Neurobiology of Addiction & MAT

Why give a drug to someone addicted to drugs?

Sheila Weix MSN, RN, CARN

Background and Housekeeping

- Who am I?
  - In addiction practice since the mid-1980s
  - Registered Nurse, Certified Addictions Registered Nurse (CARN)
  - Detoxification, inpatient, outpatient, residential and acute care consultation
- Expectations:
  - If you have a question, please ask.
  - If you disagree, let's talk about it…I'm always willing to learn

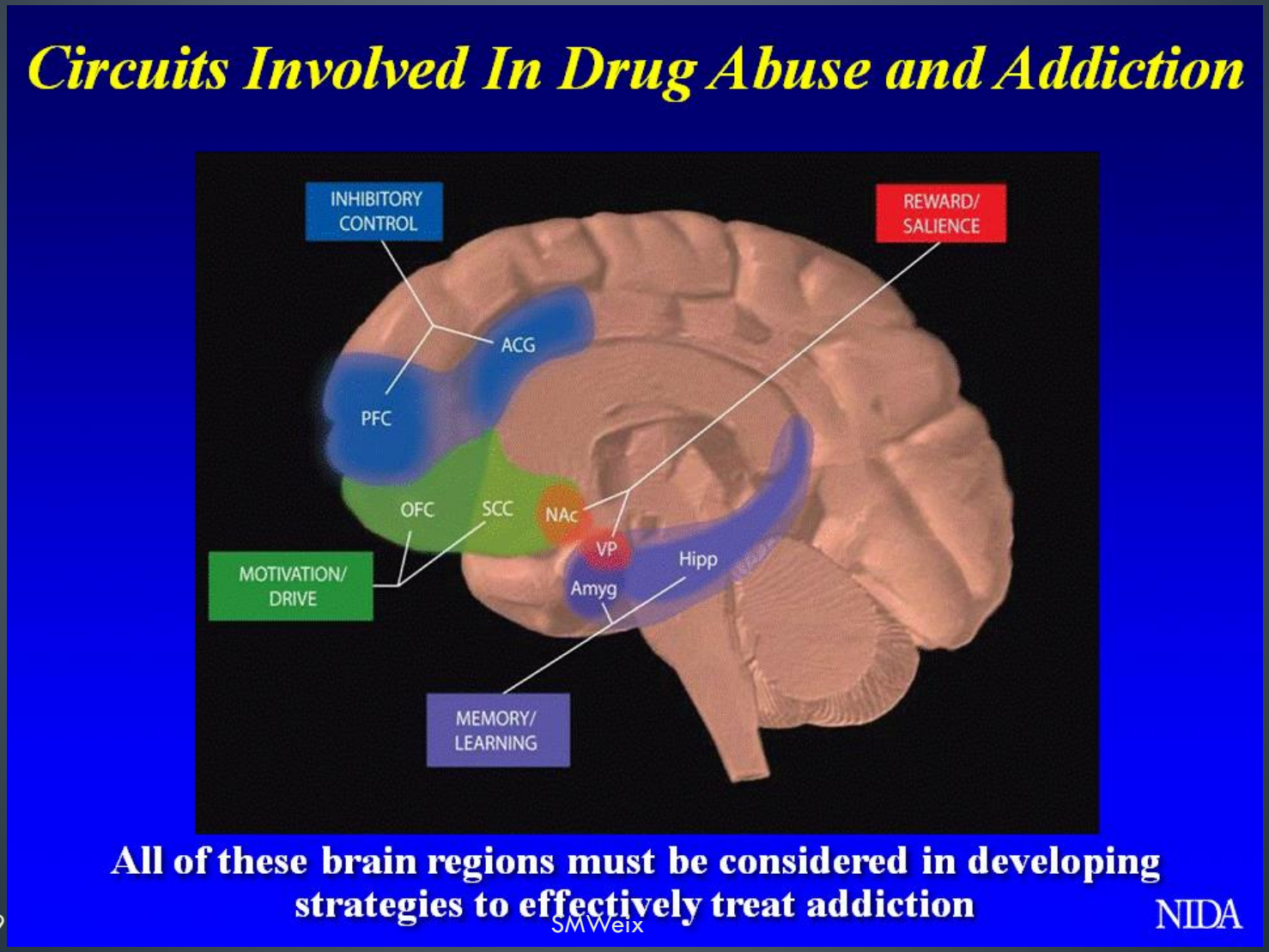
Objectives

- Neurobiology of addiction
- Medication Assisted Treatment: Why?
- Potential pitfalls
- Outcomes & future directions
- Stigma: what difference does it make?

