# Neurodegenerative Diseases Study Guide

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## I. Autism and Asperger's

***Abstract*—Range of neurodevelopmental disorders called Autism Spectrum Disorders (ASD). Asperger's is on the lower end of the spectrum while Autism can range from milder to severe. These diseases can also be characterized under Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS). Autism is characterized by social, behavioral and communicational impairment. Asperger's also implies social and behavioral impairments but communication is fine.**

***Keywords*—Neurdevelopmental Disorders, Autism Spectrum Disorders (ASD), Prevasive Developmental Disorder Not Otherwise Specified (PDD-NOS), Autism, Asperger's**

### A. Symptoms and Characterizations

In general, Autism is characterized by social, behavioral and communicational impediments. Asperger's is characterized by social and behavioral impediments but NOT speech impairment.

- Autism: Social, Behavioral, Speech
- Asperger's: Similar to Autism but without communication. Also has Obsessiveness.

***Autism Syndrome***

1) Communication difficulties
2) Avoid eye contact during conversation
3) Desire to be alone
4) Trouble with feelings
5) Tendency to echo words or phrases
6) Speech delay
7) Witdrawal from socializing

***Asperger's Syndrome***

1) Impaired nonverbal skills
2) Trouble maintaining relationships
3) May have a lack of empathy
4) May be physically awkward
5) Above average memory
6) Struggle with abstract concepts
7) Intelligence normal to above average
8) Motor skill delays
9) Want to interact with society but doesn't know how

***Combined Symptoms***

1) Sensory disorders
2) Social impairments
3) Fixated, obsessive interests
4) Repetitive behavior
5) Adherence to routine

*1) Co-Ocurring Conditions:*

- Anxiety
- Depression
- OCD
- Tourette's
- ADD/ADHD
- Fragile X Syndrome
- Tuberous Sclerosis

*2) Diagnosis:*

- Start with children
  - Lack of responsiveness
- Questionnaire and screening administered
- Comprehensive evaluation witha multidisplinary team
- Cognitive and language testing

***Keywords*—Speech impediment: Autism, Obsessiveness no speech impediment: Asperger's**

### B. Treatment

Autism and Asperger's being psychological disorders, do not really have a direct treatment. Rather, their is therapy to help absolve some of the symptoms, and medication for some of the Co-Occurring Conditions.

- Therapy and behavioral interventions
- Medication for treatment of co-occurring conditions
  - Medicotian for ADD and OCD
- Antipsychotic medication for severe behavior issues
- Preemptive care improves development

***Keywords*—Therapy, Medication for ADD/OCD, Preemptive care**

### C. Causes

*1) Risk Factors:*

- Occurs 5 times more in males
- Genetic predisposition and environmental factors: (TF does this even mean)
- Immune dysfunction and neurological abnormalities
- Genetic and chromosomal conditions
- Child of an older couple == higher risk
- Cause unknown

*2) Genetic Theories:*

- Immune dysfunction and neurological abnormalities
- X linked, common in males
- Genetical cause more significant in Asperger's than Autism
- Autism may result from a combination of genetics and brain injury

*3) Neurological Theories:* Main neurological theories is related to abnormalities in teh limbic system. That is, the cerebellum, hippocampus, and amygdala. The limbic system is responsible for emotional and behavioral developemnt.

- Dysfunction in serotonergic system:
  - Higher levels of serotonin
- Neural Overconnectivity
- Cerebral Overgrowth
- Circuitry abnormalities in cerebellum, hippocampus, and limbic regions

- Loss of Purkinje cells in hippocampus, amygdala, and cerebellum
- Abnormal assembly of dendritic spines
  - Long and thin spines yielding:
- Altered calcium signaling
- Mirror neuron dysfunction
  - Neurons responsible for evolution of language, empothy and conversational skills

*4) Immunological Theories:*

- Decreased levels of apoptosis
- Metabolic Defects
- Autoimmune diseases
- Viral infections early childhood or prenatal development
- Excessive or improper vaccination OF an immunocompromised child
- Leaky gut
- Gut dysbiosis

*5) Prenatal Theories:*

- Early birth
- Exposure to pathogens prenatally
- Heavy metal toxicity

***Keywords—X linked, Higher levels of serotonin, Limbic system, Mirror neuron***

### *D. Connections to Other Diseases*

No connections really to other diseases.

