Exploring Myths About Addiction

Dr. Carlton Erickson
November 16, 2001
Exploring Myths About Addiction

Carlton Erickson, Ph.D.
Director, Addiction Science Research and Education Center
College of Pharmacy, U.T.
We have problems....

Here are some myths:

• Club drugs and marijuana are not addicting.
• Prozac and other antidepressant drugs are addicting.
• Everyone who uses cocaine or heroin is addicted.
• It takes a history of heavy smoking to produce addiction to nicotine.
• Anyone who drinks too much, too often, is an alcoholic.
Movie about Alcoholism

Click here to view animation
Movie about Addiction

Click here to view animation
TWO CRITICAL DEFINITIONS*

Abuse

Dependence

* Based on the Diagnostic and Statistical Manual-IV (DSM-IV)
ABUSE

• **Intentional Overuse** in cases of celebration, anxiety, despair, self-medication, or ignorance. Tends to decline with adverse consequences. (“a problem to solve”)

• **Not a minor problem** - produces a major socioeconomic impact in the nation
DEPENDENCE

- **Impaired Control** over drug use, probably caused by a dysfunction of the medial forebrain bundle, "pleasure pathway"

("a disease to conquer")
Addiction is impaired control over use of the drug!

Dependence = Addiction

Alcohol Dependence = Alcoholism
Determining whether someone is an alcoholic or drug addict is a professional decision.

You should not make that decision.
A NINE MINUTE COURSE IN NEUROBIOLOGY
The brain is made up of millions of neurons that send information across the brain with electrical signals.

Neuron cell bodies

Click here to view animation
These neurons are separated by small spaces called synapses.
Neurons communicate across synapses by chemical signals called neurotransmitters.

Click here to view animation
A Detailed Look at a Neural Synapse
Neurotransmitters in the synapse.
Cocaine inhibits the uptake of a neurotransmitter called dopamine.
When neurotransmitter is not taken out of the synapse, it causes more stimulation than it normally would.
Amphetamines increase the release of dopamine.
Pleasure Pathway
Prozac inhibits the uptake of a neurotransmitter called Seratonin.
SOME PEOPLE MAY BE PRE-DISPOSED TO ADDICTION

Certain people may have a functional deficiency in one or more neurotransmitters that occur in the pleasure pathway.

NEUROTRANSMITTERS OF “ADDICTION”

- Dopamine (DA)
- Serotonin (SER)
- Endorphins (END)
- Gamma-aminobutyric acid (GABA)
- Glutamate (GLU)
- Acetylcholine (ACh)
ADDICTION IS A BRAIN CHEMISTRY DISEASE!

1. **Addicting drugs** “match” a transmitter system that is not normal.

2. **Abstinence** is the first step in the total treatment process, in order to access the “wreckage of the past”.

3. Some people require a chemical to overcome the non-normal transmitter system. Evidence for is found in cases of methadone maintenance.
GENETICS OF ALCOHOLISM

• What is passed from parent to child?
• “The tendency to become alcoholic is inherited.”

Research on the Genetics of Alcoholism
• family, twin, and adoption studies
• the search for the genes
Genetic Risk of Alcoholism (Speculated)

Mother (4 genes)
- egg
Father (1 gene)
- sperm

Children
- None
- Low
- Mod.
- High

Risk -
SCIENTIFIC RATIONALE BASED UPON GENETICS

abnormal genes $\rightarrow$ abnormal proteins

transmitter synthesizing enzymes
transmitter breakdown enzymes

Receptors

neurotransmitter dysfunction in the pleasure pathway

impaired control
Medial Forebrain Bundle
DEPENDENCE MODEL

• This is **not** a will power or poor judgment disease.

• **Impaired control** is caused by brain chemistry malfunction.

• Addicts **need** to drug to feel normal.

• Ultimate treatment must **normalize** neurotransmitter function in the proper brain area.
REDUCING DRUG ABUSE

• make drugs harder to get (alcohol: age, taxes, supply)

• coerce or punish abusers

• educate to prevent first use

• increase adverse consequences
REDUCING DRUG DEPENDENCE

- intervention for those in denial
- inpatient-outpatient-aftercare
- 12 steps (abstinence)
- relapse prevention therapy
- new medications to reduce craving (now) and fix abnormal genes (in the future)
PHARMACOTHERAPIES FOR CHEMICAL DEPENDENCY

• **alcohol** - naltrexone, acamprosate, ondansetron
• **nicotine** - patches, gum, bupropion (Zyban), new vaccine
• **heroin** - methadone, buprenorphine
• **cocaine** - many alleged (GVG?), new vaccine
SCIENCE PROPOSES THAT BEHAVIORAL THERAPIES CHANGE BRAIN CHEMISTRY!
The Real Situation

• we wrongly tend to think all drug problems have a single solution

• we want to blame people for their affliction, while not seeking real causes (ask: why do they do that?)

• we hate what we fear or become angry at people who act badly

• stigma, prejudice, and misunderstanding are enormous

• addiction science is teaching us to become more tolerant
Acknowledgements

The following people and institutions provided support to make this presentation possible.

The Environmental Science Institute
  Nelson Guda
  Jay Banner
The College of Pharmacy
  The National Science Foundation
Carlton Erickson is interested in addiction science education, performed through the dissemination of new research findings on drug addiction in lay language. Primarily through lectures and slide presentations to treatment professionals (alcohol and other drug abuse counselors, social workers, mental health counselors, etc.) and the “reachable public” (criminal justice workers, physicians, nurses, pharmacists, dentists, clergy, and family members), education is packaged in an easily-understandable form so that new information can be transferred quickly to those who can use it. He is also interested in teaching other researchers to communicate their research results more effectively, and to motivate them to also talk to nonscientific groups. Finally, the evaluation of such information transfer is critical to its long-term effectiveness in altering public opinion about addictions as diseases. Therefore he is interested in learning behavioral change methods and theory, attitudinal theory, and how to influence public opinion regarding drug use, abuse, and dependence in our society.