THE ADOLESCENT BRAIN

December 4, 2015
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Why is the Middle School Brain so Intriguing?

- Highest Brain plasticity occurs between ages 0-3 and early adolescence.

- Adolescent Brain is keenly tuned to memory of “experiences”.

- Adolescent brain can be remodeled!

- Adult brain can only be re-decorated.
Adolescent Development

- This is not a time to survive, but a time to thrive.

- Changing our approach with teens is key! It is a time of opportunity. Laurence Steinberg, PhD from Temple University has conducted research on teaching self-control to teens. Studies show it can be taught and that hormones play a major role in adolescent brain functioning.
The young brain is prone to addiction at a much higher rate than an adult brain. An adolescent who begins using substances early on is 40% more likely to form an addiction by the time they reach adulthood.

It is ideally recommended that individuals avoid substance use until they are over 25.
Window of Sensitivity

- Teen brains experience a similar vulnerability to a baby in utero.
- Toxic substances/experiences harmfully affect developing brains.
National Data for 8th Grade Marijuana Use

**Monitoring the Future 2014 Report**

- 11.7% reported using marijuana
- 20.8% reported using alcohol
“I feel pressure to drink alcohol”

7th grade 94.8% said “NO”
8th grade 98.3% said “NO”
“My peers use marijuana”

- 7th grade perception 5.3% believe peers use.
- 7th grade actual data 0% of peers reported use.

- 8th grade perception 13.8% believe peers use.
- 8th grade actual data is that 0% of peers reported use.
2011 CGS Results

“"I have used alcohol""

- 7th grade 100% reported that they never drank.
- 8th grade 98.3% reported that they never drank.
CG middle school students are significantly below the national averages for self-reported substance use.
Social Norming as an Intervention

- Using the data to show students that everyone is not using substances makes a powerful impact on teen decision making. Most kids want to fit in with the majority. Knowing the facts over gossip and the occasional war story helps to keep things in perspective and reality based.
Great Window of Opportunity

- Our students have not yet experimented with substances.

- In our health curriculum they have learned about their brains and addiction risks.

- They have practiced in health class ways to deal with peer pressure.
Basic Brain

What do you know about this picture?
Activity at the Synapse
Thinking about the connections between the neurons in your brain.....

Who do you think has the most connections?
A. A newborn baby
B. A six year old
C. A teenager
D. Adult
Synaptic Pruning

New connection result from learning and increase the potential for learning.
Drugs and Alcohol Hijack the Brain’s Reward Circuitry

Immediate effect of drug use is an increase in dopamine.

Continued use of drugs decreases the brain’s dopamine production.

Because the dopamine is a part of the reward system, the brain is fooled into thinking the drug has survival value to the organism.

The reward system responds with drug seeking behaviors.

Craving and eventually dependence occurs.
Alcohol at the Synapse

Alcohol's Effect Dopamine and other on Neurotransmitters

Dopamine, which some think of as the body's natural cocaine, plays a role in brain regulation of movement, cognition, and emotion; it is released when we engage in an activity which we find pleasurable. Alcohol increases dopamine levels by binding to D4 receptors in the nucleus accumbens (shown in yellow in the image on the right), the caudate nucleus, and the putamen (shown in green in the left figure), producing feelings of pleasure.

Image courtesy of John W. Sundsten, Ph.D., Digital Anatomist Program, University of Washington
Marijuana at the Synapse
Effects of Marijuana

