A photograph of three young women with long hair, smiling and blowing colorful confetti into the air. The background is a blurred outdoor setting with trees and lights. The text is overlaid on the image in pink boxes.

**Hormonal
moodchanges in women
with ADHD during the
lifespan**

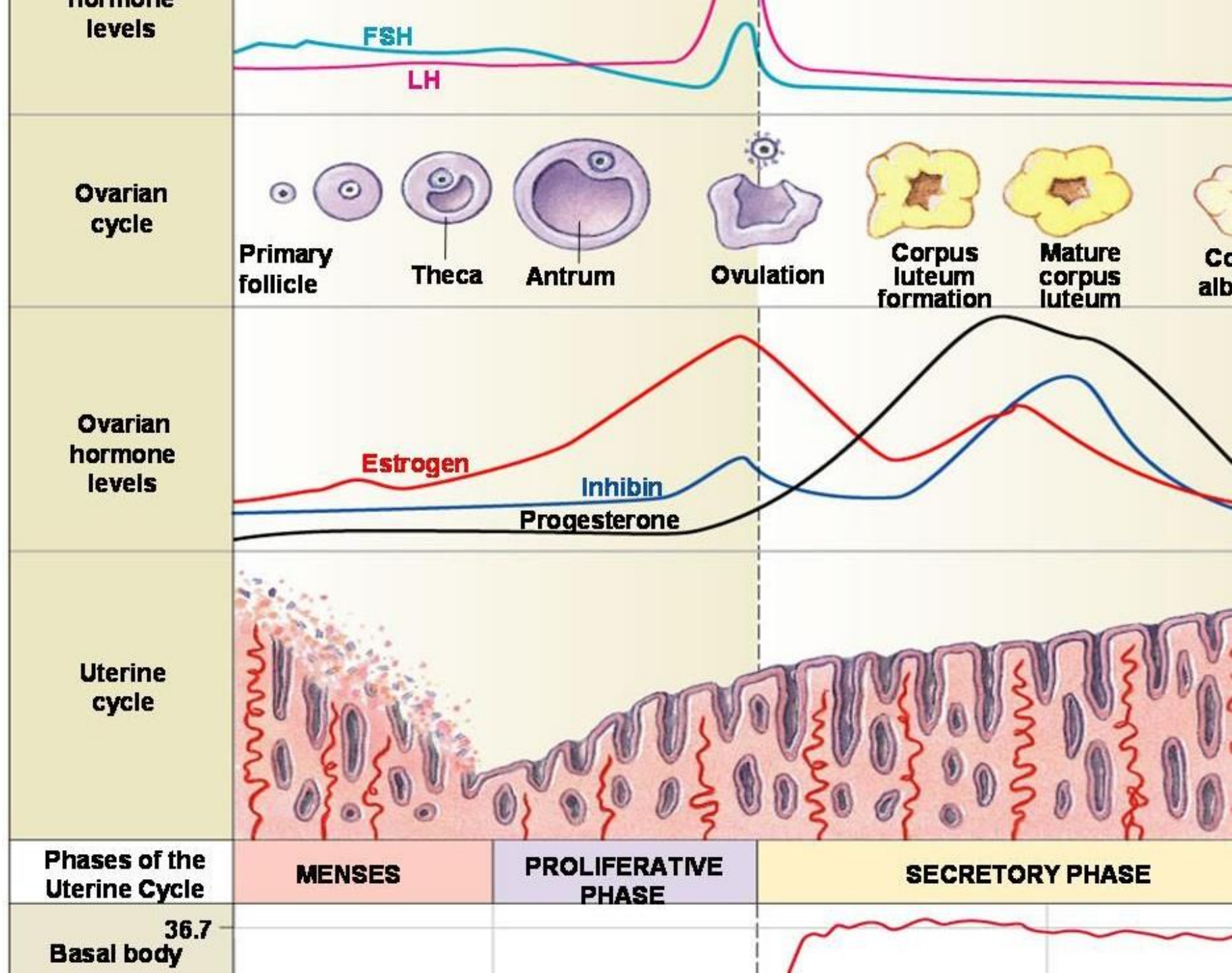
ADHD Congress Tel Aviv, 2022

**Prof. ADHD in adults - J.J. Sandra Kooij
Amsterdam UMC/VUmc &**

**PsyQ, Dutch Expertise Center Adult ADHD
The Hague, The Netherlands**

No conflict of interest

Hormonal Mood Changes in women with ADHD



Clinical experience:

Premenstrual mood problems in women with ADHD:

Women with ADHD report severe premenstrual mood instability & increased severity of ADHD:

Inattention, inability to focus

Impulsivity

Irritability and anger outbursts

Depressed mood

Increased sleep disturbance

Anxiety, panic attacks

Suicidal thoughts

Symptoms recur every month

Efficacy of ADHD meds seems reduced

DANGER WEEK!



The causes of mood swings are generally hormonal.

