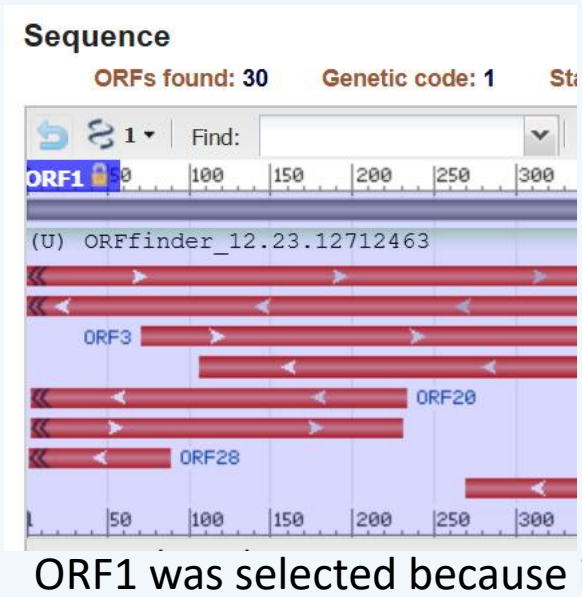
Computational Analysis of Unknown DNA Sequences Using Integrated Bioinformatics Tools

Organism: Homo Sapien
Gene: KRT17
Protein : Keratin

DNA ANALYSIS

Homo sapiens	2765	2765	99%	0.0	100.00%	1514
Homo sapiens	2761	2761	99%	0.0	99.93%	1512
Pan troglodytes...	2730	2730	100%	0.0	99.14%	1591



5'3' Frame 1

TQLGAPLLSSPSPVCLPPAAATMTTSIRQFTSSSSIKGSSGLGGGSSRTSCRLSGGLGAGSCRLGSAGGLGSTLGGSSYSSCYSFGS
GGGYGSSFGGVDGLLAGGEKATMQNLNDRLASYLDKVRALEEANTELEVKIRDWYQRQAPGPARDYSQYYRTIEELQNKILTATVDN
ANILLQIDNARLAADDFRTKFETEQALRLSVEADINGLRRVLDELTLARADLEMQIENLKEELAYLKKNHEEEMNALRGQVGGEINV
EMDAAPGVDLSRILNEMRDQYEKMAEKNRKDAEDWFFSKTEELNREVATNSELVQSGKSEISELRRTMQALEIELQSQLSMKASLEG
NLAETENRYCVQLSQIQGLIGSVEEQLAQLRCEMEQQNQEYKILLDVKTRLEQEIATYRRLLEGEDAHLTQYKKEPVTTRQVRTIVE
EVQDGKVISSREQVHQTTR-GLSYPGRPPRRQGGSRPICPTVSGLSSLSPLLQSLPHASLPDDNKAC-LS

3'5' Frame 2

S-VNKLYCHQARKHGEGTEAGG-GWRGRRLWGRWGGCLPASWVAGRGS-VLSGWSGGPARGRR-PCHPGPLPQWYAPDGWSPVLSCT
ESGGHPLPPAGGGRWQSPAPAASSHPAGFCIPGSAAPSRSEAGPAAPPRCQSAPGSGTAARSSGSLSPPGCPPGMLSC-AGTAALSP
RPAWCAGAPRSHSCHSAPAHCWWPPRGSVPLSC-RTNPRHPCGSSLPSSHTGHASR-GCGSGPRLGQRPSPH-SHHPPGLAGRSSPP
RGSSSGRPAPP-GSQSASPGRLWPGSAHPAPCAGH-CRPPHSGAGPALSQTWCGSHQQPDGHCQSVAGCWHCPRWL-GSCSAAPQLS
CSTGCSHGRAPGPASGTSHGSSPPAQCWPPPGHAPCPGRRPGGH-GSAWWPSHLQPAAHQHPQSCCHSHHQSQSCSSWSSCYPRGCC
PGRQQIPACRSRHPGRQTAGRRCGTSRPPGRRSP-WSWRR-TGGWRWSWWRRQEAGTQEKGWRGEGPQVV

ORF1 was selected because it is among the longest predicted ORFs with a start and stop codon, makes it a reliable candidate for analysis.