## II. Left Neglect Disorder

***Abstract*—Left neglect, hemispatial neglect or Right Hemisphere Brain Damage is a perceptual disorder in which the person ingores or has difficulting perceiving anything on the left side. For example, they could not be able to use their left arm and leg as much, eat only food on the right side, or read words only on the right side of the page.**

***Keywords—Left Neglect, Hemispatial neglect, Right Hemisphere Brain Damage, Perceptual Disorder***

### *A. Background Information*

The brain has two hemispheres, the right and left.

- Left Hemisphere: Responsible for language function
- Right Hemisphere: Responsible for numerous actions including:
  - Memory
  - Attention
  - Reasoning

Damage to the Right Hemisphere will cause a disruption in most cognitive skills. Because of this, the person will not realize that they are even experiencing any of the problems that will arise or that they have brain damage. ***Keywords—Right Hemisphere, Left Hemisphere***

### *B. Physiology*

*1) Temporal-Parietal Junction:* A cause of Left Neglect can be attributed to a stroke. A stroke occurs when there is an infarction of the brain, causing those brain cells to die and that part of the brain to be damaged. Sometimes, the part of the brain that is afflicted by the stroke can be the temporal-parietal junction and posterior parietal cortex. The temporal-parietal junction of the brain is responsible for self-awareness of the person.

- Orient body in space
- Coordination of the body as the person wishes

Furthermore, the temporo junction can be responsible for emotional processing and moral judgments. ***Keywords—Temporal-Parietal Junction, Posterior parietal cortex,***

*2) Posterior Parietal Cortex:* Similarly, Left Neglect occurs when a person experience damage to the Posterior Parietal Cortex. The post parietal cortex is used for voluntary movement. It responds to a stimulus and uses visual displays and other factors to determine its position of the body and target in space. There are two parts of the posterior parietal coretex: area 5 and area 7. Area 5 responds tp any sensory stimuli while area 7 responds to any visusal stimuli. These two work in unison to form the posterior parietal cortex and perform any voluntary movements. ***Keywords—Voluntary moevement, Area 5, Area 7***

### *C. Causes*

There is a high probability of developing Left Neglect after a stroke. Damage as a result of the stroke to the temporo-parietal junction and the posterior parietal cortex cause Left Neglect. If these two structures are damaged, then the person loses coordination and voluntary movement. The combination of these two results in Left Neglect: the disorder in which the person ignores or does not process movement and objects in the left side. ***Keywords—Damage to the right hemisphere includes: stroke and traumatic incident***

### *D. Symptoms*

- ***Paying less attention to their left side***
- ***Ignoring their left arm and left leg***
- ***Only eating food from the right side of their plate***
- ***Reading only the right side of a page and often losing their place***
- ***Emotional distress***

### *E. Treatments*

***There is no clinical way to treat someone with Left Neglect. The best treatment is to offer support and slowly guide them to using their left side. Therapies are also effective with this, such as covering the right eye forcing the person to use the left eye. Keywords—Therapy***

### *F. Relationship to Other Diseases*

- ***Prescription Drugs***
  ***No relation; Left Neglect uses therapy for treatment***
- ***Depression and Multiple Personality Disorder***
  - ***Can have some effect because Left Neglect patients realize their disorder and are troubled within themselves***

- ***Bipolar disorder***
  - ***No relation because Left Neglect patients are still the same person***
- ***Autism and Asperger***
  - ***Some relation in the sense that both involve a disorder in the brain.***
  - ***Differs in that Asperger's is a condition in which the language aspect of the brain (left) is affected, Left Neglect affects the right.***