<table>
<thead>
<tr>
<th>Brain Structure</th>
<th>Regulates</th>
<th>THC Effect on User</th>
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</thead>
<tbody>
<tr>
<td>Amygdala</td>
<td>emotions, fear, anxiety</td>
<td>panic/paranoia</td>
</tr>
<tr>
<td>Basal Ganglia</td>
<td>planning/starting a movement</td>
<td>slowed reaction time</td>
</tr>
<tr>
<td>Brain Stem</td>
<td>information between brain and spinal column</td>
<td>antinausea effects</td>
</tr>
<tr>
<td>Cerebellum</td>
<td>motor coordination, balance</td>
<td>impaired coordination</td>
</tr>
<tr>
<td>Hippocampus</td>
<td>learning new information</td>
<td>impaired memory</td>
</tr>
<tr>
<td>Hypothalamus</td>
<td>eating, sexual behavior</td>
<td>increased appetite</td>
</tr>
<tr>
<td>Neocortex</td>
<td>complex thinking, feeling, and movement</td>
<td>altered thinking, judgment, and sensation</td>
</tr>
<tr>
<td>Nucleus Accumbens</td>
<td>motivation and reward</td>
<td>euphoria (feeling good)</td>
</tr>
<tr>
<td>Spinal Cord</td>
<td>transmission of information between body and brain</td>
<td>altered pain sensitivity</td>
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The brain structures illustrated above all contain high numbers of CB receptors.
Implications

- What are the potential risks of any substance impacting the brain and the synaptic circuitry?
- Is it reasonable to assume that herbs are safe? Pain medications? Illegal drugs? Legal drugs for those over 21?
WHAT IS OUR ROLE?

Parents, Teachers, Counselors, and other Adults
It’s Just Therapy
Focus on the RELATIONSHIP:

- Be someone our kids can talk to about anything.
- Expect them to make mistakes, those are the teachable moments.
- Take the time to understand their point of view.
- No more “I told you so’s.”
- On their terms, for now.
- Kids need information, not rules. Natural consequences.
- Share your family’s values and standards. Set expectations.
- Express confidence in their ability to handle their own decisions, the consequences, and the rewards.
“America’s newly identified at-risk group is preteens and teens from affluent, well-educated families. In spite of their economic and social advantages, they experience among the highest rates of depression, substance abuse, anxiety disorders, somatic complaints, and unhappiness of any group of children in this country.”

Dr. Suniya Luthar of Columbia University’s Teachers College. Advances in Child Development, 2005.
What should we be discussing?

How do we handle our children’s increased exposure?

How important is modeling?

How can we prepare our children to be good decision makers who use healthy coping methods?
What should we be discussing?

- Alcohol
- Prescription Drugs
- Marijuana
- Inhalants
- Bath salts
- Ask them what they are hearing about from other kids.
What should we be discussing?

- Risks versus Rewards:
  - Addiction – 1 in 6 who start as teens become addicted.
  - Impact on memory, critical thinking, and problem-solving skills. In boys, erectile dysfunction.
  - Criminal record
  - Future job opportunities
  - What might you lose?
    - Impaired driving – lose license
    - Good grades – lose college opportunities and scholarships
How do we handle our children’s increased exposure?

- Have a family plan!
  - How to recognize when someone is impaired.
  - “I’m in danger, I don’t feel safe” phone call or text.
    - No shaming. Discuss the next day what went wrong?
      - How did you get into this situation?
  - Role-play scenarios and what to say.
  - Let them use you as a scapegoat:
    - “My parents will kill me.”
How important is modeling?

- Our children learn from us, whether we want them to or not. Examine what they are learning from you.

  - They are always observing our behavior.
  - What role do substances play in your coping?
  - Never glamorize or joke about your use. Share the consequences that occurred.
  - Follow the law.
  - If in recovery, talking about your experiences and family history is vital, as you cannot model appropriate use.
How can we prepare our children to be good decision makers who use healthy coping methods?

- Teach and model healthy coping and stress management.
- Support their ability to identify their feelings and to resolve them.
- Plan for peer pressure.
- Expect your children to be responsible for their own decisions and to be equipped to handle the consequences.
- Express your belief in their abilities.
RESOURCES

www.cdc.gov/nccdphp/dash/yrbs/index.htm
www.drugabuse.gov/related-topics/trends-statistics/monitoring-future
www.hazelden.org
http://headsup.scholastic.com/
www.monitoringthefuture.org
www.oas.samhsa.gov/NSDUHLatest.htm
