

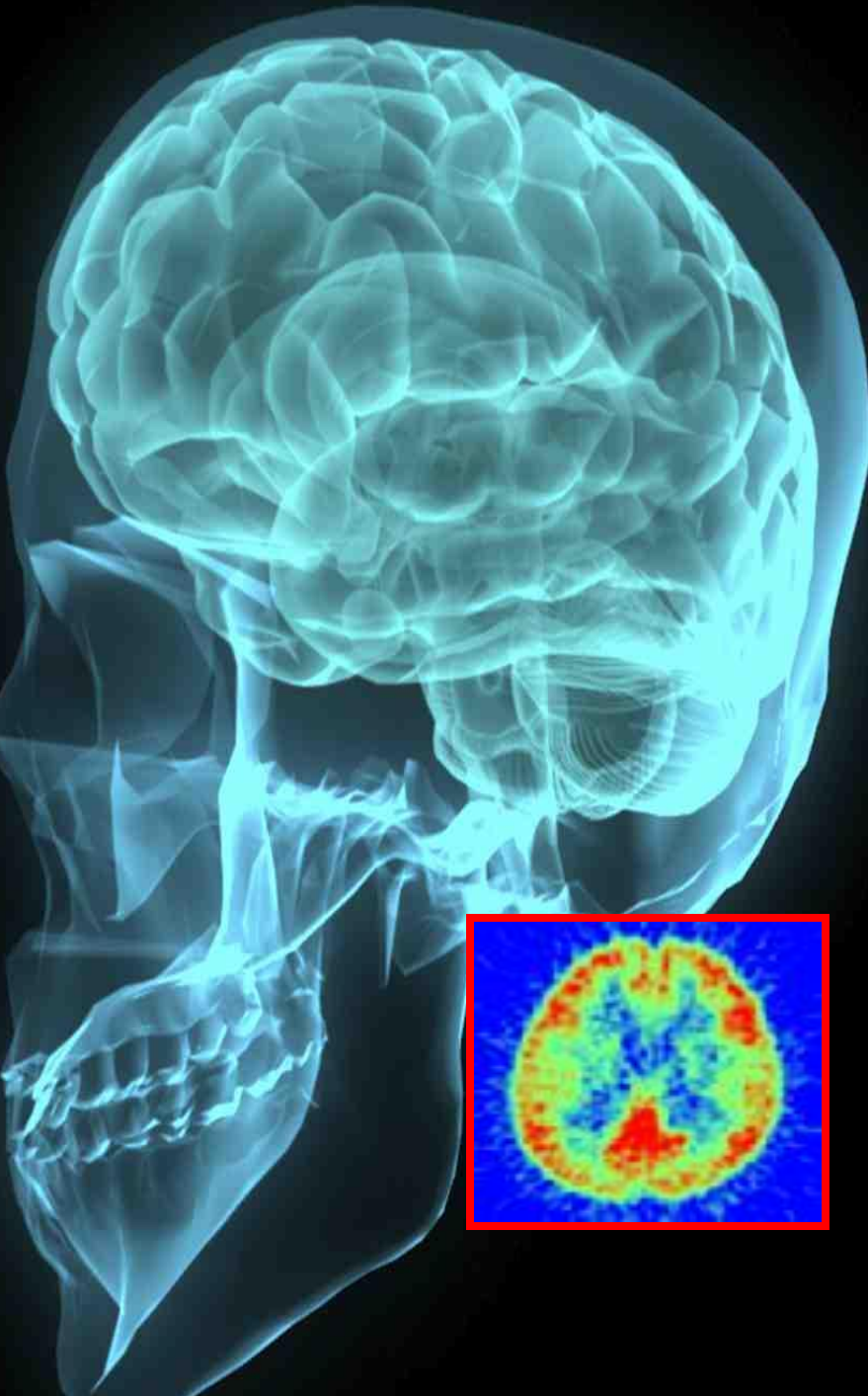
DR. KEVIN COLLINS



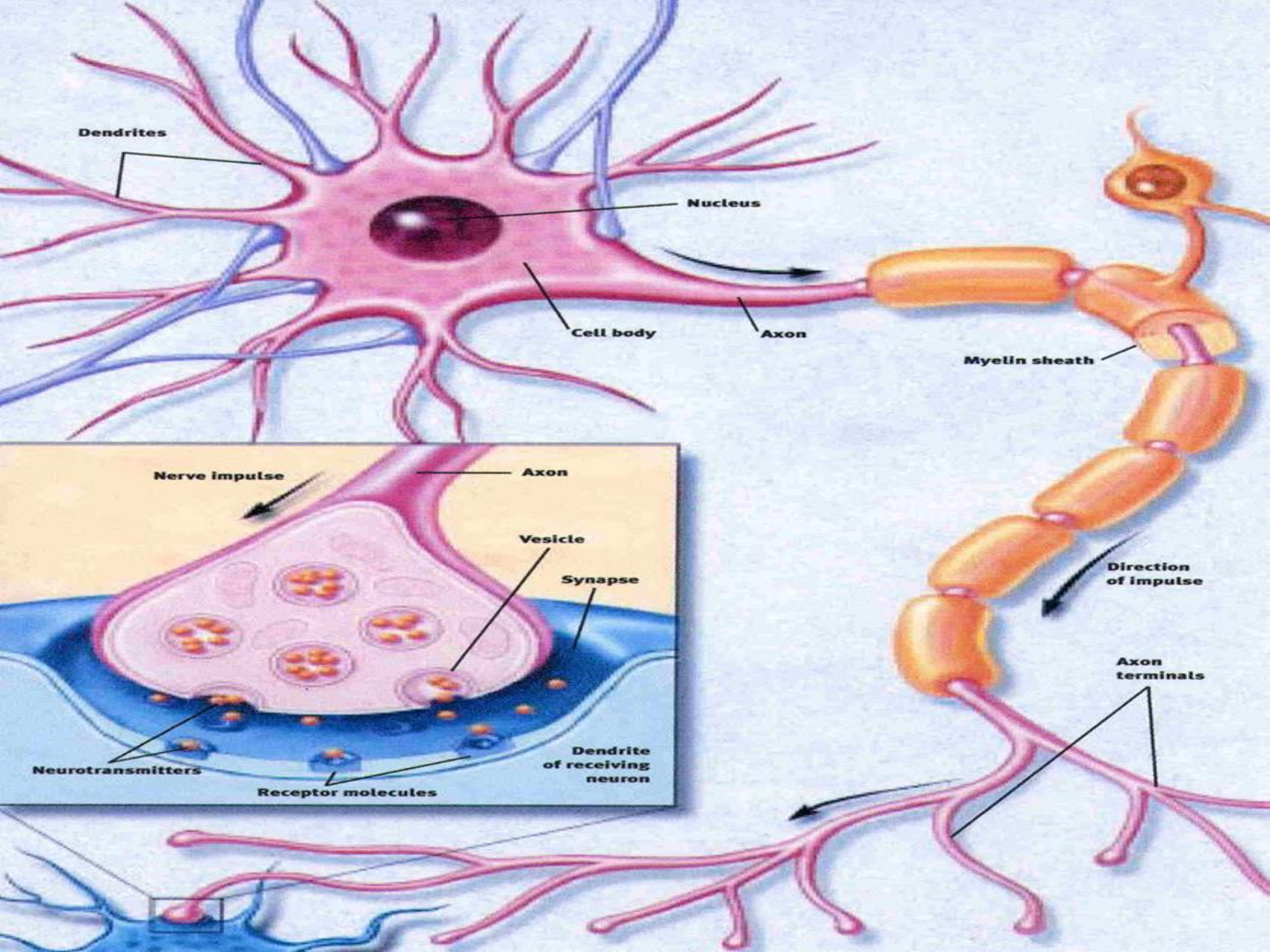
THE DANGERS OF TEENAGE EXPERIMENTATION

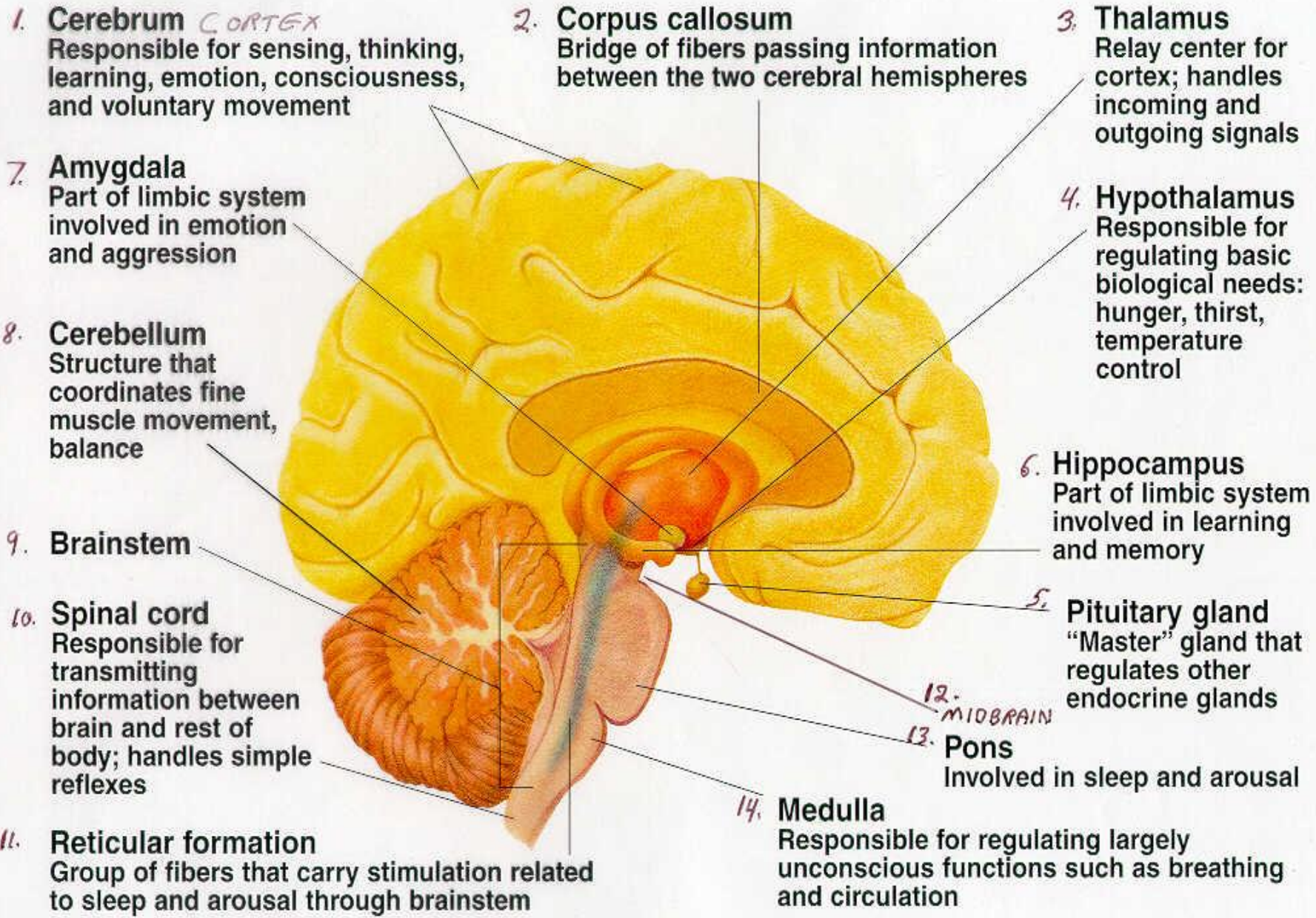
Photo courtesy of NIDA.