Besides premenstrual, also postnatal & perimenopausal mood changes

- According to clinical experience, postnatal depression and perimenopausal depression also seem more severe and more frequent than normal

But no data so far ...

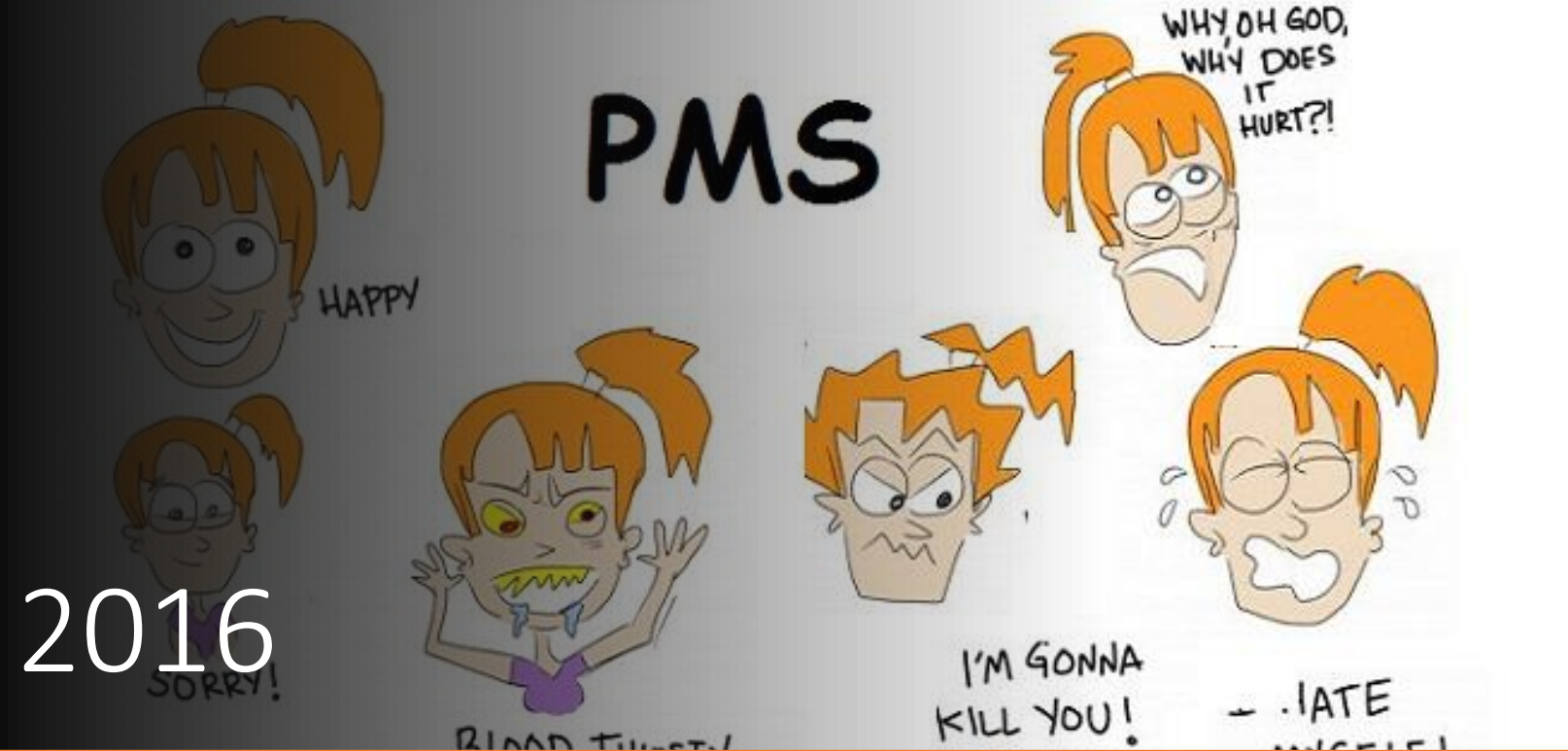
- **Research question:**

Are hormonal mood problems indeed more severe and more frequent in women with ADHD compared to women without?

- *General female population:*

Premenstrual Dysphoric Disorder (PMDD) in 29%

ADHDWoman 2016



Women with ADHD were asked to vote for their most urgent question to science:

Highest votes for hormonal mood changes during the lifecycle



Vraag	Stemmen
Wat is het verband tussen hormonen en emotionele labiliteit bij ADHD?	64
Waarom ben ik of hyperactief of compleet oververmoeid?	31
Wat veroorzaakt... bij ADHD?	23
Wat is de rol van...wisselingen van ADHD?	21
Waarom ben ik...	14
Wat is de rol van...ADHD op je...	13
horm...	13
Zijn...	12
reage...	11
bloed...	10
beter...	10

1st study on mood x female hormones in ADHD, 2016

N=200 participants at the Dutch ADHDWoman Conference

Self report questionnaire on mood changes to the level of clinical depression during:

