

Mutations: The Effect on Phenotype
Worksheet 2 Transcription and Translation

Transcribe each of the following two DNA sequences (nucleotides 142 to 171 of each PTC taste receptor sequence) into RNA. Then, use the provided amino acid table to translate the RNA into an amino acid sequence.

| | | | | | | | | | | | |
|-------------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| "TR" | DNA | GTC | GGT | GAC | TCG | TTG | TCA | CTA | ACA | CAC | GAC |
| | RNA | | | | | | | | | | |
| | AA | | | | | | | | | | |

| | | | | | | | | | | | |
|-------------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| "NT" | DNA | GTC | CGT | GAC | TCG | TTG | TCA | CTA | ACA | CAC | GAC |
| | RNA | | | | | | | | | | |
| | AA | | | | | | | | | | |

Transcribe each of the following DNA codons from each PTC taste receptor into RNA. Then, use the amino acid table to translate the RNA into an amino acid.

| | | | | | | | |
|--------------------------------|------------|-----|--|--------------------------------|------------|-----|--|
| Nucleotide position 785 | | | | Nucleotide position 886 | | | |
| "TR" | DNA | CGA | | "TR" | DNA | CAG | |
| | RNA | | | | RNA | | |
| | AA | | | | AA | | |

| | | | | | | | |
|-------------|------------|-----|--|-------------|------------|-----|--|
| "NT" | DNA | CAA | | "NT" | DNA | TAG | |
| | RNA | | | | RNA | | |
| | AA | | | | AA | | |

How many differences are found in the amino acid sequences of "TR" and "NT"? _____

How could these differences affect the function of the protein? _____

How can we test if TR and NT differ in their ability to taste PTC? _____

Why would it be beneficial to have the ability to taste PTC? _____

Could it be harmful to not be able to taste PTC? Why? _____

Could it be beneficial to not taste PTC? _____