The New Neurobiology of Addiction

Petros Levounis, MD, MA
Professor and Chair, Department of Psychiatry
Rutgers New Jersey Medical School

Center of Excellence in Addiction Medicine Learning Collaborative
Rutgers New Jersey Medical School

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Outline

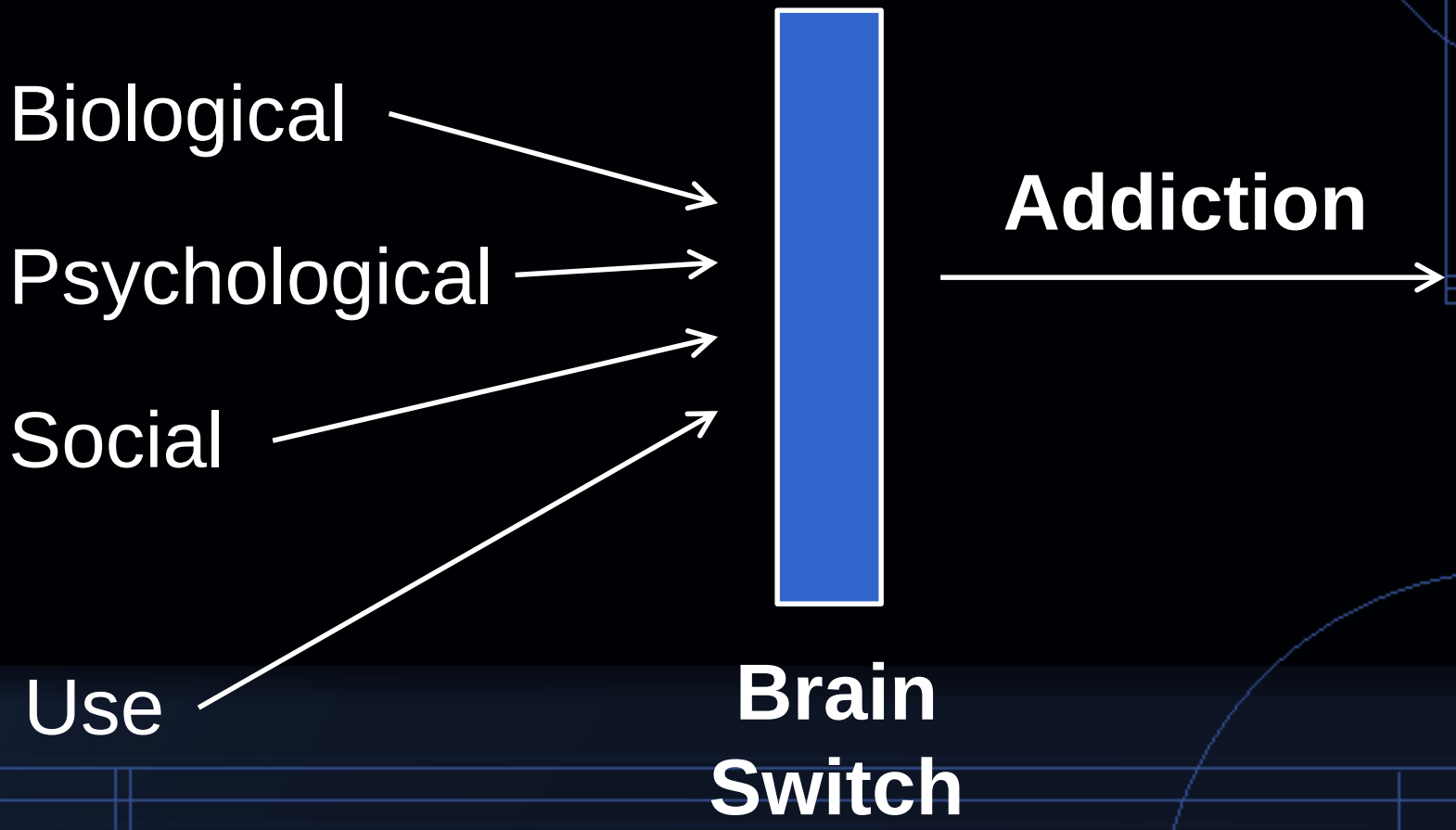
1. The Basic Model
2. Neurobiology of Addiction
3. New Neurobiological Concepts
4. Addiction Treatments
5. New Directions