How does addiction develop?

- Complex interaction, not a simple equation
- Genetics
  - Increased risk in first degree relatives of addicts, second only to alcohol
  - Selective disruption of gene encoding in rodents eliminating opiate self-administration
- Environmental factors
  - Access/exposure
  - Perceived risk
  - Traumatic lifetime experiences (ACE)/PTSD
- Effects of the substance (opioids)

Let's start with the brain



Your Brain on Drugs

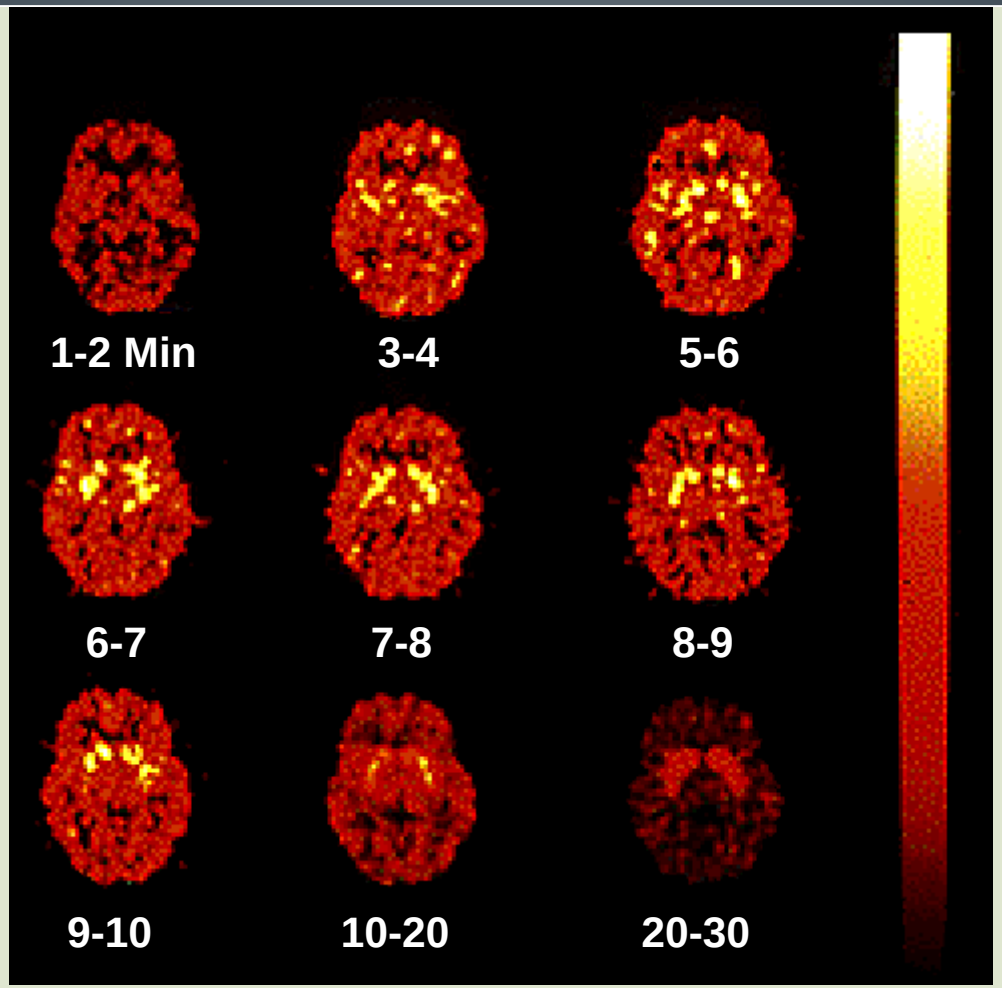


Photo courtesy of Nora Volkow, Ph.D. Mapping cocaine binding sites in human and baboon brain in vivo. Fowler JS, Volkow ND, Wolf AP, Dewey SL, Schlyer DJ, Macgregor RIR, Hitzemann R, Logan J, Bendreim B, Gatley ST. et al. *Synapse* 1989;4(4):371-377.

