

# STREET DRUG PHARMACOLOGY: Module I

Randall Webber, MPH, CADC

# ESSENTIAL ISSUES IN UNDERSTANDING STREET DRUG PHARMACOLOGY

- Psychoactivity
- Dependence
- Tolerance
- Toxicity
- Psychiatric Impairment
- Set and setting
- Substance  
misrepresentation/misidentification

Psychoactivity = ability to affect mood, thinking and/or behavior

# CONTROLLED SUBSTANCES

- Schedules I-V
- Schedule I: High potential for abuse, tendency to produce dependence, no accepted medical use in US
- Schedules II-V: Potential for abuse, tendency to produce dependency, does have accepted medical application

# SCHEDULE I SUBSTANCES

- LSD
- Heroin
- Cannabis
- PCP

# SCHEDULE II SUBSTANCES

- **Morphine**
- **Cocaine**
- **Short-acting barbiturates**
- **Amphetamines**



# **DESIGNATED PRODUCTS:**

## **State of Illinois**

● **Schedule II substances with a higher potential for abuse and addiction**

- **amphetamines**
- **cocaine**
- **short-acting barbs**
- **methadone**
- **morphine**
- **OxyCodone**

# DRUG NAMES

- Chemical (7-chloro-1,3-dihydro-1-methyl-5-phenyl-2H-1,4-benzodiazepin-2-one)  
CN1C=NC2=C1C(=C(C=C2)C(=O)N3C(=CC=C4C3=CC(=C4)C)C5=CC=CC=C5C4=O
- Generic: diazepam
- Brand : Valium
- Street: No common street names for Valium



# DRUG MEASUREMENT

## ● metric:

- micro = 1/1,000,000.
- Microgram (mcg./ $\mu$ , also called a "gamma") = 1/1,000,000 gram)

## ● Street

- nickel/nickel bag & dime/dime bag = \$5 or \$10 worth of drug
- eightball = 1/8 oz. (3.75 grams)

# DRUG MEASUREMENT

## ● Street

- sixteenth = either 1/16 oz (1.875 gm) or 1/16 gm (62.5 mg, about three lines of cocaine)
- line = an elongated pattern of powdered drug. Quantity = whatever the user decides.
- joint = a marijuana cigarette.

# DRUG FORMS

- **plant/botanical matter** (marijuana, opium poppies, khat, coca, peyote, psilocybin mushrooms, jimsom weed).
- **liquids** (alcohol, pure LSD, injectable pharmaceuticals)
- **powders** (cocaine hcl., heroin, PCP, methamphetamine)

# DRUG FORMS

- **pills** (tablets, capsules, caplets of either pharmaceutical or illicit origin)
- **other forms** (ex: "rocks" of crack cocaine).

# Potency, purity & misrepresentation of street drugs

- **potency** = strength, compared to some other drug of a similar type.
- **purity** = the major determinant of potency.
  - The more pure the drug, the more potent.
  - Street drugs are seldom pure, but are commonly misrepresented in one of three ways



# DRUG MISREPRESENTATION

- **adulteration:** (to adulterate = to "step on"/"hit"/"dance on" "cut" a drug).
- **Substitution/misrepresentation-1:** None of the alleged drug is present, but another drug/drugs is/are.
- **substitution/misrepresentation -2:** None of the alleged drug is present, and neither is any other drug or active substance.



# The Problem with Pill Identifications:



New York City May 2000 Amphetamine



Chicago May 2000 MDMA



Tucson AZ July 2000 PMA



# TIME FACTORS

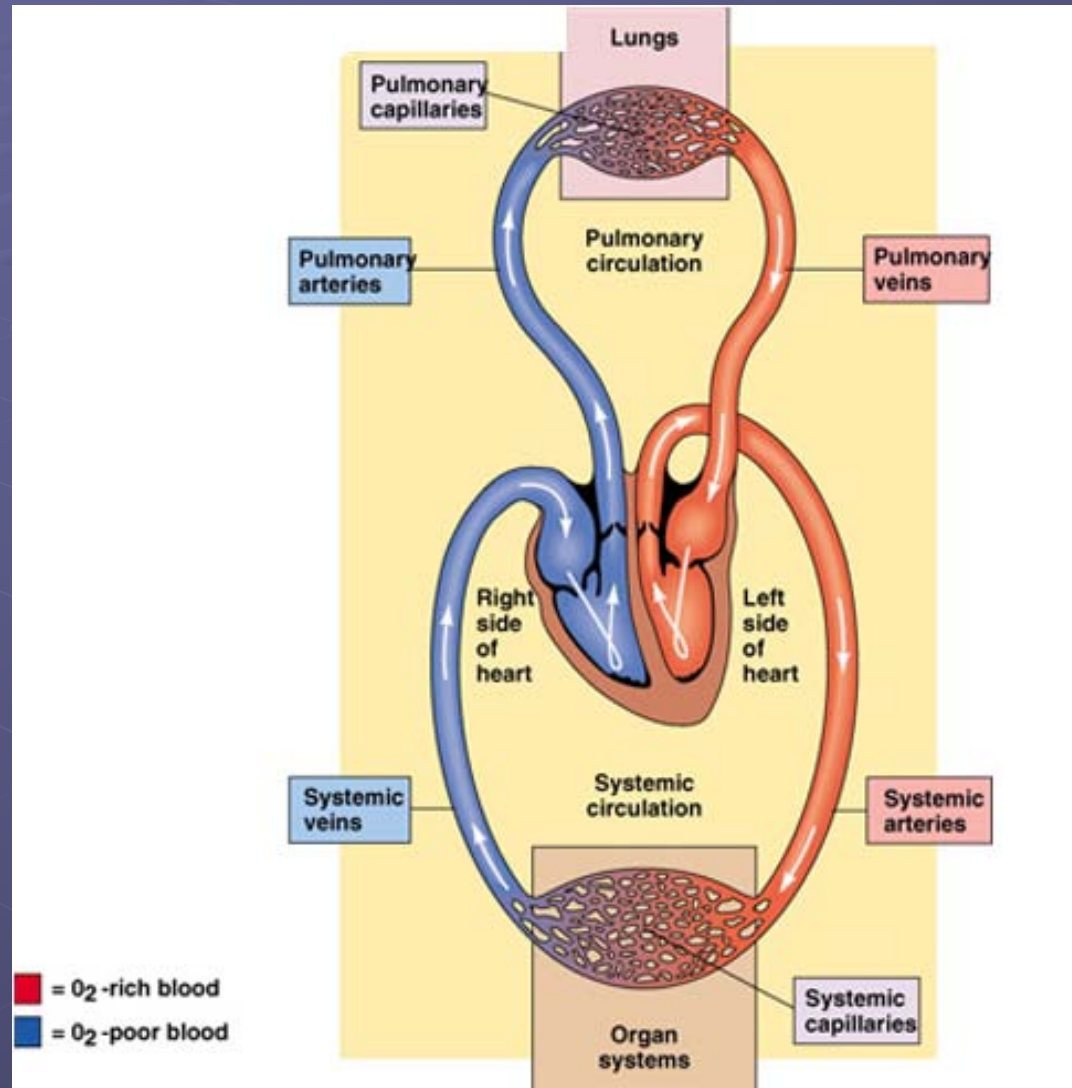
- **Onset of action:** How quickly does the drug produced it's effect?
- **Duration of action:** How long does the drug's effect last?
- **Residual effects:** After-effects, extended drug reaction, flashbacks

# The route of circulation.

● Blood flows in a circle according to this pattern:

- Capillaries
  - vena cava
  - Lungs
  - Aorta
- veins
  - right side of the heart
  - left side of the heart
  - body (capillaries, etc.)

# Route of Circulation



# METHOD OF ADMINISTRATION

- **Ingestion (oral): slower onset/longer duration**
- **Insufflation (sniffing/snorting): faster onset/shorter duration**
- **Intravenous (I.V.) Injection: faster onset (seconds)/shortest duration**
- **Smoking: fastest onset/shortest duration**







# METHOD OF ADMINISTRATION

- **Ingestion (oral): slower onset/longer duration**
- **Insufflation (sniffing/snorting): faster onset/shorter duration**
- **Intravenous (I.V.) Injection: faster onset (seconds)/shortest duration**
- **Smoking: fastest onset/shortest duration**



# METHOD OF ADMINISTRATION

- **Ingestion (oral): slower onset/longer duration**
- **Insufflation (sniffing/snorting): faster onset/shorter duration**
- **Intravenous (I.V.) Injection: faster onset (seconds)/shortest duration**
- **Smoking: fastest onset/shortest duration**



# THE “RUSH” OR “FLASH”

**A highly pleasurable sensation  
produced by the instantaneous effect  
of i. v. injection or smoking\***

**\* If entire dose administered at once**



# METABOLISM AND EXCRETION

- **The break-down of a drug into simpler substances**
- **The removal of the drug from the body**