1

The Basic Model

~ 1980

A Biopsychosocial Illness

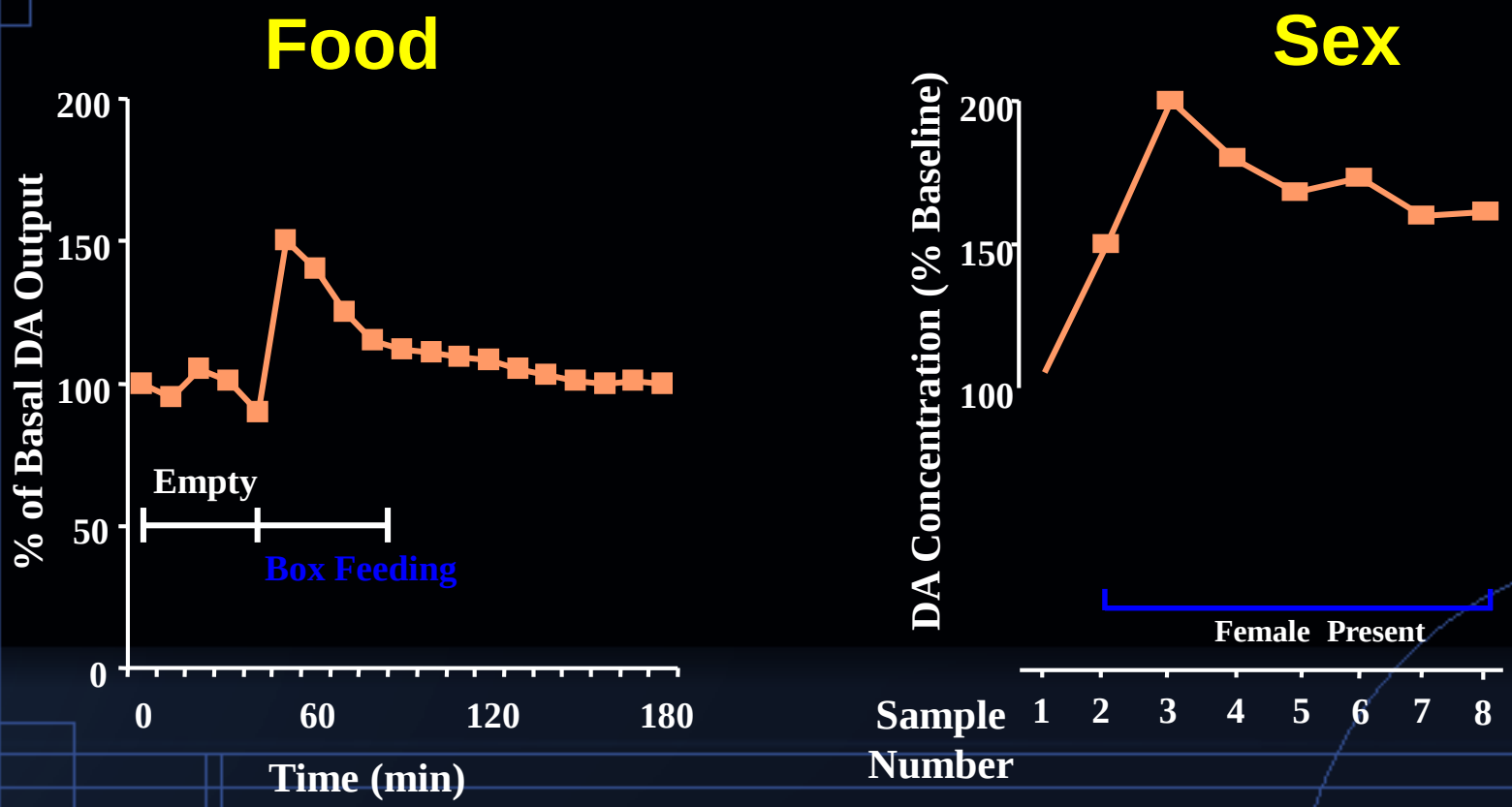


Olsen and Levounis, *Sober Siblings*, 2008.

