Addiction

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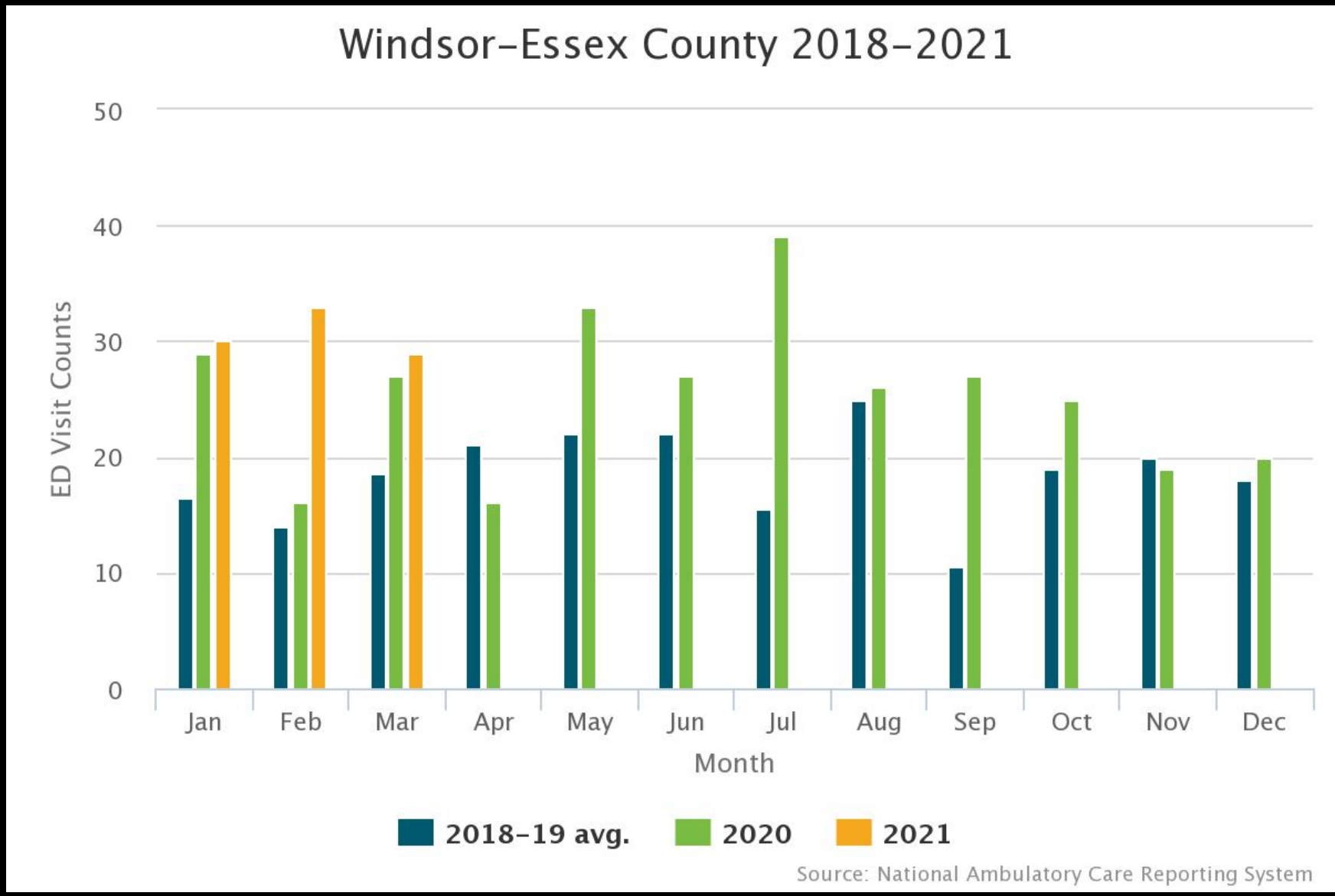
Objectives

- Magnitude of the problem
- What is addiction?
  - Physical Dependence
  - Pseudoaddiction
- What causes addiction?
  - Disease model
  - Epigenetics
  - Trauma

Magnitude of the Problem in Ontario

- The burden of addictions/MI in Ontario is estimated to be
  - >1.5X that of all cancers
  - >7X of all infectious diseases
- The estimated costs for Ontario resulting from untreated opioid abuse exceeds $1 billion annually
- 1 in 5 Ontarians will experience a mental illness or addiction issue in their lifetime

Confirmed opioid overdose monthly ED visits



What is Addiction?

