Cheatography

Bio 1010U - Module 1 Cheat Sheet

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Transcription - Key terms

Promoter	regulatory region of DNA, where RNA polymerase other proteins involved in transcripton initiation bind
Enhancer sequences	regulatory DNA sequences that bind transcriptions factors and enhance transcription of the gene they are associated with
General transcription factors	set of proteins, that bind to the promotor of a gene and are involved in initiating transcription
Transcriptional activator proteins	proteins that bind to enhancer sequences to begin transcription
Enhancer sequences	sequences in the DNA that are bound by transcription activator proteins that activate transcription

Molecular interactions

Nonpolar covalent bond: Electron pairs are shared equally

Polar covalent bond: Electron pairs shared unequally (electronegativity)

Hydrogen bond: Weak electrical attraction between a covalently bonded H atom and an electronegative atom

Ionic bond: Electric attraction between opposite charges due to differences in electronegativity

Electronegativity

Electronegativity is the tendency between atoms and their ability to attract electrons

- Hydrophobic interactions occur with nonpolar molecules in the presences of polar molecules

Cohesion

Cohesion is the attraction of molecules for other molecules of the same kind

Ex: a molecule of water sharing a hydrogen bond with other water molecules

Amino Acid categories

Protein structures

Primary Structure	Sequence of amino acids in a protein
Secondary Structure	Hydrogen bonds causes folding of the polypeptide chain
Tertiary Structure	R groups determines the function and formation
Quartenary Structure	Made up of 2 or more subunits that determine the activity of the protein

RNA Splicing - Introns and Exons

Removal of introns (non-coding) and leaving exons (protein-coding intact) - done by Spliceosome

Spliceosome – binds to both the 5’ and 3’ ends (splice sites)

Introns loop on itself then gets broken down into nucleotides

Exons join each other and have no interr-uptions from introns

Primary transcripts have introns and exons and depending on what's cut off and what exons are joined, protein is made

Key Terms

Phosph-odiester Bond	Chemical bond (by conden-sation) between phosphate and hydroxyl groups from sugar groups
Example	The backbone of DNA or RNA molecules
Pyroph-osphate	Group of phosphates released by hydrolysis which creates energy to join bases to the RNA transcript
Example	Adding a uracil to the 3' end of a transcript

Transcription (brief overview)

Central Dogma : DNA codes for RNA and RNA codes for protein, the flow of inform-ation from DNA to Protein

Transcription: mRNA carries instructions for making polypepetides from DNA, DNA serves a template for polypoptide synthesis (transcribed from DNA to mRNA)

New RNA strand grows in 5' to 3' direction - DNA strand is oriented in the 3'-5'

3 stages: Initiation, Elongation, Termination

Initiation

RNA polymerase and associated proteins bind to the DNA duplex at promoter sequences

- When RNA polymerase binds to the promoter region – doesn’t start right away (starts downstream (abt 25 nucleotides from the box)) before starting

How the promotor is recognized: Promoter region needs to be identified (TATA box-green box) and bound by GTF;

TAP (activators) bind enhancers to recruit mediator proteins which then recruits RNA polymerase to the promoter region (can cause DNA loop - mediator complex)

Elongation

Polymerization Reaction - 3' -OH group attacks the 2 phosphate which get released and turn into pyrophosphates (irreversible)

Termination

Hydrophilic Amino Acids		
Basic	*Acidic*	*Polar*
Lysine	Aspartic Acid	Asparagine
Arginine	Glutamic Acid	Glutamine
Histidine		Serine + Threonine

Hydrophobic Amino Acids

Alanine Valine Leucine Isoleucine Methionine Phenylalanine Tryptophan

lots of carbon-hydrogens + not many functional groups

Special Amino Acids

Glycine Proline (group is part of a ring) Cysteine

Once RNA polymerase bumps into the termination sequences, it falls off and the transcript is released

RNA transcript is called the primary transcript (not processed yet) – has to go thru a series of processing steps before it can be called mRNA

RNA tha combines with riobsome to direct protein synthesis : mRNA

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