2

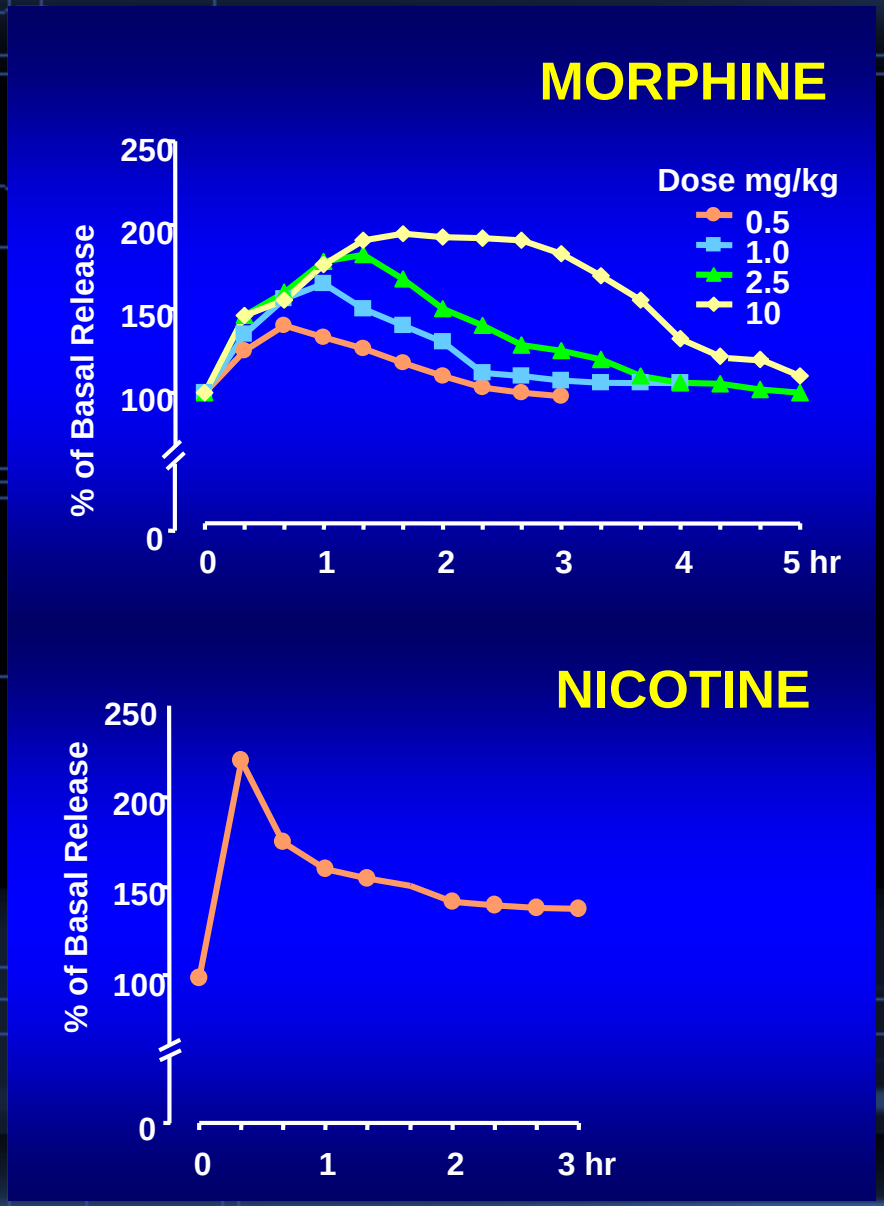
Neurobiology of Addiction

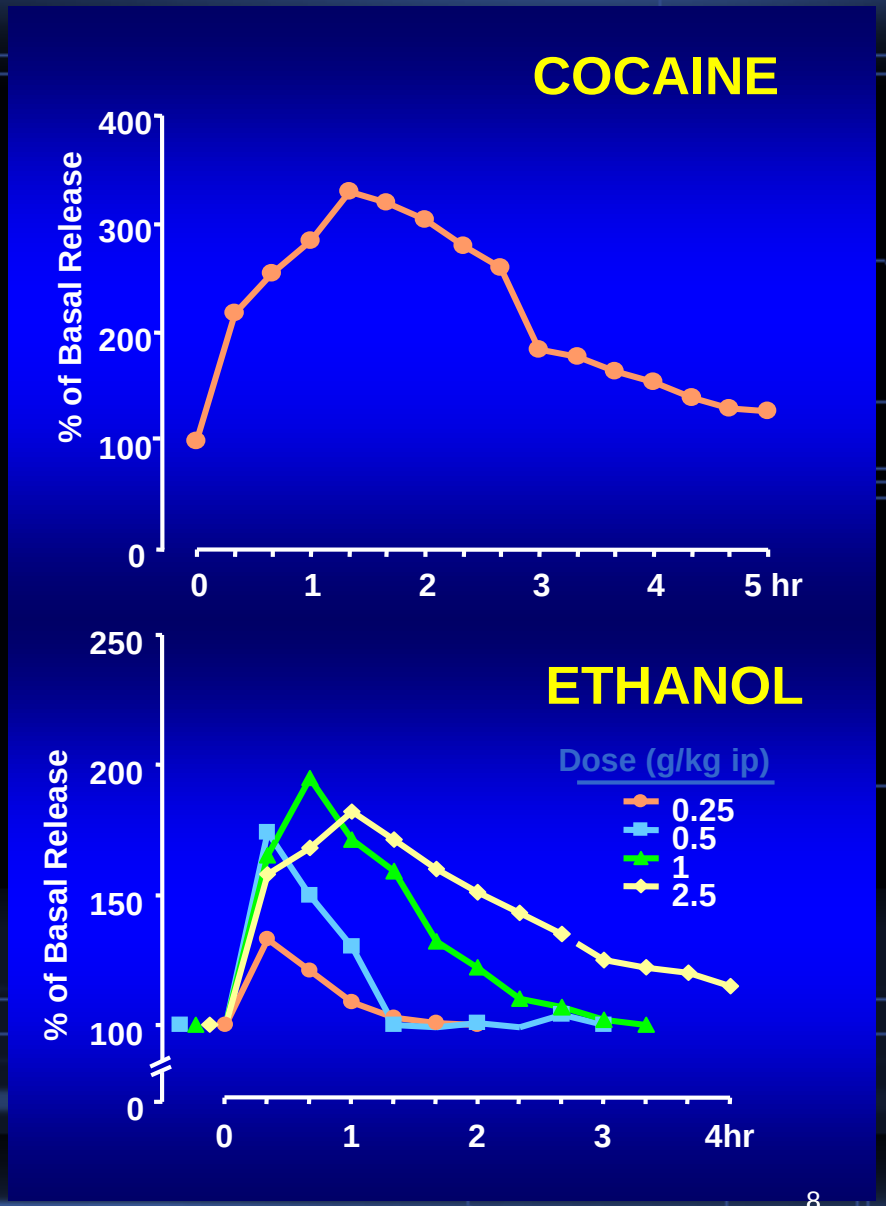
Natural Rewards



Adapted from: Di Chiara et al, *Neuroscience*, 1999
Adapted from: Fiorino and Phillips, *J Neuroscience*, 1997

