

**MARIJUANA IS THE NEW ALCOHOL: ILLEGAL UNTIL 21<sup>st</sup> BIRTHDAY,  
UNSAFE FOR THE DEVELOPING BRAIN (to 25 years), and POTENTIALLY TOXIC FOR ANYONE**

**Marijuana is dangerous for developing brains**, as documented in reviews from American College of Obstetricians and Gynecologists (2017), American Academy of Pediatrics (2018) and US Surgeon General (2019):

- Exposure to marijuana during **pregnancy** and from **breast milk messes up** the **function** and **organization** of nerves and their connections in the key parts of the developing **brain**, especially:
  - The limbic system including amygdala (mood) and hippocampus (memory).
  - The prefrontal lobe (organization, planning, reflection, behavioral and attention control).

This can cause lifelong problems with **mood** (explosive mood, depression, anxiety and aggression), registering information in **memory** and keeping memories long term (trouble learning), and **self-management** (impulsivity, inattention, hyperactivity, poor executive function and disorganization). There may also be greater risk of **psychosis** in young adults who had been exposed as a fetus or newborn. It appears that brains of males are more vulnerable to these effects, with the exception of aggression which is more associated with exposed females.

- Fetal marijuana exposure causes **structural and genetic changes** in the brain's dopamine reward system. Higher drug seeking behavior including **substance abuse and addiction** is documented in individual adults who had been marijuana-exposed at least weekly prenatally compared to individuals without known exposure.
- Fetal exposure to marijuana is dangerous to the **overall wellbeing** of the fetus, with greater likelihood of **stillbirth, being small for gestational age** and **premature birth**. Marijuana can disrupt the direction of blood vessel formation in the **placenta**. This impairs placental support of the fetus, such as hormones, immunity and delivery of nutrients and oxygen.

**SMOKE:** Marijuana smoke (from mom or anyone nearby) has five times the concentration of the deadly **carbon monoxide** as secondhand tobacco smoke. Carbon monoxide displaces oxygen from hemoglobin, decreasing the body's ability to carry oxygen. This is an immediate threat to function and survival of developing cells and can contribute to slowed growth and stillbirth. Marijuana smoke also has carcinogens and cell-damaging **toxins**.

- The brains of **adolescents and young adults** are still actively developing. **Disruption of neural network maturation** by marijuana use during these years is particularly evident in the hippocampus (initiates memory) and the prefrontal brain (controls reasoning and regulates the limbic system). The alterations in brain development can cause lifelong problems.

**Marijuana can be toxic for anyone at any age.** Throughout life THC (tetrahydrocannabinol) and CBD (cannabidiol) in marijuana act by attaching to innumerable receptors on the surfaces of cells that specifically recognize plant cannabinoid as a "look-alike" to the body's own "endocannabinoid" substances.

- CBD receptors are mainly in the immune system, but CBD is often contaminated with THC and pesticides.
- THC-binding cannabinoid receptors reside on nerve cells (neurons). The body's endocannabinoid can bind to its receptor to decrease message transfer from one neuron to the next when needed, where needed. Plant THC (tetrahydrocannabinol) can flood the system, binding receptors that decrease neuron firing everywhere, decreasing function & control.
- Marijuana becomes **more toxic as the dose (concentration) of THC increases**. Marijuana products today usually have a much higher concentration of THC than in the past, making toxicity more likely. Frequent use of marijuana, by repeatedly **decreasing neuron firing, decreases neuron wiring**, as the body eliminates less used neuron connections.





Edibles have much higher risk of causing intoxication compared to smoking, and are especially dangerous for toddlers, because:

- The concentration of marijuana in edibles is typically very high,
- Edibles usually look like yummy treats, and
- Unlike the immediate sensations from smoking, the onset of effect of edibles is delayed by several hours.

Toxic effects of THC in marijuana that can impair function in anyone, from toddlers to elders, include:

- **Bad feelings:** Altered perception, Anxiety, Panic, Paranoia, Psychosis (may become violent)
- **Trouble getting around:** Dizziness, Weakness, Slurred speech, Poor coordination.
- **Shutting down:** Excessive sleepiness, Apnea (not breathing for 10 seconds or longer), and Heart problems.

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