

Round 24: OCD & related Disorders

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Obsessive-Compulsive Disorder

- Obsessions
 - Recurrent, persistent ideas, thoughts, images, or impulses that are intrusive, senseless, excessive, or absurd
 - Themes frequently include contamination, aggression, harm avoidance, distasteful or excessive sexual ideas, religious concerns, orderliness, and perfectionism

Frequency of Obsessional Themes		
	Percent of Patients	
Theme	Study A*	Study B**
Contamination	50	38
Pathologic Doubt***	42	--
Somatic	33	7
Symmetry	32	10
Aggressive	31	24
Sexual	24	6
Multiple Obsessions	72	--
Religious	--	6
Hoarding	--	5
Unacceptable Urges	--	4

Notes:
 * Data were derived from a study conducted by Rasmussen and Eisen in 1992. N=560 Patients meeting DSM-III or DSM-III-R criteria.
 ** Data were derived from a study conducted by Foa and Kozak in 1995. N=425 patients meeting DSM-IV criteria.
 *** Fear or doubt regarding responsibility for a terrible event.

Obsessive-Compulsive Disorder

- Compulsions
 - Repetitive, seemingly purposeful behaviors or mental acts performed according to rigid rules
 - Acts are designed to prevent a future feared event but are not realistically connected to the event, or are excessive
 - Carry a sense of subjective compulsion and bring no pleasure

Frequency of Compulsive Behaviors		
	Percent of Patients	
Compulsions	Study A*	Study B**
Checking	61	28
Cleaning-washing	50	27
Counting	36	2
Need to Ask/Confess	34	--
Symmetry/Exactness	28	--
Multiple compulsions	58	--
Ordering	--	6
Hoarding	18	4
Repeating	--	11
Mental Rituals	--	11

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Obsessive-Compulsive Disorder

- Effects 1-2% of the population
- Prevalence similar for men and women
- Onset usually occurs during adolescence or early adulthood
- Onset earlier in males than females
- Chronic, with periods of waxing and waning of symptoms

- Person recognizes that obsessions/compulsions are excessive or unreasonable
- Must be severe/time consuming taking up more than 1 hour a day
- Cause marked distress or interfere with normal routine, occupational functioning, social activities, or relationships



Related & Co-Morbid Disorders

- Trichotillomania
 - Hair pulling disorder, usually triggered by stress
- Skin picking disorder
 - Most commonly the face
- Hoarding disorder
 - Behavioral pattern characterized by excessive acquisition of and an inability or unwillingness to discard large quantities of objects that cover the living areas of the home and cause significant distress or impairment
 - Affects 2% to 5% of adults
 - Onset in childhood and gets worse with increasing age
- Body Dysmorphic Disorder
 - Obsessive idea that some aspect of one's own body or appearance is severely flawed and therefore warrants exceptional measures to hide or fix it
 - Can lead to extensive plastic surgeries
 - Affects from 0.7% to 2.4% of the population
 - Shares features of OCD but involves more depression and social avoidance

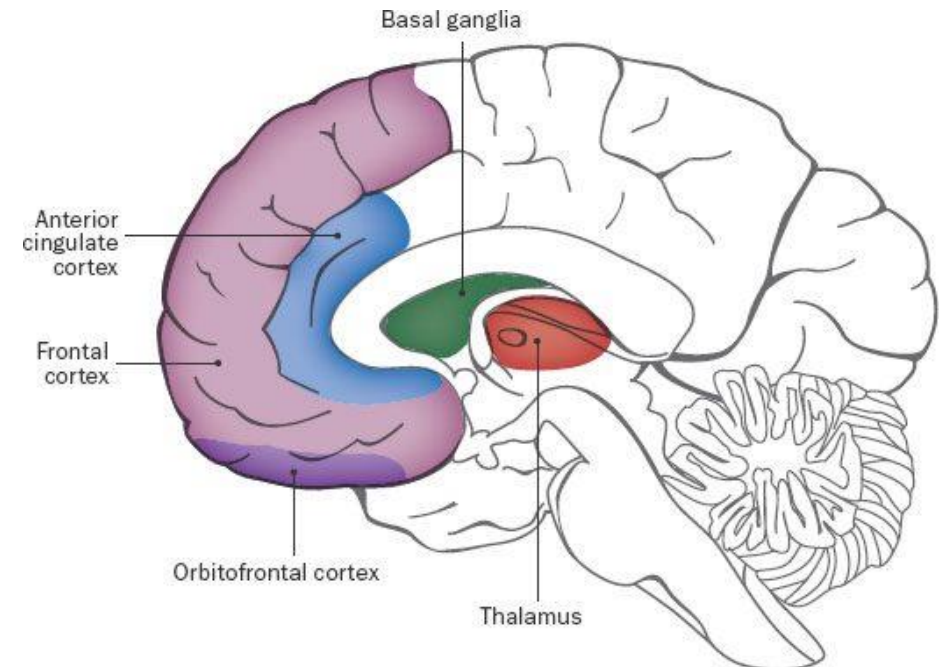
Obsessive-Compulsive Disorder

- Associated Cognitive Deficits
 - Spatial memory
 - Verbal memory
 - Verbal fluency
 - Executive function
 - Processing speed



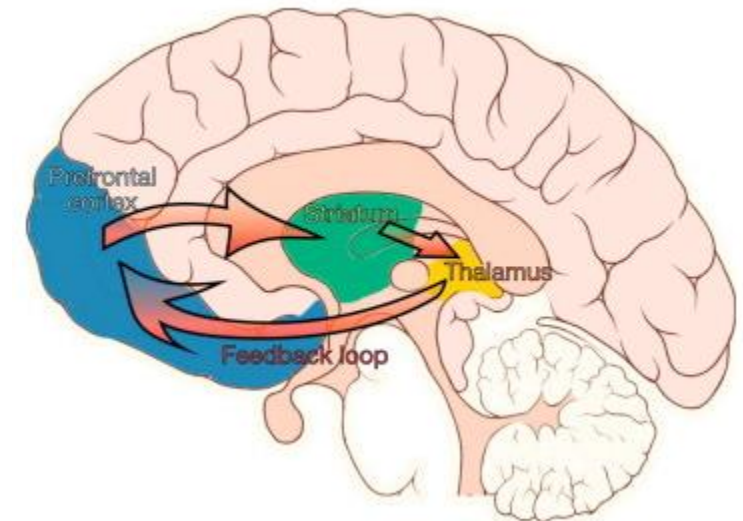
Obsessive-Compulsive Disorder

- **Orbital-Frontal Cortex**
 - Reward processing
 - Evaluates whether a task was performed correctly or incorrectly
 - Overactive -> pts to believe they did something wrong and that the task needs to be performed again
 - Reduced grey matter (inhibition & attentional control)
- **Cingulate Gyrus**
 - Motivation & behavioral responses
 - Receives input from limbic system (Reward/Learning)
 - Orbits-frontal Cortex says, “you did something wrong,”
Cingulate Gyrus -> feel discomfort or anxiety until you fix it
 - Overactive
- **Caudate Nucleus**
 - Procedural learning, associative learning, inhibitory control of actions
 - Helps set shifting, exert control to override compulsions or intrusive thoughts
 - Underactive



