mRNA moves out of the nucleus, into the cytoplasm, and undergoes translation.

tRNA brings the proper amino acids to the ribosomes, in the order encoded in the mRNA.

tRNA carry codons

a. True
b. False

What is the difference between transcription and translation between prokaryotic and eukaryotic cells?
In prokaryotes, transcription and translation happen in the same location and are coupled.
In eukaryotes, transcription (takes place in the nucleus) must be complete before translation. Translation occurs in the ribosomes within the cytoplasm.

Genes that are always expressed are called what?
Constitutive genes

What are operons and where are they found?
Operon → multiple (>1) genes that are regulated by one region (regulated as a single unit)
Found in the nucleus, in the genetic code.
When an operon is active, all the genes in that set are on and transcribed. When the operon is off, all of those genes turn off and transcription stops.

List and define the two types of operons.
Inducible operon → the operon is turned on by a substrate
Repressible operon → the operon is turned off by the product synthesized

A substrate is the reactant molecule that an enzyme binds to, causing a reaction.

List the genes within the Lac operon.
Lac Y, Lac Z, & Lac A

What turns Lac operon on?
Lactose

What makes up the Lac operon? List in order.
Promoter, operator, & genes

Repressors bind to the operator.

a. True
b. False

How is the Lac operon regulated?
Lac operon is regulated by a regulatory gene. The gene is constitutive (will always be on and expressed), producing a repressor protein product. The repressor protein binds to the operator of the operon and keeps RNA polymerase from binding to the promoter and transcribing the genes.
* this repressor protein will always be present

Explain what happens when lactose is present in the cell.
Lactose binds to the regulatory protein, changing its shape so it cannot bind to the operator anymore. RNA polymerase is then able to bind to the promoter and the genes are transcribed and translated.

What are repressible operons?
An operon that is turned off by the product it synthesized.

Define mutation.
A change in the nitrogenous base sequence of DNA.

wild type is the normal, non-mutated genetic code.

An organism that has a mutation is called a mutant strain.

How do mutations happen?
Occur spontaneously or when induced. Random changes in the DNA happen because of errors made during the replication process. Induced changes happen when the cell is exposed to mutagens (chemical agents, radiation, etc.)

What are the means of genetic recombination in bacteria?
Conjugation → plasmid or chromosomal fragment transferred from donor cell to recipient cell through a pilus (direct connection between cells)
Transformation → cells with special DNA-binding proteins on its cell wall can accept plasmid and chromosome fragments from a lysed cell.
Transduction → a bacteriophage acts as a carrier, taking random DNA fragments from the host it was assembled into another host cell.