

## Changes in the Brain

Damage from long term use of inhalants can slow or stop nerve cell activity in some parts of the brain.

This might happen in the frontal cortex, the part of the brain that solves complex problems and plans ahead. Or if inhalants get into the brain's cerebellum, which controls movement and coordination, they can make someone move slowly or clumsily.

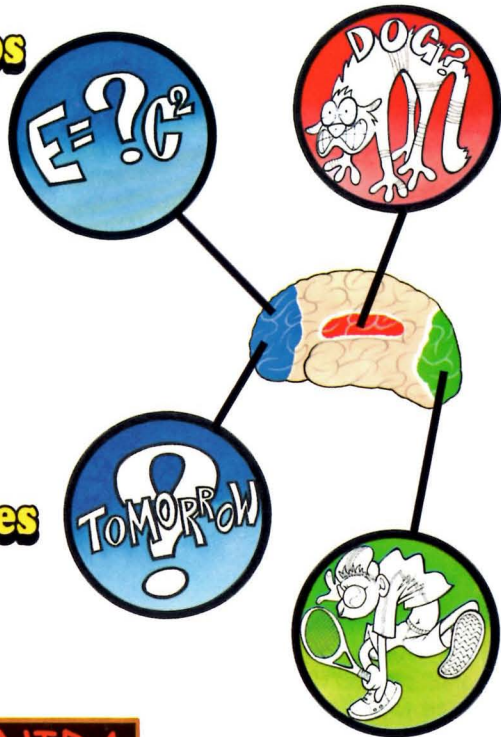
Studies show that neurons in a part of the brain called the hippocampus can also be damaged by inhalants. The damage occurs because the cells don't get enough oxygen.

Since the hippocampus helps control memory, someone who repeatedly uses inhalants may lose the ability to learn new things, may not recognize familiar things, or may have a hard time keeping track of simple conversations.

## Can You Fill the Gaps

Sometimes, nerve cells that are damaged by inhalants may be able to repair themselves. The empty spaces in the following brain-related words represent damaged neurons. See if you can "repair" them by filling in the blanks to complete the words. (Hint: All the words are in this magazine.)

- 1) M . . L . .
- 2) . . U . O .
- 3) . . PP . . M . . S



Answers:  
1) MYELIN  
2) NEURON  
3) HIPPOCAMPUS

## The Search Continues

The truth is, there's still a whole lot that scientists do not know about the effects of inhalants on the brain.

When scientists learn more about how various inhalants affect the brain, they may be able to develop treatments that prevent the damage inhalants can cause. Maybe someday you'll make the next major breakthrough.

Until then, follow me -- Sara Bellum -- through many other magazines in my series. We'll explore how drugs can affect the brain and also the nervous system.



For more information, visit:  
[www.drugabuse.gov](http://www.drugabuse.gov)

National Clearinghouse for Alcohol and Drug Information,  
P.O. Box 2345, Rockville, MD 20847  
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# MIND OVER MATTER