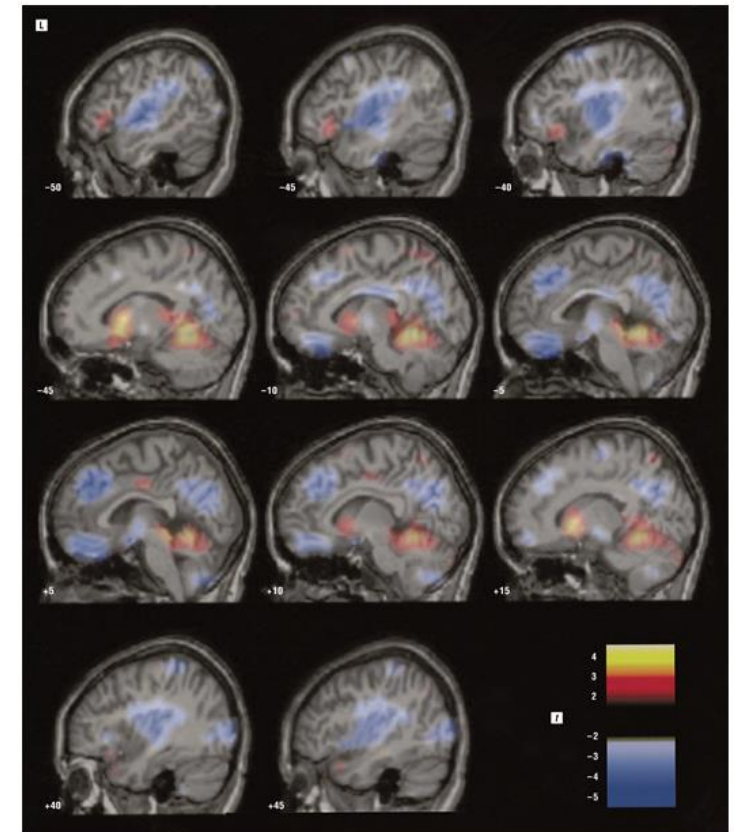
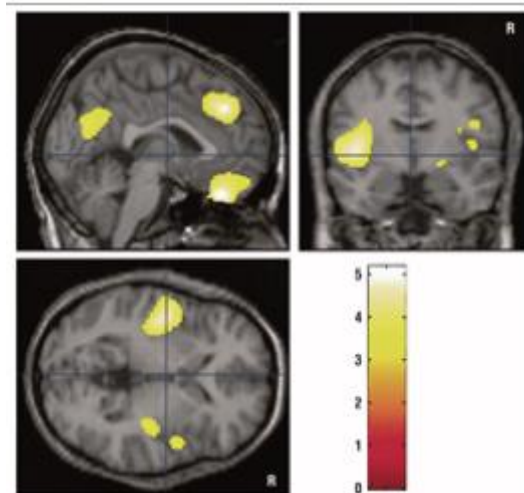
Obsessive-Compulsive Disorder

- Dysfunction in the loop
 - Orbito-frontal cortex to the cingulate gyrus, striatum (caudate nucleus & putamen), globus pallidus, and thalamus
 - Hyperactive relative to controls
 - Increased activity in the head of the caudate -> inhibits globus pallidus, which usually dampens thalamic activity
 - Increased thalamic activity increases activity in the orbitofrontal cortex -> cingulate gyrus
 - Cleaning & checking behaviors are hardwired in the thalamus
 - Become increasingly active with symptom provocation
 - No longer show hyperactivity after successful treatment