Addiction

- A chronic, relapsing brain disease that is characterized by compulsive drug seeking and use, despite harmful consequences
- A complex condition, a brain disease that is manifested by compulsive substance use despite harmful consequence
- A biopsychosocial disorder characterized by repeated use of drugs, or repetitive engagement in a behavior such as gambling, despite harm to self and others
- A chronic dysfunction of the brain system that involves reward, motivation, and memory.

Addiction

- 4 Cs:
  - Compulsion to use
  - loss of Control of amount or frequency of use
  - Craving
  - use despite Consequences

DSM 5 – Substance Use Disorder

1. Hazardous use
2. Social or interpersonal problems related to use
3. Neglected major roles to use
4. Withdrawal
5. Tolerance
6. Used larger amounts/longer than intended
7. Repeated attempts to control use or quit
8. Much time spent using
9. Physical or psychological problems related to use
10. Activities given up to use
11. Craving

2-3 Mild

4-5 Moderate

6+ Severe

Addiction

- A term used to indicate the most severe, chronic stage of substance-use disorder, in which there is a substantial loss of self-control, as indicated by compulsive drug taking despite the desire to stop taking the drug.
- In the DSM-5, the term addiction is synonymous with the classification of "***severe*** substance-use disorder"

Physical Dependence

- ≠ Addiction
- Dependence – changes in the brain and body cause withdrawal symptoms when discontinued
- Tolerance and Withdrawal
  - normal physiologic responses that often occur with the persistent use of certain medications
  - under “appropriate medical supervision.”

Pseudoaddiction

- Iatrogenic syndrome
- Mimics the behavioral symptoms of addiction in patients receiving inadequate doses of opioids for pain
- Under-treatment of pain
- Patients stop drug-related behaviors and opioid misuse after their pain has been effectively treated

Is Addiction a Choice or a Disease?

Disease or Choice?

- The initial decision to take drugs is typically voluntary
- People with addiction show physical changes in areas of the brain that are critical to judgment, decision making, learning and memory, and behavior control
- With continued use, a person's ability to exert self-control can become seriously impaired

