NICOTINE AND THE DEVELOPING BRAIN

Adolescent Brain Development

Adolescence is a critical period of brain development during which the maturation of areas involved in cognitive functioning is still ongoing.[1] The prefontal cortex is one of the last areas of the brain to mature. Evidence suggests that exposure to nicotine during adolescence interferes with the normal course of brain maturation and has lasting effects on cognitive abilities, mental health, and personality.[2] The adolescent brain is in a vulnerable state of imbalance and particularly susceptible to the influence of brain-altering substances like nicotine.

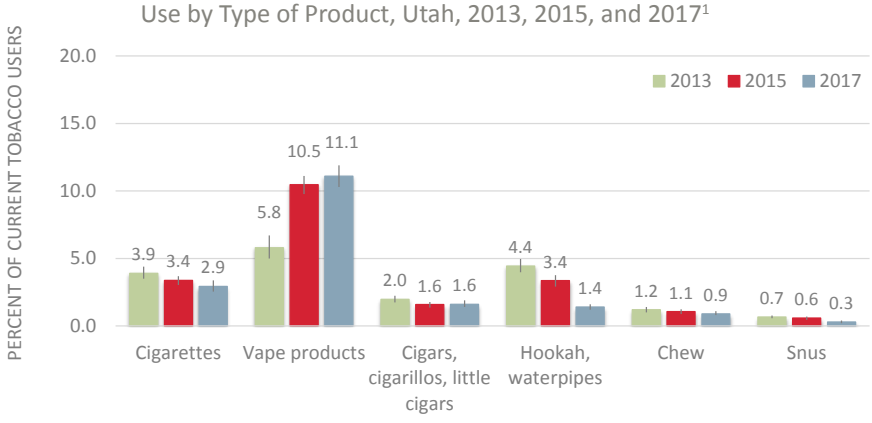
Nicotine and the Brain

Nicotine is a psychoactive and addictive substance that directly interferes with all brain areas involved in emotional and cognitive processing. Nicotine use during adolescence results in cell damage and cell loss throughout the brain, particularly in the hippocampus, the mind's memory bank. The effects of nicotine on critical components of reward pathways and circuits involved in learning, memory, and mood are likely to contribute to increased addiction and long-term behavioral problems in adolescents. Furthermore, research indicates that nicotine exposure during adolescence increases the risk of developing psychiatric disorders later in life.[1] Compared to adults, adolescent nicotine users experience more episodes of depression and cardiac irregularities, and are more likely to become quickly and persistently nicotine-dependent. As a result, adolescents are more vulnerable to nicotine addiction than those who begin smoking as adults. Furthermore, studies indicate that even a brief period of intermittent or continuous nicotine exposure during adolescence can lead to lasting neurobehavioral damage.[1]

Tobacco and Vape Product Use Among Utah Students

Since 2013, Utah students were more likely to report use of vape products than any other tobacco or nicotine product. Vaping nearly doubled from 5.8% in 2013 to 11.1% in 2017.[3] This increase in vaping is concerning due to the perception that vaping is safe compared to use of other tobacco products. The nicotine in vape products has negative effects on brain development and establishes patterns that leave adolescents vulnerable to other addictions later in life.

Percent of Students (Grades 8, 10, 12) Who Reported Current Tobacco Use by Type of Product, Utah, 2013, 2015, and 2017[1]



References

[1] Goriounova, N., Mansvelder, H. Nicotine Exposure During Adolescence Alters the Rules for Prefrontal Cortical Synaptic Plasticity During Adulthood. 2012. Frontiers in Synaptic Neuroscience.

[2] Centers for Disease Control and Prevention (CDC). The Health Consequences of Smoking - 50 Years of Progress: A Report of the Surgeon General. 2014. Atlanta, GA: U.S Department of Health and Human Services (HHS).

[3] Tobacco Prevention and Control Program. Prevention Needs Assessment Tobacco Questions, SHARP SURVEY 2013, 2015, and 2017. Salt Lake City: Utah Department of Health.