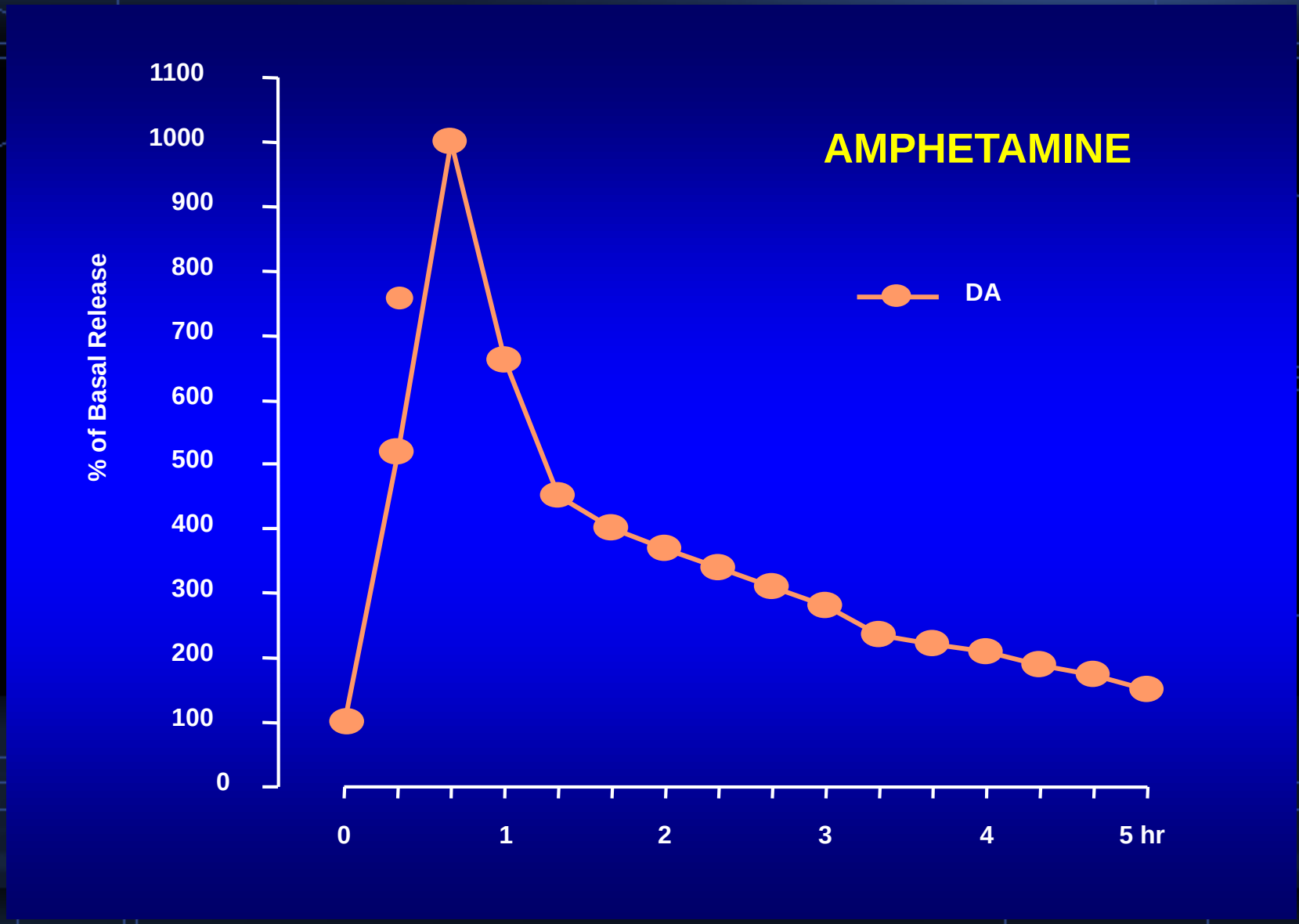
Effects of Drugs on Dopamine Levels





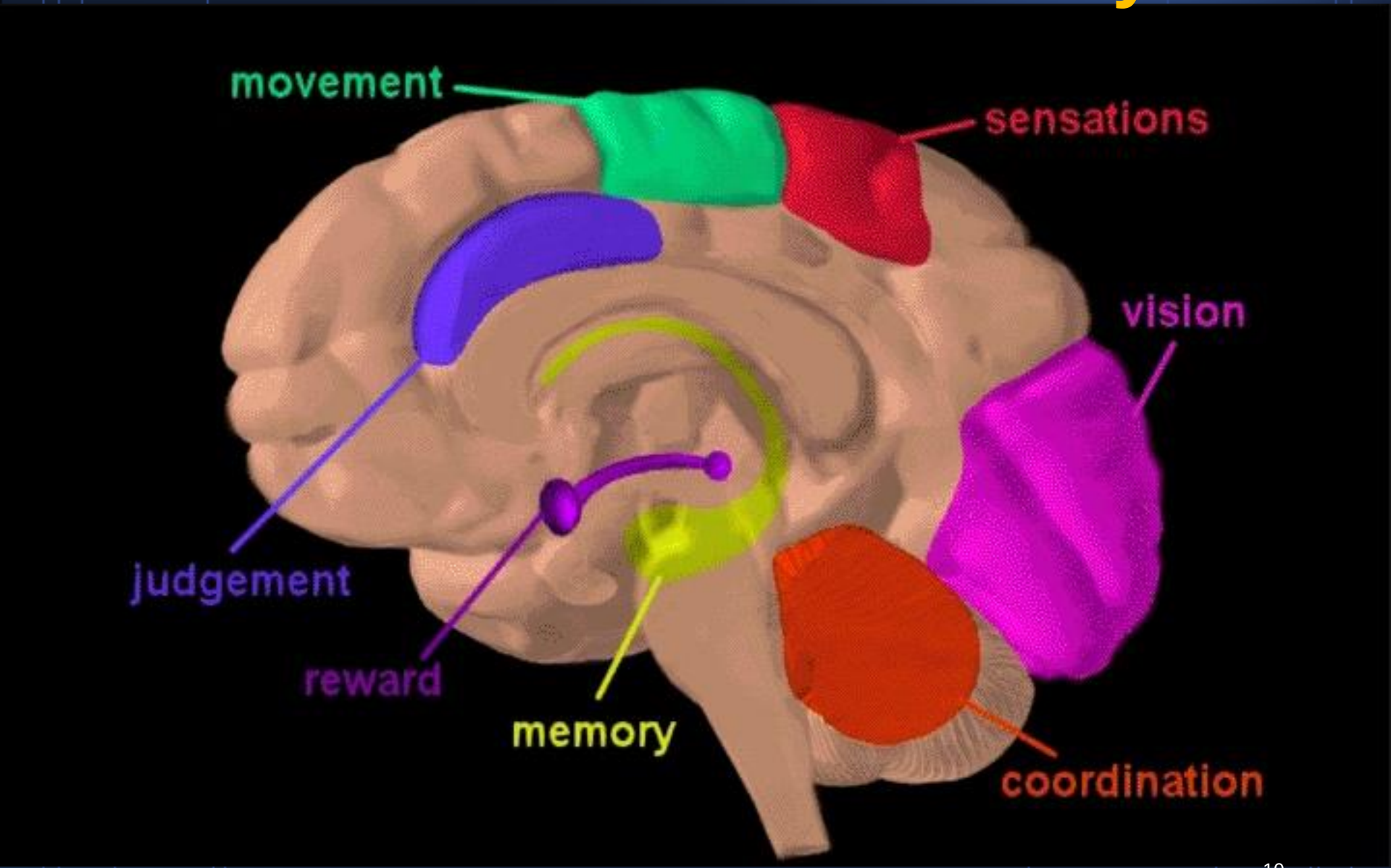
Adapted from: Di Chiara and Imperato, *Proceedings of the National Academy of Sciences USA*, 1988; courtesy of Nora D Volkow, MD

Effects of Amphetamines on Dopamine Levels



Adapted from: Di Chiara and Imperato, *Proceedings of the National Academy of Sciences USA*, 1988; courtesy of Nora D Volkow, MD.

Pleasure-Reward Pathways



National Institute on Drug Abuse, www.nida.nih.gov, 2000.