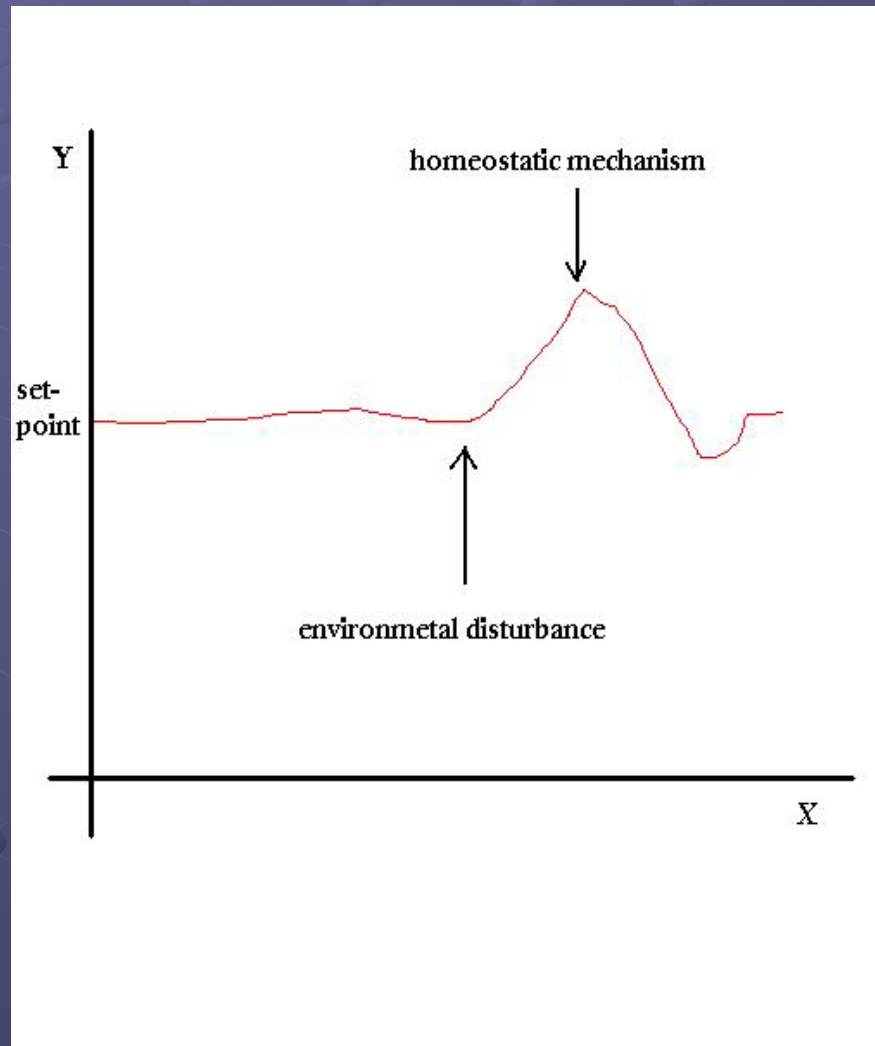


# TOLERANCE

## Homeostasis

**The human body's natural tendency to move toward a state of equilibrium or constancy**

# SET POINT RESPONSE TO DRUG USE



# TOLERANCE

- Need to increase the dose of a drug in order to obtain the desired effect
- Decreased effect of drug after repeated administration
- Dependent on prior dosage level
- Develops in hours (cocaine), days (LSD), or weeks

# TOLERANCE

- Effective dose (ED)
- Intoxicating dose (ID)
- Lethal dose (LD)

# TYPES OF TOLERANCE

- **Enzyme induction**
- **Pharmacodynamic**
- **Behavioral Need to increase the dose of a drug in order to obtain the desired effect**

# DEPENDENCE

- **Addiction**

- **Physical dependence**



# ADDICTION POTENTIAL

- **What percentage of first-time users will enjoy the effect of the drug enough that they will seek it out again?**
- **If an individual uses the drug on a regular basis, how likely is it that s/he will become dependent on the substance?**

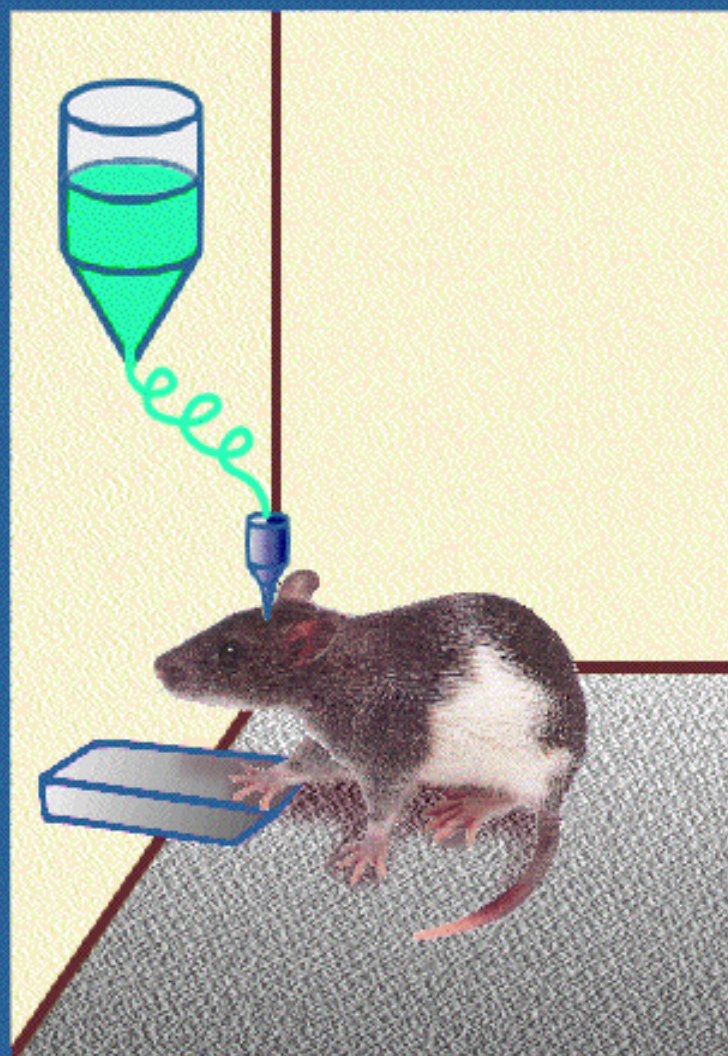
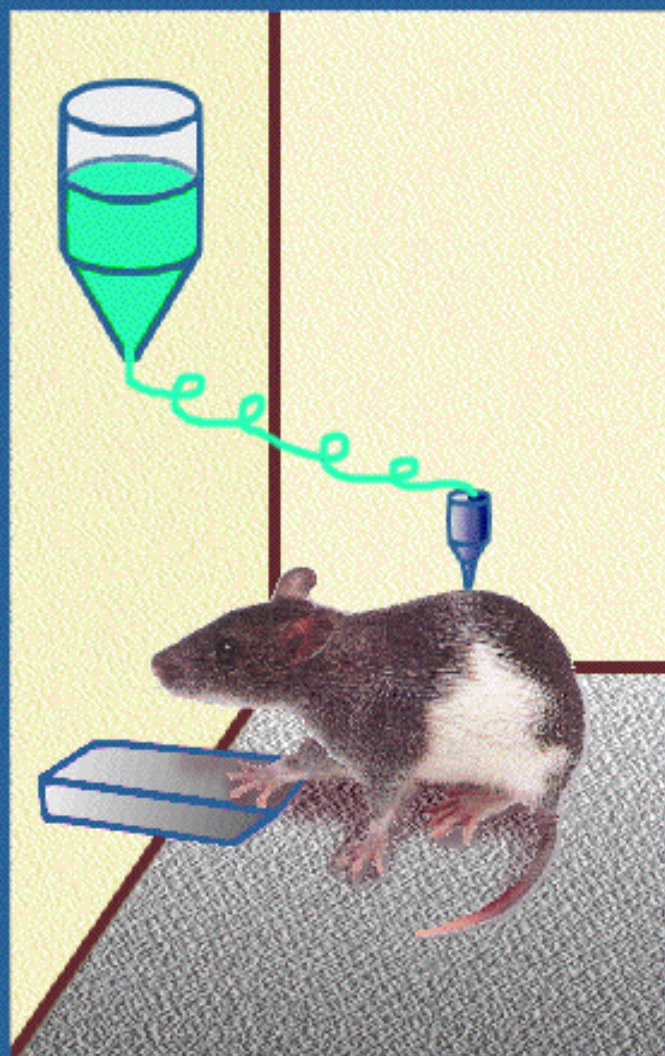
# ADDICTION POTENTIAL

