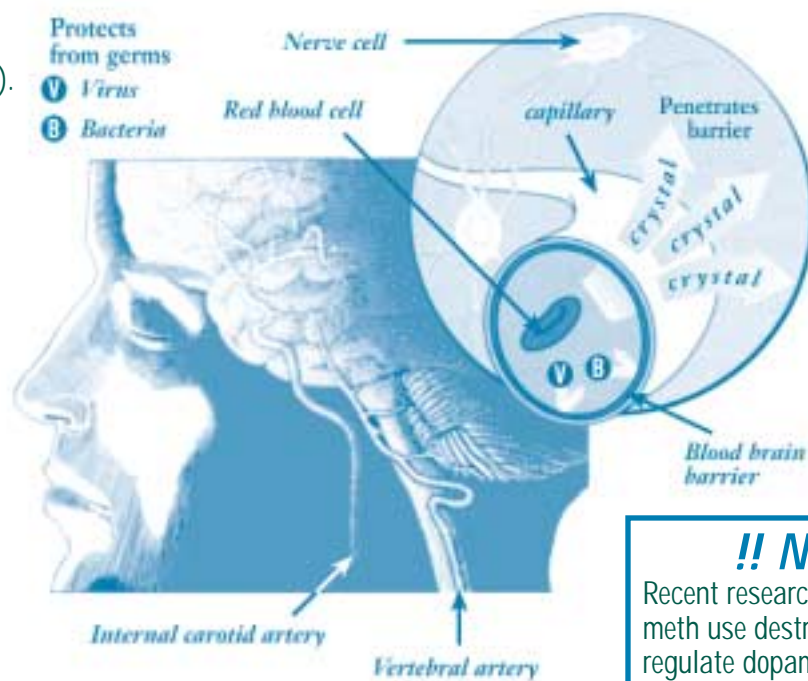




## THE BRAIN and THE NERVOUS SYSTEM

- ★ To change the way a person thinks, feels, and sees, crystal meth must first pass through the **blood-brain barrier** (BBB).
- ★ When crystal crosses the BBB, several brain chemicals called **neurotransmitters** are released into the bloodstream.
- ★ Neurotransmitters send “emergency alert” messages to the heart, the digestive system, the kidneys, the lungs and the glands that make the body’s hormones.

### How the **BLOOD BRAIN BARRIER** works



### Concerns of regular, long-term crystal use

- ✓ Stores of neurotransmitters get depleted.
- ✓ Paranoia and anxiety become more frequent and last longer.
- ✓ Psychosis develops from too much dopa-mine, norepinephrine and lack of sleep.
- ✓ Blocked blood vessels within the brain can lead to increased chances of stroke.

### !! NEWS FLASH !!

Recent research has shown that long-term meth use destroys nerve cells in the brain that regulate dopamine, muscle movement, memory, and decision-making. This damage can be wide-spread and permanent.

## HOW DOES ALL THIS WORK?

Don't be confused. The **blood-brain barrier (BBB)** is not a concrete roadblock. It is a sleeve-like filter of tightly packed fat cells. This “sleeve” lines the inside wall of the tiny blood vessels (capillaries) that carry fresh blood to the brain.

➤ **What does the BBB do?** Two of its most important functions are (1) to protect the brain from germs, and (2) to act as the gateway to the central nervous system. All psychoactive drugs (those that change the way we think, feel and see) cross the BBB.

➤ **What's on the other side of the BBB?** Millions of **neurons** (nerve cells). Neurons produce, store up, and release neurotransmitters.

➤ **What is a neurotransmitter?** Neurotransmitters are chemicals that allow nerves in the brain and body to “talk” to each other. Neurotransmitters carry messages from the brain out to the tissues, glands and organs of the body. They also carry messages from the body back to the brain.

For example, you have an itch on your knee. Your knee sends a message to your brain. The brain sends a message to your hand telling it to scratch the itch. Neurotransmitters carry these messages. In a way, they unite the brain and the rest of the body into one functioning unit.

➤ **How does crystal work?** Crystal looks and acts like a neurotransmitter. That's why neurons absorb the drug. When nerve cells soak up crystal, the natural neurotransmitters are pushed out and replaced. When these chemicals get pushed out of the nerve cells, they are released into the bloodstream. Once released, neurotransmitters start “talking” to the rest of the body. We might say that crystal ups the volume of the conversation from a whisper to a scream.

## NEON

*Needle and Sex Education Outreach Network*

We provide information and services to gay and bisexual men who use crystal methamphetamine. We do not judge. We are a collaboration of people from Public Health — Seattle & King County, Stonewall Recovery Services and many gay and bisexual men who use crystal.

### NEON's goals are to:

- raise awareness about the links between crystal use and transmission of HIV and sexually transmitted diseases (STDs)
- provide accurate and truthful information about how crystal affects the body and mind
- provide options for reducing sexual and drug using risks associated with crystal
- provide free help to better manage or stop crystal use

NEON provides needle exchange, peer education, health information, referrals, one-on-one counseling, and advocacy. We also sponsor several groups for men who want to manage, cut down, or quit crystal altogether. Counseling and groups are provided at Stonewall Recovery Services. All NEON services are free. We are not a 12-step program.