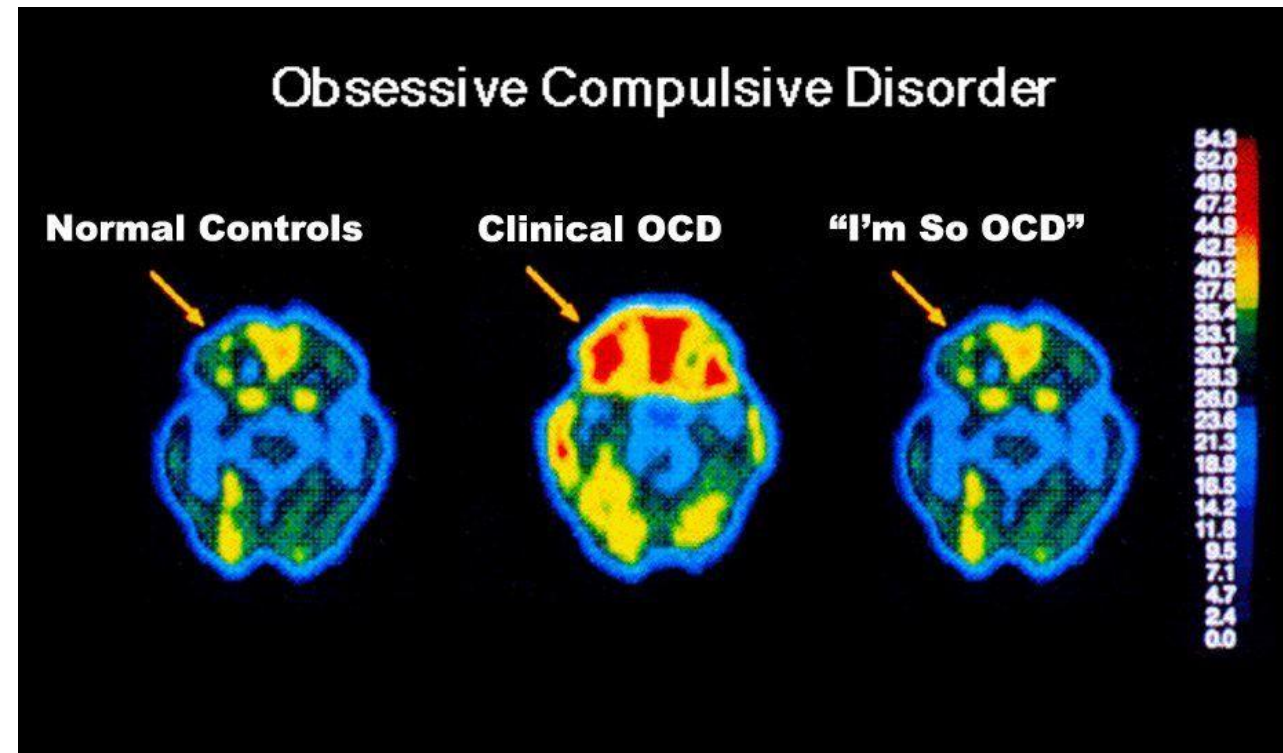
Obsessive-Compulsive Disorder

- Reduced grey matter volume in the medial frontal gyrus, the medial orbitofrontal cortex, and the left insulo-opercular
- Increased in gray matter in ventral putamen and anterior cerebellum
- Pts with prominent aggressive obsessions and checking compulsions reduced amygdala volume in the right hemisphere



Obsessive-Compulsive Disorder

- Likely as much of an impulse control (executive function) problem as it is an anxiety disorder
- Dysfunctions & associated brain regions of OCD
 - Error detection → ACC
 - Memories of behavioral sequences → PFC/Hippocampus
 - Inhibitory control
 - Globus pallidus (decreased white matter)
 - Angular gyrus (decreased grey matter)
 - Compulsive checking behavior → Superior Temporal Gyrus
 - Threshold for activation of motor/behavioral patterns → Basal Ganglia

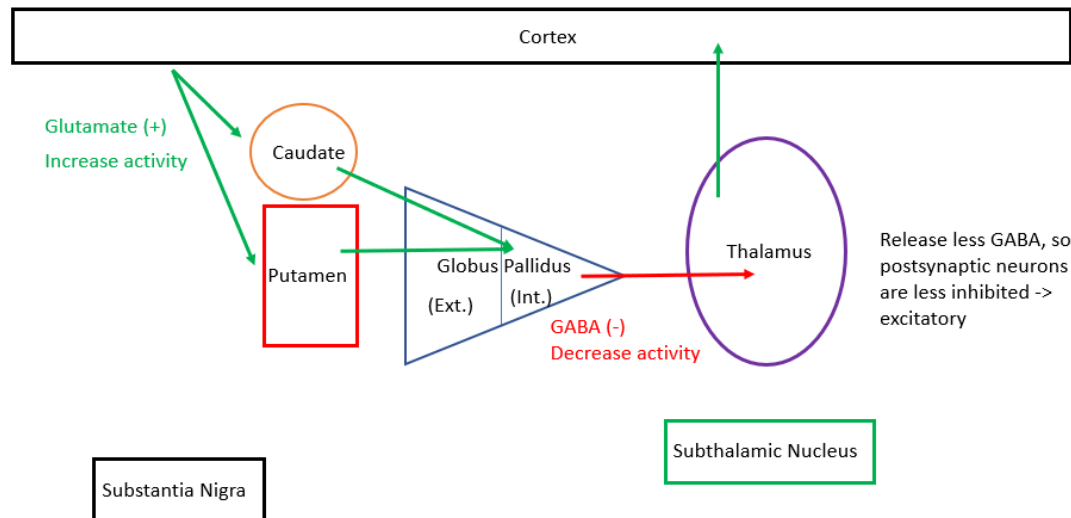


Obsessive-Compulsive Disorder

- Basal Ganglia -> Direct & Indirect pathways
 - Direct pathway -> overactive causes the positive feedback loop to get stuck -> obsessive thoughts get trapped
 - Unclear why pts get specific obsessions instead of generalized obsessive behavior

