



# **ECHO IDAHO:** **Behavioral Health in Primary Care**

**Disruptive Mood Dysregulation Disorder**

**09/04/2024**

**Chris Streeter, MD**

**Medical Director, St. Luke's Children's Center for Neurobehavioral Medicine**

None of the planners or presenters for this educational activity have relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

# Disclosures

- None

# Learning Objectives

- Understand what Disruptive Mood Dysregulation Disorder (DMDD) is
- Understand the differences between it, MDD, and bipolar disorder
- Understand and be able to apply a basic framework for treatment (psychotherapy and medications)

# Disruptive Mood Dysregulation Disorder

- Since around 1998-2000 there has been a big debate about bipolar disorder in children, how it is conceptualized and diagnosed. Irritability was the middle ground symptom that most of the attention.
- It is a named symptom of **ODD** (easily annoyed/spiteful/vindictive), generalized anxiety (chronic worry), PTSD, depression (in youth), and bipolar illness among others. Irritability was and is *still* being debated as being over or under associated with bipolar.
- Biederman, et.al., were very strong advocates of including irritability as a defining characteristic of childhood bipolar disorder (though in 2011 was found by Harvard to have received \$1.6 million from pharmaceutical companies when only reporting \$200,000).

Carlson, GA. Disruptive mood dysregulation disorder; where did it come from and where is it going. *J Child Adolesc Psychopharmacol.* 2016;26:90-93



# Disruptive Mood Dysregulation Disorder



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# Disruptive Mood Dysregulation Disorder

- Liebenluft, et.al. were very strong advocates of DMDD being included in the DSM5.
- It was intended to capture children who were too irritable to have “just” ODD while also to avoid over-diagnosing bipolar disorder
- This editorial reviewing 10 *J Child and Adolescent Psychopharmacology* articles confirms children with non-episodic, manic like symptoms are “quite impaired and difficult to treat”

Carlson, GA. Disruptive mood dysregulation disorder; where did it come from and where is it going. *J Child Adolesc Psychopharmacol.* 2016;26:90-93



# DMDD Criteria

- Severe temper outbursts at least three times a week
- Irritable, or angry mood almost every day in between outbursts
- Reaction is bigger than expected for developmental level
- Child must be at least six years old
- Symptoms begin before age ten
- Symptoms are present for at least a year
- Child has trouble functioning in **more than one** place (e.g., home, school, and/or with friends)
- Cannot coexist with ODD, intermittent explosive disorder, or bipolar disorder (but can with depression, anxiety, ADHD)
  - AACAP Facts for Families [[Disruptive Mood Dysregulation Disorder \(DMDD\)](https://www.aacap.org/facts_for_families/entry.aspx?id=10) ([aacap.org](https://www.aacap.org))]

# DMDD <6 is a NO NO





# DMDD: Neural Correlates

- 3 groups of ~25 kids (DMDD, bipolar, control)
- Ambiguous faces with ranged emotion from minimal to significant in 3 domains: fear, anger, happy



Image: [nimh.nih.gov/images/news-items/BrotmanHappyAngryFearful\\_152913\\_1.jpg](http://nimh.nih.gov/images/news-items/BrotmanHappyAngryFearful_152913_1.jpg) (via NAMI website)

Wiggins JL, Brotman MA, Adleman NE, et al. Neural correlates of irritability in disruptive mood dysregulation and bipolar disorders. *Am J Psychiatry*. 2016;173:722-730

# DMDD: Neural Correlat

## EMOTIONS OF VADER

- Youths with bipolar or DMDD had similar levels of reported irritability but **did** differ in neural activity. In fMRI amygdala analyses, the DMDD group were cranky across all intensities of all facial emotions but bipolar youth got cranky with *only* the fearful faces.
- Irritable youth tend to interpret ambiguous faces as irritable (therefore would treatment to retrain this recognition help with irritability?)
- Studies ongoing for Interpretation Bias Training (IBT)



ANGRY



HAPPY



SAD



SLEEPY



CONFUSED



EXCITED



STRESSED



MAD



CALM

Wiggins JL, Brotman MA, Adleman NE, et al. Neural correlates of irritability in disruptive mood dysregulation and bipolar disorders. *Am J Psychiatry*. 2016;173:722-730

# DMDD: A Translational Model

- Aberrant reward/threat processing
- Longitudinal studies are in fact the best at differentiating between bipolar and DMDD in youth.
- Chronic irritability is a risk factor for depression and anxiety, and suicidality, but does not increase risk for manic episodes

Brotman, MA, Kircanski, K, Stringaris A, Pine DS, Leibenluft E. Irritability in youths: a translational model. *Am J Psychiatry* 2017; 174:520-532