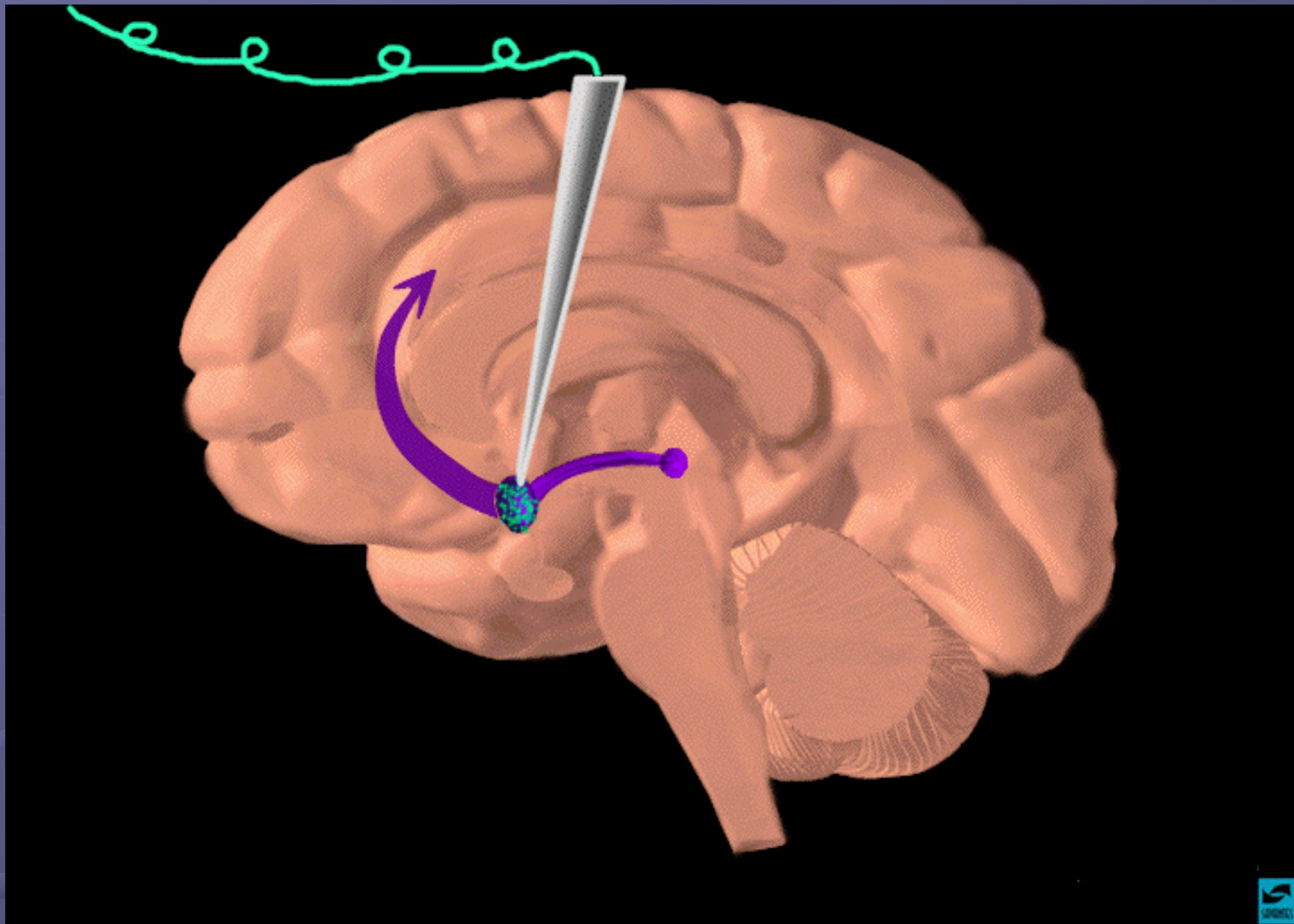
- After being introduced to the drug, do sub-human animals (e.g., monkeys, rats, mice) seek out opportunities to self-administer the substance? Do they do so to the exclusion of eating, consuming water and engaging in reproductive behavior?