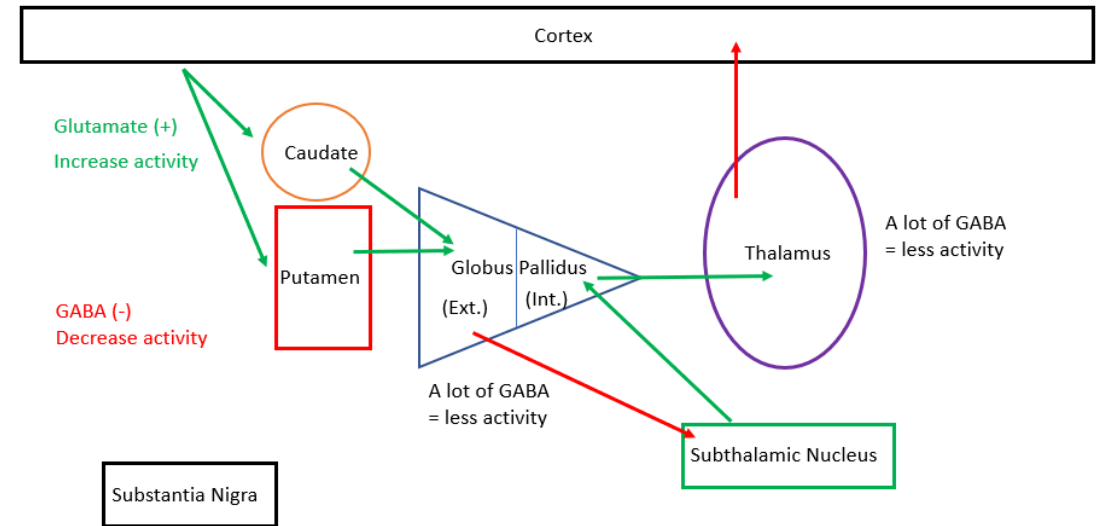
The Direct Pathway

Increase Motor Activity



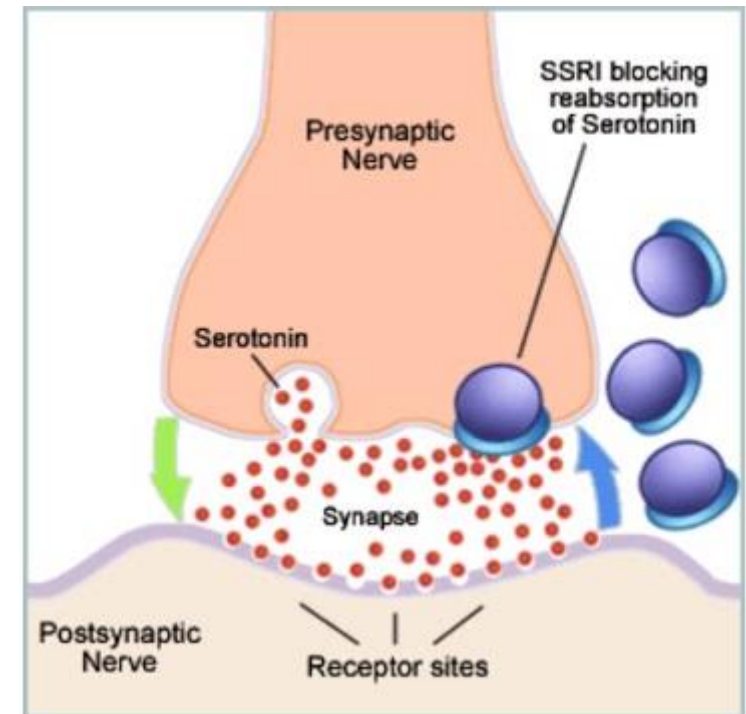
The Indirect Pathway

Decrease Unwanted Motor Activity



Obsessive-Compulsive Disorder

- Pharmacological Treatments
 - Serotonin reuptake inhibitor
 - Clomipramine
 - Citalopram
 - Fluoxetine
 - Sertraline
 - Paroxetine
- Block serotonin reuptake increases the amount of serotonin in the synapse
- 40-60% of patients will respond to medications

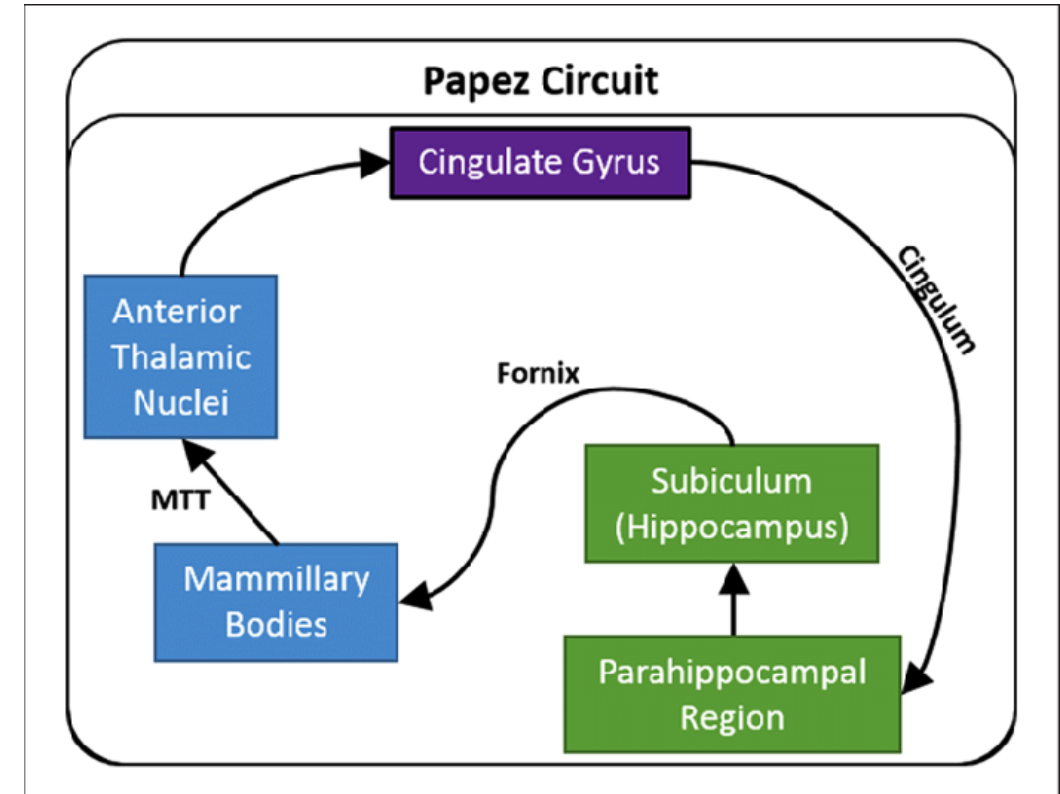


Obsessive-Compulsive Disorder

- Exposure and Response Prevention Psychotherapy
 - Only form found effective in multiple controlled trials of OCD
 - Exposure to feared situations or thoughts and the prevention of rituals
 - Mostly works with pts with cleaning or checking rituals
 - 50% benefit from treatment
 - 65-75% are improved or much improved 6 months – 3 years after treatment
 - 25% show no lasting benefit
 - Poor response to behavior therapy
 - Severe depression – patient cannot habituate their anxiety
 - Hypomania or mania – impair compliance
 - Severe family problems – impair compliance
 - Schizotypal personality disorder

Obsessive-Compulsive Disorder

- Surgical Treatments
 - Cingulotomy
 - Symptomatic improvement believed to interrupt loop at the anterior cingulate
 - Disrupting frontal cortical input into Papez circuit & limbic system
 - Believed to mediate anxiety and other emotional symptoms
 - Anterior capsulotomy (lesion within the anterior limb of the internal capsule and subcaudate)
 - Interrupt fronto-thalamic fibers
 - May mediate the obsessive & compulsive components of OCD