# DMDD: A Translational Model

- 3% is the most common rate of severe irritability in youth
- 2.6% is about the rate of bipolar spectrum disorders (symptoms including decreased NEED for sleep, hypersexuality, grandiosity) in the context of elevated, euphoric, expansive, or (yes) irritable mood

Brotman, MA, Kircanski, K, Stringaris A, Pine DS, Leibenluft E. Irritability in youths: a translational model. *Am J Psychiatry* 2017; 174:520-532



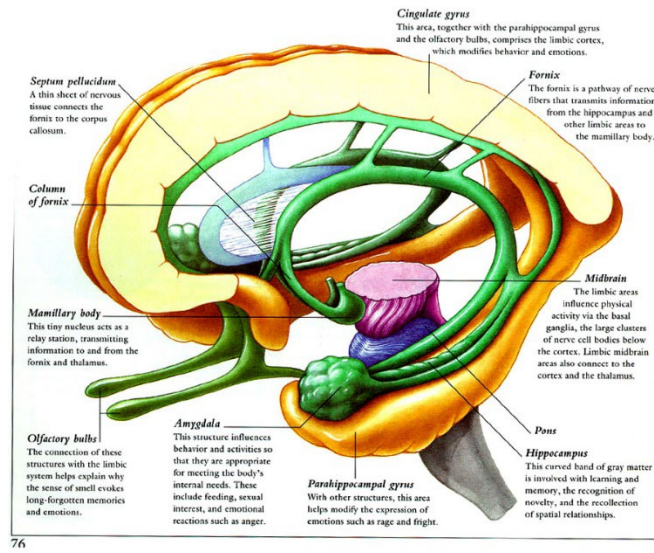
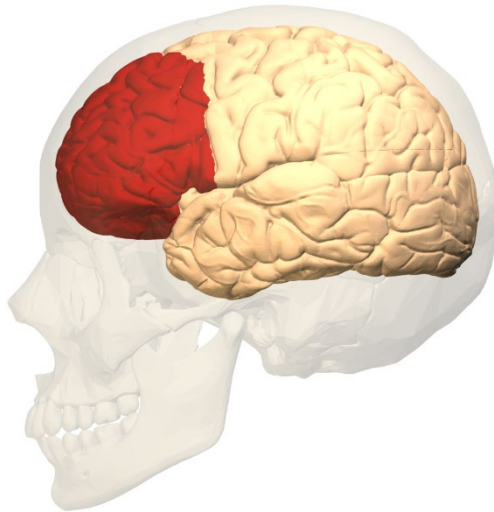
# DMDD: A Translational Model Aberrant Reward Processing

- **Frustrative nonreward** (when you expect a cookie and get nothing, or even worse, broccoli)
- Evolutionarily this correlates to a motivating irritation that then compels the organism to get the cookie
- Circuitry is mapped to the prefrontal and anterior cingulate cortex, striatum, and amygdala.



Brotman, MA, Kircanski, K, Stringaris A, Pine DS, Leibenluft E. Irritability in youths: a translational model. *Am J Psychiatry* 2017; 174:520-532

# Circuitry Involved in Reward



Amygdala

Cingulate Cortex

Striatum

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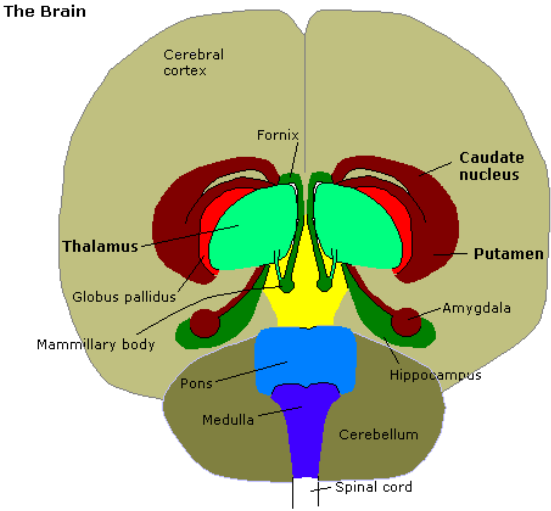
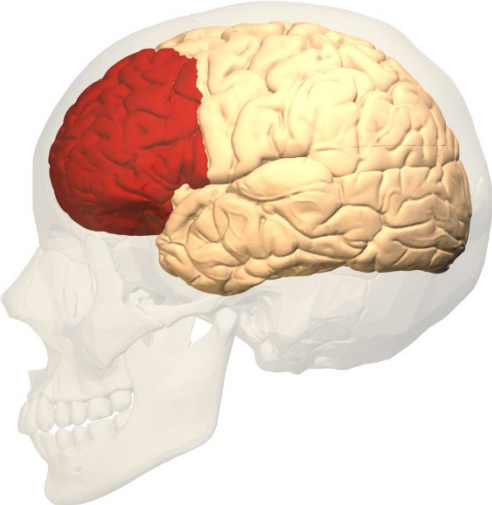
# DMDD: A Translational Model Aberrant Threat Processing