Master Control

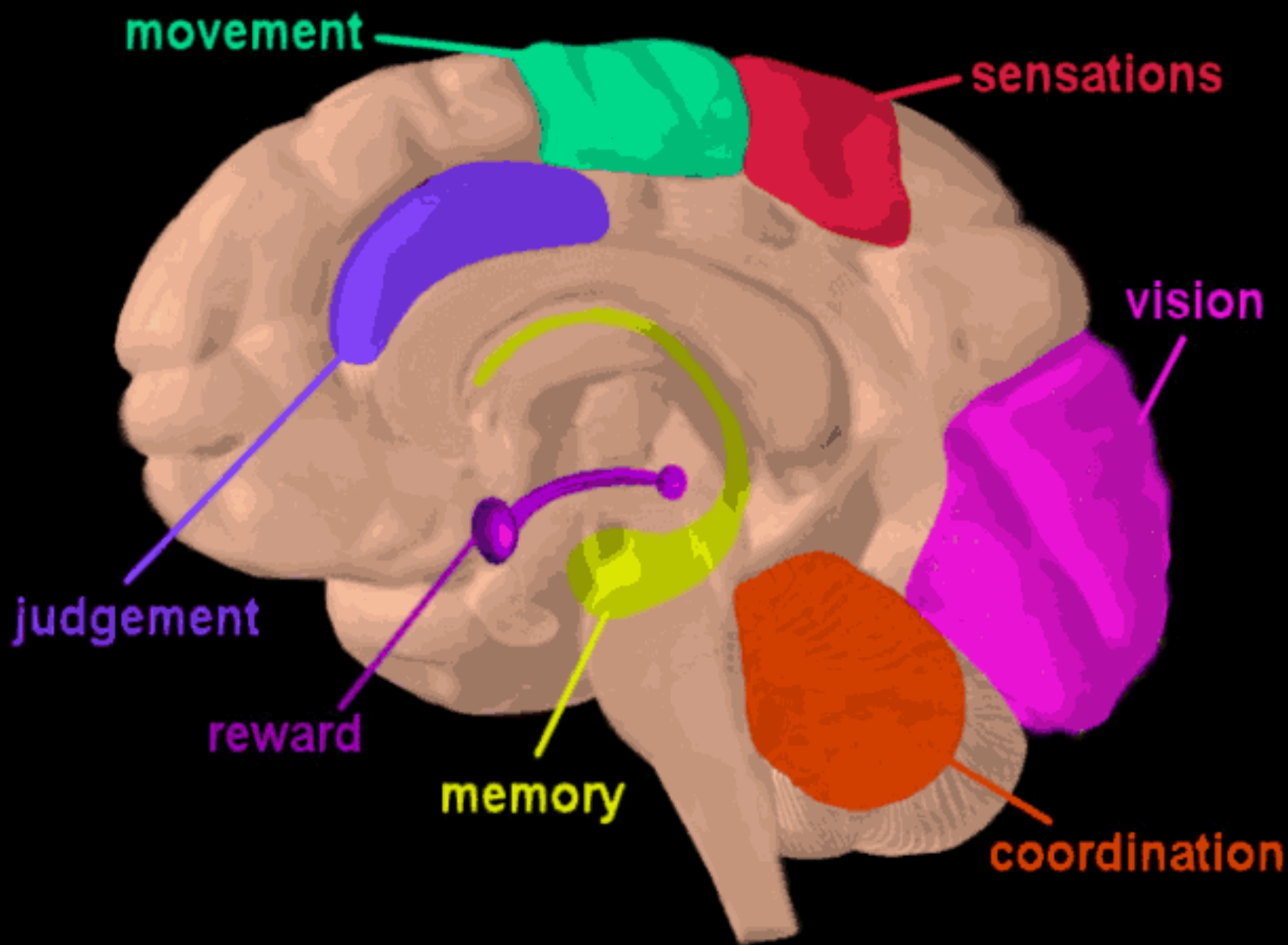


The human brain is made up about 85,000,000,000 information processing cells, called neurons. The neurons are connected by 'wires' that carry electrical signals, rather like the wires in a computer do. The total length of these 'wires' in a human brain is about 100,000 miles! That's half the distance between the earth and the moon.