Obsessive-Compulsive Disorder

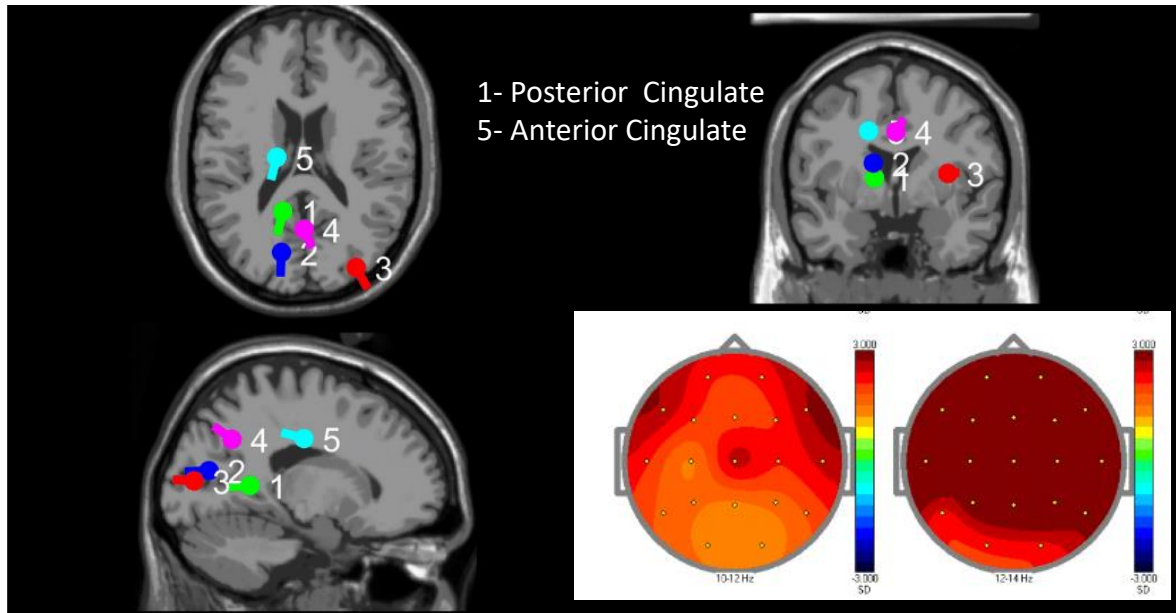
- Neurofeedback
 - Two sub-types
 - Frontal Alpha dominant pattern
 - 9-14 Hz
 - Train alpha down over posterior cingulate
 - Theta dominant pattern
 - 4-8 Hz
 - Resistant to medication
 - Standard protocol
 - Train Theta down, Alpha 9-11 Hz up, Cz SMR



OCD Case Study 1

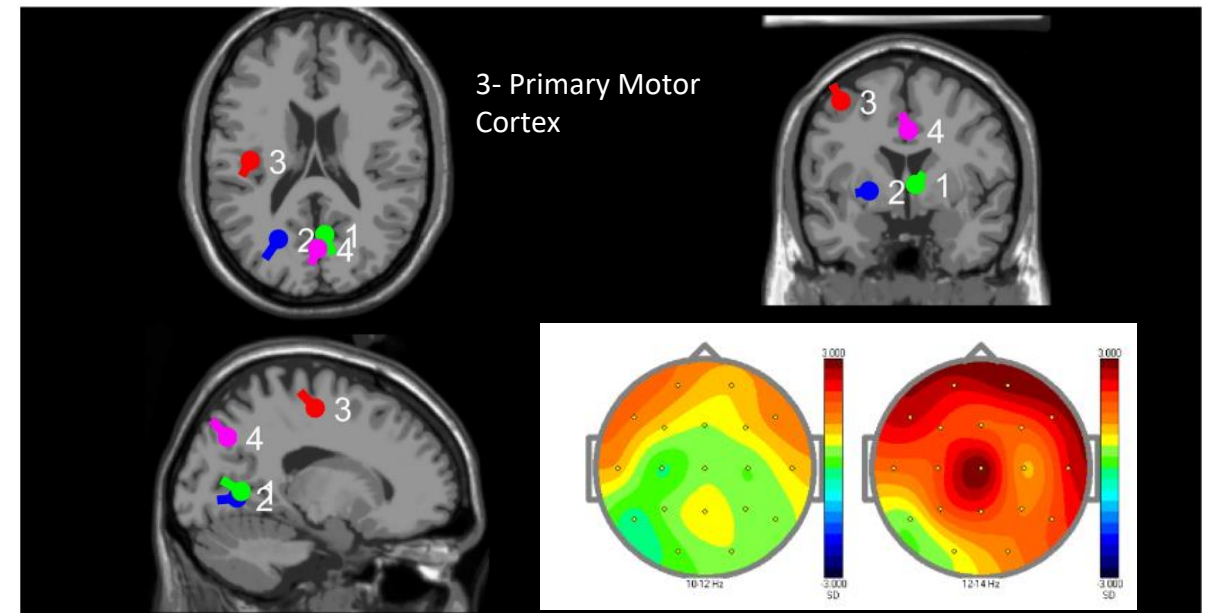
- 17 year old female
- Diagnoses
 - OCD
 - Anxiety
 - Bulimia