# ADDICTION POTENTIAL CAN ALSO BE PREDICTED IN PART BY OBSERVING ANIMAL SELF-ADMINISTRATION

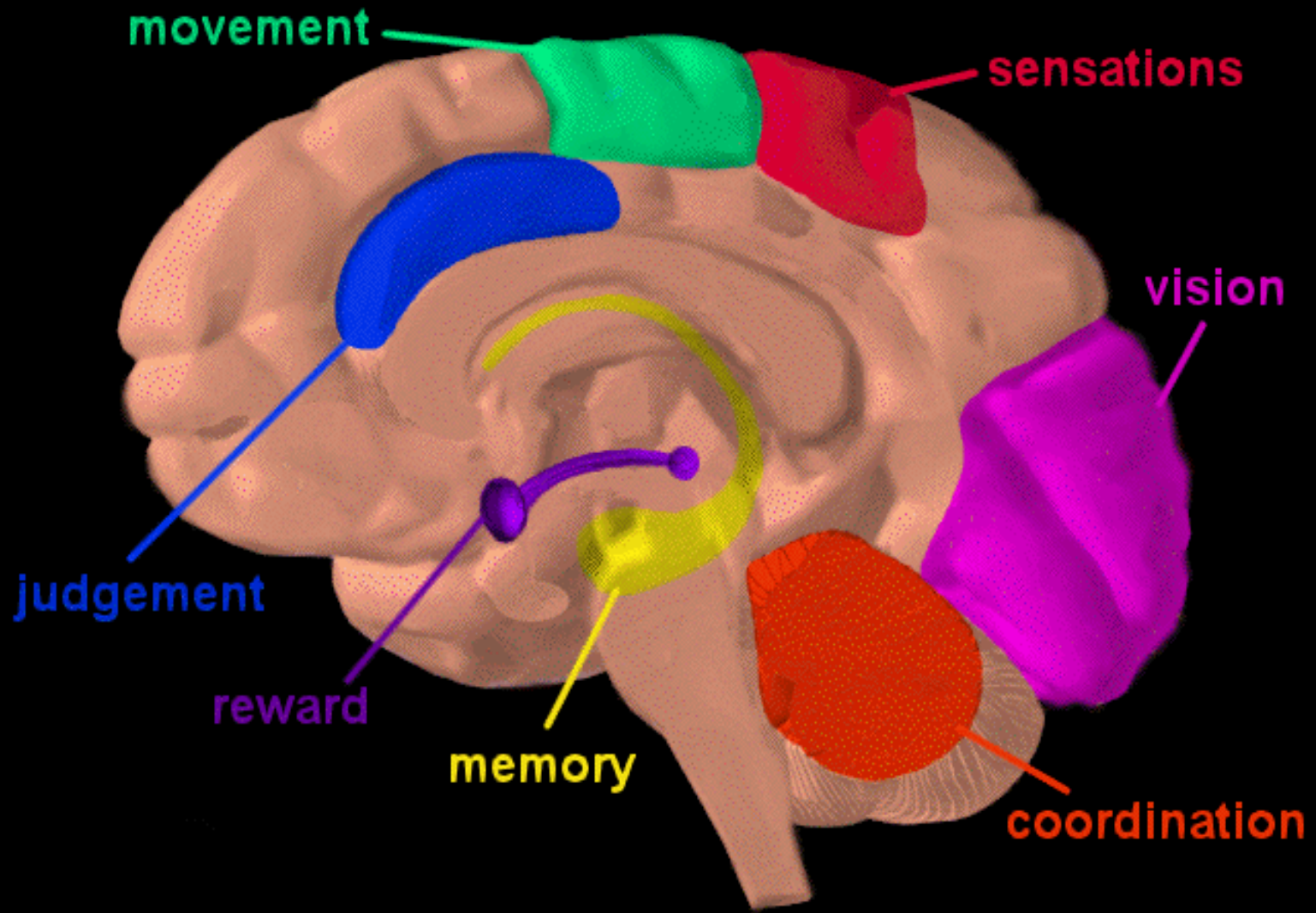








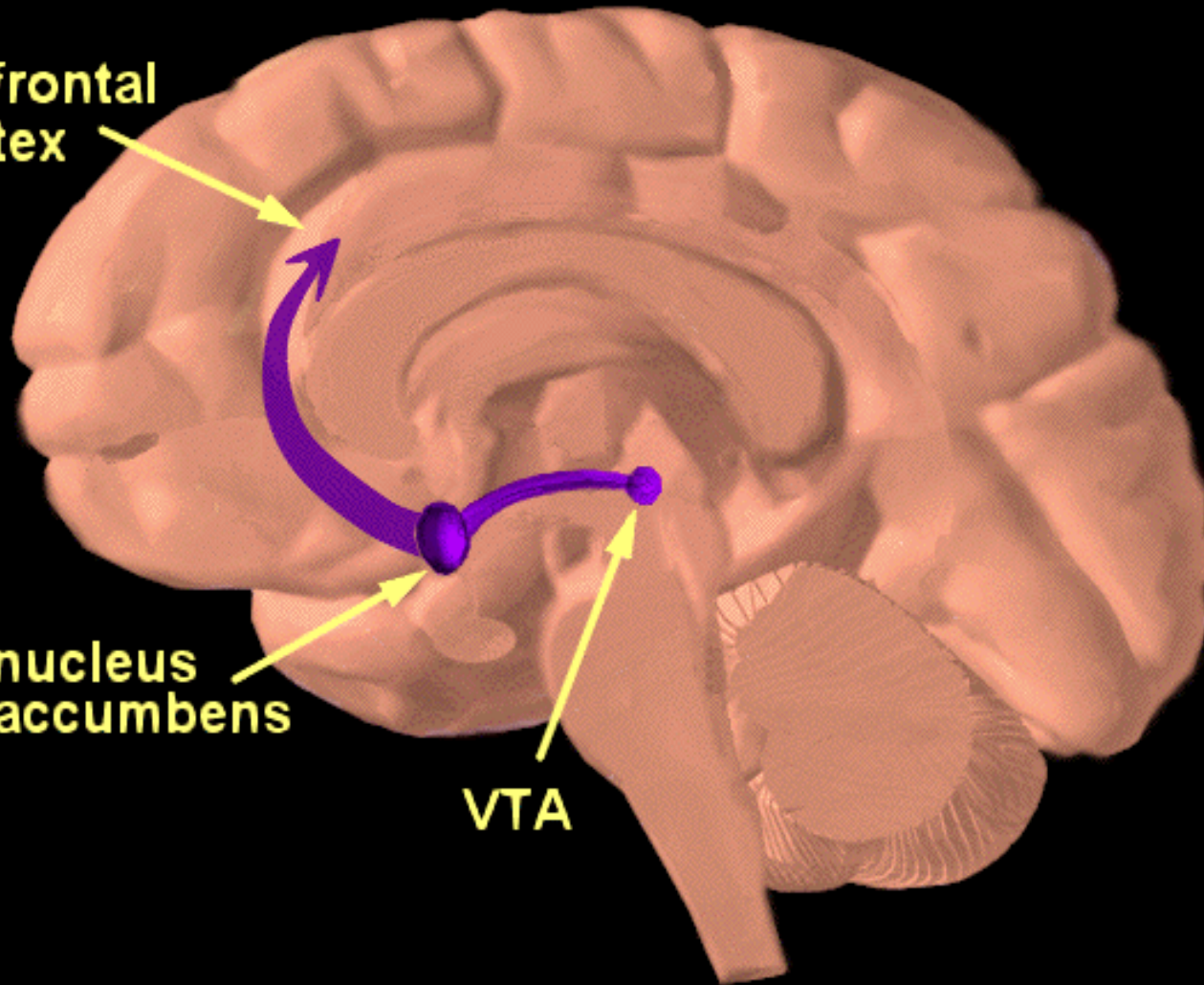




**prefrontal  
cortex**

**nucleus  
accumbens**

**VTA**



# **ADDICTION POTENTIAL**

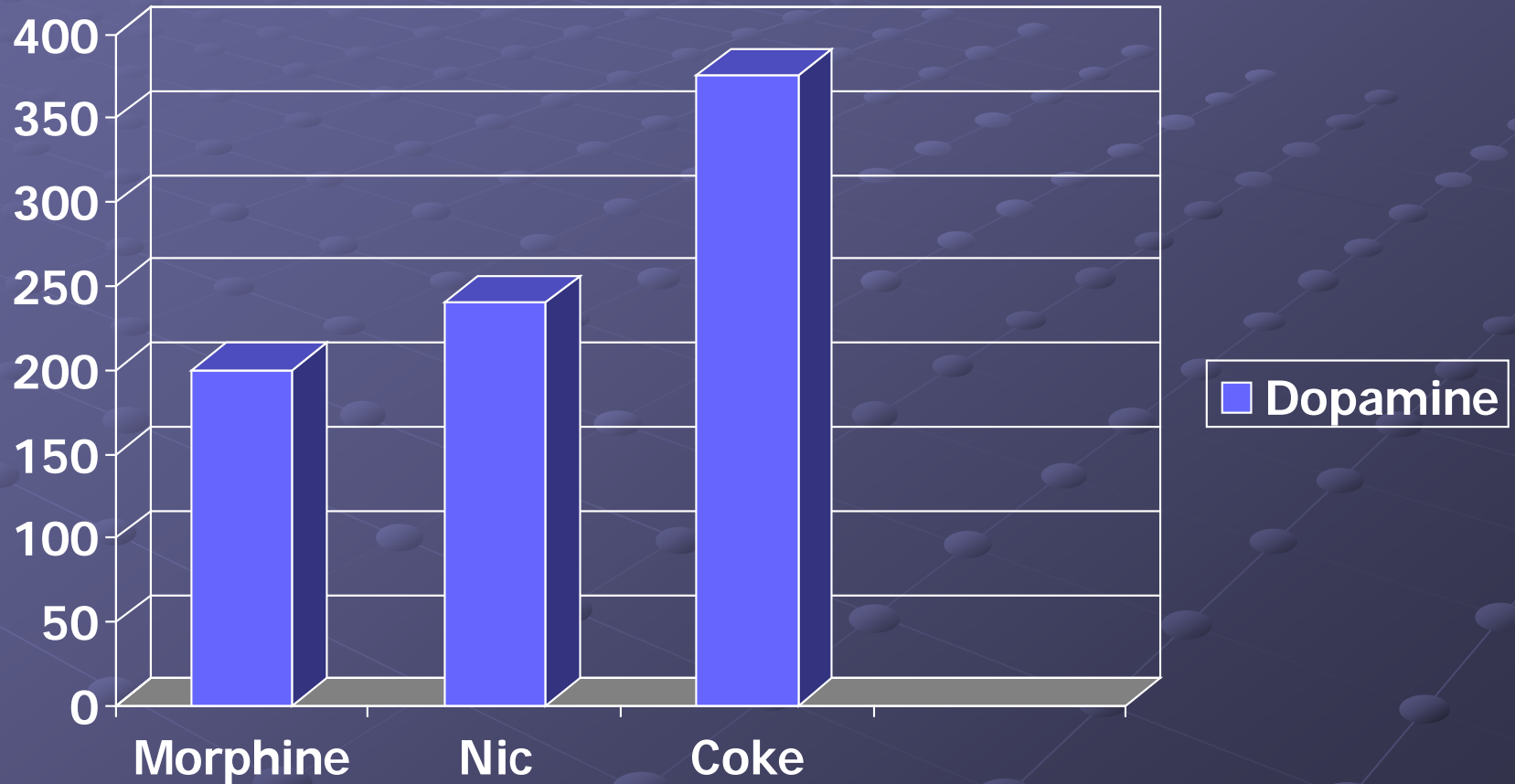
- **Ability to stimulate the brain's reward circuits**
- **Ability to meet a individualized neurochemical need**
- **Physical dependency potential**
- **Intensity of withdrawal symptoms**

# ADDICTION POTENTIAL

- **Ability to stimulate the brain's reward circuits**
- **Ability to meet a individualized neurochemical need**
- **Physical dependency potential**
- **Intensity of withdrawal symptoms**