- Aberrant frequent approach toward threat
- Circuitry in the prefrontal cortex, amygdala, hypothalamus, and periaqueductal gray.
- Threat Level
  - Low (increased vigilance)
  - Moderate (freeze)
  - High (fight/flee) where imminent inescapable threats evoke anger or rage to actively engage the threat to neutralize it



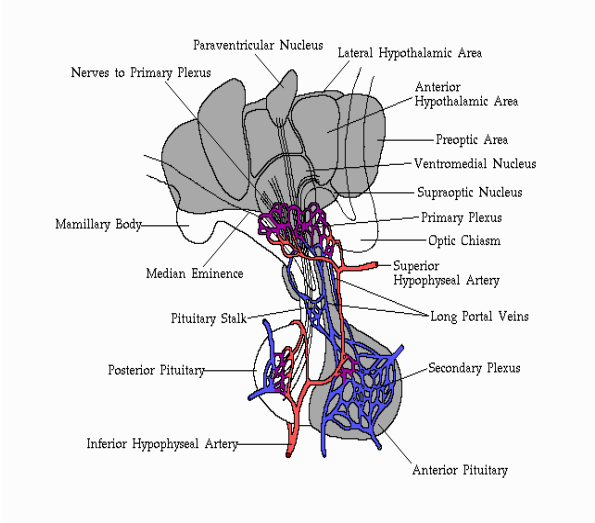
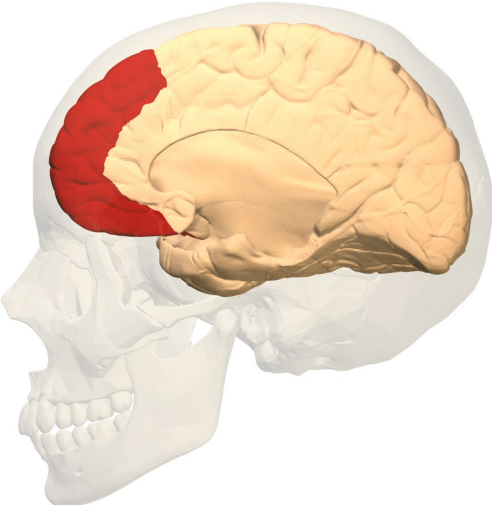
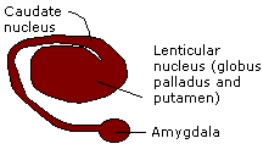
Brotman, MA, Kircanski, K, Stringaris A, Pine DS, Leibenluft E. Irritability in youths: a translational model. *Am J Psychiatry* 2017; 174:520-532

# Circuitry Involved in Threat

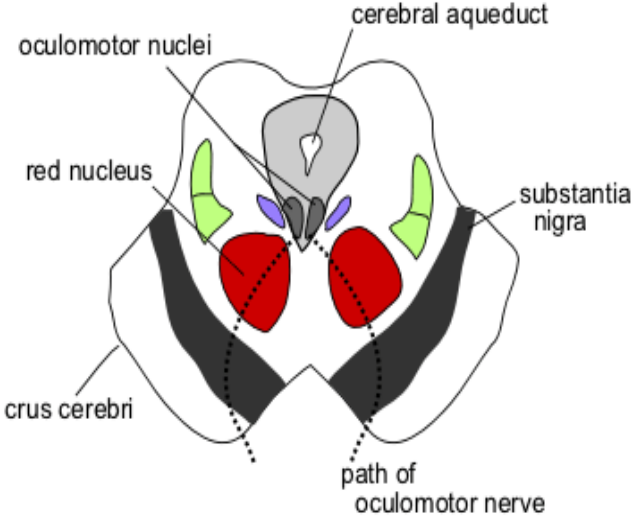


The brain as viewed from the underside and front. The thalamus and Corpus Striatum (Putamen, caudate and amygdala) have been splayed out to show detail.

