



HOW DO GENES AFFECT ADDICTION?

Experts in genetics are discovering how genes can affect a person's risk of becoming addicted to drugs or alcohol. Their studies could help prevent and treat this illness.

Why do some people become addicted to drugs or alcohol, while others do not? That's one question that scientists are trying to answer. Some different factors can give each child a different risk for addiction. Environmental factors—such as stress, peer pressure, and the strength of family relationships—play a role. The risk for becoming addicted to drugs or alcohol is also affected by biological factors, including age and genetics. Scientists are now studying the link between genes and addiction. Some kids are genetically more likely than others to be addicted to drugs or alcohol. Scientists are now identifying some genes that can lead to addiction. They have found certain gene variants that occur more often in people who are addicted to alcohol, tobacco, or other drugs. This means that genes can have a greater role in developing an addiction than was once thought. Scientists are now studying how these genes affect people's brains. Family members who struggle with

How Do Genes Affect Addiction? National Institute on Drug Abuse

One of the keys to preventing negative consequences of drug and alcohol use is determining what puts people at risk for addiction. In the article “How Do Genes Affect Addiction?,” students will learn about the role of genetics in a person’s risk for addiction, as well as learn that genetics isn’t the only factor that influences the risk. Many other biological and environmental factors play a role, and students will get tips about choices they can make to reduce their risk. By sharing the article and skills sheet (see reverse side) with your students, and teaching the lesson below, you can help them understand the risks and how to stay safe.

Subject

- Science Literacy
- English Language Arts
- Health/Life Skills

Common Core State Standards

- RST.6-8.1 / RST.9-10.1
- Cite specific textual evidence to support analysis of science and technical texts
- W.6-8.1 / W.9-10.1
- Write arguments to support claims, using valid reasoning and relevant and sufficient evidence

Next Generation Science Standards

- MS-LS3.A / HS-LS3.A
- Inheritance of Traits
- MS-LS3.B / HS-LS3.B
- Variation of Traits

National Science Education Standards

- Reproduction and Heredity
- Personal Health

National Council for the Social Studies

- 4. Individual Development and Identity
- 8. Science, Technology, and Society

Additional Teaching Resources:

- headsup.scholastic.com/teachers
- teens.drugabuse.gov

Critical-Thinking Questions

- 1) How might genetics help prevent or treat addiction in the future? (*Answers may include that scientists may one day develop medications that reverse the effects of high-risk genes. People who may have high-risk genes could be provided with counseling or take actions to increase protective factors.*)
- 2) Do you think there is a single “addiction gene” that determines if someone will become addicted to drugs? Why or why not? (*Answers may include that it is unlikely that a single addiction gene exists. Besides genes, there are many factors that determine a person’s risk for becoming addicted to drugs.*)
- 3) Why is it important to understand the risk factors for addiction? (*Answers may include that knowing the risks may help people actively reduce their risk factors and boost their protective factors.*)

Writing Prompts

- **Grades 6–8:** Explain how genes could increase a person’s risk for addiction.
- **Grades 9–10:** What is one reason genetics research is important in understanding addiction? Use evidence from the text to support your answer.
- **Grades 11–12:** What might a person do to decrease his or her risk for addiction?

Vocabulary Tools:

Visit scholastic.com/headsup/teachers/how_do_genes_affect_addiction for a vocabulary list to support the student article and lesson.

Student Skills Sheet

The worksheet on the reverse side provides students with information about some of the different factors that can affect a person’s risk for addiction and asks critical-thinking questions about the information. Possible answers include:

1. A protective factor is something that reduces the risk for addiction, such as strong family bonds or having friends who don’t use drugs. A risk factor is something that increases a person’s risk, such as a family history of addiction or a lack of parental support. (Examples are found in the table.)
2. A person with no family history of addiction and strong family bonds can still develop an addiction. Many factors can come into play, and every person is unique.
3. A person can reduce his or her risk by increasing the number of protective factors in his or her life. Some examples are: spending time with friends who are a good influence and don’t use drugs; not taking drugs at a young age; and getting involved in after-school activities.

Interactive Activity

- “PI: Pedigree Investigator, On the Case of Nicotine Addiction” (learn.genetics.utah.edu/content/addiction/pi/)

This activity gives more information about how pedigrees are constructed and has students complete one to see how nicotine addiction runs in a family.

- **Writing Prompt:** Does the family described in the activity support the theory that genes affect nicotine addiction? Explain how using a pedigree helped you reach your answer.

WHAT AFFECTS THE RISK FOR ADDICTION?

Many factors can increase—and decrease—a person’s risk for becoming addicted to alcohol, tobacco, or other drugs.

Risk factors can increase the chance of addiction. They include biological factors, such as certain genetic variants, and environmental factors, such as friends who use drugs.

Protective factors can decrease the risk for addiction. They include strong family bonds or friends who are a good influence.

A person with more risk factors and fewer protective factors usually has a greater chance for addiction. However, a person with few risk factors can still become addicted. And most people who are at high risk never become addicted. Study the table to the right to learn some risk and protective factors for addiction.

Directions: Study the table. Then use this information along with facts from the article “How Do Genes Affect Addiction?” to answer the questions at the bottom of the page. Write your answers on separate paper.

Risk and Protective Factors for Addiction



RISK FACTORS

- Family history of addiction
- Lack of parental support
- Lack of strong family bonds
- Friends or family who use alcohol, tobacco, or drugs
- Availability of drugs
- Drug use during adolescence
- Mental health problems such as depression
- Stress
- High-risk gene variant
- Exposure to trauma or violence



PROTECTIVE FACTORS

- Strong family bonds
- Parental involvement
- Friends who are a good influence and don’t do drugs
- Strong community
- Anti-drug policies at home and in school
- Strong school performance
- Participation in after-school activities
- Having strategies to cope with stress
- Low-risk gene variant

QUESTIONS:

1. Explain the difference between a protective factor and a risk factor for addiction. Give one example of each.
2. Suppose a person has no family history of drug addiction and has strong bonds with his or her parents. Is it guaranteed that the person will not develop an addiction? Support your answer with evidence from the text.
3. Suppose a person has a strong genetic history of addiction. Give three ways the person can reduce his or her own risk.