

# Pharmacogenomics

## What is pharmacogenomics?

Pharmacogenomics is the science that studies the role of the genome (the complete set of genes in an organism) related to an individual's response to a drug. Today, pharmacogenomics is being applied to improve the safety and efficacy of many therapeutics and treatments. Notably the application of pharmacogenomics to healthcare can help to prevent adverse drug reactions (ADRs); an unwanted or harmful reaction experienced following the administration of a drug or combination of drugs.

## How can pharmacogenomics help?

Pharmacogenomics can help to predetermine your response to drugs. The combination of your genetic make-up and your environment determines whether you respond well or poorly to treatment. It is estimated that genomics can account for anywhere between 20% and 95% of the variation in individual responses to medications. Some genes for example have certain variants that increase the chances of experiencing certain side effects from a specific drug. Also some gene variants will determine whether a certain medication will be effective or not in treating your medical condition.

Advances in technology now allow us to test multiple genes at once. By comparing gene variants with people who have similar responses to medication, we can learn about which responses are affected by our genes. This can help us identify patients who might be at a significantly elevated risk of an adverse reaction and also identify those who will not benefit from a specific treatment.

## Challenges

Before pharmacogenomic tests can be implemented more widely, they must be shown to be reliable and will lead to better health outcomes for patients. Researchers in BC and elsewhere are performing pilot studies, particularly amongst groups that are highly susceptible to ADRs (such as children undergoing cancer treatment). Also as genetic based testing becomes more routine, it is important to ensure all groups of the Canadian population have access to these tests and benefit from these improved health outcomes while limiting additional costs to the publicly funded healthcare system.

## Resources

<https://www.nature.com/articles/6500188>

<http://www.pharmacytimes.com/publications/issue/2015/march2015/ethical-issues-in-pharmacogenomics>

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

<https://www.yourgenome.org/stories/adverse-drug-reactions>

<https://www.yourgenome.org/stories/how-is-pharmacogenomics-being-used>

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