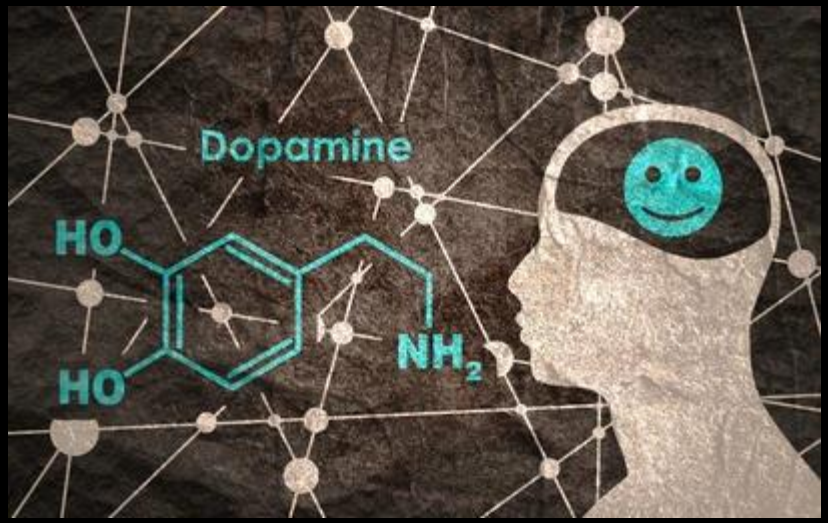
Disease Model of Addiction

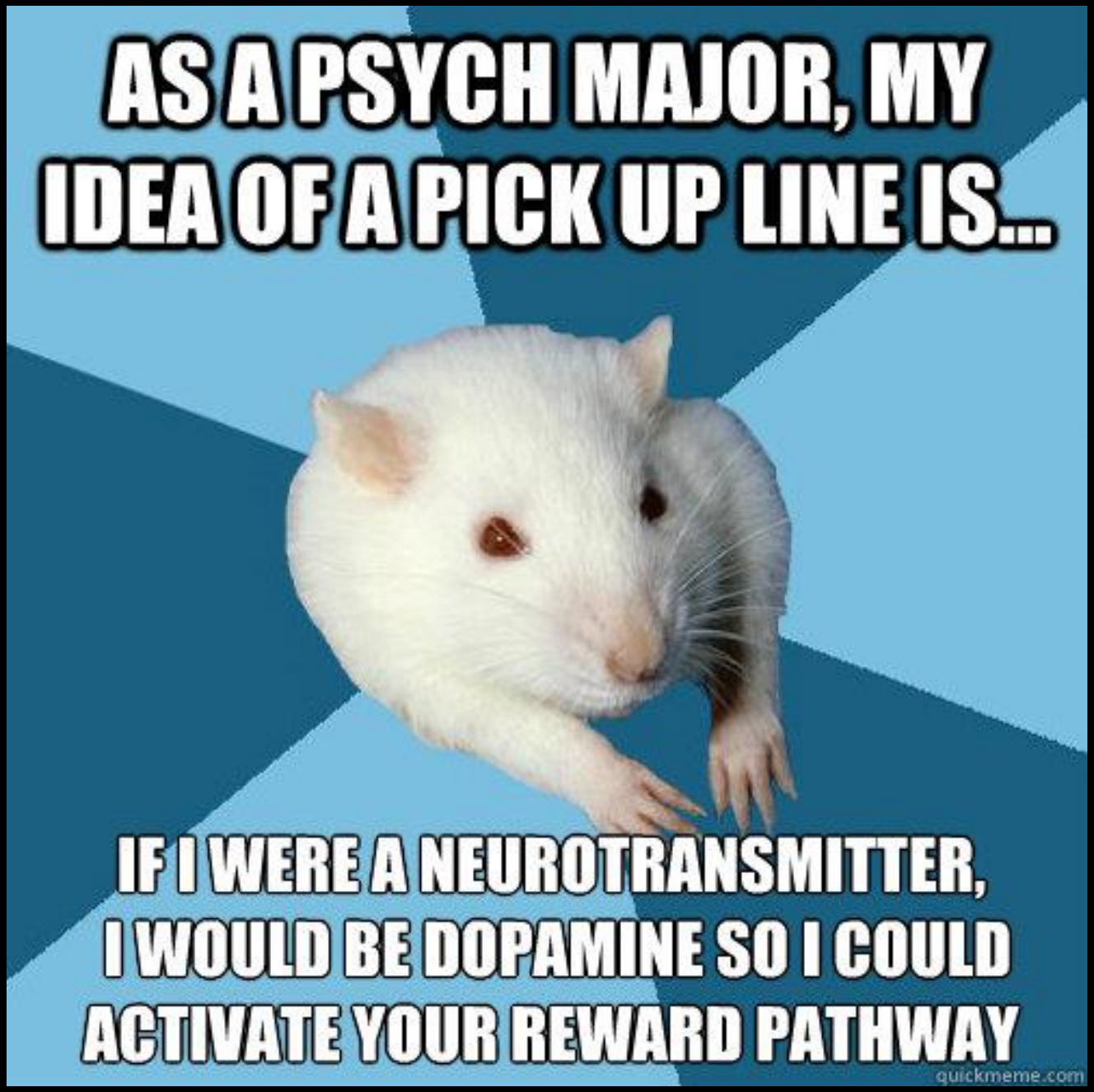
- Addiction is a chemical/biological issue that is primary, progressive, chronic and ultimately if left untreated, fatal
- Biological, environmental, genetic and neurological sources of origin
- Attributes addiction to a genetic predisposition that can they be influenced and exacerbated by environmental factors

How Addiction Hijacks the Brain

Dopamine (DA)

- Dopamine – ‘feel-good’ neurotransmitter or ‘reward chemical’
- Drugs/Alcohol release 2-10X greater DA than is normally released, producing a “high.”



