

## 1 | **Types of micro (point) mutations**

### 1.1 | **insert/remove**

#### 1.1.1 | **frameshift mutation**

1. deletion/insertion that nets a non-multiple of 3, so the codons don't line up anymore
2. everything downstream is "corrupted"

### 1.2 | **substitute**

#### 1.2.1 | **missense mutation**

1. changes an amino acid to another amino acid

#### 1.2.2 | **nonsense mutation**

1. changes an amino acid to a stop codon

#### 1.2.3 | **silent mutation**

1. does not change an amino acid

## 2 | **macro mutations**

### 2.1 | **deletion of a large chunk**

### 2.2 | **duplication of a large chunk**

### 2.3 | **inversion of a large chunk (reverses it)**

### 2.4 | **substitution (move a chunk elsewhere)**

### 2.5 | **translation?**

## 3 | **comparison**

### 3.1 | **micro mutations tend to happen and then cause macro mutations, both can cause cancer**