Eyes Closed



Alpha

Eyes Open

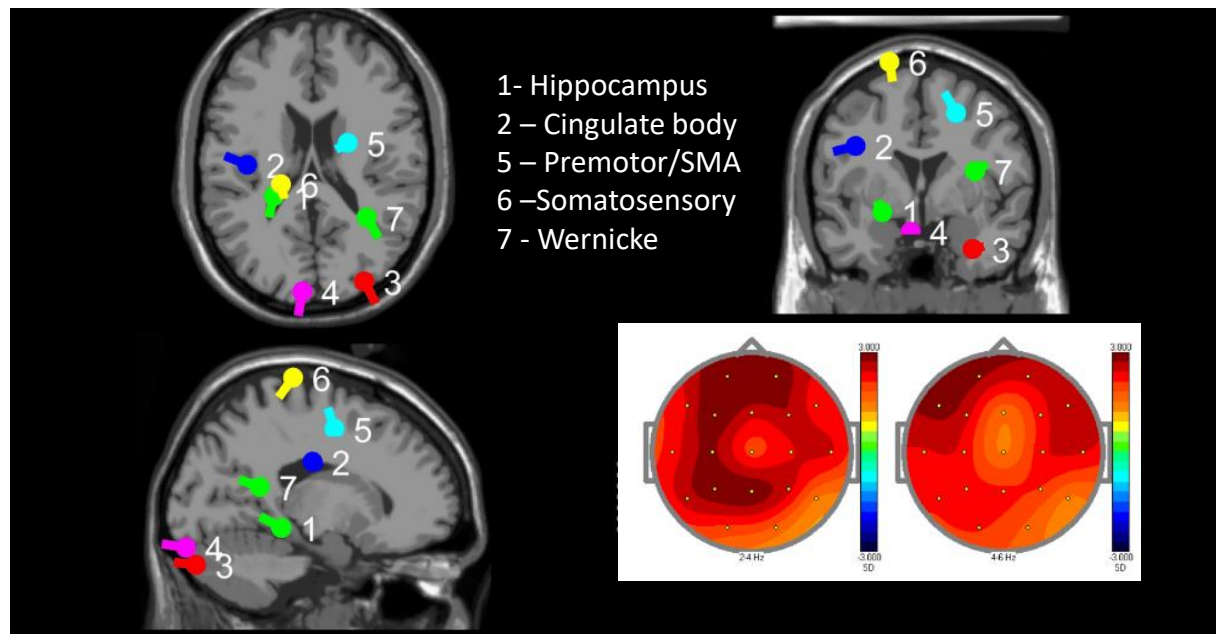


Alpha

OCD Case Study 2

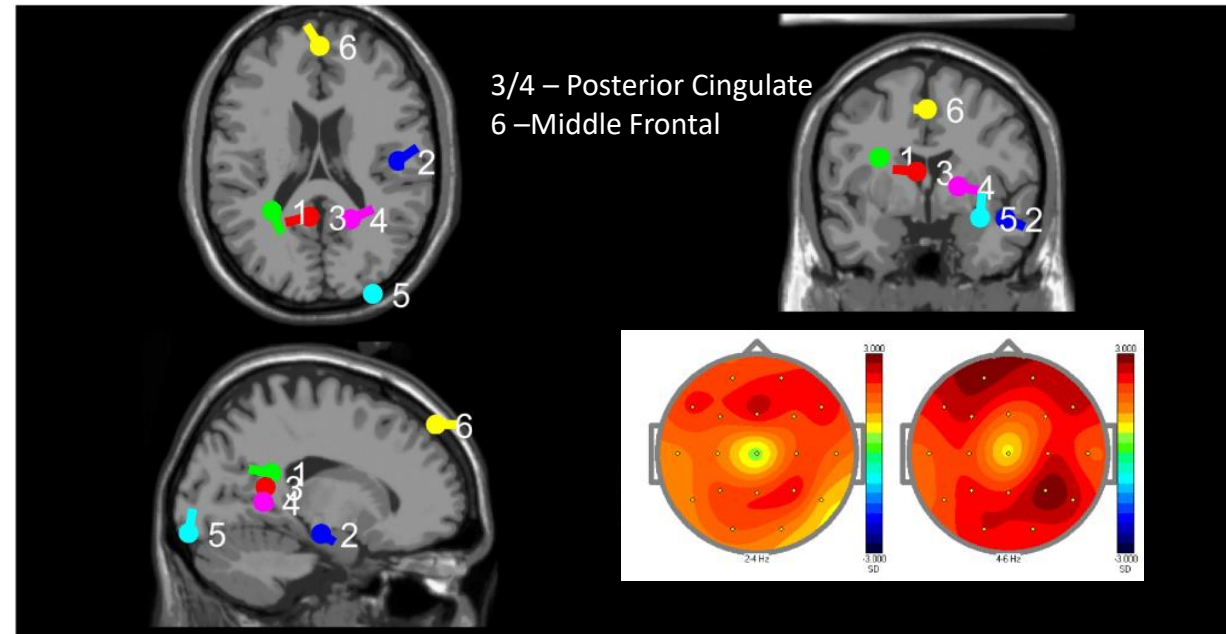
- 18 year old female
- Diagnoses/Symptoms
 - Anxiety, Autism, OCD, intrusive thoughts, depression, focus, sensory issues, social issues, reading/speech
 - Developmental trauma, addiction tendencies

