Attachment: Basic Concept

- Attachment is...
  - the interconnectedness between human beings.
- Attachment requires...
  - reading each other’s cues
  - responding appropriately to each other’s cues.

Attachment: Where to start?

Mother ↔ Child

When does risk happen?

Embryonic Period

- Embryonic
  - First 12 weeks after conception
  - Cells are “undirected” (stem cells)
  - Cells become imprinted during this phase
- Early gestational stress marks the genes
  - Adds a methyl group to the gene (methylation)
  - Becomes fixed as memory: epigenetic memory
Fetal Period

- Genes can be changed through fetal experiences
- Serotonin
  - Shapes neuronal circuits in the frontal brain
  - Provided to frontal brain via the placenta
- Cortisol
  - Response to maternal fear, anxiety
  - Transmitted to fetus via placenta
- Fetus is learning what to expect in the outer world

Two Essential Caregiver Qualities

- Accessibility
- Responsiveness

Six Factors Affecting Relationships in Chemically Dependent Women

- Negative heritage
- Emotional instability
- Lack of social support
- Cognitive functioning
- Psychological functioning
- Substance abuse

Chronic administration of drugs of abuse, such as opiates or cocaine, substantially reduces oxytocin levels in the hypothalamus.

Just in case you didn’t get it...

Attachment: What about the baby?

Mother  ➙  Child
Biological Basis of the Effects of Prenatal Drug Use: The Catecholamine System

**Catecholamines**

- 

Biological Basis of the Effects of Prenatal Drug Use: Methamphetamine

**Catecholamines**

- 

Biological Basis of the Effects of Prenatal Drug Use: Cocaine

**Catecholamines**

- 

The nucleus accumbens

- Three types of neurons participate in opiate action:
  1. opiates (green) bind to opiate receptors (yellow)
  2. this decreases GABA release (inhibits dopamine release)
  3. this sends a signal to the dopamine terminal to release more dopamine.

*gamma-Aminobutyric acid

Prenatal opiate exposure

- Prenatal opiate exposure \( \rightarrow \) increased rates of:
  - Low birth weight
  - Low birth length
  - Small birth head circumference
  - Stillbirth
  - SIDS

The Action of Opiates
**Some key questions...**

- What is true neonatal withdrawal? Is it the same as abstinence?
- How does NAS differ from neurobehavioral difficulties?
- What factors affect diagnostic labeling?
- Is it in fact important to differentiate NAS and neurobehavioral difficulties? Does the diagnosis affect treatment?

**Some definitions....**

- **Addiction**
  - a state in which an organism engages in a compulsive behavior
  - the behavior is reinforcing
  - loss of control in limiting intake

- **Dependence**
  - a state in which an organism functions normally only in the presence of a drug
  - manifested as a physical disturbance when the drug is removed

- **Abstinence**
  - the practice of restraining oneself from indulging in something

- **Withdrawal**
  - the unpleasant physical and mental effects that result when you stop doing or taking something

- **Neurobehavioral**
  - of or relating to the relationship between the action of the nervous system and behavior

**Why is the question of withdrawal vs. neurobehavior so difficult to address?**

- Small or highly selected samples
- Difficulty of prospectively collecting measures of substance use
- Lack of control for potential confounders with varying levels of adjustment
- Differences in study design and outcome measures
- Variance in terminology (addiction vs. dependence, abstinence vs. withdrawal, NAS vs. NDS)
- Polydrug use
- Physiology of adults does not necessarily translate to understanding physiology of the fetus or newborn

**Neonatal Abstinence Syndrome**

- **NAS**
  - the collection of signs and symptoms that occur when a newborn prenatally exposed to opiates experiences opioid withdrawal.
  - Develops in 2-11-55-94% of opioid drug-exposed infants
  - Does not represent “addiction” in the newborn
  - Does it represent “dependence”?
### Nonnarcotic Drugs That Cause Neonatal Psychomotor Behavior Consistent With Withdrawal

- **Alcohol**
  - Hyperactivity, crying, irritability, poor suck, tremors, seizures, onset of signs at birth, poor sleeping pattern, hyperphagia, diaphoresis
- **Barbiturates**
  - Irritability, severe tremors, hyperacusis, excessive crying, vasomotor instability, diarrhea, restlessness, increased tone, hyperphagia, vomiting, disturbed sleep
- **SSRIs**
  - Irritability, constant crying, shivering, increased tonus, eating and sleeping difficulties and convulsions
- **Diazepam**
  - Hypotonia, poor suck, hypothermia, apnea, hypertonia, hyperreflexia, tremors, vomiting, hyperactivity, tachypnea

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### Neurobehavior

- of or relating to the relationship between the action of the nervous system and behavior
- interactions with and response to internal and external environment

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### Substances associated with neurobehavioral changes

- Nicotine
- Alcohol
- Marijuana
- Cocaine
- Methamphetamine
- PCP
- Opiates

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### Neurobehavior: Information Processing Model

Four domains of information processing

- **Input** (recording information)
- **Integration** (interpreting input)
- **Memory** (storing input for later use)
- **Output** (appropriate use of language and motor skills)

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### Neurobehavior

- **Key domains**
  - **Orientation**
    - the ability to attend to specific stimuli (auditory and visual)
  - **State regulation**
    - the ability to regulate state of arousal

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### Management

- **Supportive**
  - Swaddling
  - Pacifier
  - Low lighting
  - Oscillating crib
  - Avoidance of abrupt changes
  - Frequent small feedings
  - NAS only: Pharmacologic

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So what is the difference between “withdrawal” and neurobehavioral deficits?

Neurodevelopmental Disorder

Neurocognitive functioning

Adaptive functioning

Self-regulation

Impact of Regulatory Difficulties

- State Regulation and Arousal
- Sleep States
- Habituation
- Reflex Development
- Self-soothing
- Attention
- Transitions
- Modulation of Affect

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