Name:_____
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Science 9
Notes on 4.2 Mutation

A gene mutation involves a change in the order of **bases** (A,C,T,G) that make up the gene. There are several types of gene mutation:

1. Deletion (base missing)
2. Addition (extra base added)
3. Substitution (one base substituted for another)

Gene mutations may produce **proteins** that are beneficial or harmful to the organism, or may have no effect at all.

Example: a particular mutated gene produces **white coat** Kermode bears - they occur as only a small percentage of the population (they are normally **black** in colour).

Effects of Mutations:

1. Positive Mutations
   When a gene mutation **benefits** the individual.

   Example: **Some plants have developed resistance to bacterial and fungal infections.**

2. Negative Mutations
   When a gene mutation **harms** the individual

   Example: **Sickle cell genes in affected humans cause blood cells that are abnormally shaped.**

3. Neutral Mutation
   When a gene mutation has **no effect** on the individual

   Example: **The white Kermode bear**

Mutagens & Mutation Repair:
Mutagens are substances or factors that cause **mutations**

Environmental mutagens such as **mercury**, **cigarette smoke**, **X-ray** and **UV radiation**, and certain **viruses** can cause mutations

Correcting mutations is difficult, but new techniques such as **gene therapy** offer hope.

Gene therapy is **complicated** and **experimental**:

1. A virus in engineered to carry a **normal gene**
2. The virus is somehow targeted to the cells with the **defective gene**
3. The normal gene must then **replace** the defective gene
4. The normal gene must then be "**switched on**" so that the replacement normal gene produces the proper healthy proteins.
5. It is also important that the normal gene make the correct **amount** of healthy protein.