

Genomics Lite: Antimicrobial Resistance 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 is antimicrobial resistance?

Antimicrobial resistance describes microorganisms - including bacteria, viruses, fungi and parasites - that no longer respond to medicines designed to kill them. Antibiotic resistance is where bacteria develop the ability to survive exposure to antibiotics.

<https://www.yourgenome.org/facts/what-is-antibiotic-resistance>

Antibiotics, like penicillin, are drugs developed to combat bacteria by killing them or stopping them growing. Resistance occurs when these bacteria no longer respond to the drugs designed to kill them.

<https://le.ac.uk/vgec/topics/microbial-sciences/antibiotic-resistance/schools-and-colleges>

This resistance can spread between bacteria by horizontal gene transfer - the ability of bacteria to transfer their genetic material to each other - through three mechanisms: conjugation, transformation and transduction.

<https://le.ac.uk/vgec/topics/microbial-sciences/mutation-and-adaption/school-and-colleges>

This comic-style game shows how fast this resistance can spread in a colony of bacteria, and the resulting ineffectiveness of an antibiotic treatment.

<https://www.brainpop.com/games/antibioticresistancegame/>

Watch this video series as an overview of what pathogenic bacteria are, what antibiotics are, and how antibiotic resistance arises and spreads.

https://www.youtube.com/watch?v=X1GT2bKgci8&list=PLgWDxCKzXssmagFtMXZDJyBsu7_8FNmFF

How is antibiotic resistance studied?

Different bacterial strains can be identified in the lab - this virtual lab interactive highlights the main steps involved in identifying bacteria from the DNA sequence.

<https://www.biointeractive.org/classroom-resources/bacterial-identification-virtual-lab>

Genomics sequencing can help track drug-resistance in bacteria like MRSA to keep ahead of potential outbreaks.

<https://www.yourgenome.org/stories/tracking-superbugs>

Check out this interactive resistance graph from the Center for Disease Dynamics, Economics & Policy, that tracks antibiotic resistance of different pathogens.

<https://resistancemap.cddep.org/CountryPage.php?country=United%20Kingdom>