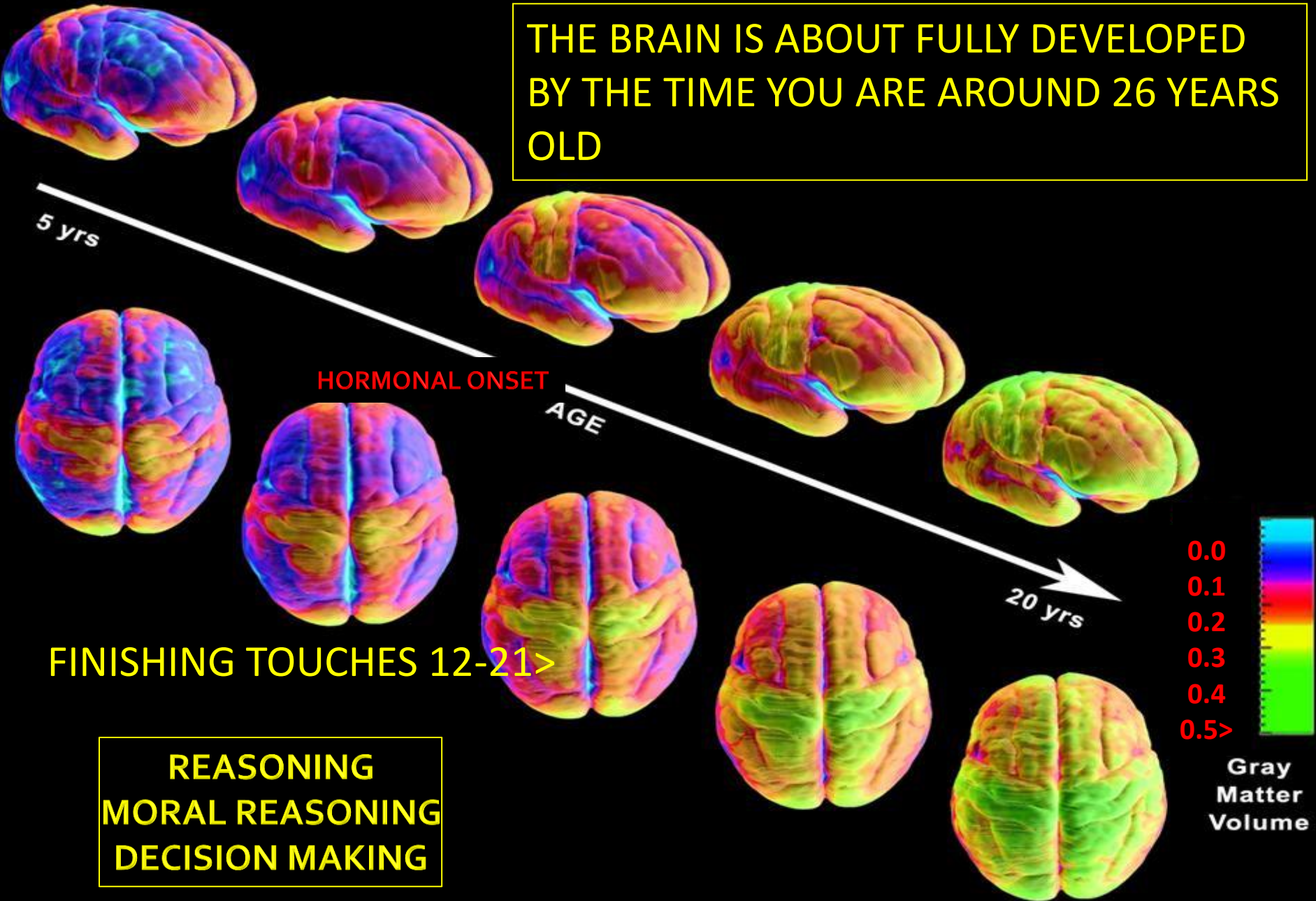


Structures and areas in the human brain



BRAIN

THE BRAIN IS ABOUT FULLY DEVELOPED BY THE TIME YOU ARE AROUND 26 YEARS OLD



5 yrs

HORMONAL ONSET

AGE

20 yrs

FINISHING TOUCHES 12-21>

0.0
0.1
0.2
0.3
0.4
0.5>

Gray
Matter
Volume

REASONING
MORAL REASONING
DECISION MAKING

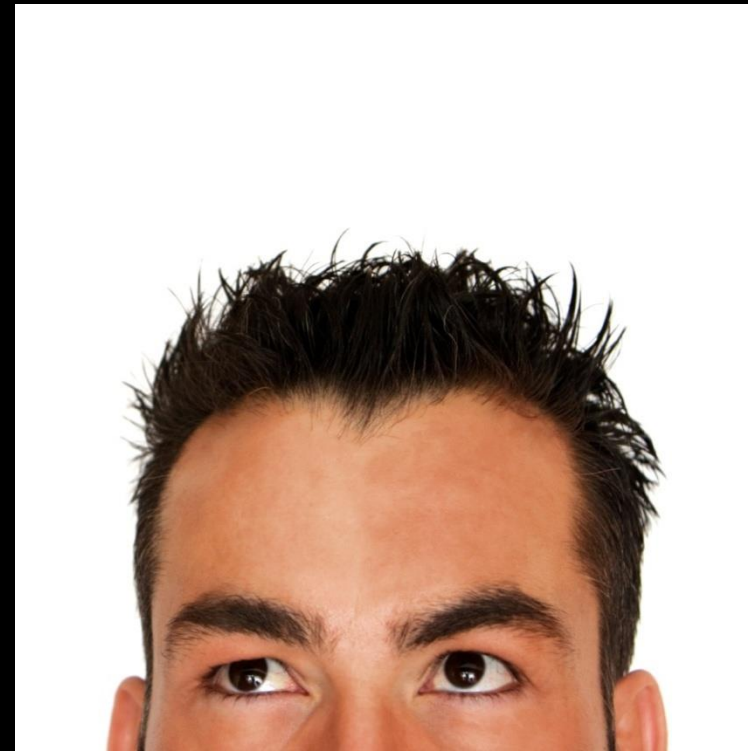
FRONTAL LOBE

- As the “prefrontal cortex” area of the frontal lobe matures, through experience and practice, teens can reason better, develop more **impulse control**, and make better judgments
- Prefrontal cortex is one of the last areas of the brain to fully develop (Sowell, 2001, Utah Addiction Center)
- Increased need for structure, mentoring, guidance



What Have We Learnt?

- Adolescence is a period of profound brain maturation.
- We thought brain development was complete by adolescence
- We now know... maturation is not complete until about age 25!



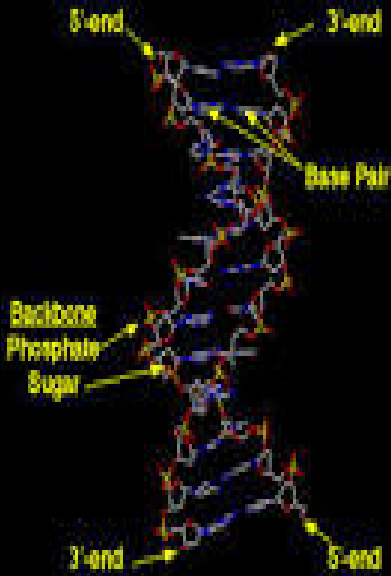
Teens are more likely too:

- Have preference for physical activity
- Less optimal planning and judgment
- More risky and impulsive behaviors
- Minimal consideration of negative consequences
- More likely to misinterpret surroundings and other human behavior



Risk Factors

People of any age, sex or economic status can become addicted to a drug. However, certain factors can affect the likelihood of your developing an addiction:

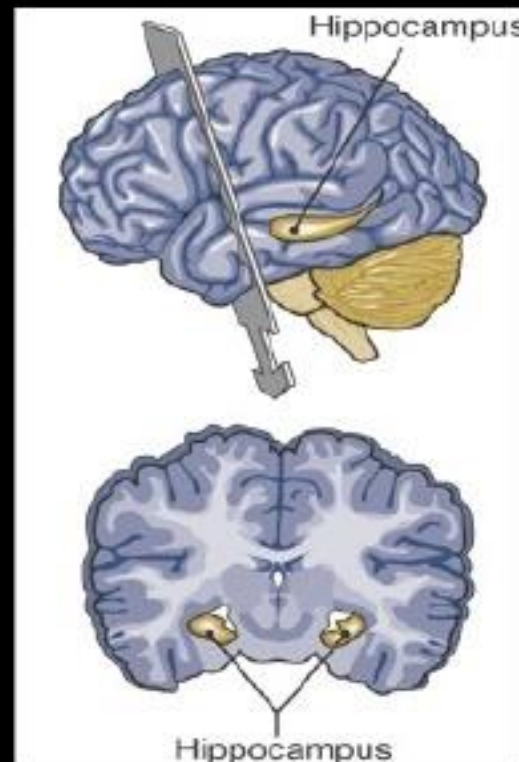


- **Family history of addiction.** Drug addiction is more common in some families and likely involves the effects of many genes. If you have a blood relative, such as a parent or sibling, with alcohol or drug problems, you're at greater risk of developing a drug addiction.
- **Being male.** Men are twice as likely to have problems with drugs.
- **Having another psychological problem.** If you have a psychological problem, such as depression, attention-deficit/hyperactivity disorder or post-traumatic stress disorder, you're more likely to become dependent on drugs.
- **Peer pressure.** Particularly for young people, peer pressure is a strong factor in starting to use and abuse drugs.
- **Lack of family involvement.** A lack of attachment with your parents may increase the risk of addiction, as can a lack of parental supervision.
- **Anxiety, depression and loneliness.** Using drugs can become a way of coping with these painful psychological feelings.
- **Taking a highly addictive drug.** Some drugs, such as heroin and cocaine, cause addiction faster than do others.
- **Age of first onset**
- **Generation "Y" brain priming**

Effects of Harmful Substances

Hippocampus

- Responsible for learning and memory
- Most sensitive during adolescence
- Shutdown results in blackouts
- Smaller in alcohol-abusing teens



