagatgc cgcccactcc

1801 caccccactc ctaggctgcc ttggagggta caagatccac tgagggtggc caccacagcc

1861 ttggctccat ggtggcgggt agacaaggga tgcctgggct gactgggcag aggaacctct

1921 agctctgact gtcactcggc tctccctacc catttggctc tggaagctgc ttggcccccc

1981 cagatcaggg cctgggtgaa ctccctggac ctttcctagc cagccgcaca gtctaggccc

2041 ttgtggggtg aagaatggag ggaggagcag gctaggaaga cggggccacc accctctcct

2101 tgctttcagc ccttcccaca ggaaacatca agaagcccca gccaggaggg gccaggctgc

2161 caaggcggct cccctgttta tctagagcct tcgttcctgg ccataccccg gactgccctc

2221 ctgtgcctga tgtccccagc tggggtcagt ctcaacagga gccagtcttc tggagcctct

2281 gggcagaacc ctccatcaga gtggaaatca gacgggaccc cctgcagctt ccctgaccac

2341 gccactgacc agctatctgg ggaagtttac tgtgaagggg tttctgcctt tagcaatggg

2401 gttcactaag ggggttcccg aggcccaggg ccaaggcact cccaccgcct accttagcac

2461 agggtctctg caggactgcg ggagccagcg ctcctgccgc ccctcttgcc cctcagacct

2521 tgcatccaca gaagcacaac ccagccaaac accacagcct tctccagagc cggcactgtc

2581 ccggcaacca ggggtgcccc aggctagctc ttctacctct ggggcaccac ggactcccct

2641 tggccactct tgggactttg gtccacgtcc tgagccactg accacggcca gtctctcttt

2701 ttatatgtgc agaaaagtgt ttttacacaa actttctcat ggtttgtagg tattttttta

2761 taaccccagt gctgaggaga aaggaggggc agtggcttcc ccggcagcag ccccatgatg

2821 gctgaatccg aaatcctcga tgggtccagc ttgatgtctt tgcagctgca cctatgggaa

2881 gaagtagtcc tctcttcctt ctcctcttca gctttttaaa aacagtcctc agaggatcca

2941 tgatccccag cactgtccca tcctccacaa aggcccacag gcatgcctgt actctctttc

3001 attaaggtct tgaagtcagg ctgccccctc cccagccccc agttctctcc ccaccccctc

3061 accccacccg gggctcactc agcctggcag aggaagaagg aaggcagaca tctccgcagc

3121 cactcctggg ccttttatgt gccgagttac cccacttgcc ttgggcgtgt ccactgagcc

3181 ttccccagcc agtcttgttc tcaattttgt tttgttttgt tttgagacgg agtcttgctc

3241 tgtcacccag gctggagtgc tatggctcga tcttggctca ctgcaacctc cacctcccag

3301 gttcaagcaa ttctcttgcc tcagcctccc gagtagctgg gattacaggt gcatgccacc

3361 atggctggct aatttttgta tttttagtag agatggggtt tcaccatatt ggtcaggctg

3421 atctggaact tctgacctca ggtgatccac ctgcctcagc ctcccaaagt gctgggatta

3481 caggcgtgag caatcgtgcc cagccttgtt cttaattttg tatcatccag tcatcgctaa

3541 tattacacgc accttctcac ttaatcctca cgacaagcct gtgaggcaga tgctcattgt

3601 tcccatcttg atgaaacttg agtctcaggg aagtgaagtg acttgcccag ggtcactcag

3661 gtagagttga gattcaaacc cacatgtggc tccaaagtct gcatctggat ttgggggtgt

3721 tttttggcat ggcaccctca cctctctccc tgcctgtttt ccccaaagtg gaaaggaagg

3781 cctttcaaac cagagtgtct cactcccctc tgacctccag accagatggg gcatgagcca

3841 gccagctcag ccaggctccc tgtgtcctgg gaggaagtgt ccccatcccc catgcccctt

3901 atggggaggg agggcgtctg atgctctctc tctgcctccc cccccatcct gtcaggcaca

3961 ggtgacgggg gcagcccatg cgagcccttc tcctgctgct ctgggagggc cagttccaca

4021 ttgagccagc ctggtcccat ggaaaatgat ggcctgggct ttctgaggcc ttatctgatg

4081 cctctgcagt tcatgtcccc caccaggcct cgaggctcag ggtgggagag ggccccgggc

4141 tgccctgtca ctcctctaac acttccctcc cctgtcccca acatgccctg taataaaatt

4201 agagaagact aa

*Sequence 6:* Human Selenoprotein N1 (Mutated SEPN1 Sequence from Maya, Missing Nucleotides 2825–2828 (aatc).

*No link to National Center for Biotechnology Information (NCBI) is available. This sequence is nearly identical to Sequence 5, but is missing nucleotides 2825-2828 and is replaced with spaces and highlighted in yellow to indicate this deletion.*

1 gcttcccggg ccgccggcag ccgccgccag ccgcagccat gggccgggcc cggccgggcc

61 aacgcgggcc gcccagcccc ggccccgccg cgcagcctcc cgcgccaccg cgccgccgcg

121 cccgttccct ggcgctgctc ggagccctgc tggccgccgc cgctgccgcc gccgtccggg

181 tctgcgcccg ccacgccgag gcccaggcgg ccgcgcggca ggaactggcg ctgaagaccc

241 tggggacaga tggccttttt ctcttttcct ccttggacac tgacggggat atgtacatca

301 gccctgagga gttcaaaccc attgctgaga agctaacagg gtcaactccc gcggccagct

361 gcgaggagga ggagttgccc cctgacccta gcgaggagac gctcaccata gaagcccgat

421 tccagcctct gctcccggag accatgacca agagcaaaga tggcttccta ggggtctccc

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