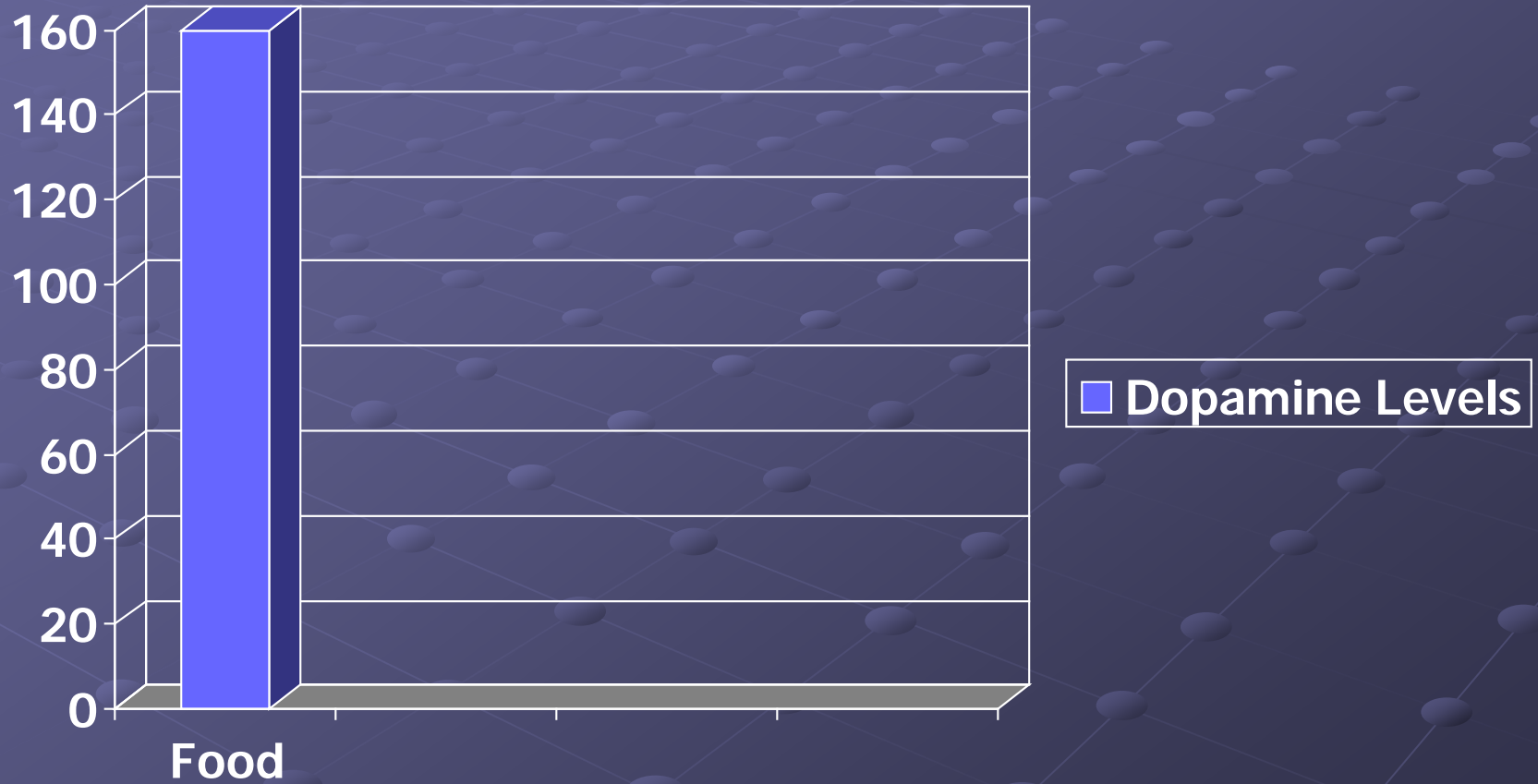


# Dopamine Levels in the Shell of the Nucleus Accumbens (% of baseline)

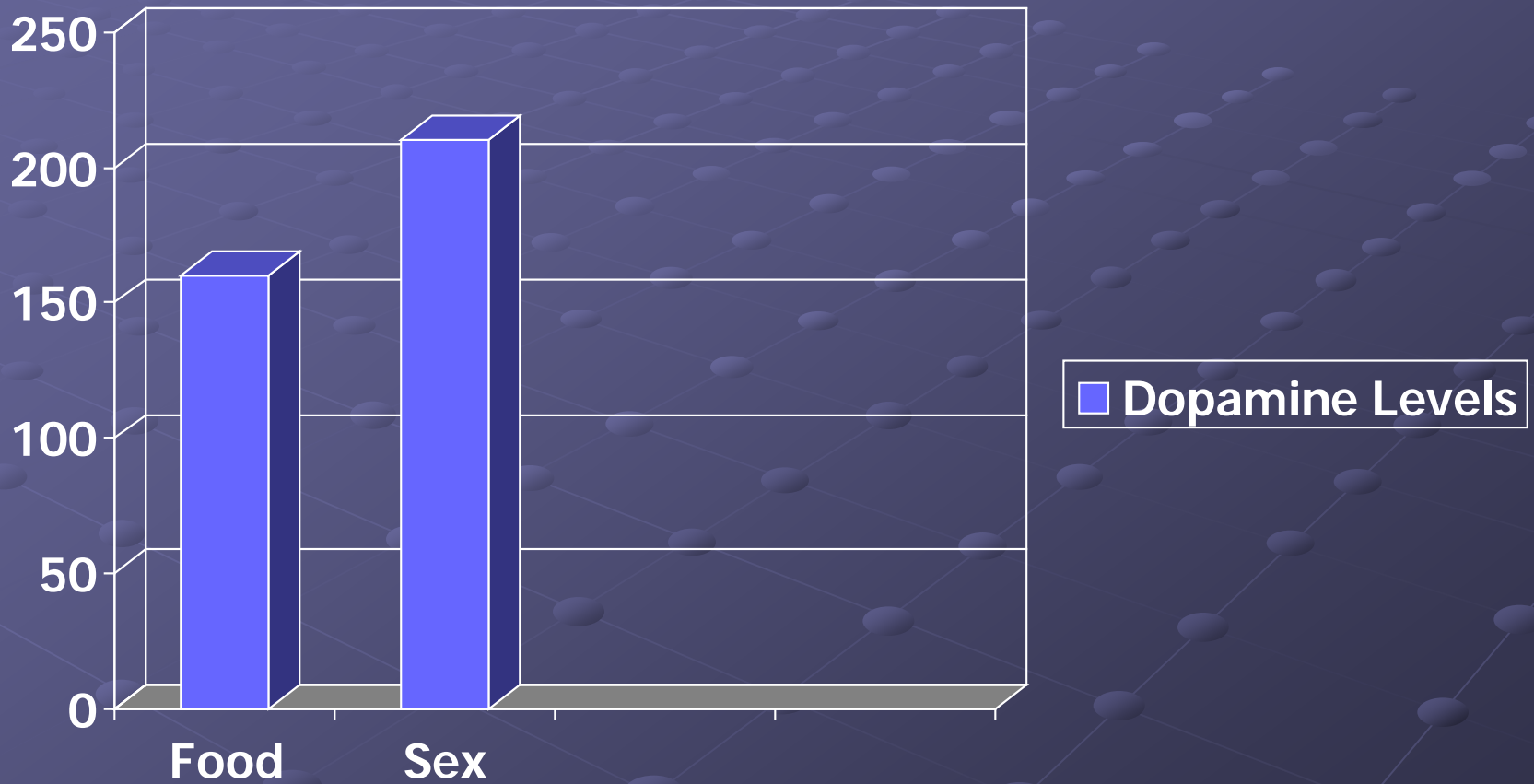




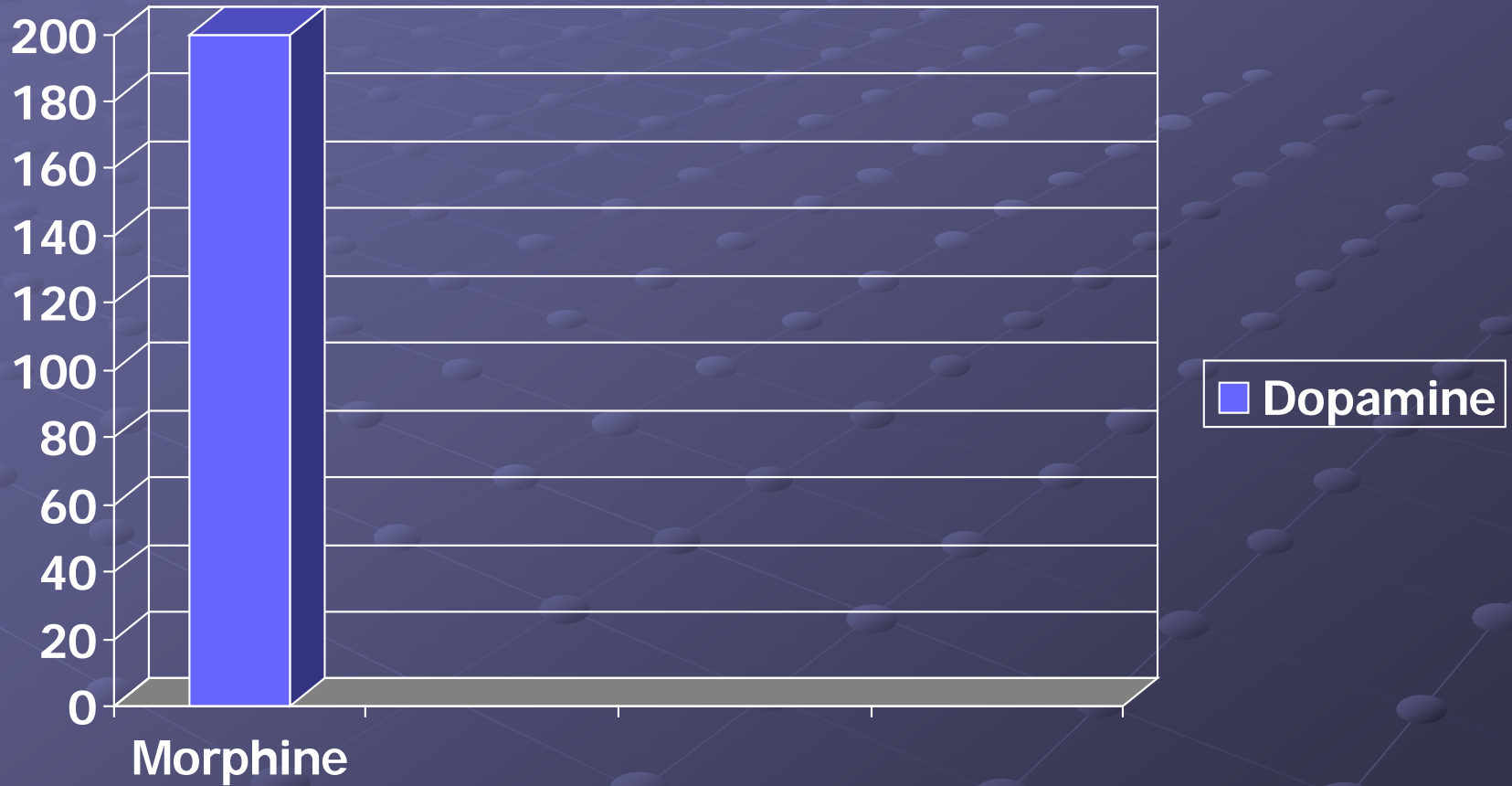
# Dopamine Levels in the Shell of the Nucleus Accumbens (% of baseline)



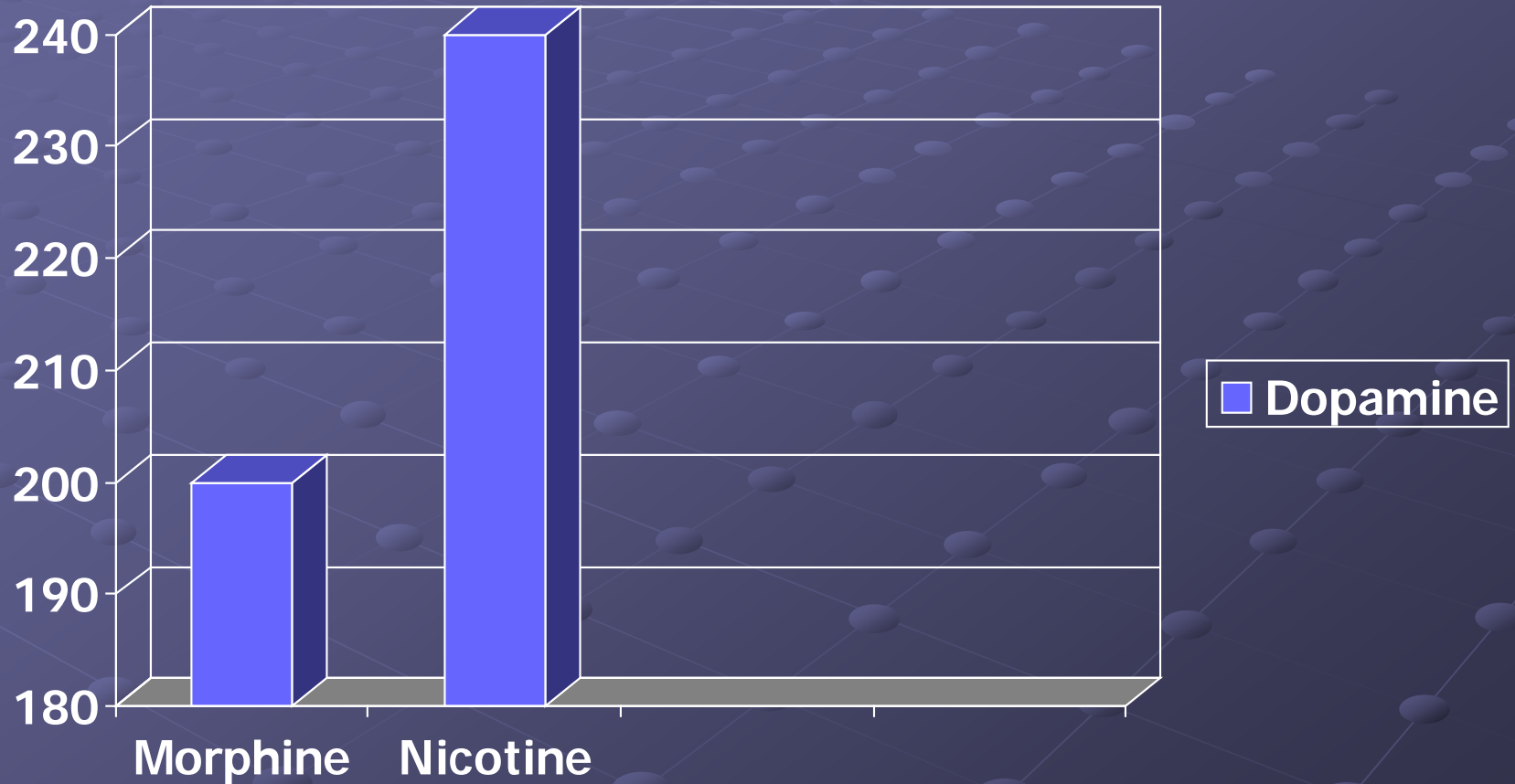
# Dopamine Levels in the Shell of the Nucleus Accumbens (% of baseline)



