

Regulating Gene Expression : (page 594)

Living cells respond to their environment by changing the kinds of proteins made. As certain proteins are produced, or the production changes or stops, the cell changes.

Ex. Seasonal color change for sex or camouflage

Factors affecting transcription and translation.....

Light or temperature -

thicker / thinner coats for seasons

Plant seed germination

Dormancy

Photosynthesis rates

Nutrients in the environment -

Increase cell production when something is lacking, decreasing when nutrients are abundant....E coli

The presence / absence of hormones -

steroid / nonsteroid hormones effect changes on and inside cells

embryo development ([homeobox genes](#))

Changes made to proteins....MUTATIONS
(Permanent changes to an organisms
genome)

[Germ cell mutations](#) vs [somatic](#) mutations

[Mutagens](#)...UV radiation physically destroys DNA, chemical mutagens enter the nucleus and splice into DNA.....frame shift results. Carcinogenic mutations...cumulative effect.

Mutations affecting just one or only a few nucleotides are called “[point mutations](#)”.

- [substitution](#)
- [addition](#)
- [deletions](#)

genetic redundancy limits their impacts

Mutations that have no observable effect on the protein’s correct function.... “[silent mutations](#)”.

If a protein’s structure is changed, but it is still able to function... “[mis-sense mutations](#)”

Ex. Sickle cell anemia

Variety of immune antibodies

“Nonsense mutations” are changes made to proteins that alter them so much they are unable to function. (ex. Missing start signal, or early stop signal)

Frame shift mutations are changes made in the codon reading order, most often cause nonsense mutations. Might be cancelled out by another mutation down the line.

Chromosomal Mutations :

Transposons (1957, Barbara McClintock)

Short sequences of DNA that can be cutout by transposase, and spliced back into the genome somewhere else.

Most are spontaneous....results of molecular interactions during normal cell processes. Mutations caused by things outside the cell are “induced mutations”.