See "Getting Stupid" by
Bernice Wuethrich in *Discover*
Magazine, March 2001

LONG-TERM EFFECTS OF ALCOHOL ON THE BODY

HEART

- Increases blood pressure
- Enlarges heart
- Irregular heart rate

MUSCLES

- Shrinking of muscles

SKIN

- Redness/flushing
- Increased sweating

NOSE

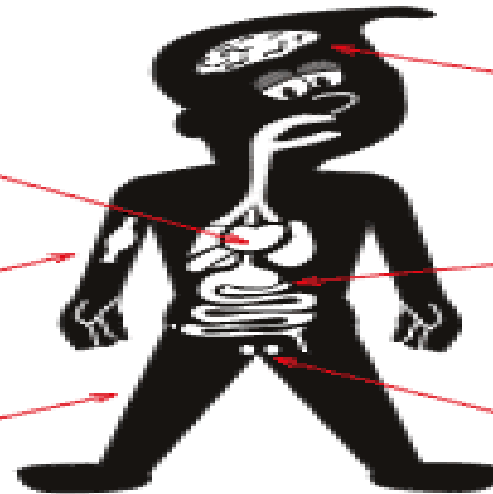
- Broadening of the nose

LIVER

- Cancer
- Cirrhosis
- Hepatitis
- Extreme pain and swelling

FEMALE SEX ORGANS

- Increased risk of gynaecological problems
- Harm to unborn babies



BRAIN

- Brain damage
- Memory loss
- Confusion
- Hallucinations

PANCREAS

- Pain and swelling

MALE SEX ORGANS

- Shrinking of testes
- Impotence
- Fewer sperm

LUNGS

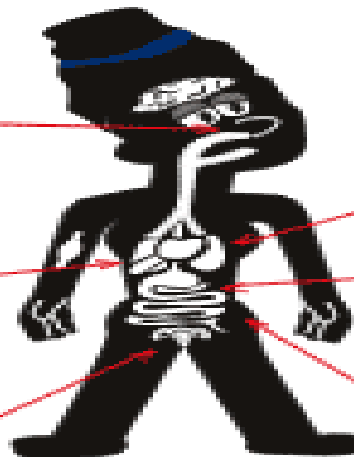
- Increases chances of infections

STOMACH

- Bleeding
- Ulcers
- Inflammation of the lining

INTESTINES

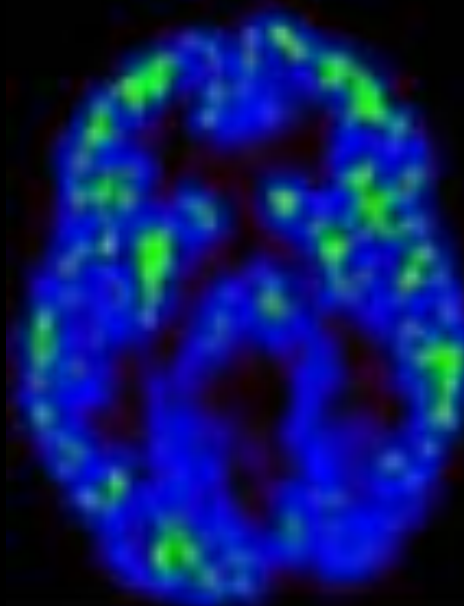
- Ulcers
- Inflammation of the lining





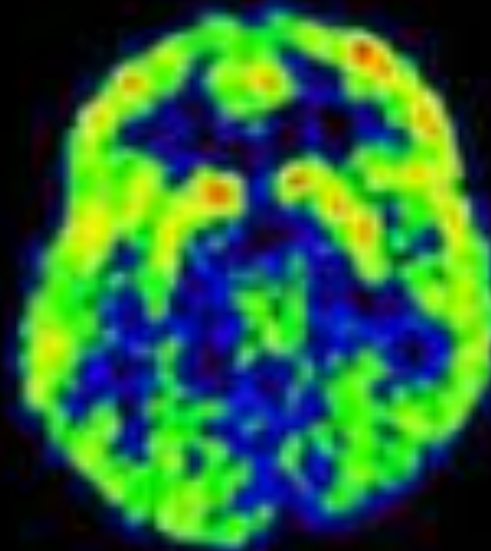
Teen brain development and

alcohol



Alcoholic

Darker Colouring
indicates depressed
brain activity

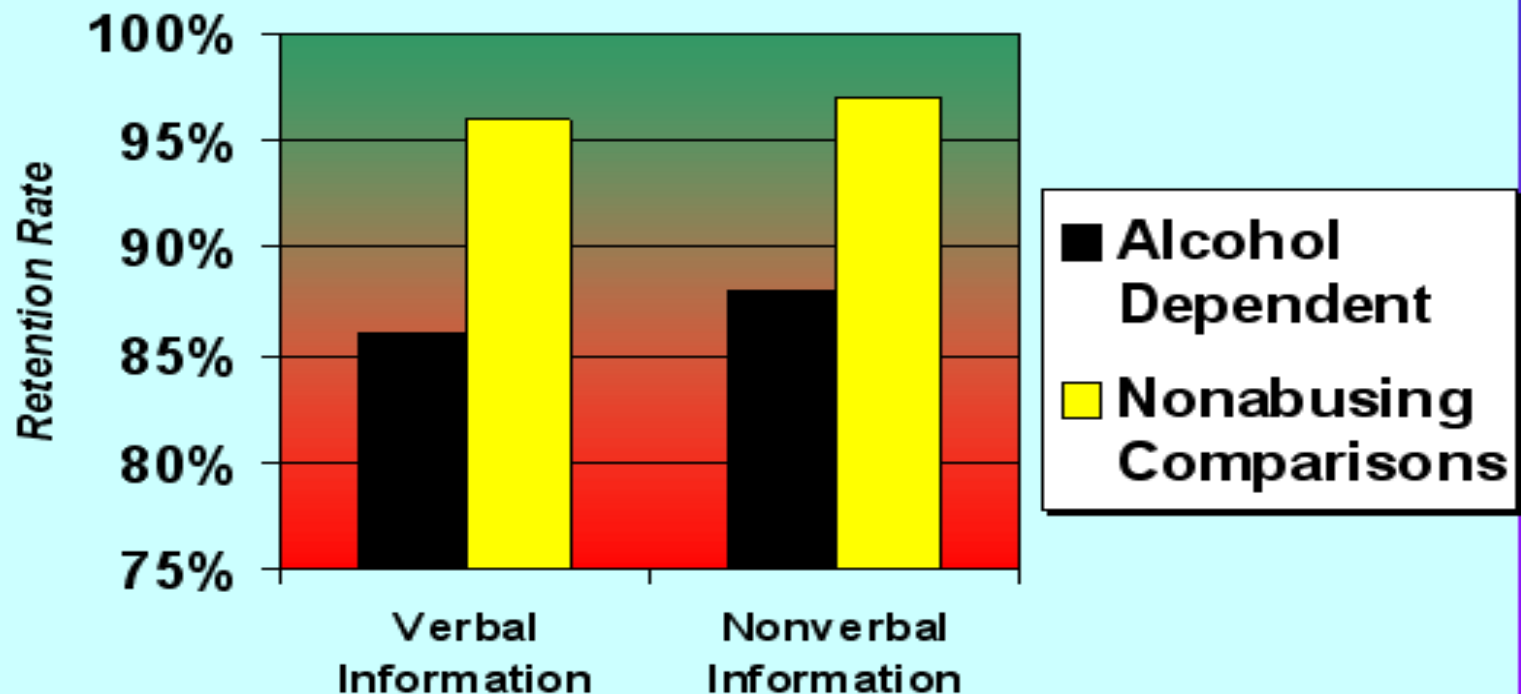


Normal

Healthy levels of
brain activity

Studies on Teen Drinking

15-16 Yr. Old Abusers Have Less Recall



Could be the difference between an "A" and a "B"

Source: Brown SA, Tapert SF, Granholm E, Delis DC (2000). Neurocognitive Functioning of Adolescents: Effects of Protracted Alcohol Use. *Alcoholism: Clinical and Experimental Research*. 24 (2): 164-171.

Studies on Teen Drinking

The brain images below show how alcohol may harm teen mental function. Compared with a young non-drinker, a 15-year-old with an alcohol problem showed poor brain activity during a memory task. This finding is noted by the lack of pink and red coloring.