Your Brain After Drugs

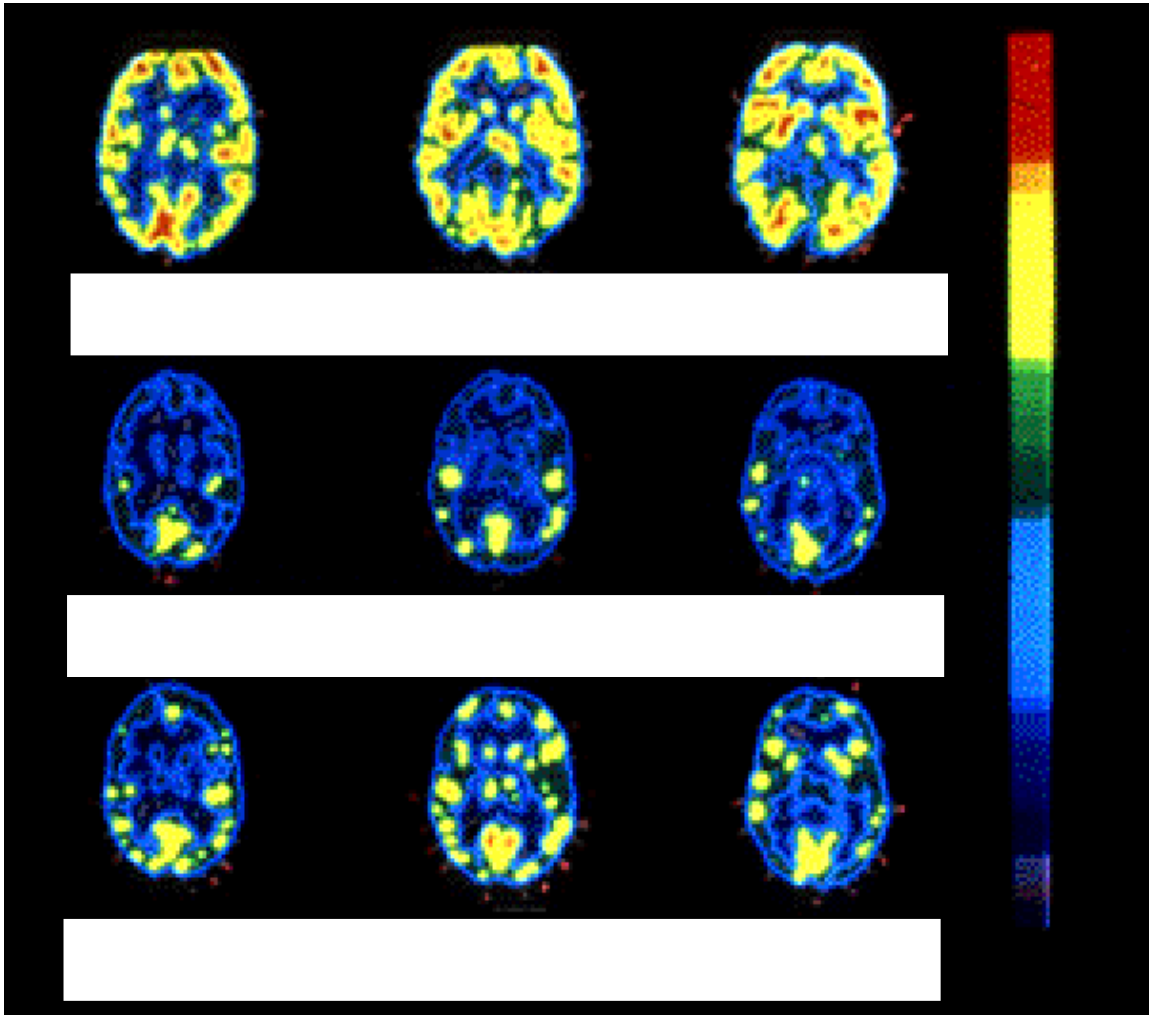


Photo courtesy of Nora Volkow, Ph.D. Volkow ND, Hitzemann R, Wang C-I, Fowler IS, Wolf AP, Dewey SL. Long-term frontal brain metabolic changes in cocaine abusers. *Synapse* 11:184-190, 1992; Volkow ND, Fowler JS, Wang G-J, Hitzemann R, Logan J, Schlyer D, Dewey 5, Wolf AP. Decreased dopamine D2 receptor availability is associated with reduced frontal metabolism in cocaine abusers. *Synapse* 14:169-177, 1993.