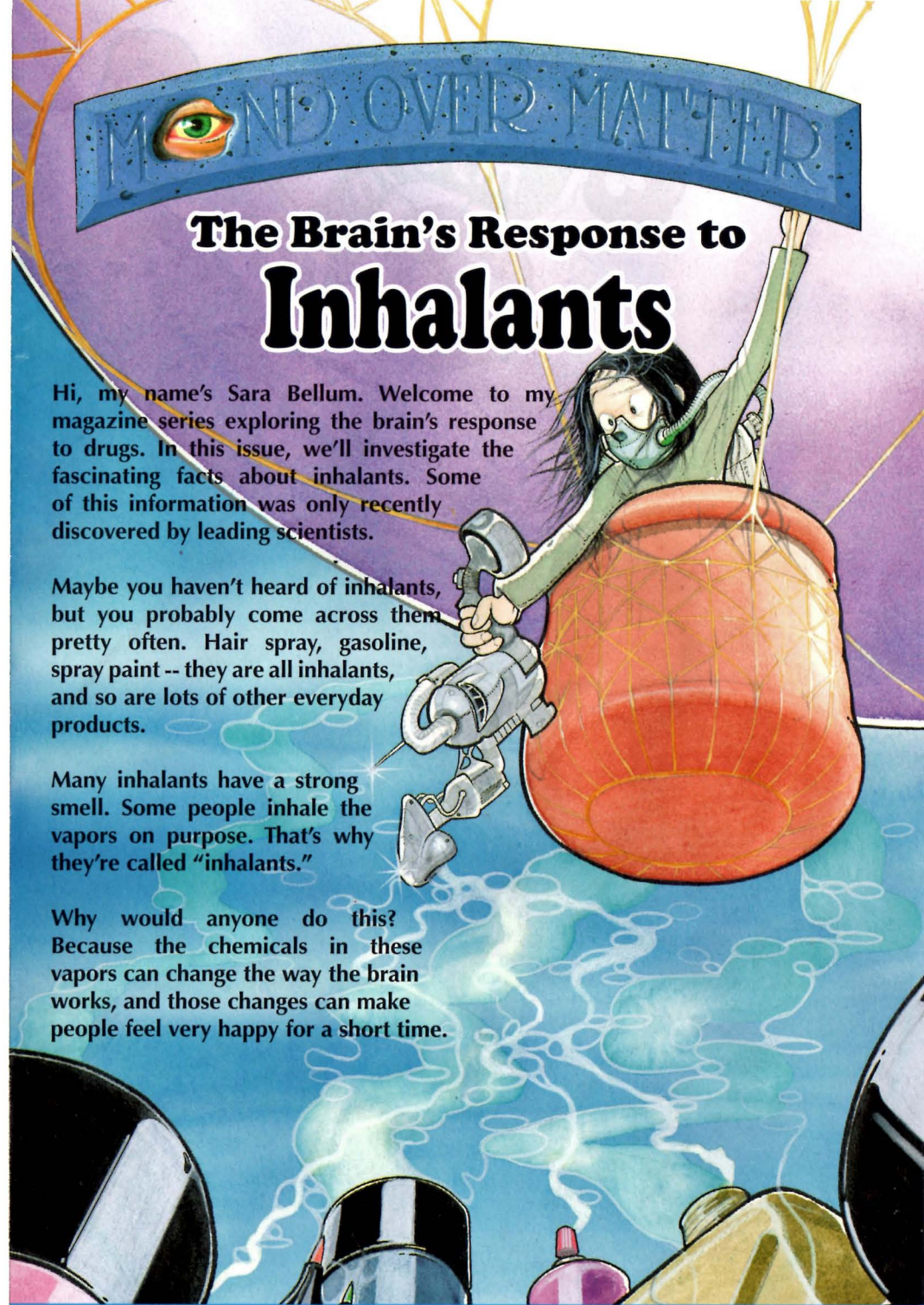
## The Brain's Response to Inhalants

Hi, my name's Sara Bellum. Welcome to my magazine series exploring the brain's response to drugs. In this issue, we'll investigate the fascinating facts about inhalants. Some of this information was only recently discovered by leading scientists.

Maybe you haven't heard of inhalants, but you probably come across them pretty often. Hair spray, gasoline, spray paint -- they are all inhalants, and so are lots of other everyday products.

Many inhalants have a strong smell. Some people inhale the vapors on purpose. That's why they're called "inhalants."

Why would anyone do this? Because the chemicals in these vapors can change the way the brain works, and those changes can make people feel very happy for a short time.



National Institute on Drug Abuse



## They Don't Go Away When You Exhale

Inhalant vapors often contain more than one chemical. Some leave the body quickly, but others are absorbed by fatty tissues in the brain and nervous system. They can stay there for a long time.

One of these fatty tissues is myelin -- a protective cover that surrounds many of the body's nerve cells (neurons). Nerve cells in your brain and spinal cord are sort of like "Command Central" for your body. They send and receive messages that control just about everything you think and do.

If you picture nerve cells as your body's electrical wiring, then think of myelin as the rubber insulation that protects an electrical cord.

One problem with inhalant use over the long term is that the chemicals can break down myelin. And if myelin breaks down, nerve cells may not be able to transmit messages.

One reason scientists are so interested in inhalants is that these chemicals affect the body in lots of ways. While some effects are due to changes in the brain, others are direct actions on other parts of the body, such as the circulatory system.

Did you know that some inhalants directly increase the size of blood vessels, allowing more blood to flow through? And some inhalants can make the heart beat faster. This can be a serious problem, especially if someone inhales butane gas.

Butane, found in cigarette lighters and refills, makes the heart extra sensitive to a chemical that carries messages from the

nervous system to the heart. This chemical, noradrenaline, tells the heart to beat faster when you're in a stressful situation -- like if something suddenly scares you.

If the heart becomes too sensitive to noradrenaline, a normal jolt of it may cause the heart to temporarily lose its rhythm and stop pumping blood through the body. Some inhalant users die this way. Inhalants can also cause death by suffocation. This occurs when the inhaled fumes take the place of oxygen in the lungs and the brain. This is known as Sudden Sniffing Death.

## Beyond the Brain

