

Transcription

1. The starting molecule for transcription is **DNA**. The resultant molecule is **RNA**. These molecules are in the same “language”, the “language of **nucleotides**.” – **slide 3**
2. Compare and contrast DNA and RNA in the table below: **slide 4**

DNA	RNA
Thymine	Uracil
Double-stranded	Single-stranded

3. The strand of the DNA molecule containing the gene to be transcribed is referred to as the **antisense** strand. – **slides 5, 6**

Translation

1. The starting molecule for translation is **RNA**. The resultant molecule is **protein**. These molecules are in different “languages”, the “language of the transcript is **nucleotides**” while the “language” of the protein is **amino acids**. **Slide 16**
2. Every codon is made up of **three** nucleotides. **Slides 18, 19** and codes for exactly **one** amino acid(s) in protein. **Slides 18, 19**
3. Transcribe the following DNA sequence into RNA and then translate this sequence into protein. **Slide 23**

Sense strand	Antisense strand		RNA transcript		Protein sequence
A	T	→	A	→	MET
T	A	→	U		
G	C	→	G		
A	T	→	A	→	THR
C	G	→	C		
G	C	→	G		
G	C	→	G	→	ASP
A	T	→	A		
T	A	→	U		
C	G	→	C	→	GIN
A	T	→	A		
G	C	→	G		

Name: _____
BIO300/CMPSC300
Mutation - Fall 2017

As you know from lecture, there are several types of mutation:

DELETION (a base is lost)

INSERTION (an extra base is inserted)

Deletion and insertion may cause what's called a **FRAMESHIFT**, meaning the reading "frame"

changes, changing the amino acid sequence.

POINT MUTATION (one base is substituted for another)

If a point mutation *changes* the amino acid, it's called a **MISSENSE** mutation.

If a point mutation *does not change* the amino acid, it's called a **SILENT** mutation.

If a point mutation *changes the amino acid to a "stop,"* it's called a **NONSENSE** mutation.

Complete the boxes below. Classify each (i.e., **Deletion, Insertion, or Substitution**) **AND** as either **frameshift, missense, silent or nonsense** (hint: deletion or insertion will always be frameshift). Remember to compliment the DNA sequence when you create the mRNA.

Original DNA Sequence:	T A C A C C T T G G C G A C G A C T
mRNA Sequence:	<u>A U G U G G A A C C G C U G C U G A</u>
Amino Acid Sequence:	<u>MET -TRP- ASN -ARG- CYS - (STOP)</u>

Mutated DNA Sequence #1:	T A C A <u>T</u> C T T G G C G A C G A C T
What's the mRNA sequence?	<u>A U G U A G A A C C G C U G C U G A</u>
What will be the amino acid sequence?	<u>MET -(STOP)</u>
Will there likely be effects?	<u>YES</u> What kind of mutation is this? <u>POINT MUTATION- NONSENSE</u>

Mutated DNA Sequence #2:	T A C <u>G</u> A C C T T G G C G A C G A C T
What's the mRNA sequence?	<u>A U G C U G G A A C C G C U G C U G A</u>
What will be the amino acid sequence?	<u>MET - LEU -GLU- PRO-LEU-LEU</u>
Will there likely be effects?	<u>YES</u> What kind of mutation is this? <u>INSERTION - FRAME SHIFT</u>