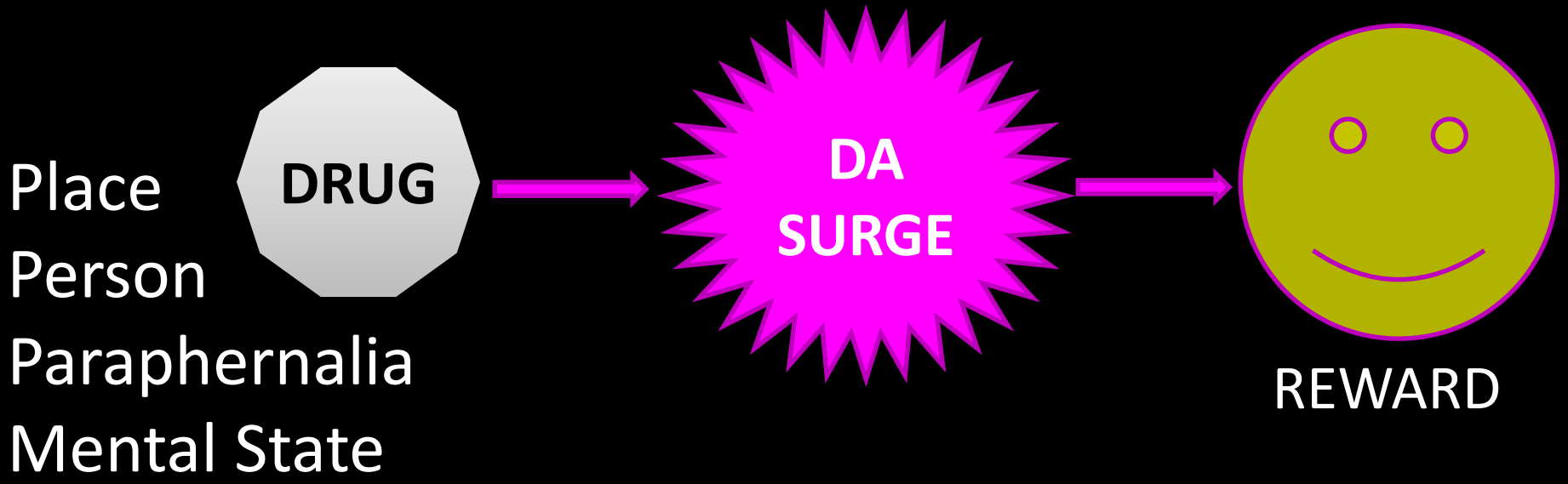

AS A PSYCH MAJOR, MY IDEA OF A PICK UP LINE IS...
IF I WERE A NEUROTRANSMITTER, I WOULD BE DOPAMINE SO I COULD ACTIVATE YOUR REWARD PATHWAY
quickmeme.com

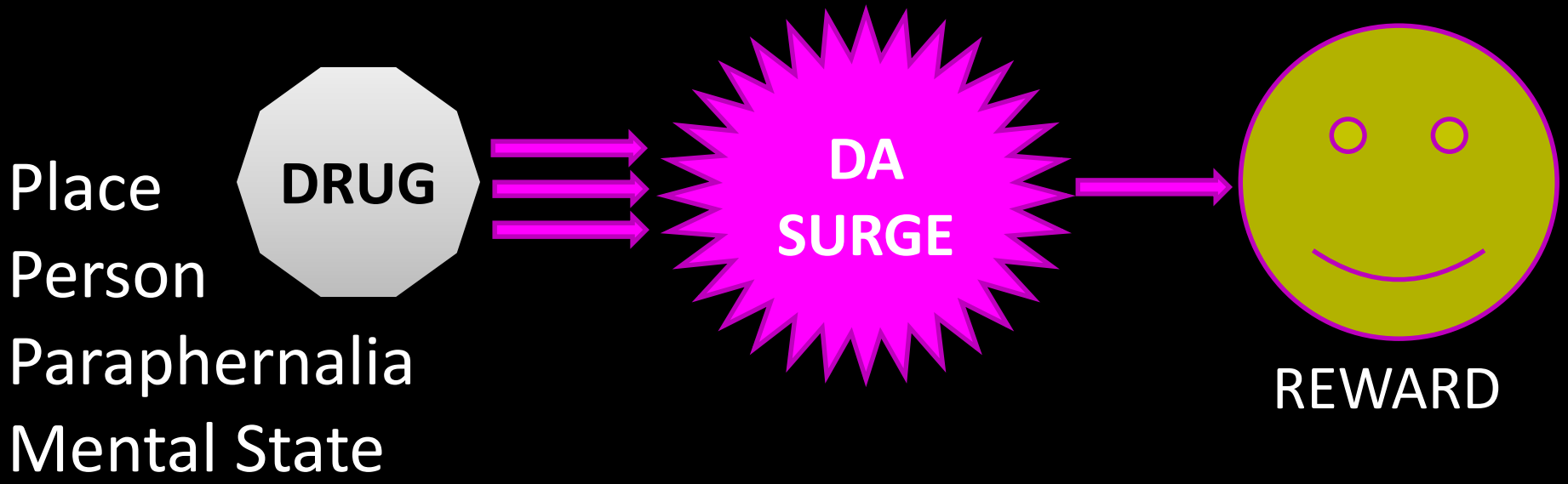
Dopamine (DA)

- With continued use:
  - Brain adapts by reducing the ability of cells in the reward system to respond to DA
  - Reduces the high
  - Less and less able to derive pleasure from other things they once enjoyed (food, sex, social activities, etc)

Stages of Addiction

1. Binge and Intoxication
   - Surge in DA activates reward pathways in brain
   - ***Conditioning*** - repeated experiences of reward become associated with the environmental stimuli that precede them
   - environmental stimuli → conditioned, fast surges of DA release that trigger craving for the drug, motivate drug-seeking behaviors, and lead to heavy "binge" use of the drug


