**Metabolism**

Metabolism is the process of the human body interacting with chemicals. In general, chemicals that get into your blood are metabolized by your liver and forced out of your body through your urine. Your body tries to speed up metabolism to get rid of the chemicals as quickly as possible. Chemicals and drugs that get into your body dissolve into fat cells and sometimes are harder to get out of the body. People have different rates of metabolism, which can mean that different people handle chemicals and drugs in their bodies differently. Ethnic groups of people have similar genes and often metabolize drugs the same way.

When nicotine enters the body it is absorbed very quickly by the liver. Once it is in the body about 80-90% of it is metabolized and turned into cotinine. Cotinine stays in the body longer than nicotine and is how many researchers determine the amount of nicotine a person has ingested.

In NEAM, scientists and researchers studied how people metabolized nicotine to better understand the speed at which it was metabolized among people of the Bristol Bay region.

**Genes**

What are genes?
Each cell in your body has about 30,000 genes. These genes are what determine traits such as your eye color and how you smile. You have 23 pairs of chromosomes from your parents, and there are hundreds or more genes in one chromosome. The chromosomes and genes are made of DNA and are what make you unique. Genetics is the study of genes and the information passed from parents to children (heredity).

What is an enzyme?
Some genes determine what proteins your body makes, and some of these proteins are enzymes. These proteins are able to produce chemical changes inside your body. For example, the enzyme pepsin helps your body begin digestion.

Some ethnic groups may be at higher risks for illnesses and diseases caused by tobacco.
Genetics are passed from parents to children.

Your genetic makeup determines many things including how you smile.

A NEAM participant giving a blood sample.

NEAM: A Genetic Study

There are 2 enzymes that metabolize nicotine to cotinine: CYP2A6 and CYP2B6. CYP2B6 is an enzyme that also metabolizes some medications used to help people quit tobacco. Having variants of the CYP2A6 and CYP2B6 genes can influence tobacco use patterns, risks of tobacco related disease, and responses to certain medications. Studies have shown that the frequency of these genes vary across cultures.

Participants in the NEAM study voluntarily gave blood when they met with the study team. This blood was sent to one of the NEAM scientists who works at the University of Toronto in Canada. The blood was used to look at the frequency of the genes and compare findings with the speed of metabolism of NNK (a tobacco carcinogen) and the level of dependence on tobacco products.

Findings

The findings from the genetics part of the NEAM study indicate that:

- Alaska Native people have unique CYP2A6 variations.
- Participants who were tobacco users had higher levels of the tobacco carcinogen NNAL and a higher potential risk for developing cancer if tobacco use is continued.
- The variations of the gene may lead their bodies to metabolize nicotine slower, which can cause higher amounts of tobacco carcinogens (NNAL) in the body and put the person at a greater risk of getting tobacco related cancers.
- The participants generally had high frequency of CYP2B6 variants, meaning their bodies would likely metabolize medications used to help stop smoking and chewing tobacco more slowly.

NEAM scientists found that Alaska Native people who participated in NEAM had variants of the CYP2A6 and CYP2B6 genes. These variations could influence tobacco use patterns, risks of tobacco related diseases, and responses to certain medications.
### Tobacco Trivia!

<table>
<thead>
<tr>
<th>Trait</th>
<th>Heredity</th>
<th>Metabolism</th>
<th>Nicotine</th>
<th>Program</th>
<th>Medication</th>
<th>Cancer</th>
<th>Genetics</th>
<th>Enzyme</th>
<th>Liver</th>
<th>Cessation</th>
<th>Bupropion</th>
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Word List

1. Traits
2. Heredity
3. Metabolism
4. Nicotine
5. Program
6. Medication
7. Cancer
8. Genetics
9. Enzyme
10. Liver
11. Cessation
12. Bupropion
13. Cells
14. Disease
15. Addiction
16. Chemicals

To solve:
- Unscramble each of the clue words.
- Copy the letters in the numbered boxes into the boxes below with the same number.
Are you interested in quitting tobacco?

Working with a tobacco cessation counselor increases your chance of success!

Check out these **Free Tobacco Cessation Programs**

BBAHC Nicotine Dependence Treatment Program
1-800-478-5201 EXT 6547 or 907-842-9547
www.bbahc.org/tobacco.htm

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM
Nicotine Exposure and Metabolism Study
4000 Ambassador Drive D-DCHS
Anchorage, Alaska 99508

One way to cope when a craving comes is to go for a walk, learn more about withdrawal by calling a program today.