RNA ANALYSIS

The stability of the keratin-encoding messenger RNA (mRNA) is a separate biological process.

PHYLOGNETIC ANALYSIS

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CLUSTAL O(1.2.4) multiple sequence alignment

GGTCAGGAGATTGAGACCACGGTGAAACCCCGTCTCTACTAAAAATACAAAAAAATTAGCCGGGCGTGGT
GGCGGGCGCCTGTAGTCCCAGCTACTCGGAGAGGCTGAGGCAGGAGAATGGTGTGAACCC    60
ACACAACTTGGGGCCCCTCTCCTCTCCAGCCCTTCTCCTGTGTGCCTGCCTCCTGCCGCCGCCACCATGA
------------------------------------ 0
CTCTCCTCTCCAGCCCTTCTCCTGTGTGCCTGCCTCCTGCCGCCGCCACCATGACCACCTCCATCCGCCA
------------------------------------ 0
TCCTCTAGAGCCCACTTGCTCTGTGCTCACCTGCCGCCGCCACCATGACCACAACCATCCGCCAGTTCAC
------------------------------------ 0
CGCACCTCGGACCTCTCTCCTCTCTCGCCCTCTTGCTCTGTGCCTGCCTGCCACCCGCCGCTGCCACCAT
------------------------------------ 0
ATGACCACCACCATCCGCCAGTTCACCTCCTCCAGCTCCATCAAGGGCTCCTCTGGCCTGGGGGGCGGCT
------------------------------------ 0
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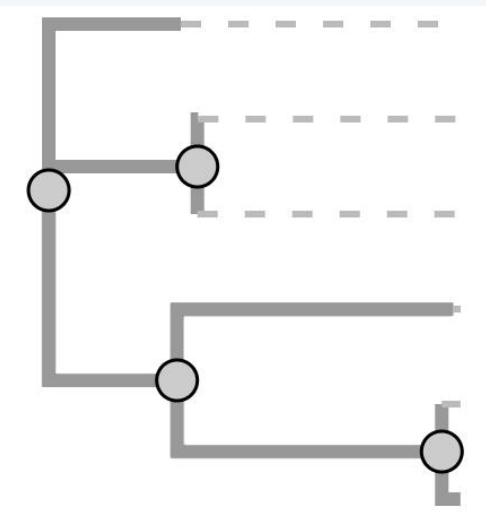
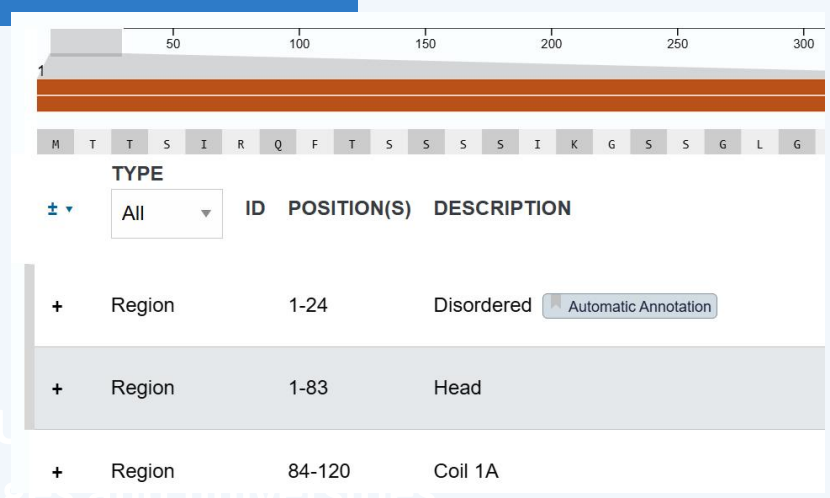