Place
Person
Paraphernalia
Mental State
DRUG
DA
SURGE
REWARD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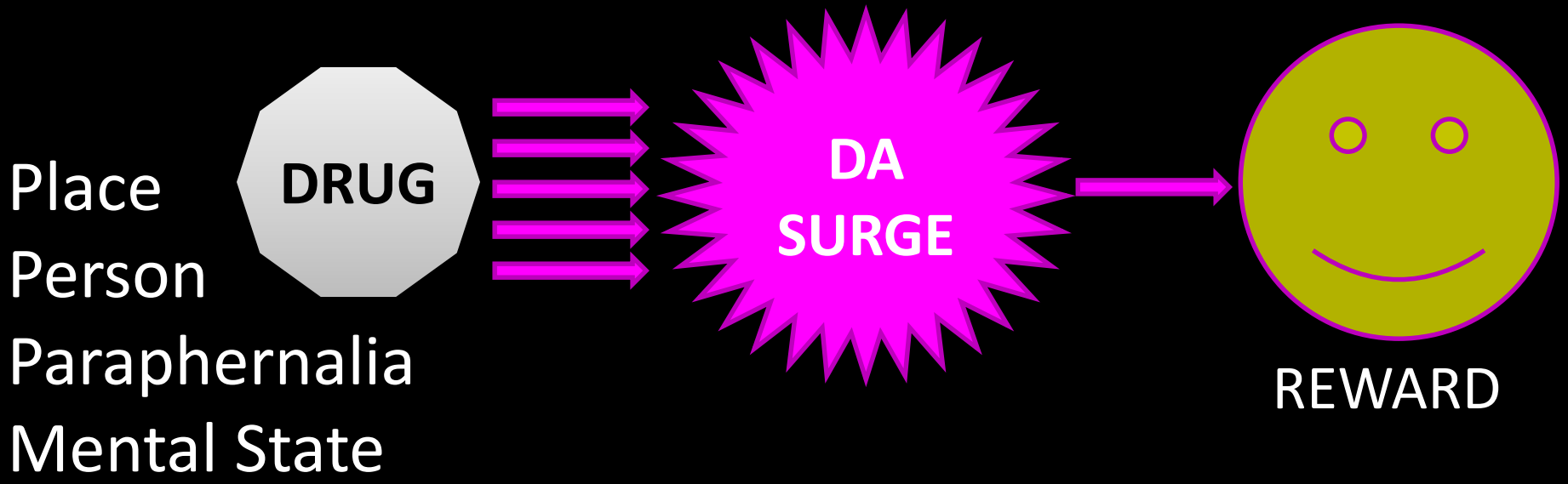
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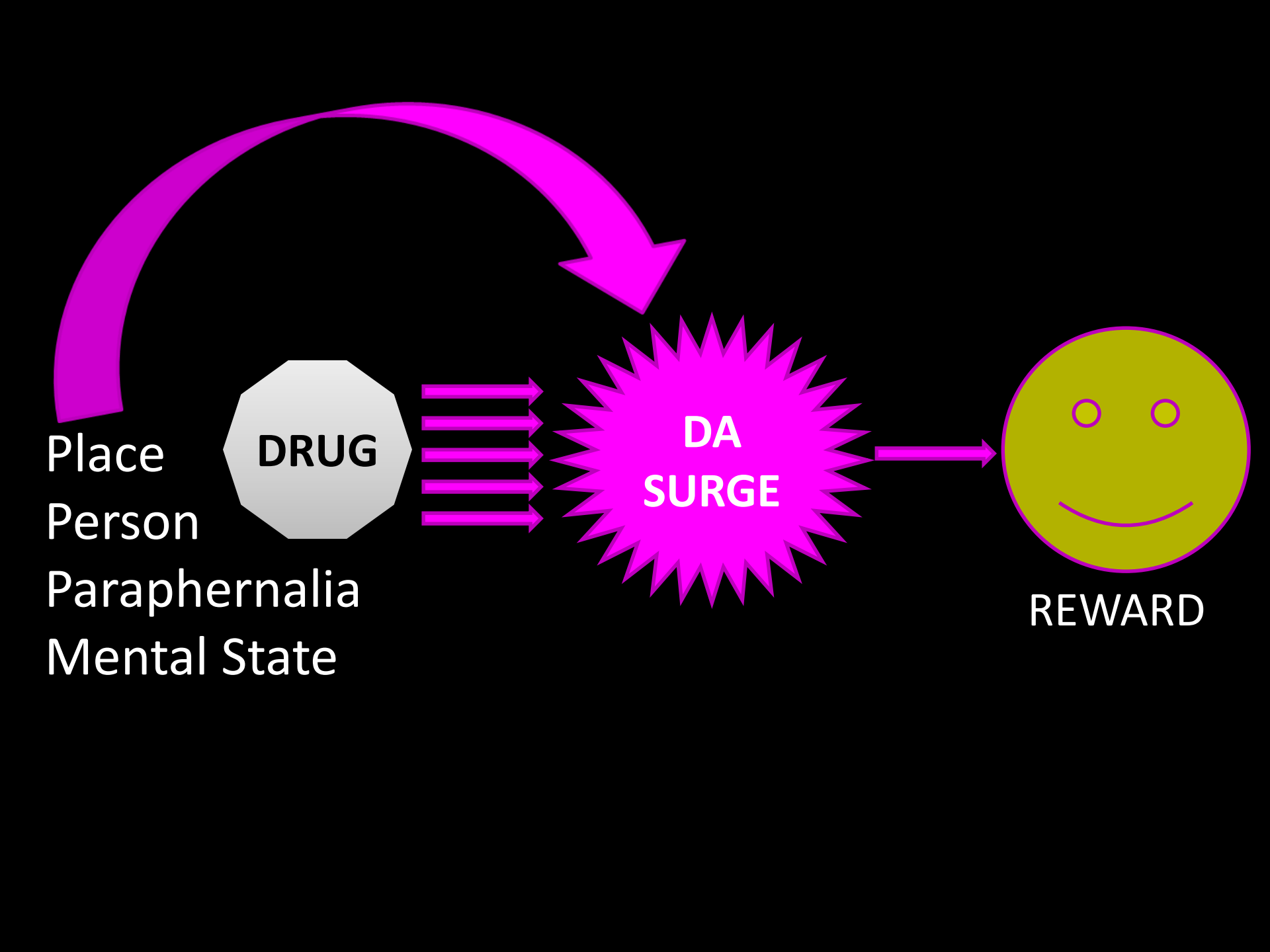