Drugs Have Long-term Consequences

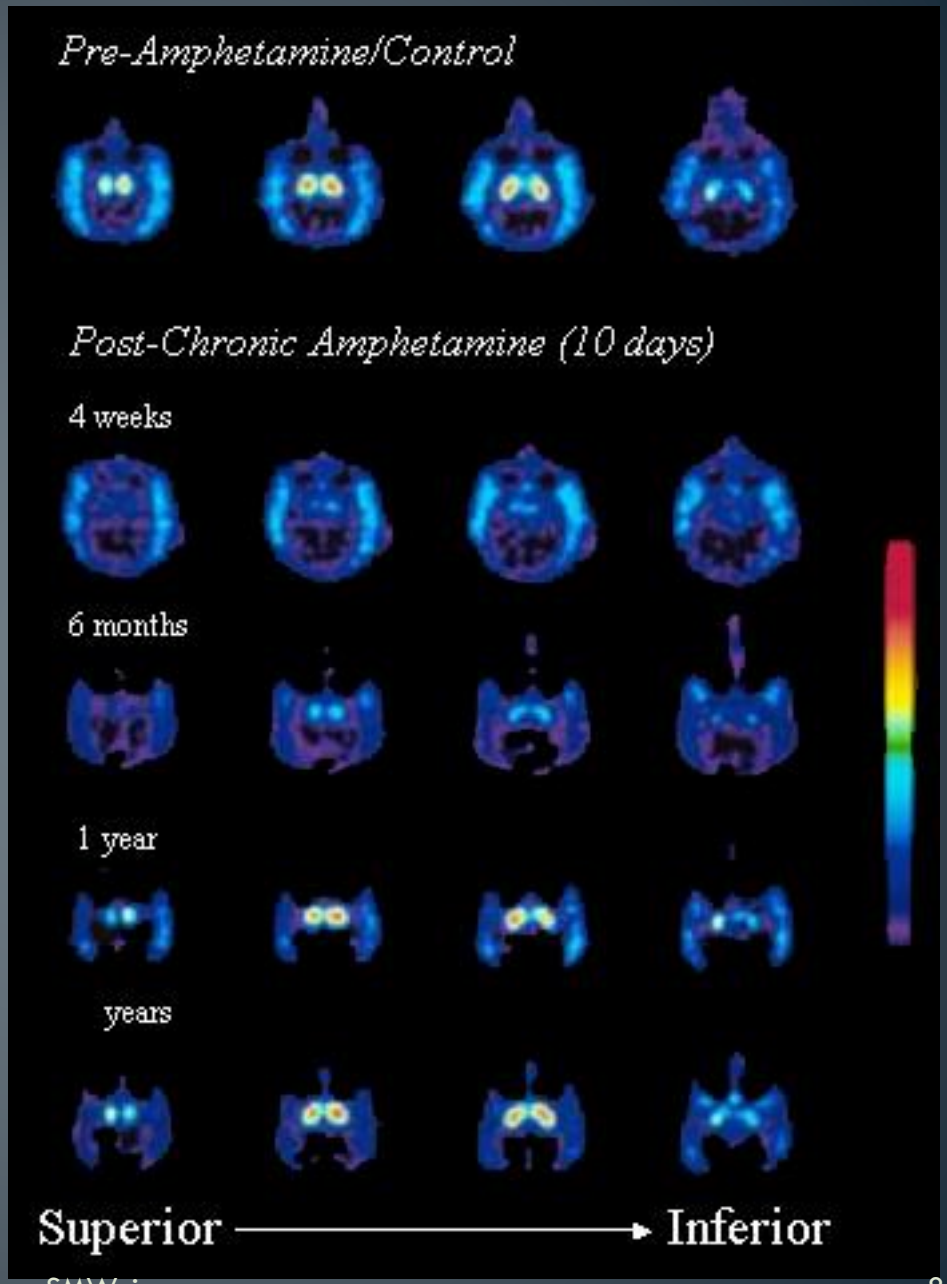
