Chapter highlights: Childhood Disorders (Ch 10)

The purpose of “chapter highlights” is to offer a framework in which to think about the specific information discussed in each Brain Facts chapter. These highlights draw upon information in the chapter and on the new Brain Facts web site (http://www.brainfacts.org) and occasionally, on our own knowledge of neuroscience that may not be discussed in Brain Facts. Questions for Brain Bee will come from Brain Facts (new 2012 publication) and entries from the new Brain Facts web site that have “brainfacts.org” in the URL. Some but not all relevant entries are cited below.

Childhood Disorders http://www.brainfacts.org/diseases-disorders/childhood-disorders/

Some childhood disorders are associated with impairments in brain development (such as autism and dyslexia), while others are associated with abnormal brain cell activity (such as attention deficit hyperactivity disorder). People with Down syndrome experience cognitive decline much like in Alzheimer’s disease.

Synapses and developmental brain disorders, for an overview go to:

- **Synapses**: the junction between two neurons that allows the neurons to communicate with one another using chemicals
- Synapses are crucial for basic brain functioning and thinking (and learning, memorizing, planning, and reasoning)
- Some developmental disorders such as Fragile X Syndrome (the most common form of mental retardation) and autism have been linked to dysfunctional synapses
- Studying synapses can lead to:
  - a better understanding of neurobiological causes of inherited mental retardation
  - treatments that could possibly reverse cognitive impairments associated with developmental brain disorders

Autism and autism spectrum disorders (ASD)

- **Autism spectrum disorders (ASD)** are characterized by impaired social skills (problems with both verbal and nonverbal communication), narrow, obsessive interests or repetitive behaviors
  - There is a strong genetic component to ASD
  - It is a complex disorder and people with autism can present very different symptoms
  - It’s referred to as a “spectrum” disorder because it involves a spectrum and severity of symptoms (i.e. some people can have very mild forms of ASD with relatively few pervasive symptoms, while other people can have more serious forms of ASD)
  - Asperger’s syndrome is a type of ASD. For an overview go to:
Children with Asperger’s retain their early language skills and have an obsessive interest in a single object or subject.

Children with Asperger’s sometimes show developmental delays in motor skills.

- While the exact cause of autism is unknown, there is **no conclusive scientific evidence that vaccines cause autism**.
- Some scientists have generated stem cells from children with autism allowing them to study how the brain develops in children with ASD. To learn more about stem cell research and ASD, watch the video at: [http://www.brainfacts.org/feeds/nimh/stem-cell-possibilities-in-autism-research/](http://www.brainfacts.org/feeds/nimh/stem-cell-possibilities-in-autism-research/)

### Attention deficit hyperactivity disorder (ADHD)

- ADHD is characterized by excessive **inattention, activity, and impulsivity**
- To watch a video about the signs and symptoms of ADHD, go to: [http://www.brainfacts.org/feeds/nimh/adhd-signs-symptoms-research/](http://www.brainfacts.org/feeds/nimh/adhd-signs-symptoms-research/)
  - There is a strong **genetic** component to ADHD, with evidence that genes that encode for parts of dopamine and norepinephrine transmission are involved in ADHD
  - Some people with ADHD have reduced **catecholamine transmission** (dopamine and norepinephrine) in the **prefrontal cortex**
  - Medications for people with ADHD act by enhancing **catecholamine transmission**

### Down Syndrome


- People with down syndrome have an extra copy (trisomy) of chromosome 21
- Associated with **impaired intellectual abilities**, low muscle tone, **characteristic appearance**
- Support can allow for a relatively normal development and lifestyle

### Dyslexia


- People with dyslexia have **difficulty speaking** and **reading** while otherwise they have normal intelligence and motivation
- One of the biggest problems in dyslexia is caused by **deficits with phonology**—how sounds are organized
- It is a persistent and chronic disorder, but practice helps to deal
- Three areas of the left part of the brain are different in dyslexics and non-impaired readers: **parieto-temporal, occipito-temporal, and Broca’s area**
• Genetic basis