

Central Dogma and Cloning

What is meant by "The Central Dogma of Molecular Biology"?

Replication, Transcription, and Translation are the 3 key processes in all living organisms

What are the three RNA polymers that are involved in the process of translation? Describe the role that each RNA plays.

mRNA - the messenger tRNA - transfer RNA that transfers the "code" to the ribosome rRNA - ribosomal RNA. The ribosome is a complex machine made out of RNA and proteins. It is the catalyst for protein synthesis.

What does genomics mean?

The science of studying genomes

What is the transcriptome? How does it differ from the genome?

It's the sequence of each product of transcription. The genome is typically larger because it contains a mixture of expressed and unexpressed portions of DNA. the transcriptome is only the parts of the genome that get transcribed into mRNA

How does proteomics relate to genomics and transcriptomics?

Proteomics = study of protein sequences. Genomics - study of size, content and organization of a genome. Transcriptome - same for mRNA (transcribed parts of DNA)

Which of the following restriction enzymes leaves a sticky end? Pick all correct answers.

- BamHI
- HpaII
- EcoRV
- HaeII
- PvuII
- HaeIII

Some restriction enzymes have a "Y" in their recognition sequence (e.g. HaeII). What does the Y mean?

the enzyme will recognize a pyrimidine (C or T)

What is the difference between an exonuclease and an endonuclease?

Both are enzymes that hydrolyze the phosphodiester backbone of DNA. exonucleases do it on the 5' or 3' end while endonucleases hydrolyze an internal bond

What does DNA polymerase do?

catalyzes the polymerization of DNA polymers from dNTP monomers

Briefly describe what can be learned from this data.

This is the result of a DNA sequencing reaction. You can determine the sequence of a piece of DNA.

What is an ORF?

open reading frame - protein coding gene

Answer problem 3-25 from your textbook.

genomic libraries are the product of shotgun sequencing which breaks an entire genome into small pieces and sequences those pieces. Consequently, genomic libraries contain the sequence of all DNA in a genome. On the other hand, cDNA libraries are created through reverse transcription reactions where mRNA is converted back to DNA. The DNA is then sequenced - the result is known as a cDNA library. These libraries only contain parts of the genome that get transcribed and converted into mRNA.