Eyes Closed



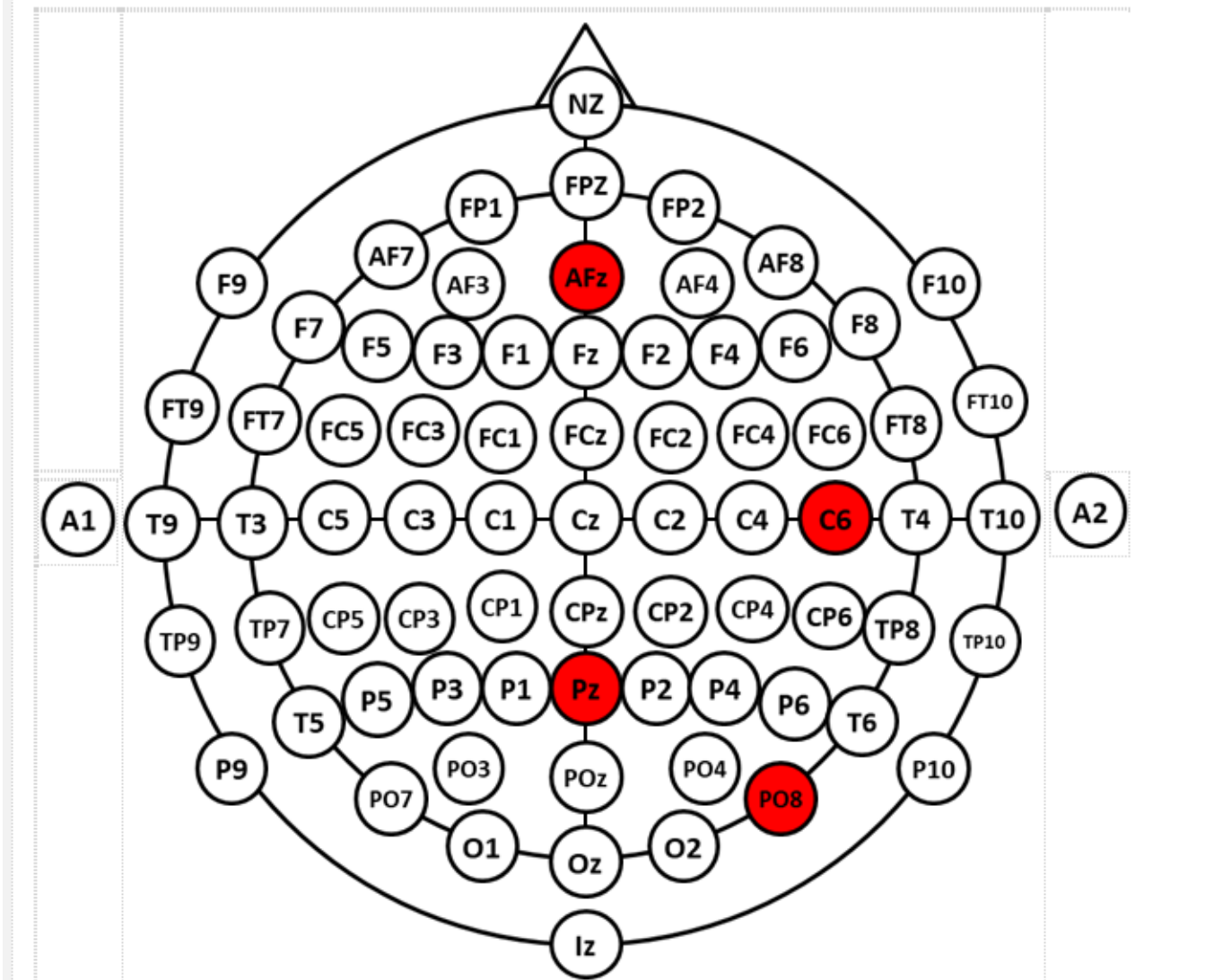
Theta

Eyes Open



Theta

Inhibit	2-7	
Inhibit	12-20	
Inhibit	20-30	B15
Reward	1-20	



Related Disorders

PANDAS - Pediatric Autoimmune Neuropsychiatric disorders Associated with Streptococcal infections

- Prevalence – 1 in 200 children
- Discovered in the 1990s
- Group of children sudden onset of OCD symptoms (e.g., vocal & motor tics, counting, excessive hand washing, other unusual rituals) after having an infection of beta-hemolytic Streptococcus
- Causes auto-immune inflammatory reactions in neural tissue, specifically in the basal ganglia
- More common in boys than girls and in children of mothers with auto-immune diseases

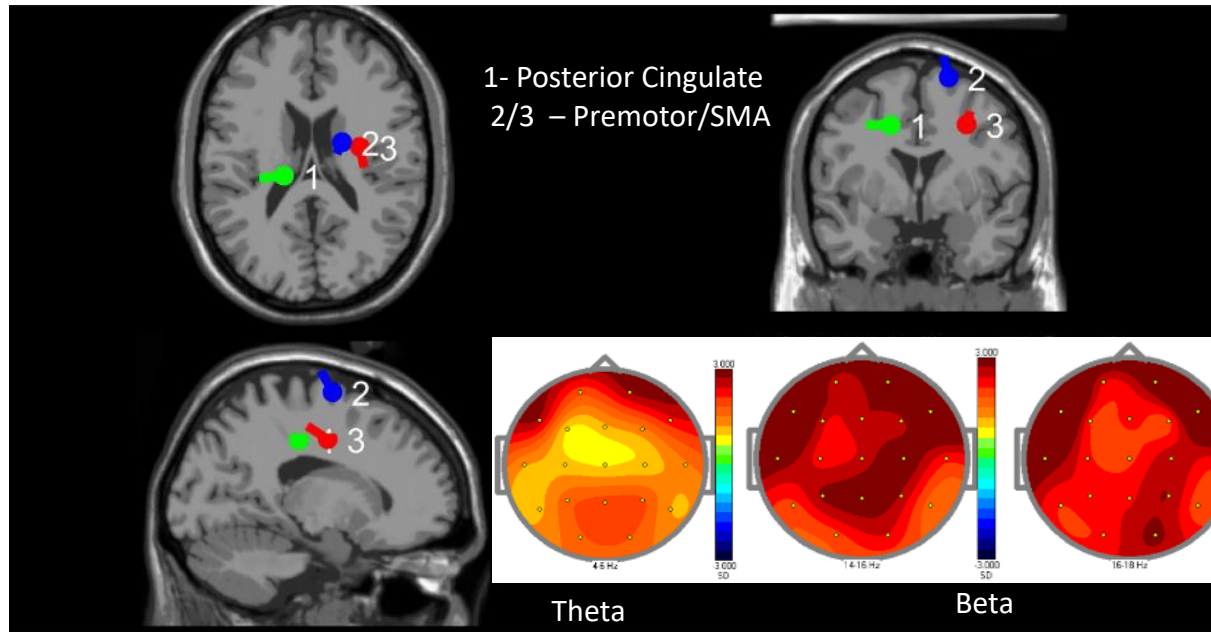
- Treatments
 - Antibiotics
 - Anti-inflammatories
 - SSRIs
 - Intravenous immunoglobulin
 - Plasmapheresis - plasma exchange