PROTEIN ANALYSIS



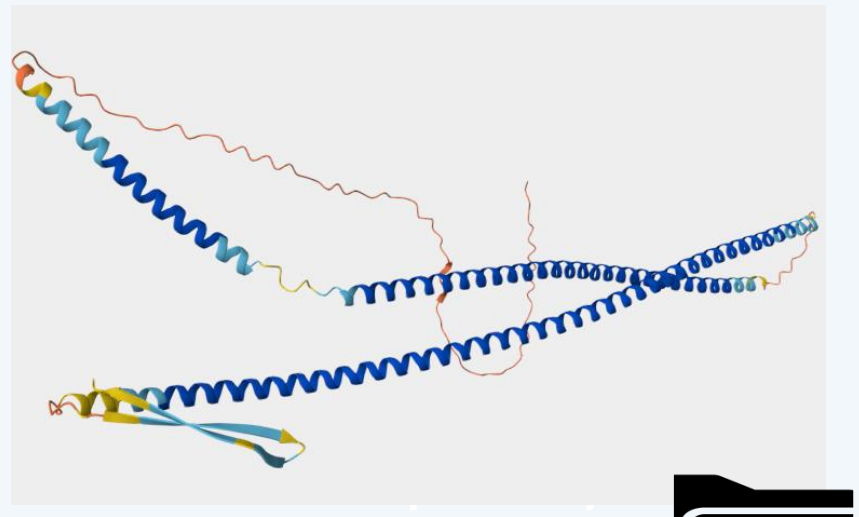
AA: 503

pI: 5.15

MW: 5.5K

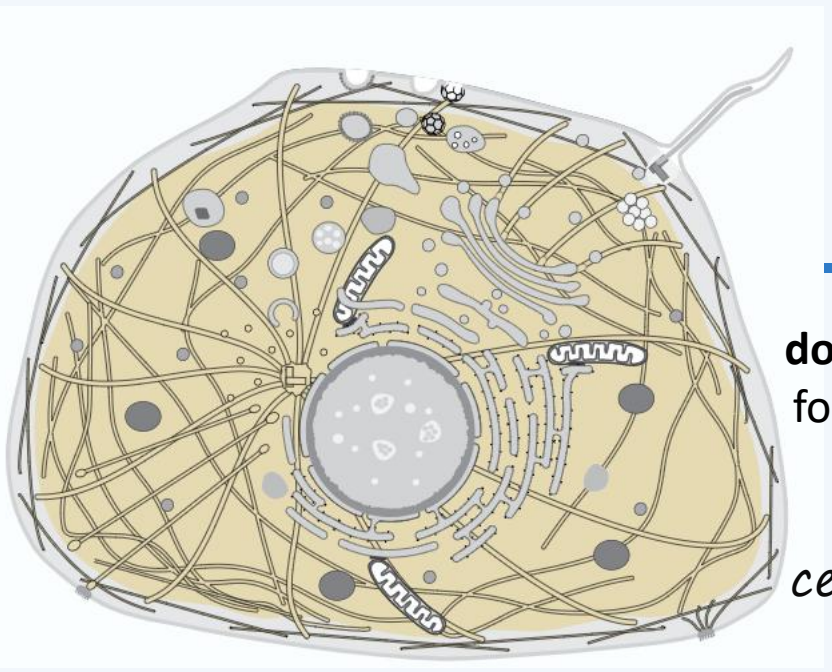
II: 55.97

AI: 82.84



Type I keratin involved in the formation and maintenance of various skin appendages

SUBCELLULAR LOCALIZATION



Keratin protein is localized in epithelial cells, *forming tough structural components in our body's barriers and appendages like* ***hair, nails, skin's outer layer.***

Keratin protein interactions **coiled-coil domains** (hydrophobic/hydrophilic interactions), forming dimers, then protofilaments, and finally intermediate filaments, *crucial for tissue strength. These filaments anchor to cell structures and interact with other proteins through* ***disulfide bonds****, providing mechanical integrity and influencing cell functions like growth,*

PROTEIN INTERACTION