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ECHO
genetics fact sheet

IRB Approved at the
Protocol Level
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Enhancing the Health of Children for Generations to Come

What are DNA, genes, genetics, and genomics?

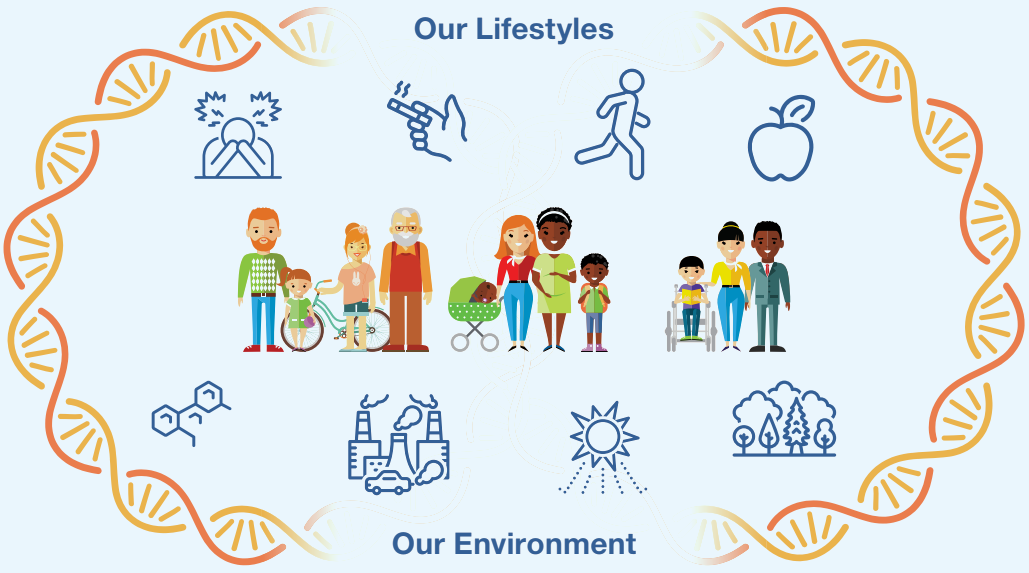
- DNA is short for deoxyribonucleic acid. It is in every cell of every living thing, and it carries information about a person's characteristics that are passed down in families—such as eye color. Each piece of information is carried on a different section of the DNA. These sections are called genes.
- Genetics involves studies of individual genes and their effects, focusing on patterns of how genes are passed down from parents to children.
- A person's complete set of DNA is called their genome. Approximately 3 billion DNA base pairs—the individual "letters" that "spell out" each gene—make up the human genome. Every person's genome sequence is different—it is unique to them, like a fingerprint—though genomes of family members share similarities.
- Genomics describes the study of a person's entire genome, including all the genes. It examines how genes are influenced by factors in the environment.

How will ECHO look at genes?

- ECHO will study DNA that is present in samples like blood or saliva.
- ECHO may use tests that scan parts of a person's genes to find genetic variations associated with their health.
- This can help researchers pinpoint genes that are likely involved in developing certain health conditions.
- Another method may include genome sequencing. This includes several different ways of studying nearly all of a person's DNA.
- Looking at changes in genes may help researchers identify environmental factors that affect children's health and development and identify who may be most susceptible to these factors. For example, genes may affect a child's sensitivity to the effects of certain environmental exposures.
- ECHO will also use genetic information to find and prevent sample mix-ups.

Why is ECHO interested in genetics and genomics?

- Genes may affect how our bodies respond to the environment, and the environment may affect how our genes work.
- Looking at genes, combined with the environment, will help researchers answer questions about how they work together to affect children's growth, development, and health.



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How will ECHO share and protect the information?

- ECHO will store data in a highly restricted research database. Only verified researchers may access the information, and only to answer specific research questions.
- ECHO will place genetic and health information in secure controlled-access NIH-supported research databases. Researchers outside ECHO may apply for and get permission to use it.
- Information in the databases will not contain any other information that would identify individual participants, like names and addresses.
- Researchers must agree not to try to identify participants.
- Laws help protect genetic information making it illegal to use genetic information to discriminate against people for health insurance coverage and employment. The laws do not apply to use of genetic information for other types of insurance (such as life, disability, or long-term care).

Will ECHO provide results or genetic counseling?

ECHO will not give any genetic results to participants or provide any genetic counseling.

More Resources

- https://www.genome.gov/about-genomics/Educational-Resources
- https://www.genome.gov/about-genomics/fact-sheets/Genetics-vs-Genomics
- https://www.genome.gov/about-genomics/fact-sheets/Genome-Wide-Association-Studies-Fact-Sheet
- https://www.genome.gov/about-genomics/fact-sheets/DNA-Sequencing-Fact-Sheet
- https://www.genome.gov/genetics-glossary
- https://www.ashg.org/discover-genetics/

Thank you for being part of ECHO.

What if I have questions?

Contact your local ECHO study team.

FOR MORE INFORMATION ABOUT ECHO

Visit: ECHOChildren.org
Contact: NIHKidsandEnvironment@NIH.gov
X: @ECHOChildHealth

ECHO
Environmental influences on Child Health Outcomes
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