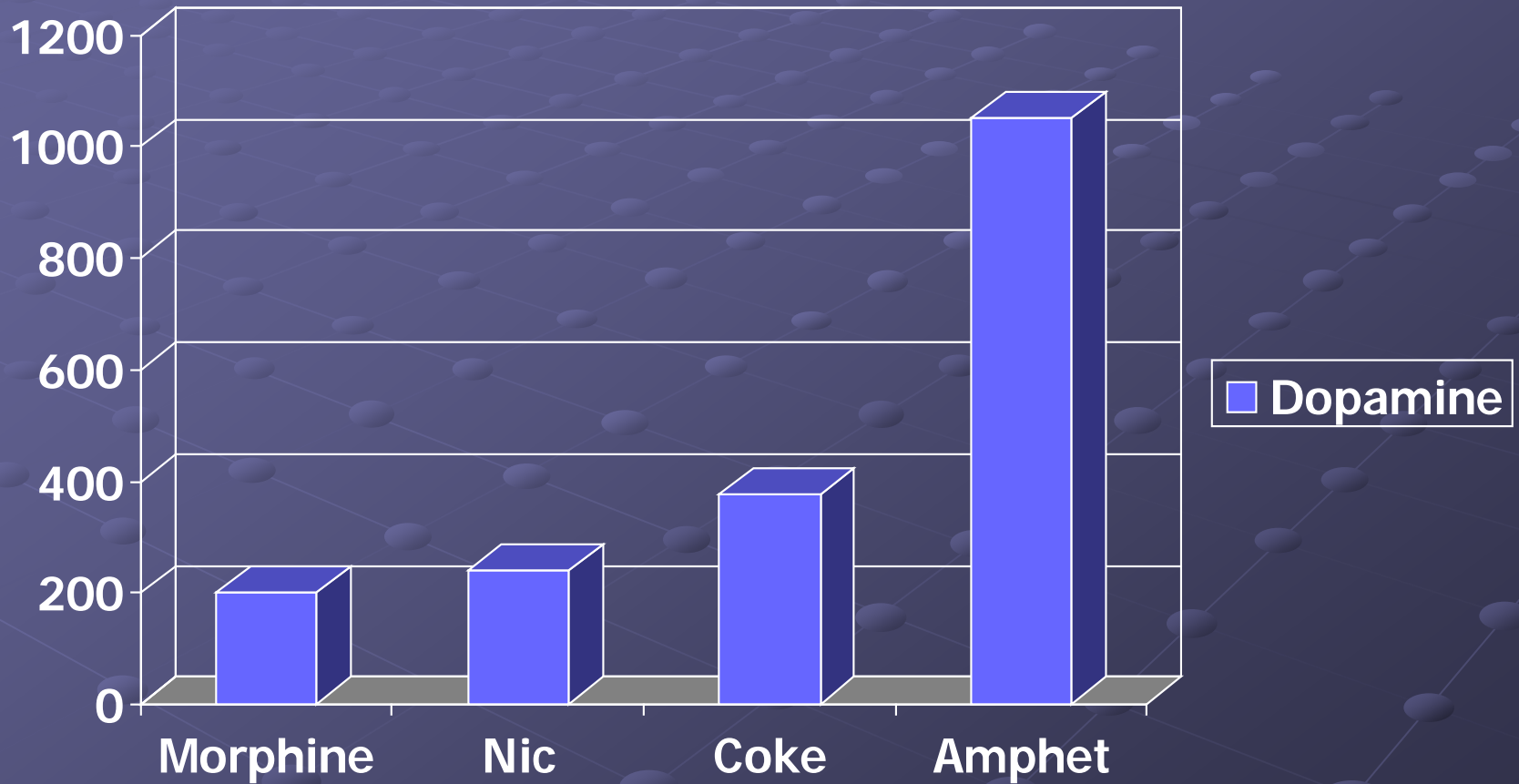
# Dopamine Levels in the Shell of the Nucleus Accumbens (% of baseline)



