**Non Nuclear DNA**

* Most of the organisms DNA is located in the nucleus.
* However small amounts are also found outside the nucleus - in the mitochondria and chloroplasts
* This DNA is known as non nuclear DNA
* Mitochondria are inherited from the female only (mother)
* This is because when a sperm fertilises an egg only the head of the sperm with the nucleus (nuclear DNA) enters the egg. The remainder of the sperm containing the mitochondria stays outside
* This is known as non nuclear inheritance
* Mitochondrial and chloroplast DNA are self replicating and their DNA has an independent existence from nDNA.

**Disease and mitochondrial mtDNA**

* Tissues with high demand for energy e.g. muscles,heart,brain are vulnerable.
* Mother will pass on her mtDNA mutations to 100% of her children.
* Mother passes mutated and normal mtDNA randomly and so each zygote will receive a different amount of mutated mtDNA.
* Severity of disease will be different for each child.
* Cyanide works by blocking mitochondrial pathways.

**Examples of diseases inherited through mitochondrial DNA**

**MIDD:** Maternally inherited diabetes with deafnes**s.**

**NARP: a** disease with muscle weakness, wobbliness and retinal disorder.

**MELAS:** Headaches, visual and hearing loss, exercise intolerance and elevated lactic acid in blood**.**

* Aging thought to be linked to deletions in mtDNA

**Chloroplast DNA (cpDNA)**

* Chloroplasts in plant tissue also have own DNA.
* Codes for some of the proteins required to make the pigments in a plant cell.
* Mutations can lead to leaf colour variation.