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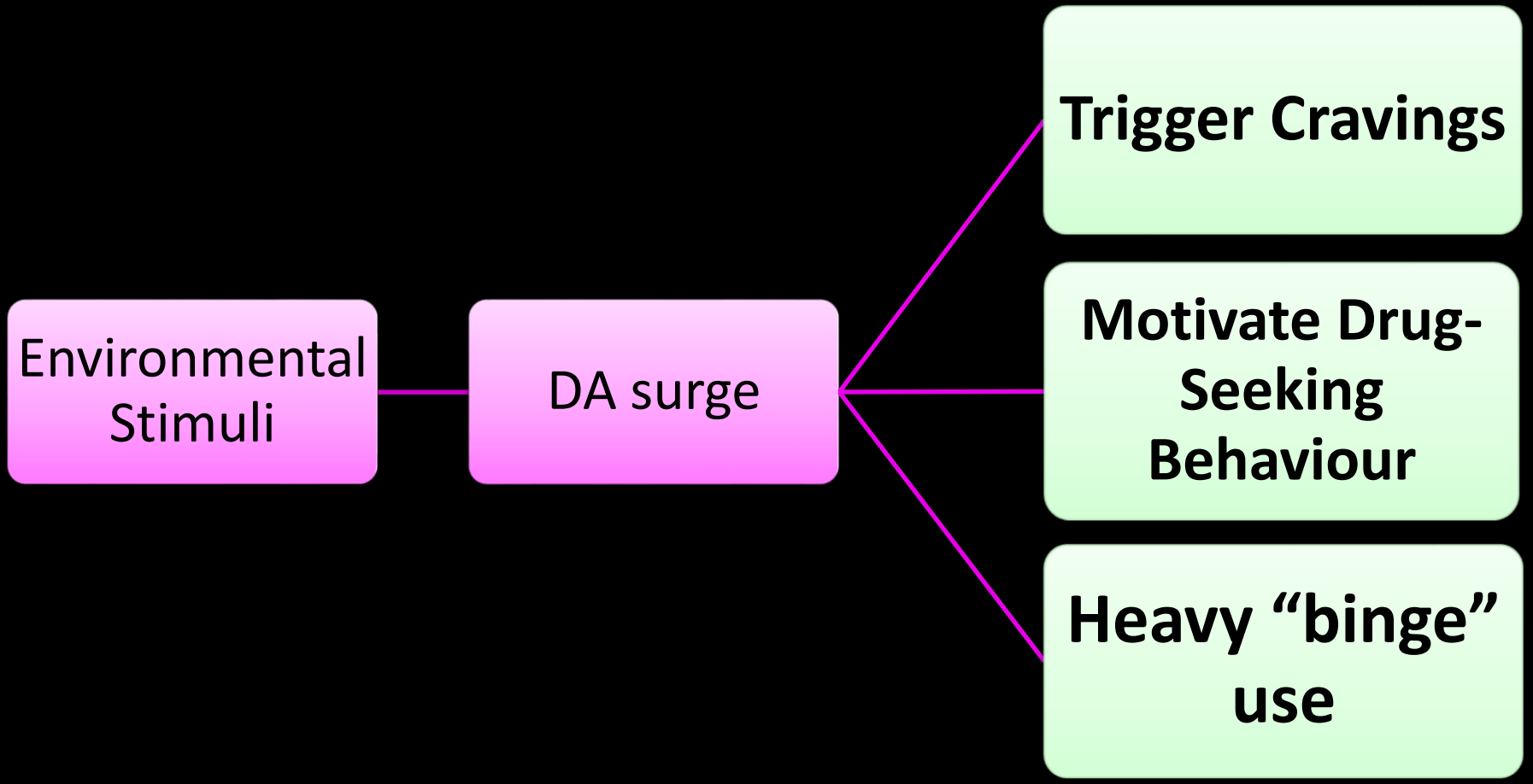
Environmental Stimuli
DA surge
Trigger Cravings
Motivate Drug-Seeking Behaviour
Heavy “binge” use

