

Genomics Lite: Cancer Mutations in Focus *Learning Resources*



These resources are designed to support and further attendees understanding of antimicrobial resistance, and are aimed at students in upper secondary years (e.g. year 10 and higher).

For further resources, visit yourgenome.org

What are mutations and how do they affect cells?

A mutation is a change that occurs in a DNA sequence. There are lots of different types of mutations, with some being associated with types of cancers.

<https://www.yourgenome.org/facts/what-is-a-mutation>

<https://www.yourgenome.org/facts/what-types-of-mutation-are-there>

<https://www.yourgenome.org/facts/is-cancer-a-genetic-disease>

Some DNA mutations can alter the structure of the encoded protein, which might lead to the protein no longer being able to function correctly.

Use this interactive to explore the effects of mutations on a cancer-associated protein BCR-ABL, how scientists have developed drugs targeting this protein, and how further mutations can lead to drug resistance.

<https://www.biointeractive.org/classroom-resources/bcrabl-protein-structure-and-function?playlist=181755>

How is cancer researched?

In a previous series of Genomics Lite, we explored different techniques that can be used to research cancer.

<https://publicengagement.wellcomeconnectingscience.org/genomics-lite-cancer-research-series>

Genome editing using CRISPR can be used to introduce mutations to understand their effects on the cell. This can be used to test the link between mutations and cancer.

<https://www.yourgenome.org/facts/what-is-crispr-cas9>

<https://www.yourgenome.org/facts/how-do-we-use-crispr-gene-editing-to-study-diseases>

<https://publicengagement.wellcomeconnectingscience.org/events/genomics-lite-crispr-in-focus>

Traditionally, working with cells in a lab involves growing cells in flat dishes, creating a two dimensional layer, which is quite different from how cancer tumours grow in the body. Utilising organoids - three dimensional cultures of cells - can provide more realistic models for understanding cancers.

<https://www.sanger.ac.uk/collaboration/human-cancer-model-initiative-hcml/>