# Dopamine Levels in the Shell of the Nucleus Accumbens (% of baseline)

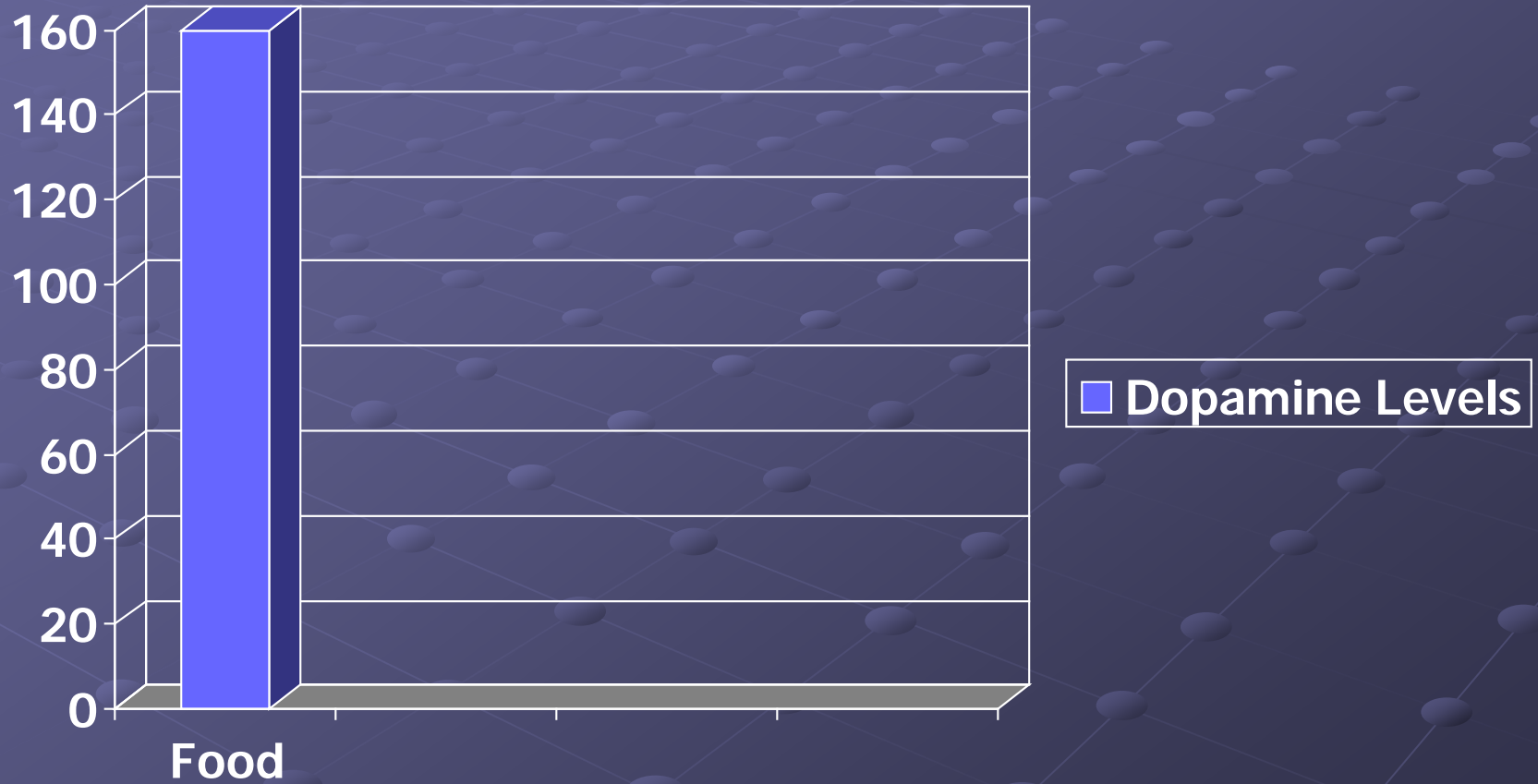


# Dopamine Levels in the Shell of the Nucleus Accumbens (% of baseline)

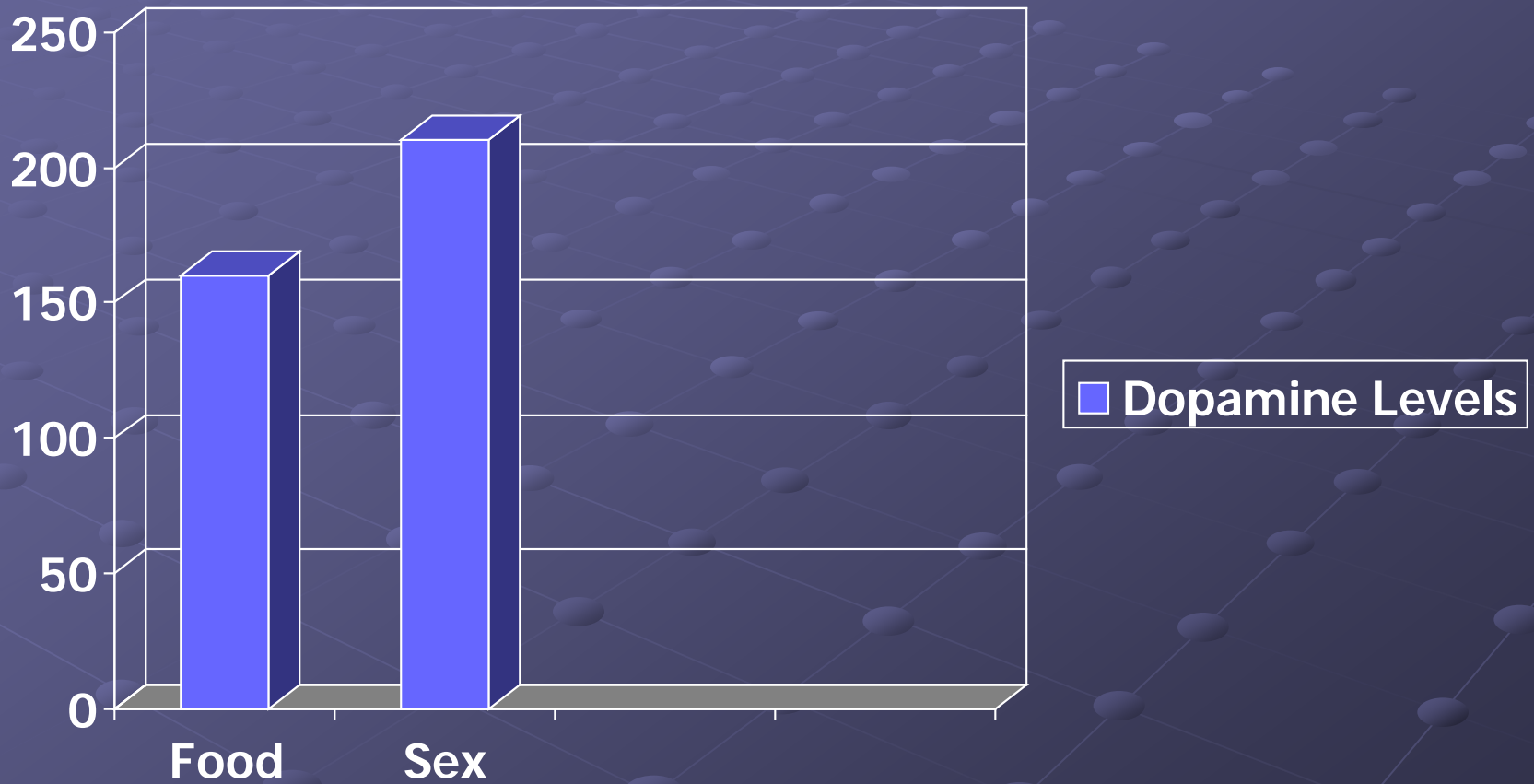




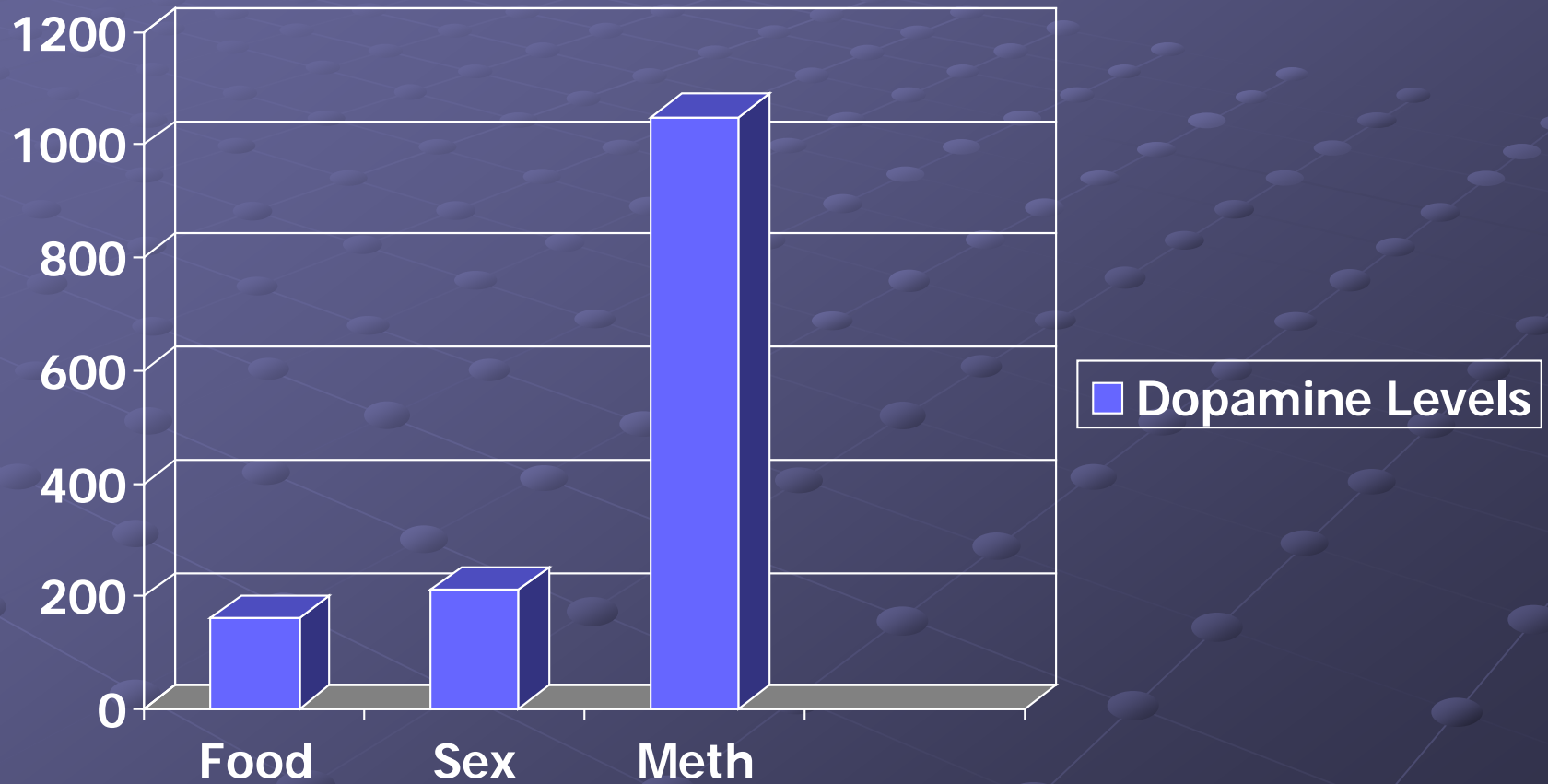
# Dopamine Levels in the Shell of the Nucleus Accumbens (% of baseline)

