Exam 3

Where does replication begin? Which direction does it proceed?

ORI

Both ways, it's bidirectional

In bacteria, where does replication begin?

ORIC

-only spot

What is required for DNA synthesis?

DNA Poly
DNA template all 4 bases
Primer

Describe chain elongation.

5'-3'

2 Terminal phosphates are cleaved off so the 3'-OH can bind

Which form of DNA polymerase is th eonly one that can exonuclease from 5'-3'?

DNA Poly I

Describe the holoenzyme.

Active form of DNA Poly III

α = 5'-3' Poly
ε = 3'-5' exonudease

θ = core assembly

What are the 7 key issues that need to be resolved for replication to happen?

- unwind helix
- reduce coiling
- primer synthesis
- lagging strand
- RNA primer removal
- filling gaps
- Proofreading

Describe the process of DNA replication. Use DNAa, helicase, SSBP, and DNA gyrase.

DNAa binds to ORI and opens helix
helicase recruits holoenzyme while ssBP keeps to strand open
DNA gyrase reduces supercoiling
DNA Poly can now do its job

What direction does DNA polymerase synthesis in? This causes what two strands to be made?

5'-3'

leading and lagging strand

What are the fragments related on the lagging strand called? What fixes them/ glues them together?

Okazaki fragments
DNA ligase

Describe eukaryotic DNA replication.

- more complex
- many ORI
- Pre-RC built in
- Alpha, delta, & epsilon Polymerases

Describe the triplet code.

64 codons for 20 Amino Acids

What does it mean when the code is degenerate and unambiguous?

- degenerate means an amino acid can be coded for by many codons
- unambiguous means a code can only be read once to make 1 Amino Acid

What is the wobble hypothesis?

The third codon is the least important

What is the initator codon in eukaryotes and the one in bacteria?

Aug fmet

What is a nonsense mutation?

early stop codon

What is an open reading frame?

a mRNA strand with more than one initator

What molecule makes RNA from DNA?

RNA Polymerase

Describe the whole process of transcription.

Promoter bind and attract RNA Poly

RNA Poly elongates and copies RNA

Termination cleaves new chain off

What are the two types of termination?

hairpin loop

Rho-dependent

Describe some differences in transcription when it comes to eukaryotes.

- in nucleus

- chromatin remodeling

- enhancers and silencers

What does RNAP III do?

transcribes a wide range of genes in eukaryotes

What is the TATA box?

- Core Promotor

- upstream to tell RNA Poly where to bind

What are enhancers and silencers?

increases or decreases gene expression

Describe the post-transcriptional modifications to make mRNA functional.

5' cap

3' Poly A tail

excision of introns

What are introns and exons?

introns: Non coding (idiots)

exons: coding

What does translation require?

Amino Acids

mRNA

tRNA

Ribosomes

What two parts make up the ribosome? Which sRNA sequences are found in eukaryotes, and which are in prokaryotes?

large & small subunit

16sRNA = Pro 18sRNA = euk

What is tRNA? What is the anticodon?

has 3 anticodons to bring Amino Acid

Anticodons → bind to codon to bring correct Amino Acid

What does tRNA charging mean? What does this?

Adding Amino Acid

Aminoacyl-tRNA synthetase

Describe the process of translation.

Ribosome subunits bind

mRNA enters A site

P site forms peptide bonds to bind Amino Acids

E site is where growing chain exits

What is the shine-Dalgarno sequence? What is this version in eukaryotes?

Initation complex Kozak sequence

What are the two types of termination?

stop codons

GTP-dependent release factors

What are polysomes?

mRNA with several ribosomes translating at once

What is a closed loop translation?

when the tail and cap bind to make a loop

Describe phenylketonuria.

Phenylalanine can't be converted to tyrosine

How are peptide bonds formed between proteins?

carboxyl group + Amino group

Produces H_2O

Describe all 4 levels of protein structure.

Primary = AA chain

secondary = helix and sheets because hydrogen bonding

tertiary = 3D

quaternary = many chains

List a few posttranslational modifications.

- Add carb
- N-terminuss AA removed
- trimming

What molecule assist in protein folding? Issues will cause what to be formed?

chaperone

Prions

What are the two types of disease of protein folding?

scrapie and BSE

-Prenatally

What is epigenetics? When are we most susceptible?

Heritable changes in gene function/expression

What are the different types of histone modifications?

Phosphorolction
methylation
Acetylation
ubiquination

Will acetylation enhance or silences genes? What about methylation?

enhance silence

What is developmental programming?

exposure during a critical period
can influence adult functions

What was the Dutch hunger winter ablet to tell us about gestation?

The third trimester is the most important

What will happen to milk production for generations if there is heat stress?

↓ Alveoli = ↓ milk