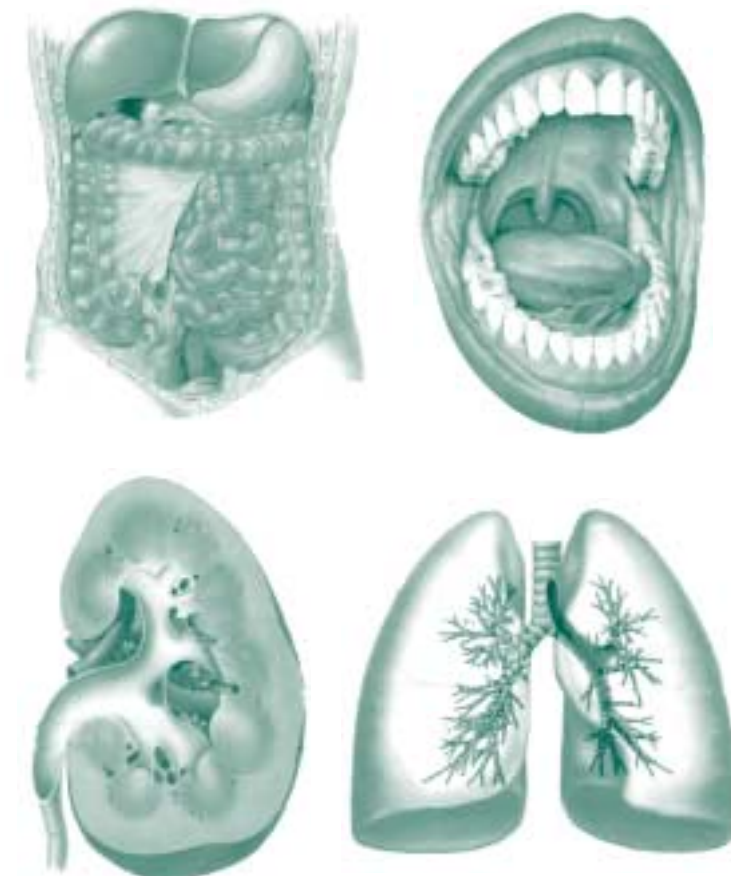


Options for gay and bisexual men who use crystal.

(206) 622-6925  
www.crystalneon.org

Available in alternate formats

REVISED 4/01



## THREE NEUROTRANSMITTERS PLAY A BIG PART IN HOW CRYSTAL AFFECTS THE MIND AND BODY.

◆ **Dopamine** gives a sense of reward and pleasure. It is also associated with body movement. Too little dopamine causes paralysis or Parkinson's-like tremors and rigidity. Too much dopamine and a person can become paranoid, hear voices and get twisted thoughts. Sound familiar?

◆ **Serotonin** is involved in sleep and sensory perception. It plays a role in depression, sex and regulating body temperature. Serotonin is involved with many emotional disorders like schizophrenia, phobias, super-aggressive states and obsessive-compulsive behavior. Too much serotonin can make it difficult (or impossible) to have an orgasm.

◆ **Norepinephrine** increases alertness and concentration. It helps kill pain and regulates blood pressure. Basic instincts like hunger, thirst and sex can be triggered by release of norepinephrine. Too much norepinephrine contributes to crystal dick.

## DENTAL AND ORAL HEALTH

### THE BODY REACTS

to crystal meth the same way it reacts to danger. Crystal floods the body with adrenaline — the same hormone that prepares it for emergencies. Adrenaline gives a super-charge of strength and endurance so the body can deal with danger and injury. The effects of crystal are easier to understand if you think of them as the body's strategy for self-defense.

Teeth and gums need blood to stay healthy. Crystal causes the vessels that supply blood to oral tissues to shrink up.

- ★ Reduced blood supply causes tissues to break down.
- ★ With repeated shrinking, the blood vessels don't recover and tissues die.
- ★ Crystal also causes dry mouth. Saliva neutralizes acids in the mouth. Less saliva means more acid. Acids eat away at the minerals in tooth enamel and cause holes or weak spots that turn into cavities.

#### Concerns

- Tooth decay
- Gum problems
- Bone loss
- Tooth loss



#### ORAL HEALTH TIPS

- ◆ Brush and floss your teeth on a regular basis. Brushing and flossing get rid of bacteria that feed on sugars in the mouth. When bacteria eat sugars, they secrete acid. More acid means more tooth and gum decay.
- ◆ Oral sex is more risky when gums or teeth are not healthy. Bleeding gums, sores, or loose teeth can create perfect openings for HIV to get into your bloodstream. Other STDs like syphilis, gonorrhea, and herpes can also be spread this way. Therefore, it's best to use a condom when you give head.



## RESPIRATORY SYSTEM (LUNGS)

Lungs transfer oxygen from the outside air to the bloodstream. Blood carries oxygen to every cell and tissue in the body. Cells need a constant supply of oxygen and nutrients to make energy.

- ★ Crystal relaxes air passages and opens them up.
- ★ This increases the intake of oxygen so that the body can fight harder or run faster.