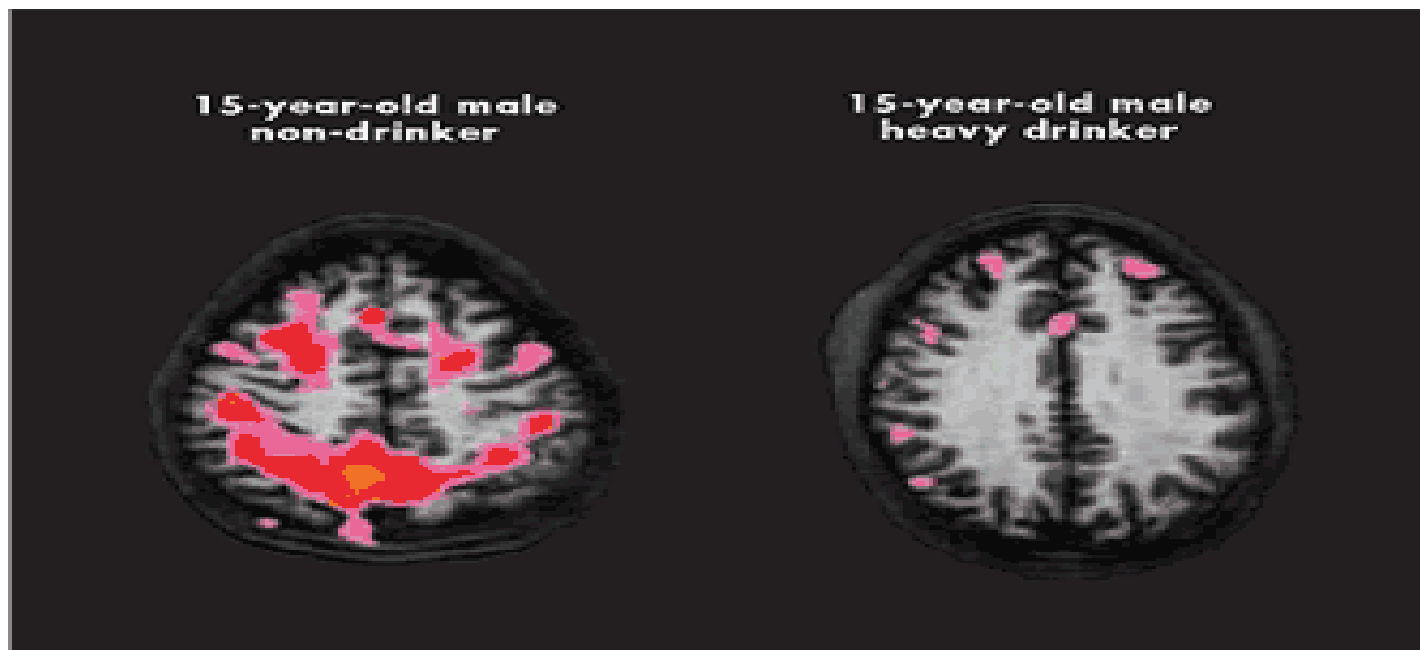
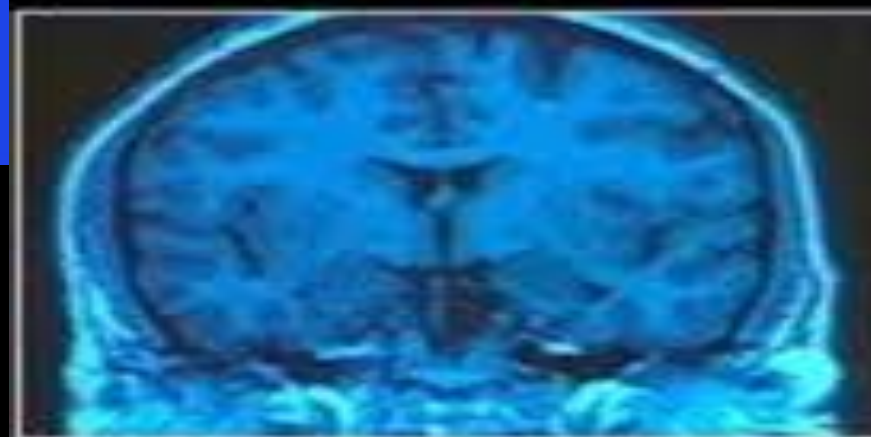
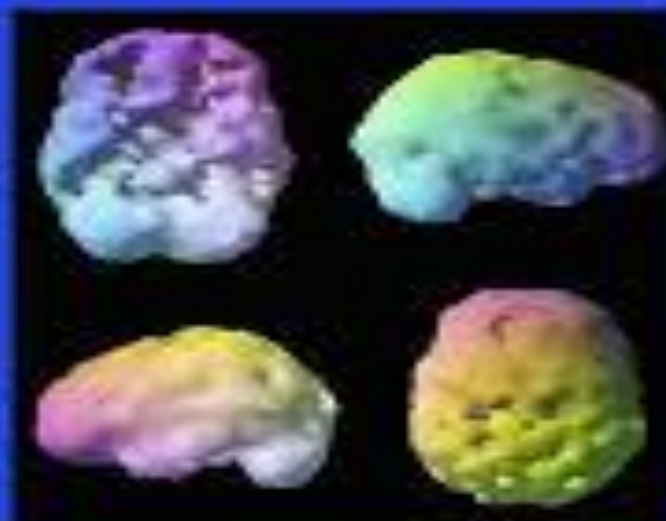
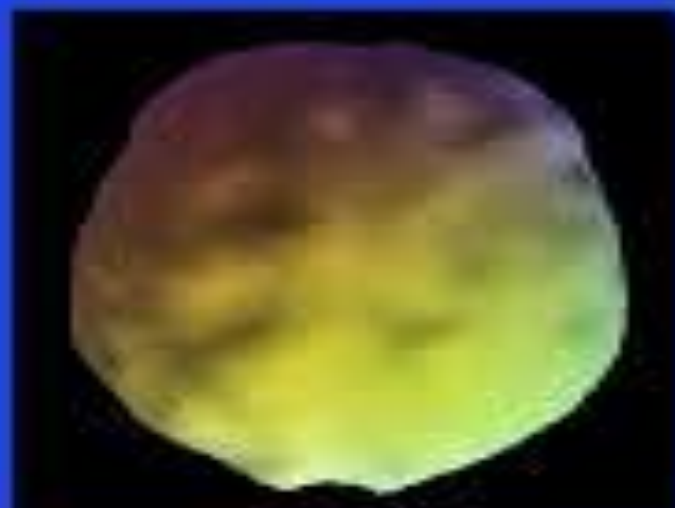


Image from Susan Tapert, PhD, University of California, San Diego.