## III. Bipolar Disorder

***Abstract*—Disease in which the patient has two diferent mental states: mania and depressive. Patient fluctuates in between the two. Diagnosis is difficult and the cause is not known, but could be related to inherited genetic traits, physiological abnormalities in the brain, chemical imbalance with neurological transmitters abd initiated by environmental stressors.**

***Keywords—Mania, Depressive***

### A. Causes

***The direct cause of Bipolar Disorder is unknown, however, it can be related to inherited genetic traits, physiological differences in the brain, chemical imbalance with neurotransmitters and initiated by the environmental stressors.***

***Genetic causes:***

- ***Familial: Half the people with bipolar disorder have a family member with it***
- ***A person with one parent with it has a 15-25 percent chance of developing it***
- ***A person with a fraternal twin with it has a 25 percent chance of developing, same risks as if both parents have it***
- ***A person with an identical twin with bipolar disorder has eightfold chance***

***Neurochemcial Causes:***

- ***Dysfunction with neurotransmitters and their respective chemicals***
- ***Norepinephrine***
- ***Serotonin***
- ***May lie dormant and can be activated on its own or triggered by external factors***

***Environmental Factors:***

- ***Life event extremities***
- ***Altered health habits such as alcohol or drug abuse***
- ***Underdiagnosis in the past could explain the trend of BD at earlier ages***
- ***Substance abuse may not be a cause, but in can worsen the depressive state***

***Keywords—Genetical/Familial, Neurochemical, Environmental***

### B. Symptoms

***Bipolar disorder is generally characterized by two episodes:***

- ***Manic: Extreme Happiness/Giddiness***
  - ***Hyperactive Mannerisms***
- ***Depressive: Extreme Sadness (Depression)***
  - ***Slower mannerisms***

***The patient will fluctuate between these two episodes in violent mood swings. They can be in one mood for the whole day than switch to the other one spontaneously. It is dependent on the situation and the individual rather than anything concrete or genetically related.***

***Keywords—Manic, Depressive***

### C. Treatments

***Treatment options include:***

- ***Medications***
  - ***Mood Stabilizer (Lithium)***
  - ***Antispychotics (Olanzapine)***
  - ***Antidepressants (Fluoxetine)***
  - ***Antidepressant-antipsychotics***
  - ***Anti-anxieties***
- ***Psychotherapy: General term for treating mental health problems by talking with a psychiatrist***
- ***Electroconvulsive Therapy (ECT): Electrical currents passed through the brain to intentially cause a seizure. This wil alter the brain chemistry and thereby help revert certain mental illness symptoms.***

***Keywords—Mood Stabilizers, Antipsychotics, Andtidepressants, Antidepressants-antipsychotics, anti-anxieties, psychotherapy, Electroconvulsive Therapy (ECT)***

### D. Special Characteristics

***Chracterized by drastic mood swings from periods of extreme highs to extreme lows. This complicates treatment options. The nature of the disease makes diagnosis difficult:***

- ***Similar symptoms to other conditions***
- ***Difficulty with dealing with patients***

***Keywords—Mood Swings***

### E. Relation to Other Diseases

- ***Autism and Asperger***
  - ***Similar symptoms resulting in misdiagnosis***
- ***Depression and Multiple Personality Disorder***
  - ***Symptoms can coincide or be related***
- ***Effect of prescription and non prescription drugs an the brain***
  - ***Can cause or enhance similar symptoms***
- ***Left Neglect***
  - ***Both neurological, but very little similarity***

### F. Pathology

***Has genetic linkage. Regions of interest include mutations on the chromosomes:***

- ***4p16***
- ***12q23-q24***
- ***16p13***
- ***21q22***
- ***Xq24-q26***

***Keywords—Chromosomal Mutation***

### G. Pathophysiology

***There is imbalance in neurotransmitters in the brain that lead to mood alterations. Furthermore, the prefrontal cortex (responsible for problem solving and decision making) in adults tends to be smaller and function less.***

- ***Area matures during adolescence, which would explain appearance of disorder around a person's teen years***

***Keywords—Mood Disorder, prefrontal cortex, neurotransmitters***

## IV.

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