#### Concerns

- Materials used to cut crystal can block blood vessels in the lungs.
- Long term use can permanently reduce the amount of air the lungs can take in.



## DIGESTIVE SYSTEM

The digestive system breaks down nutrients into simpler chemicals. The body uses these chemicals for energy and to build and repair cells and tissues.

- ★ Crystal slows down or stops the movement of the digestive tract.
- ★ This slows the breakdown of food and nutrients.
- ★ Appetite and thirst decrease.

#### Concerns

- Constipation
- Cramping
- Diarrhea
- Dehydration, dry mouth
- Malnutrition, anorexia, weight loss



## CIRCULATORY SYSTEM: HEART•BLOOD VEINS•ARTERIES

Arteries pump fresh blood, oxygen, nutrients and drugs out from the heart to the brain and body. After the fresh blood nourishes the muscles and organs of the body, veins collect the “tired” blood and carry it back to the heart. When crystal is injected into a vein it travels to the heart. The heart pumps the blood (and drugs) to other parts of the body through the system of arteries. The “rush” and “high” begin when the drug reaches the brain. This takes 15-30 seconds.

- ★ The heart beats faster and harder.
- ★ Veins and arteries constrict (get skinnier).
- ★ Skinnier veins and arteries reduce blood flow and increase blood pressure.
- ★ The blood clots more easily to stop bleeding. (Your body thinks it might be hurt.)

#### Concerns

- Heart beat gets out of rhythm.
- High blood pressure can lead to increased risk of heart attack.
- Germs (from injecting) can infect the lining of the heart (endocarditis).



## CRYSTAL & SEX

When it comes to sex, crystal is a drug of contradictions. Some men use crystal to boost their sex drive, prolong sex play and delay orgasm. But many men also experience “crystal dick” (can't keep a hard-on). For guys who do keep hard, the delay of orgasm can last too long and become painful. The sexual effects of crystal are probably related to the way hormones and neurotransmitters — two types of body chemicals — interact with each other.

Generally speaking, sexually charged images, thoughts and places cause the body to produce sex hormones — chemicals that increase sexual arousal and excitement. Crystal, on the other hand, causes the release of neurotransmitters — nervous system chemicals that boost energy and concentration. If a person uses crystal in a sexually charged environment, neurotransmitters combine with sex hormones to boost sexual arousal and performance. But over the course of a high, levels of these chemicals shift and change. The result is not always ideal. High levels of certain neurotransmitters actually impede arousal and performance. The result is crystal dick and delayed orgasm.

#### Concerns

- Almost half (47%) of gay or bisexual men in Washington state who inject crystal have HIV or AIDS.
- Crystal dick makes it more likely that a man will take the role of “bottom” (receptive anal partner). The bottom is at higher risk for HIV, other viral infections, bacterial infections and tissue damage. That's why condoms are recommended for anal sex.
- Through prolonged sexual activity, tissues of the penis, anus and throat can get damaged. If damaged tissue is exposed to blood or semen, it's much easier for HIV or other harmful organisms to enter the body.
- Some men become dependent on crystal and can no longer have sex without it.
- In spite of having “hot sex” while using crystal, many men end up feeling socially isolated, disconnected, distrustful and empty.

## HOW crystal meth AFFECTS THE body



### LIVER

The liver is the body's largest internal organ. Along with the kidneys, the liver clears the blood of drugs and poisons that might otherwise build up in the body.

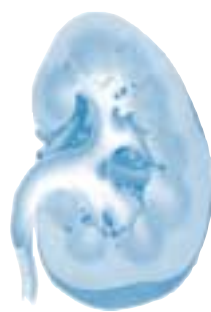
- ★ The liver breaks crystal down into simpler chemicals so they can be excreted. Each time blood circulates through the liver, it breaks down more of the drug.

#### Concerns

- Crystal competes with other drugs to get broken down in the liver.
- The liver cannot break down the overload of toxic substances that build up in the bloodstream.
- This leads to dangerous drug interactions and stimulant overdose.
- Overdose can mean a sudden and dangerous increase in blood pressure causing a severe lack of oxygen and blood to the brain.
- Body temperature can go up to dangerous levels. Sweating (which cools the body down) sometimes does not happen in stimulant overdose.
- User could see spots (due to pressure on the nerves in the eye) or pass out. Chances of heart attack, stroke, or coma go up.

#### HEALTHY LIVER TIP

- ◆ Injectors who share needles or works can also get hepatitis C, a serious and chronic inflammation of the liver. Hepatitis C can cause liver cancer and cirrhosis. Never share needles, cookers, water or cottons.



### KIDNEYS

The kidneys filter the blood and get rid of fluid wastes through urine. Crystal is filtered by, then excreted through the kidneys. Kidneys also balance the acid level in your body's fluids.

#### Concerns

- Crystal constricts blood vessels in the kidneys.
- With less blood flow, the kidneys produce less urine. Toxic wastes get recycled back into the bloodstream.
- When toxic blood reaches the brain, you can get headaches and suffer confusion.
- Urine becomes very concentrated and sits in the bladder. This can result in bladder infections. Kidneys can get inflamed.