What Alcohol Does to the Brain



Normal
43-year-old



Alcoholic
43-year-old

IMAGING OF ALCOHOL USERS

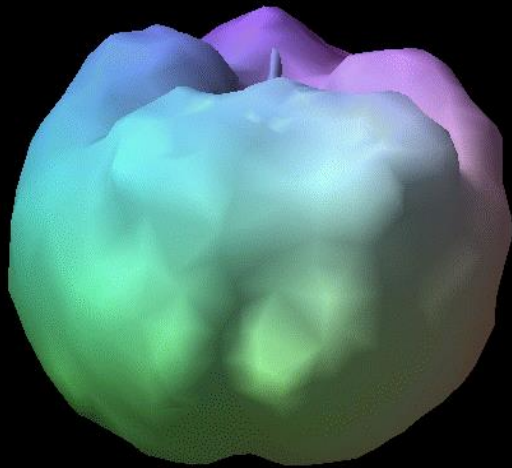
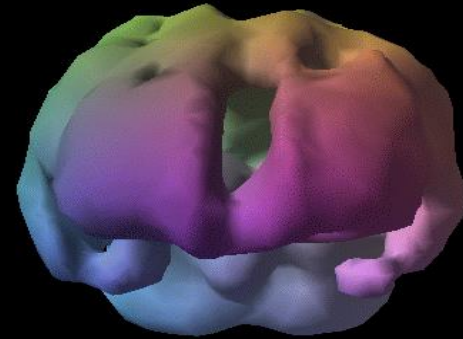


IMAGE OF NON-
DRINKER



IMAGING OF LONG
TERM
ALCOHOLIC



MARIJUANA SKILL IMPAIRMENT



NON USER

**SIMPLE HAND
SKILL**



MARIJUANA USER

**SIMPLE HAND
SKILL**

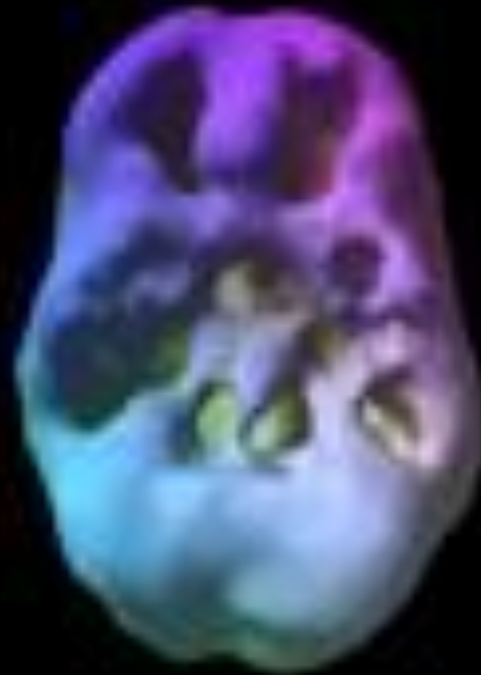
Note: Subject not under influence during scan.