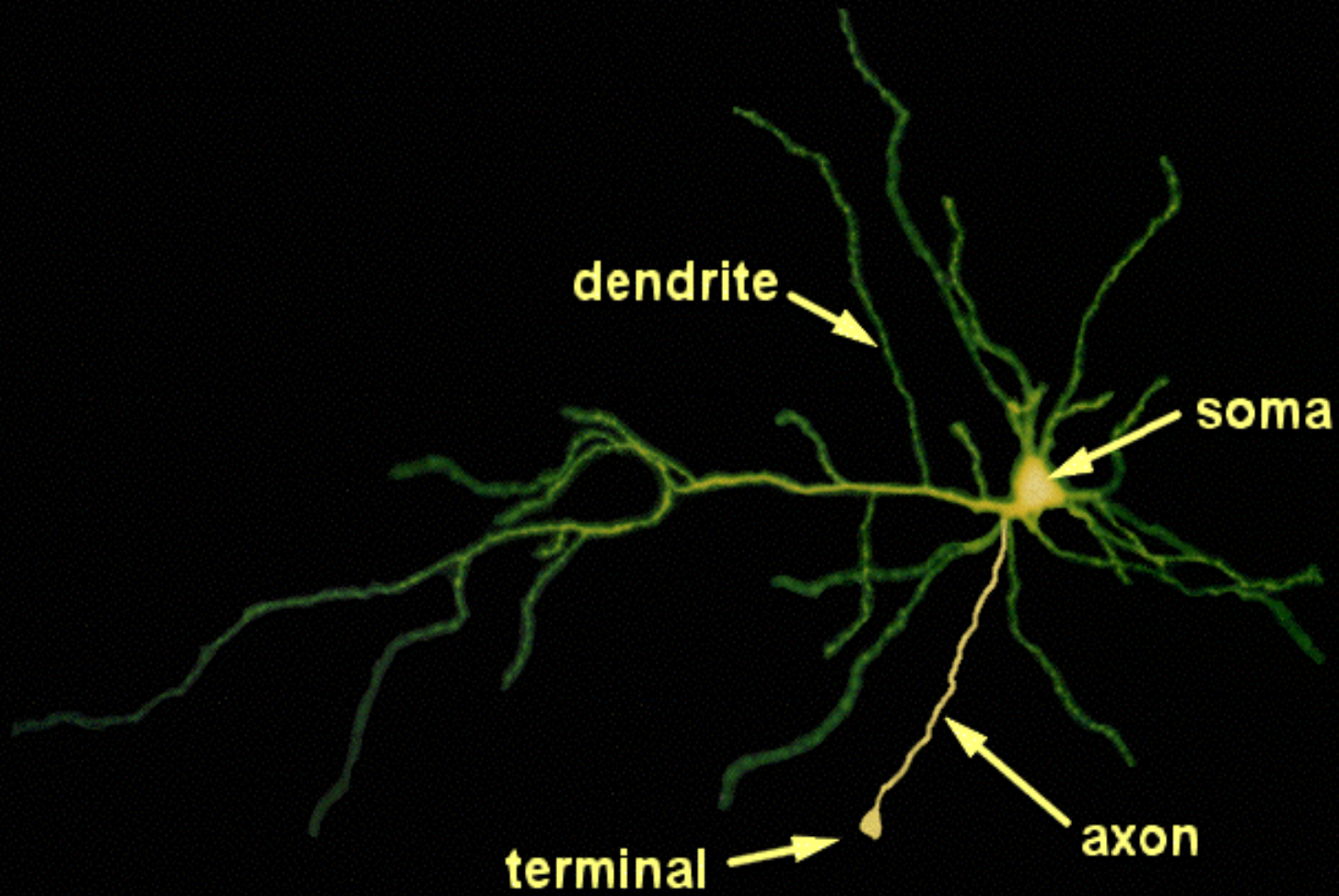


# Dopamine Levels in the Shell of the Nucleus Accumbens (% of baseline)

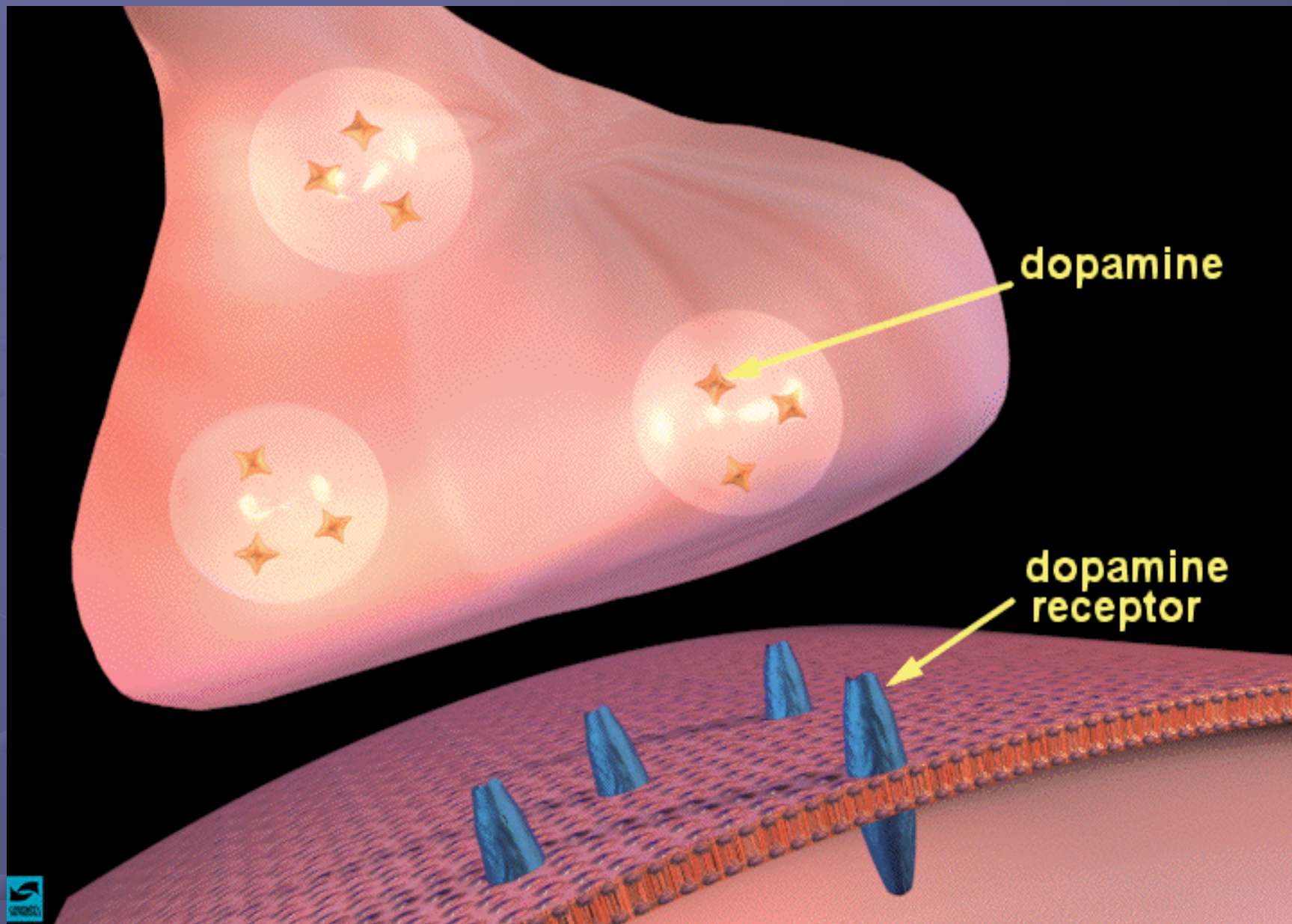


# Dopamine Levels in the Shell of the Nucleus Accumbens (% of baseline)

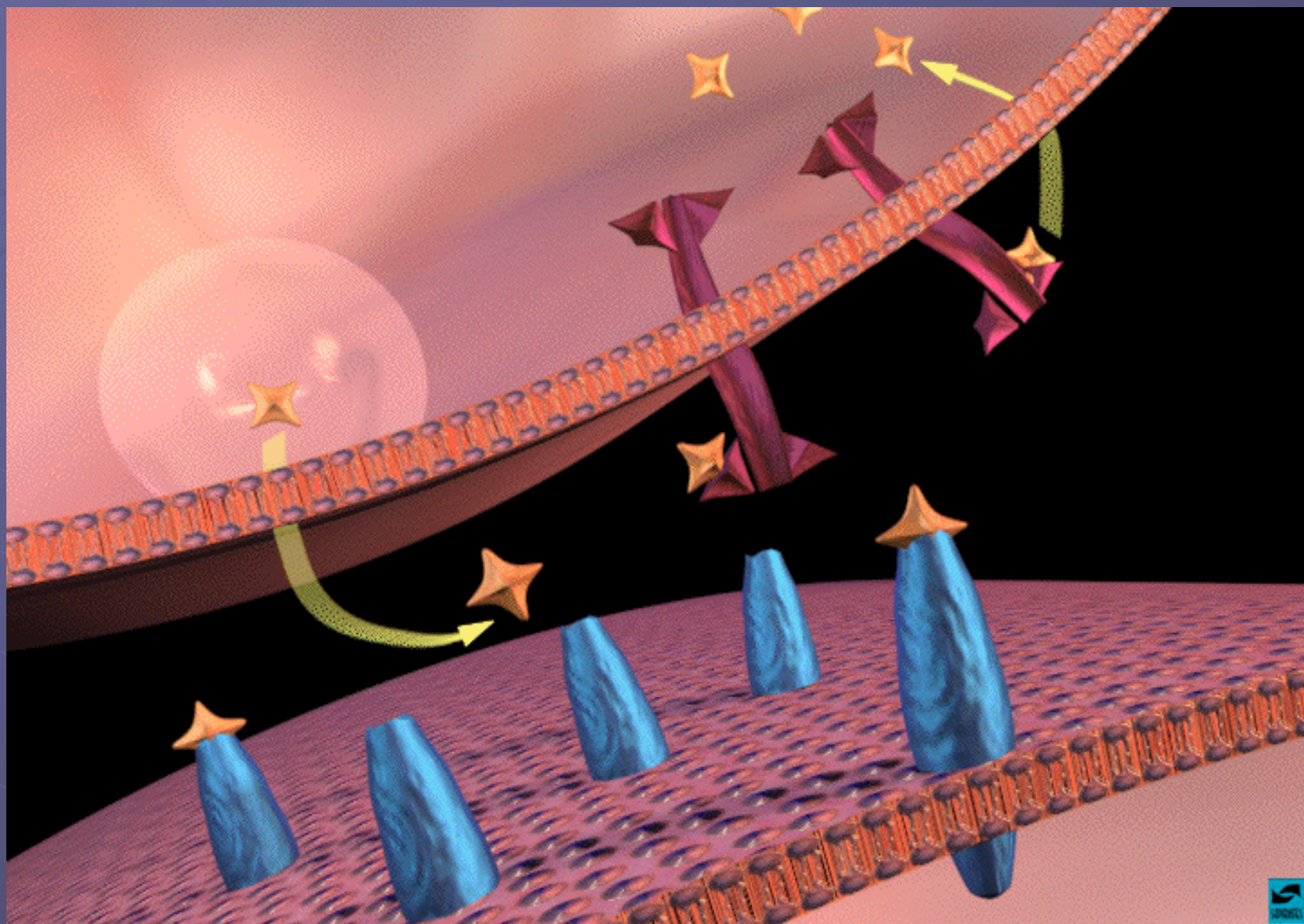












# NEUROTRANSMITTERS

- **Naturally-occurring brain chemicals**
- **Many psychoactive drugs resemble neurotransmitters:**

# NEUROTRANSMITTERS

DRUG

NEUROTRANSMITTER

LSD

Serotonin

Methamphetamine

Norepinephrine

heroin

Endorphins



# NEUROTRANSMITTERS

DRUG

NEUROTRANSMITTER

THC

Anandamide

PCP

Receptor site identified but not  
associated neurotransmitter

# ADDICTION

- **Compulsive drug-taking**
- **Loss of control**
- **Continued use despite negative consequences**
- **Tolerance and physical dependence not required but may be part of the addiction picture**



# TOXICITY

- **Ability to produce physical damage to the human body**
- **Long-range = months, years**
- **Short-range = days, weeks**
- **Physical vs behavioral**

# TOXICITY

- **Physical**
- **Behavioral**
- **Acute Vs Long-Term**

# PSYCHIATRIC IMPAIRMENT

- Ability of drug to produce negative changes in thinking, learning, perception, mood or behavior
- Acute vs chronic

# PSYCHIATRIC IMPAIRMENT

- **Short-term**
- **Long-term**
- **Affective Disorders**
- **Thought Disorders**