Stages of Addiction

2. Withdrawal and Negative Affect
   - Reward systems come to expect the HUGE release of DA produced by the drug and its cues
   - Eventually - reward system becomes much less sensitive to stimulation by both drug-related and non–drug-related rewards
   - ⇧ DA in amygdala → increases reactivity to stress and leads to negative emotions

Stages of Addiction

3. Preoccupation and Anticipation
   - Similar changes occur in the function of the ***prefrontal cortex***, involved in executive processes
   - Seriously impairs
     - self-regulation
     - decision making
     - attribution of salience (the assignment of relative value)
   - These impairments weaken their ability to resist strong urges or to follow through on decisions to stop

3

Changes to the prefrontal cortex impair planning, decision making and self-regulation

2

Reward System becomes less sensitive to DA = hard time feeling happy/experiencing pleasure

↑↑ DA

Reward System

1

Amygdala - conditioned response to environmental stimuli = intense cravings

Stages of Addiction Summary

- Chronic drug use remodels the brains chemical structure, it's anatomy and physiological functioning
- Changes occur in
  - Reward systems
  - Emotional systems
  - Executive processing

So why doesn't everyone become addicted?

Dr. Gabor Maté

- “Addiction is a complex condition, a complex interaction between human beings and their environment”
- Viewing addiction as an illness, either acquired or inherited, narrows it down to a medical issue

Dr. Gabor Maté

- “Addiction has biological, chemical, neurological, psychological, medical, emotional, social, political, economical and spiritual underpinnings”
- 3 factors coincide for addiction to occur
  - Susceptible person
  - Drug with addictive potential
  - Stress