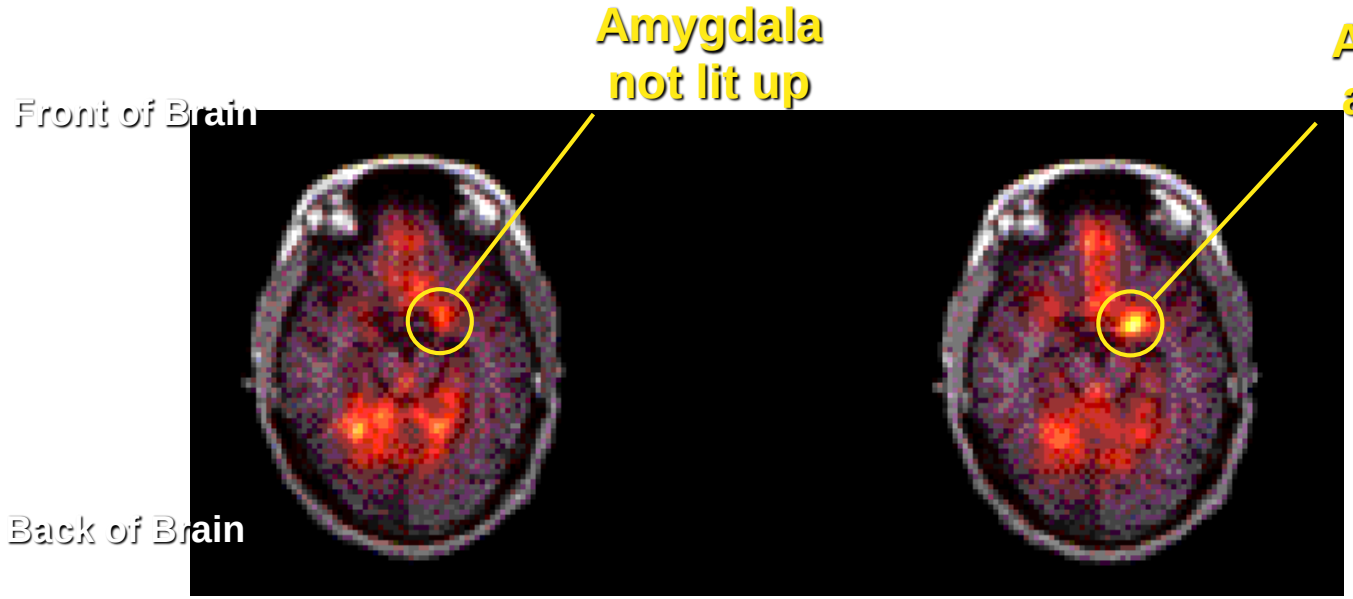