POT OR NOT? YOUR CHOICE YOUR GAME

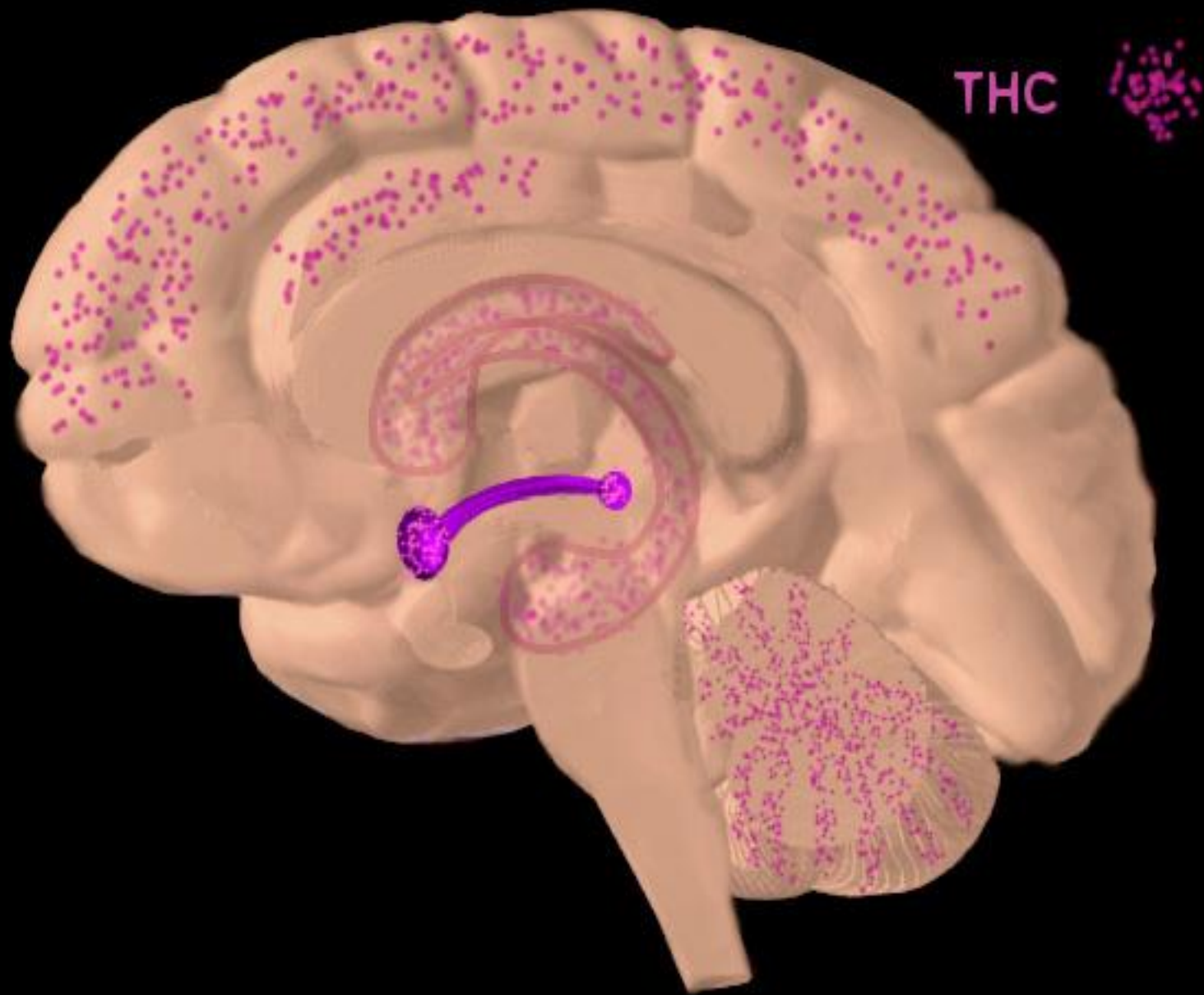
MARIJUANA

Healthy Brain

Marijuana Brain



16 yr. old daily user



Your Brain After Drugs

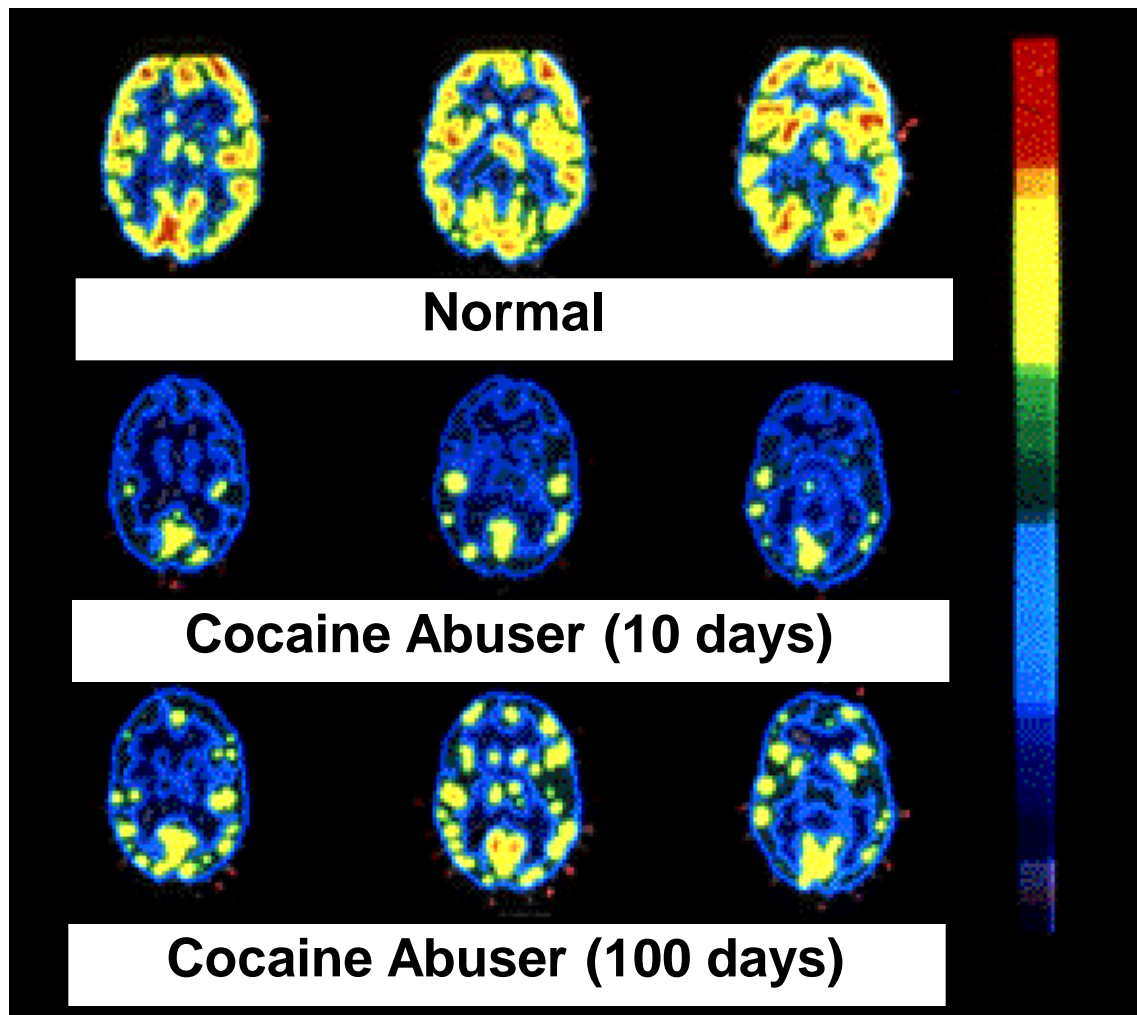
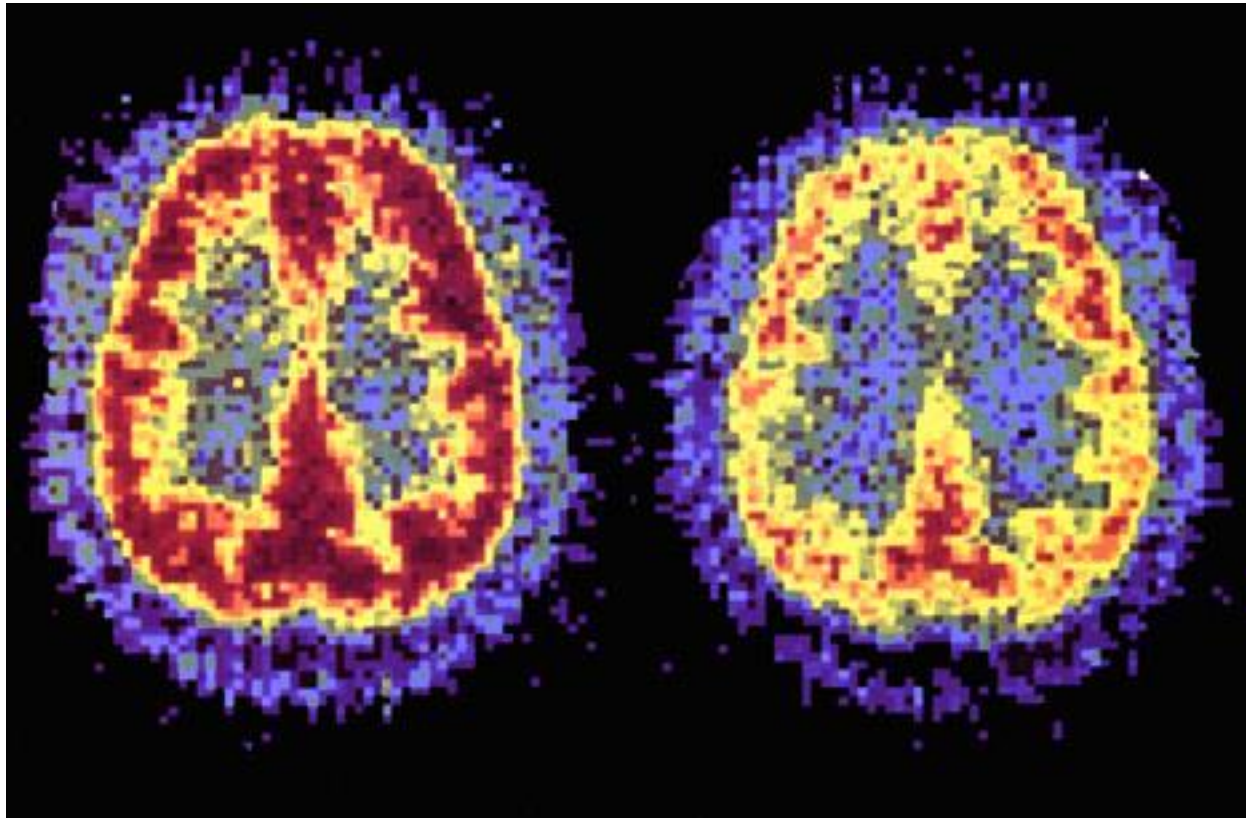


Photo courtesy of Nora Volkow, Ph.D. Volkow ND, Hitzemann R, Wang C-I, Fowler IS, Wolf AP, Dewey SL. Long-term frontal brain metabolic changes in cocaine abusers. *Synapse* 11:184-190, 1992; Volkow ND, Fowler JS, Wang G-J, Hitzemann R, Logan J, Schlyer D, Dewey S, Wolf AP. Decreased dopamine D2 receptor availability is associated with reduced frontal metabolism in cocaine abusers. *Synapse* 14:169-177, 1993.

The good news is...

Drug Addiction is a preventable disease!





Have you changed your mind?