Brain Pathology of Heroin Addiction

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Brain Pathology of Heroin Addiction
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Pathophysiology of Heroin Addiction

**Neurocircuitry**
- Neurobiological addiction research seeks to understand "changes at the molecular, cellular, and neurocircuitry levels that mediate the transition from occasional, controlled substance use to loss of control in drug intake and chronic addiction" (Koob & Volkow, 2016, p. 760).
- Addiction to drugs involves a recurring intoxication, withdrawal, and craving cycle that traps the addict into the addictive behavior by creating neuroplastic changes in the brain reward, stress, and executive function systems (Koob & Volkow, 2016, p. 763).

**Substance use disorders characteristics**
- Uncontrollable compulsion to take an addictive substance.
- Inability to control amount of drug that one takes.
- Developmental irritability and anxiety when one is unable to obtain the drug.
- Chronic relapse. May be mild, moderate, or severe. (Koob & Volkow, 2016)

**Other Effects**
- Potential infection with other pathogens such as HIV and hepatitis due to sharing of injection paraphernalia. (National Institute on Drug Abuse, 2010).
- Liver disease.
- Impairment.
- Mental cycle irregularity.
- Collapsed veins and scarring.
- Permanent brain damage due to hypoxia caused by overdose.
- Overdose and untimely death.

**Brain Pathology of Heroin Addiction**
- The Diagostic and Statistical Manual of Mental Disorders define drug addiction as a substance use disorder (Koob & Volkow, 2016).
- Cerebral blood flow to the cingulate cortex has been shown to increase after long term heroin use. Damage to the cingulate cortex which is involved in motivation and cognition and is part of the brain reward, stress, and executive function systems (Koob & Volkow, 2016).
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**Changes in three major brain-areas include:**
- The basal ganglia - associated with intoxication and bingeing.
- The amygdala - associated with withdrawal.
- The prefrontal cortex, which is where preoccupation with the addictive behavior occurs (Koob & Volkow, 2016).

**Long-Term Brain Effects**
- The cingulate cortex which is involved in motivation and cognition and is part of the reward pathway suffers from reduced connectivity from heroin addiction resulting in increased drug craving and cognitive deficits (Wollman et al., 2015).
- Damage to brain white matter can take up to five years to occur (Wollman et al., 2015).

**References**