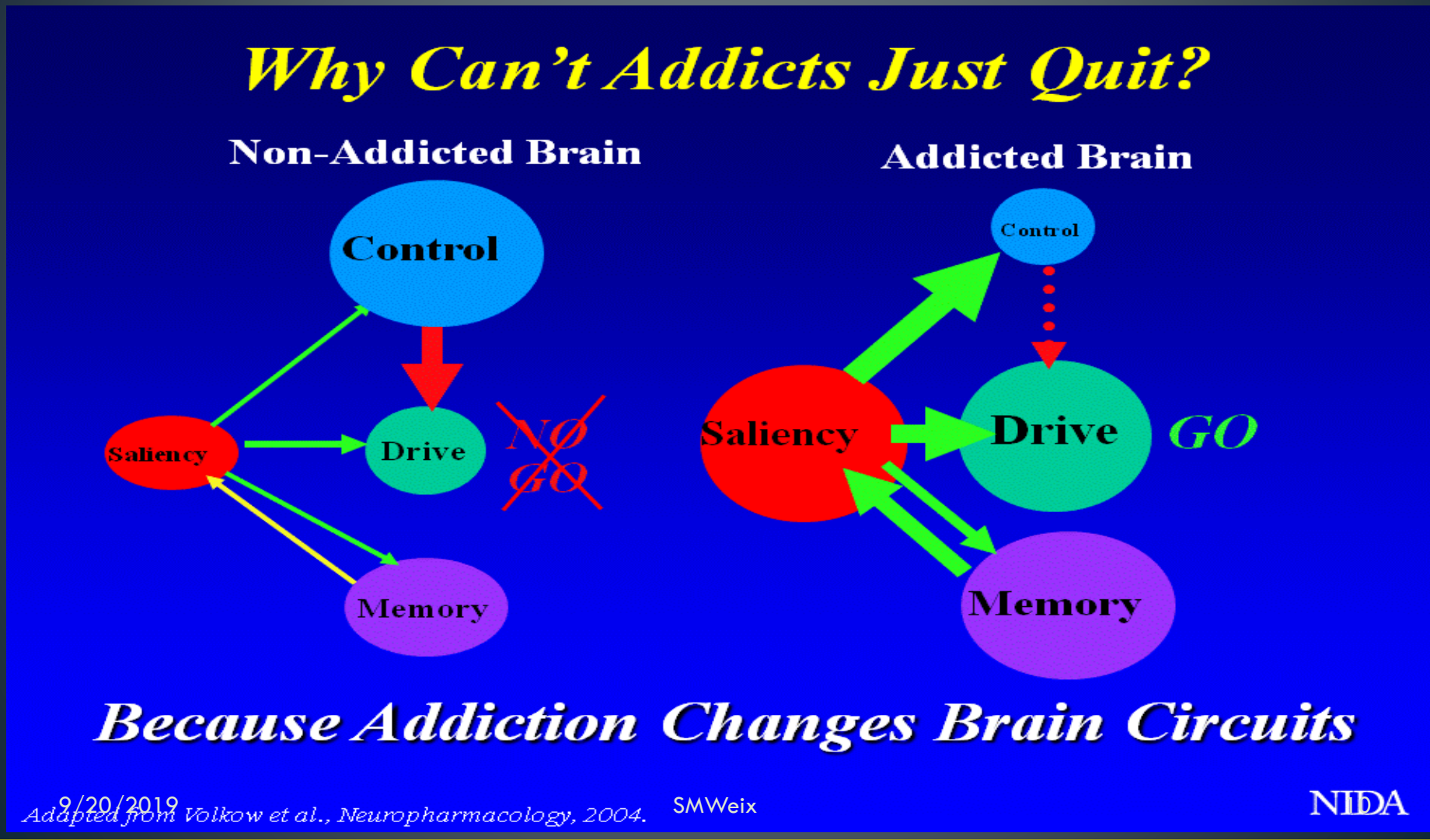
Photo courtesy of NIDA from research conducted by Melega WP, Raleigh MJ, Stout DB, Lacan C, Huang SC, Phelps ME.