**Corpus Striatum**



**Hypothalamus**



**Periaqueductal Gray**

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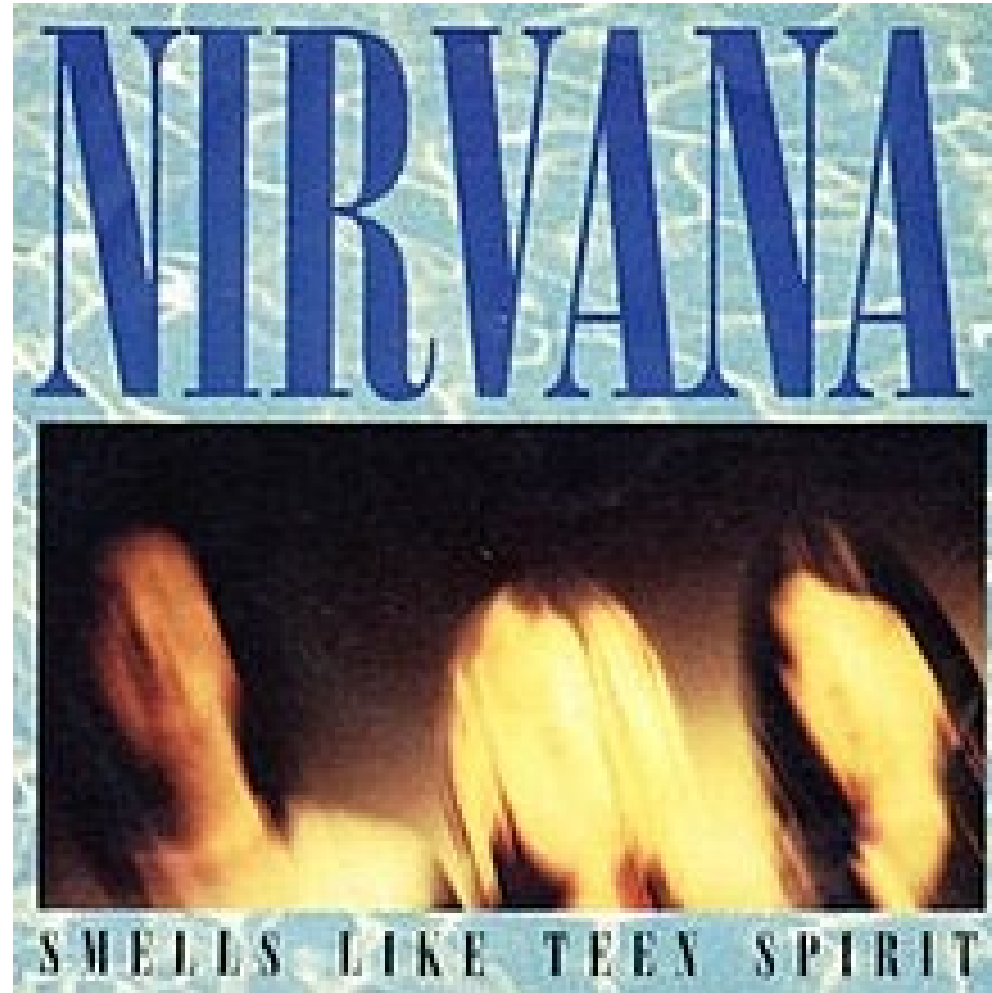
# DMDD In a Community Sample

- It is fairly common, is associated with more impairment, and almost entirely overlaps with ODD instead of depression
- Mood disorders are *episodic* whereas DMDD is non-episodic irritability (though there is occasional mood dysregulation)
- Because of the overlap, this study concluded that treatment for DMDD is often best started with evidence-based practices for ODD

Freeman AJ, Youngstrom JK, Findling RI. Disruptive mood dysregulation disorder in a community mental health clinic: prevalence, comorbidity and correlates. *J Child Adolesc Psychopharmacol* 2016;26:123-130

# DMDD

- One final kicker: youth with DMDD, ODD, Conduct Disorder, and ADHD often have *negative prediction error* (tend to expect more of a reward than is received).



“here we are now,  
entertain us!!!”

Brotman, MA, Kircanski, K, Stringaris A, Pine DS, Leibenluft E. Irritability in youths: a translational model. *Am J Psychiatry* 2017; 174:520-532

# DMDD Treatment

- ZERO FDA approved medications or therapies to date (though CBT and parent management training are often employed)
- Interpretation Bias Training was a negative study
- T-MAY (Treatment of Maladaptive Aggression in Youth)
  - Maximize psychosocial interventions BEFORE medication interventions (unless there is a clearly identifiable diagnosis that is causing or associated with the aggression)
  - [T-MAY-final.pdf \(thereachinstitute.org\)](#)
  - After psychosocial interventions optimized and no other dx: Antipsychotics (risperidone and aripiprazole have best evidence)
  - With comorbid ADHD, after psychosocial interventions optimized, add antipsychotic to stimulant, then lithium/divalproex
  - With comorbid anxiety/depression, after psychosocial interventions optimized, add lithium/divalproex to SSRI, then antipsychotic

# Key Points

- DMDD is a DEPRESSIVE disorder
- There are changes in the brain that correlate to derangements in threat processing, reward processing, and negative prediction error
- Focus on finding the underlying problem(s) driving the dysregulation first.

# Session Resources

- Session resources coming soon!



Check back after the session for resources that were referenced in the presentation or session chat and patient case recommendations.