3

New Neurobiological Concepts

2019

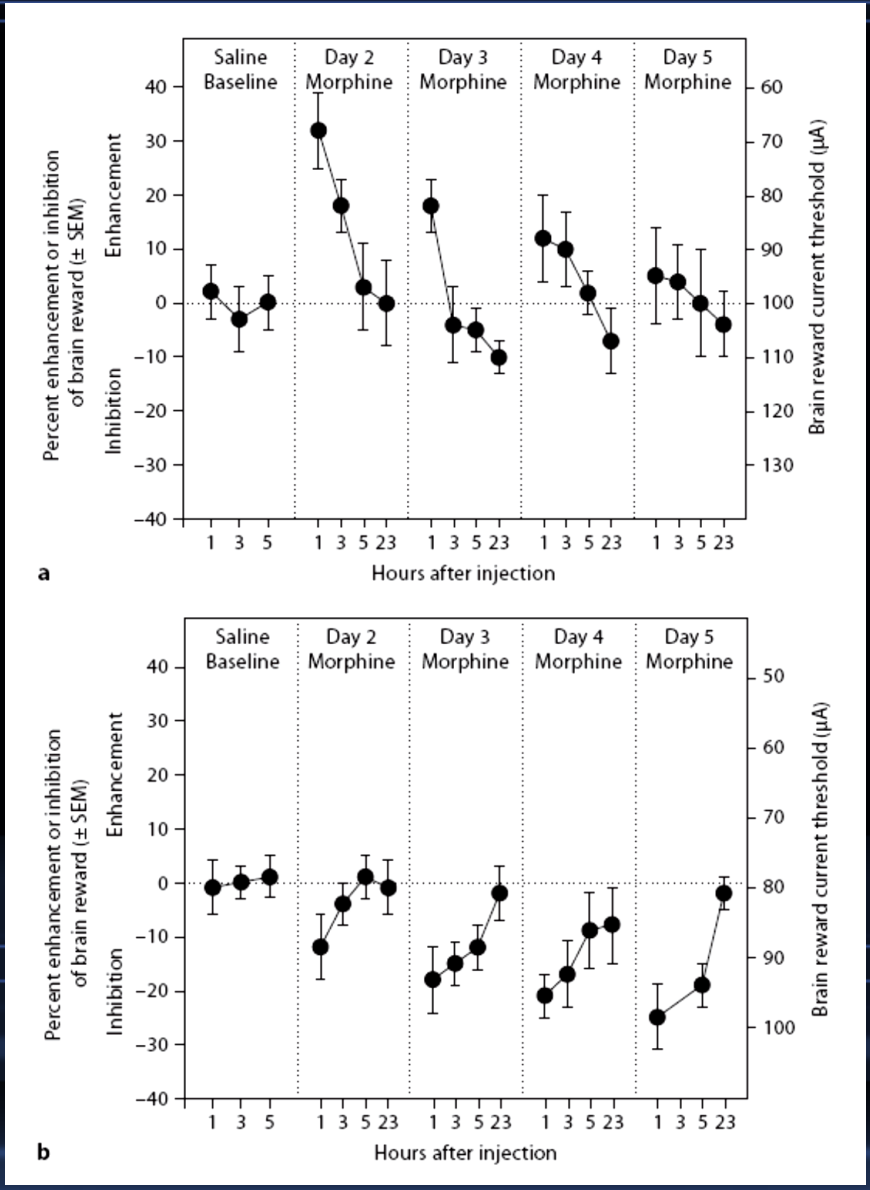
Three Novel Areas

- ✓ Motivational Circuitry
- ✓ Antireward Pathways
- ✓ Interoception

Levounis, *Journal of Medical Toxicology*, 2016.

Motivation: The Stinking Thinking Part

Reward and Antireward Systems



Gardner, *Chronic Pain and Addiction*, 2011.


sensual touch
thirst
temperature
INTEROCEPTION
PAIN
hunger
itch
breathlessness

4

Addiction Treatments

The Current Approach

- ✓ Medications
- ✓ Motivational Interviewing
- ✓ Mutual Help (12-step)

Nunes, Selzer, Levounis, Davies, *Substance Dependence and Co-Occurring Psychiatric Disorders*, 2010.
Levounis, Arnaout, and Marienfeld, *Motivational Interviewing for Clinical Practice*, 2017.
Renner, Levounis, and LaRose, *Office-Based Buprenorphine Treatment of Opioid Use Disorder, 2nd Ed.,* 2018.

5

New Directions

4th Wave: Mindfullness

"Between stimulus and response there is a space. In that space is our power to choose our response. In our response lie our growth and our freedom."

Viktor E. Frankl

Frankl V, *Man's Search for Meaning*, 1959.
Zerbo, Schlechter, Desai, and Levounis, *Becoming Mindful*, 2017.

Thank you

NJMS.Rutgers.edu/Psychiatry