The Memory of Drugs



Photographs of Anna Rose Childress, Ph.D.

The use of substances actually "re-wires" the brain



What do opioids do?

- Rapidly enters and exits the brain
- Euphoria connected with reward and reinforcing effects
- Primary target is mu opioid receptors located through out the brain
- Effects diverse areas of the brain resulting in increased saliency of drug cues leading to growth of craving
- Withdrawal leads to negative reinforcement for stopping use, leading to more use…
- Stress responsive pathways are dysregulated by short-acting opioids (everything IS a big deal!!)
- Stress response leads to more use…

So how do you treat an addicted brain??

- Remember that the altered "wiring" lasts for along time
- Decreased dopamine receptors
- Areas of the brain related to reward and behavior show alterations in opioid gene expressions
- Stress response remains elevated
- All of the connections between genetics, the environment and the drug are not yet clear
- Counseling/traditional treatment alone: 80% relapse within 2 years of intensive residential treatment
- Medication maintenance better for retention in treatment, negative urines and prevention of death

How does the medication work?

- Buprenorphine/naloxone combination
- Buprenorphine has a high affinity for mu receptors with moderate mu efficacy, so can "bump off" high efficacy opioids
- When induced appropriately and titrated, keeps the person comfortable, not euphoric
- Prevents cravings
- Suppresses stress hormones leading to normalized stress responsive markers
- The person can think about something other than using

Recommended MAT Practice

- Team approach
- In-depth assessment: AODA, medical, psychological
- Medical: Increased frequency of hepatitis C, B & HIV
- Psychological: PTSD, Anxiety disorders
- MAT as part of treatment, not single intervention. Perhaps TAM??
- Is the person pregnant?
- Is the person taking benzodiazepines?
- What are the person's goals for treatment?
- Informed consent, whole person treatment plan

Induction

- Person needs to be early withdrawal (COWS or other tool)
- First dose usually taken in clinic with observation of response
- Close follow-up (in person and via phone) Day 2 forward
- Very limited dispensing
- Repeated assessment of patient with titration of dose to prevent withdrawal symptoms
- Determine maintenance dose

Stabilization

- Starts when person has:
  - No withdrawal symptoms
  - Minimal side effects
  - No uncontrollable cravings
- Weekly contact with dosage adjustments
- Very active addiction treatment because the person can now began to think and develop the knowledge and skills to manage his/her brain disease going forward

Maintenance

- Decreased physician contact
- Continued emphasis and energy focused on Recovery skills and work
- May be time-limited or permanent: determined by person's goals and other factors
  - Supports for Recovery
  - Stable housing and income
  - Legal issues
  - Medical issues

Tapering (for those who wish to do so)

- Slowly and in very small increments
- Each reduction of the final 2 mg is done over a period of months
- May require 2 years to successfully SLOWLY taper off
- Probably due to other effects of Buprenorphine products including the effect on stress hormones
- Again, what are the person's goals?
- Is life working on the med??

Potential Pitfalls

- Other substances: Buprenorphine only works for opioids
- Need for treatment – NO magic pills
- Need to address other issues: anxiety may BE anxiety, not withdrawal symptoms
- Recovery takes time and commitment on everyone's part
- Diversion: Has street value but for preventing withdrawal not the high
- Requires in-depth assessment and follow-up to do it well. 30 days of use should not immediately lead to this intervention

Outcomes

- Medication can be the "carrot" that keeps the person coming in: necessary for treatment
- Improved brain function allows maximum benefit from the addiction treatment services provided (being able to focus is a huge help in treatment!)
- OD rates lower than abstinence approaches (whether jail or non-MAT residential)
- Overall, use of MAT with addiction treatment has better outcomes than non-MAT opioid treatment:
  - Reduced mortality
  - Improved social function
  - Decreased drug use
  - Improved quality of life

Future Directions

- Implantable Buprenorphine product approved by FDA – good for 6 months
- More research needed in terms of "best treatments" (think cancer protocols) and what about that gene work in rodents?
- Need to address the opioid exposure as the "infective agent" in this epidemic (prevent the disease)
- Changes in Pain management and prescribing
- Education for Recovering people in terms of their children's potential genetic risk (think opioid allergy)
- Need to address the Adverse Childhood Events (ACEs) that occur everyday so that opioids do not need to be our future

Stigma of Addiction: How Language Can Hurt

Sheila Weix MSN, RN, CARN

Stigma

- A mark of disgrace *Webster's New World Dictionary*
- Negative perception of something about a person that causes someone to devalue or discount the entire person

One approach

- MW is a 24 year old addict. She has been abusing drugs since she was 14. Recently, she's been using Suboxone but now she's having dirty urines. She has also been non-compliant with her treatment plan. She no-shows for appointments and doesn't follow through with anything.

Words that can hurt

- MW is a 24 year old addict. She has been abusing drugs since she was 14. Recently, she's been using Suboxone but now she's having dirty urines. She has also been non-compliant with her treatment plan. She no-shows for appointments and doesn't follow through with anything.

Another approach

- MW is 24 years old and she has a substance use disorder. She has experienced problems with drugs since she was 14. She has been trying to get help for her substance use and has been working on Recovery. Recently, she's been in a medication assisted treatment with Suboxone but now she's having positive urines. She has also been struggling with her counseling treatment. She has missed some of her appointments and has not returned the forms she needs for the program.

- We will be checking in with her to find out what is happening and how we may be able to help.

How

- Person first
- Think about the language
- Be kind
- Be specific
- Include the strengths

Questions?

- Contact information:

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