Tourette Syndrome:
What Makes ‘em Tic

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Discovery

- Discovered by a french neurologist in 1885
- Autosomal dominant neurological disorder
- Characterized by motor and vocal tics
- Affects 1 in 100 individuals in some way
- 3 in 4 affected are male

Gilles de la Tourette (1857-1904)
Diagnosis: DSM III

- Onset between ages 2 and 15
- Recurrent, involuntary, repetative, rapid, purposeless motor movements affecting multiple muscle groups
- Vocal tics
- Suppress movement voluntarily for minutes to hours
- Variation in the intensity of symptoms over weeks and months
Symptoms:

- Echolalia—mirror speech of others
- Palilalia—repeat one's own words
- Echopraxia—mimicking of other people’s actions
- Coprolalia—involuntary utterances of swear words
The Most Common Motor Tics

- eyeblinking
- shoulder shrugging
- hair out of eyes tic
- mouth opening
- arm extending
- facial grimacing
- licking lips
- rolling eyes
- squinting
- hopping-skipping
- opening eyes

Percentage
The Most Common Vocal Tics

- Throat clearing
- Grunting
- Yelling-screaming
- Sniffing
- Barking
- Snorting
- Coughing
- Spitting
- Squeaking
- Humming

Percentage
Grades of Severity

- Grade 1: 15% → Mild: meet criteria for diagnosis, but no medical treatment
  age of onset: 7.36 years

- Grade 2: 60% → Moderate: requires treatment
  age of onset: 6.77 years

- Grade 3: 25% → Severe: significant interference with individuals life
  age of onset: 5.81 years
Related disorders

- OCD—Cannot control compulsions
- ADHD—Hyperactivity
- Lesch-Nyhan Syndrome—Self mutilation
- Parkinson's Disease—tremors
- panic/phobic/schizoid/sleep/reading disorders
- alcoholism in men
- overeating in women
Possible Causes: Cholinergic deficiency

Treatment medications increase affinity for acetylcholine to bind to receptors
Possible Causes:
Tryptophan Oxygenase mutation

Tryptophan Oxygenase

Tryptophan → Serotonin

Treatment: Selective Serotonin reuptake inhibitors
How SSRIs and MAOIs work

Neurotransmitters:

- norepinepherine
- serotonin
Possible Causes: Dopamine pathway

• Dopamine is a precursor to the neurotransmitter norepinephrine
• Increase in Dopamine causes disinhibition of the limbic system

![Chemical structures of dopamine and norepinephrine]

Dopamine

\[
\text{Dopamine} \xrightarrow{\text{beta-hydroxylase}} \text{norepinephrine}
\]

Treatment medications block dopamine ion channels
The Limbic System

- **Info output**: senses, sight, smell, hearing, touching, taste, pain, temperature, sexual feelings
- **Data**: memory
- **Response**: what to do
- **Action**: motor system, endocrine system, bodily functions
Environmental onset factors

- **Increase tics**: anxiety, emotional trauma, social gatherings

- **Decrease symptoms**: visit to doctor’s office, relaxed reading, talking to friends
Treatments

**Tics:** **Neuroleptics:** Haldol
**alpha-adrenergic meds:** Tenex, Catepres

**OCD:** **SSRI:** Prozac, Luvox, Paxil, Zoloft

**ADHD:** **Ritalin**
**tricyclins:** Anafranil
improve attention, impulsivity, hyperactivity and concentration
References:

12. Pharmacognosy and How Drugs Work Class Notes; Dr. Scott Hartsel 2001.