Dr. Gabor Maté

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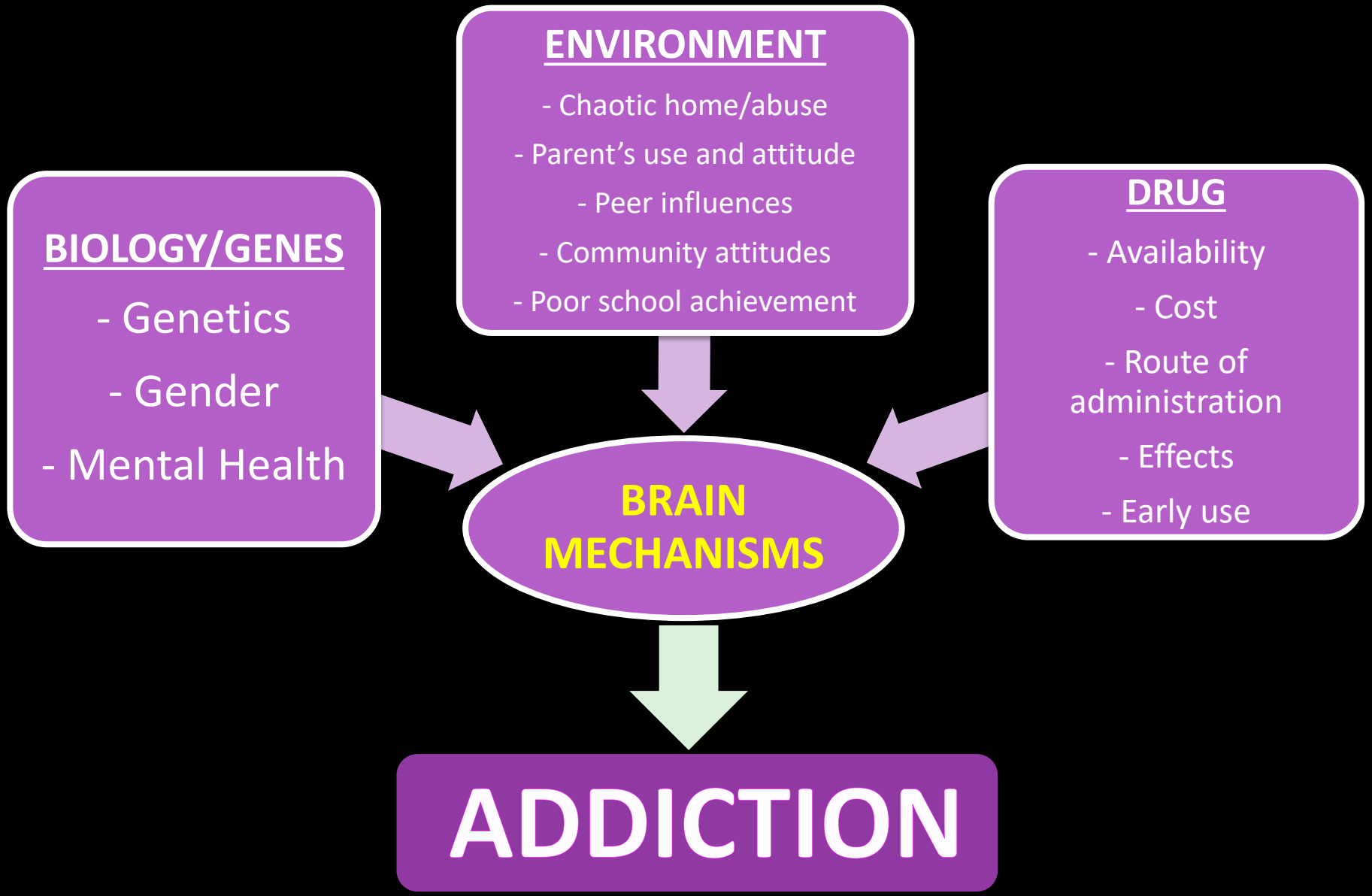
Biological and Social Factors

- Many genetic, environmental, and social factors contribute to the determination of a person's unique susceptibility to using drugs initially, sustaining drug use, and undergoing the progressive changes in the brain that characterize addiction
- Increase vulnerability:
  - family history
  - early exposure to drug use (adolescence)
  - exposure to high-risk environments
  - certain mental illnesses

Who becomes addicted?



Genetics

- Twin studies → common heritable genetic components that predispose an individual to drug addiction
  - these genetic factors may contribute approximately 20–50% to developing a drug addiction
- There is no “addiction gene”
- Epigenetics:
  - heritable and possibly reversible modifications in gene expression that do not involve alterations in the DNA sequence.

Epigenetics: Where Genes Meet Environment

- How life experiences influence the function of genes
- Genes can be turned on/off by their environment
- Effects are most powerful during early development

Epigenetics

- Epigenetic changes may alter
  - initial response to a drug
  - continued response
  - development of tolerance leading to addiction
  - withdrawal and relapse
- Emotional stressors and social adversities may cause an initial epigenetic response that alters reward-signaling pathways, predisposing one to a positive response to drug use.

Trauma and Addiction

- Trauma:
  - Extreme neglect or physical/sexual abuse in childhood
  - Lack of attunement
- Can interfere with the development of brain circuitry
  - distorted levels of the brain's endorphins, which soothe physical and emotional pain
  - fewer brain receptors of dopamine

Trauma Informed Care

- Treating a whole person, taking into account past trauma and the resulting coping mechanisms
- Promote a culture of safety, empowerment, and healing
- Stresses the importance of addressing the client individually rather than applying general treatment approaches.

Trauma Informed Care

- Service providers do not need to be specialists in trauma-specific treatment in order to implement trauma-informed practices.
- Trauma-informed practices do not require disclosure of details a trauma, and do not provide trauma-specific treatment.
- Trauma-informed practices can be implemented in any service setting

Summary

- Addiction is a very complex biopsychosocial disorder
- 4 Cs: Compulsion to use, loss of Control, Craving, use despite Consequences
- Chronic drug use *remodels the brain*, making changes to the reward system, emotional systems and executive processing
- Epigenetics helps to explain how trauma and early life experiences increase susceptibility to addiction

References

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Thank you!