PANDAS/OCD Case Study

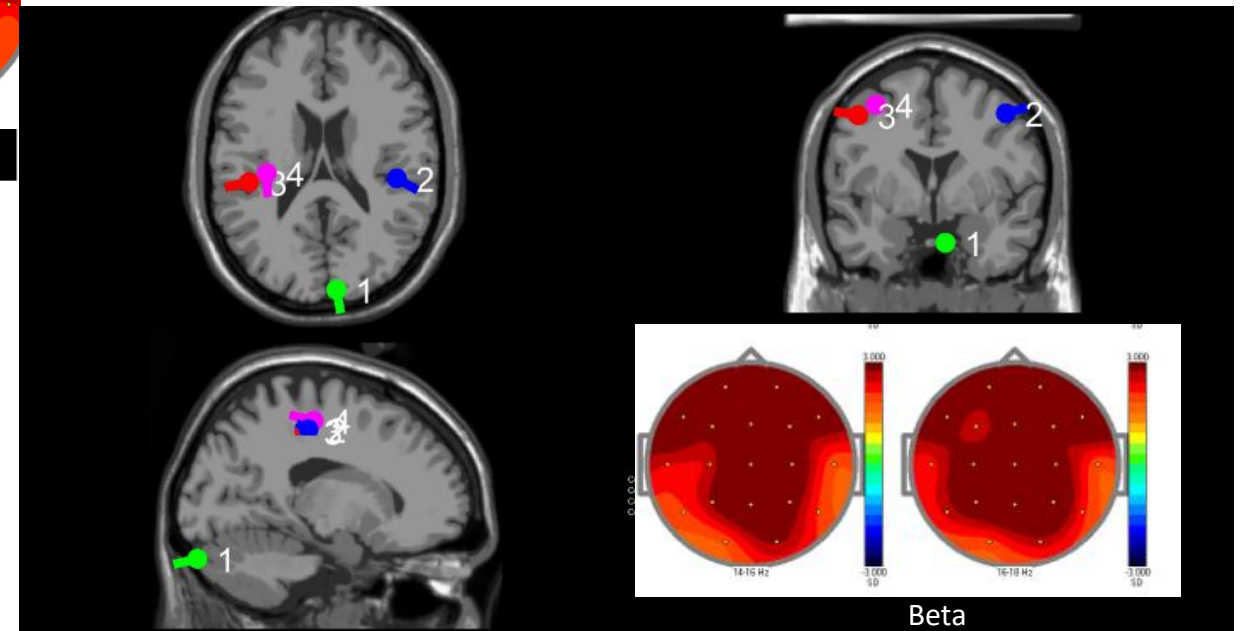
- 22 year old male
- Symptoms
 - Moral and contamination aspects of OCD for 2.5 years.
 - Scrupulosity - Pathological guilt/anxiety about moral or religious issues
 - Obsession with numbers, especially the number “6”
 - Contamination fears
 - Restrictive eating

PANDAS/OCD Case Study

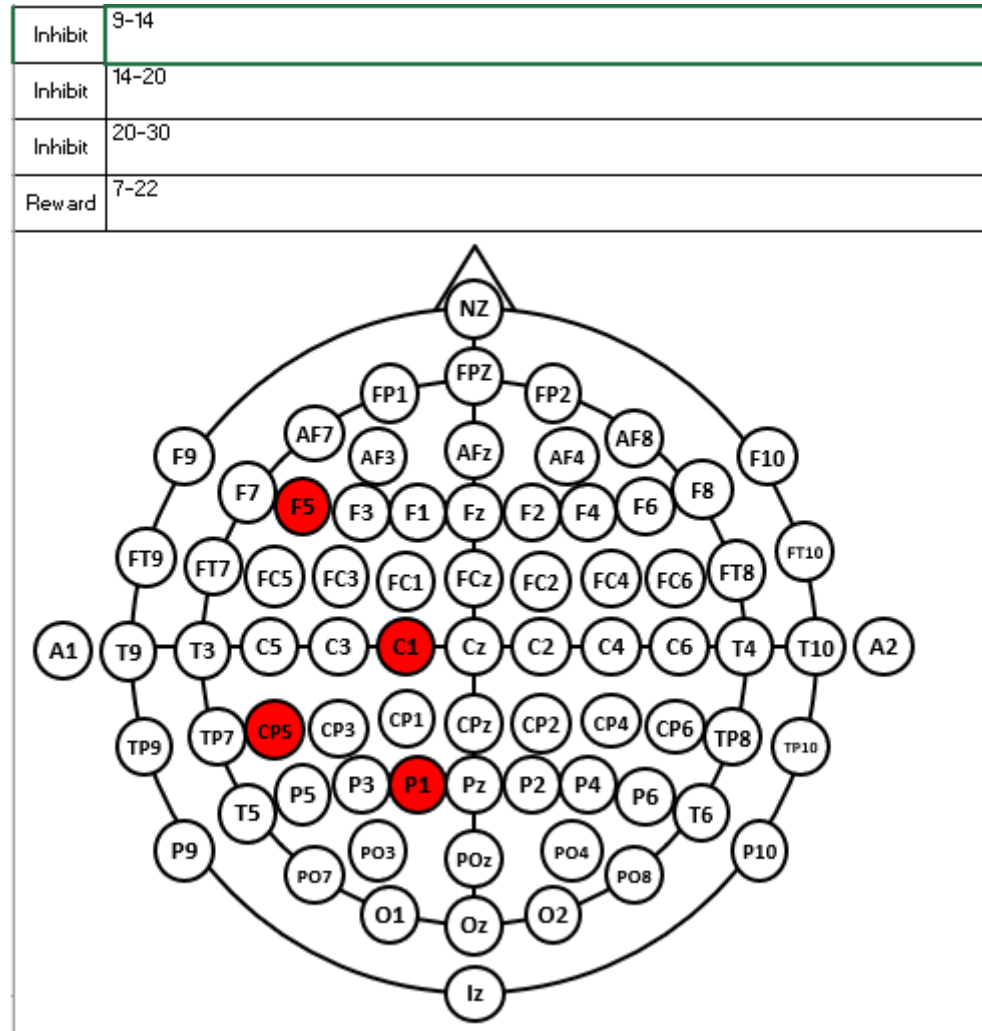
Eyes Closed



Eyes Open



PANDAS/OCD Case Study



Tourette's Syndrome

- Some forms of OCD may be genetically linked to Tourette's
- Tic-related OCD presents with counting, aggressive thoughts, symmetry, and touching compulsions
- Motor tics
 - Blinking
 - Coughing
 - Throat clearing
 - Sniffing
 - Facial movements
- Phonic tics
 - Coprolalia – utterance of obscene words or socially inappropriate, derogatory remarks

Tourette's Syndrome

- Heritable
 - 10-100 times more likely among family members
 - 50-77% of identical twins only 10-23% of fraternal twins
- Risk factors
 - Advanced paternal age
 - Forceps delivery
 - Stress or severe nausea during pregnancy
 - Use of tobacco, caffeine, alcohol, or cannabis during pregnancy
 - Premature birth, low birth weight
 - PANDAS
- Prevalence
 - 1% of school-aged children
 - Typical onset is between 5-7 years old
 - Severity reaches a peak around 8-12 years old
 - Severity of tics decrease through adolescence
- Causes & Treatment
 - Combination of genetic & environmental factors
 - Dysfunction in neural circuits involving basal ganglia
 - Decreases in the indirect pathway
 - Antipsychotic drugs
 - Inhibit dopamine bc excess dopamine in basal ganglia may contribute to symptoms
 - Neurofeedback
 - Cz SMR training, theta inhibit

Thank You