- the menstrual cycle : premenstrual dysphoric disorder (PMDD) (=more severe than PMS)
- the postnatal period : postpartum depression (PPD)
- the perimenopausal period

Questionnaire
consisted of
validated
scales,
adapted for
selfreport



Neuropsychiatric Interview Plus version
5.0 (M.I.N.I. Plus) for Premenstrual
Dysphoric Disorder (PMDD)



Edinburgh Postnatal Depression Scale
(EPDS) for life-time Post Partum
Depression (PPD)



Greene Climacteric Scale (GCS) for
Perimenopausal Mood Symptoms



Munich Chronotype Questionnaire
(MCTQ) for sleep characteristics

Results

PMDD,
PPD and
climacteric
mood symptoms
in women with
ADHD

- N=200 women
- Selfreport questionnaires
- Comparing women with ADHD symptoms to women from the general population

Results:

- **62%** indication for **PMDD**, versus **29%** in controls
- **67%** indication for **PPD**, versus **13-19%** in controls
- **(Peri)menopausal** women with ADHD: **2 fold increased severity** of mood, somatic and sexual symptoms compared to controls

Replication study

Women with a
diagnosis of
ADHD at PsyQ

- Outpatient Clinic Adult ADHD at PsyQ, the Hague, the Netherlands
- N=209 women with diagnosed ADHD
- Age 18-71 years
- Same questionnaires
- Expectation: lower prevalences compared to 1st pilot study

> [J Psychiatr Res.](#) 2021 Jan;133:10-15. doi: [10.1016/j.jpsychires.2020.12.005](#). Epub 2020 Dec 3.

Prevalence of hormone-related mood disorder symptoms in women with ADHD

Farangis Dorani¹, Denise Bijlenga², Aartjan T F Beekman³, Eus J W van Someren⁴,
J J Sandra Kooij⁵

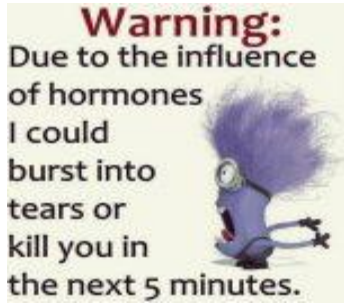
Affiliations + expand

PMID: 33302160 DOI: [10.1016/j.jpsychires.2020.12.005](#)

Abstract

This is the first study to assess the prevalence of symptoms of premenstrual dysphoric disorder (PMDD), episodes of postpartum depression symptoms (PPD) after first childbirth, and climacteric mood symptoms in Attention-Deficit/Hyperactivity Disorder (ADHD). 209 consecutive women (18-71 years) with ADHD completed the PMDD chapter of the Neuropsychiatric Interview Plus version 5.0.0 to assess PMDD, the Edinburgh Postnatal Depression Scale to assess PPD, and the Greene Climacteric Scale to assess climacteric symptoms. Comorbid psychiatric disorders, medication use, and chronobiological sleep characteristics were also assessed. The prevalence of PMDD and PPD were

Results 2nd study



Women with diagnosed ADHD compared to women from the general population

- **Indication of PMDD** in women with ADHD: **46% versus 29%**
- **PPD**: **58%** reported lifetime postnatal depressive symptoms, versus **13-19%** in the general population
- **Perimenopausal depression**: **3-fold increased** number of symptoms of anxiety, depression, somatic & sexual complaints vs women from the general population

Summary



- Confirmation of 2-3 fold increased PMDD, PPD and perimenopausal mood symptoms in ADHD women in a clinical sample
- Three periods of hormonal changes during lifetime
- Why are mood symptoms more severe in women with ADHD?
- How can we treat them better?

Why?



Little research on hormonal influences on the brain in women

Cycle often exclusion criterion in research due to changing hormonal levels;
So more research in males

No studies in women with ADHD

Female Hormones & ADHD Symptoms Across the Menstrual Cycle

- **32 control women, 18-22'yrs, regular cycle**
- **Relationships between estrogen, (E) progesteron (P), testosteron (T) and daily ADHD symptoms**
- **Higher impulsivity and inattention when E is low**
- **Higher inattention in luteal phase of cycle**
- **NB Stimulant response may also differ across the cycle**

- Roberts 2018

How?

- **Low dopamine levels in certain brain regions in ADHD**
- **Estrogen & progesteron modulate neurotransmitters like serotonin and dopamine**
- **Sex hormones have been implicated in brain development and maintenance**
- **Ovarian hormones also directly effect the brain regarding cognition, memory, learning and emotion, and influence reward-related motivation, impulsivity, and temporal decision-making**
- **Estrogen influences blood flow and metabolic rate of glucose, and this changes during the cycle**

Haimov-Kochman 2014; Volkow 2009; Barth 2015; Diekhof 2015; Soares & Zitek 2008; Fanelov & Dong 2010; Hines 2010; Reiman 1996; Sacher 2014; Frey 2014; Song 2019

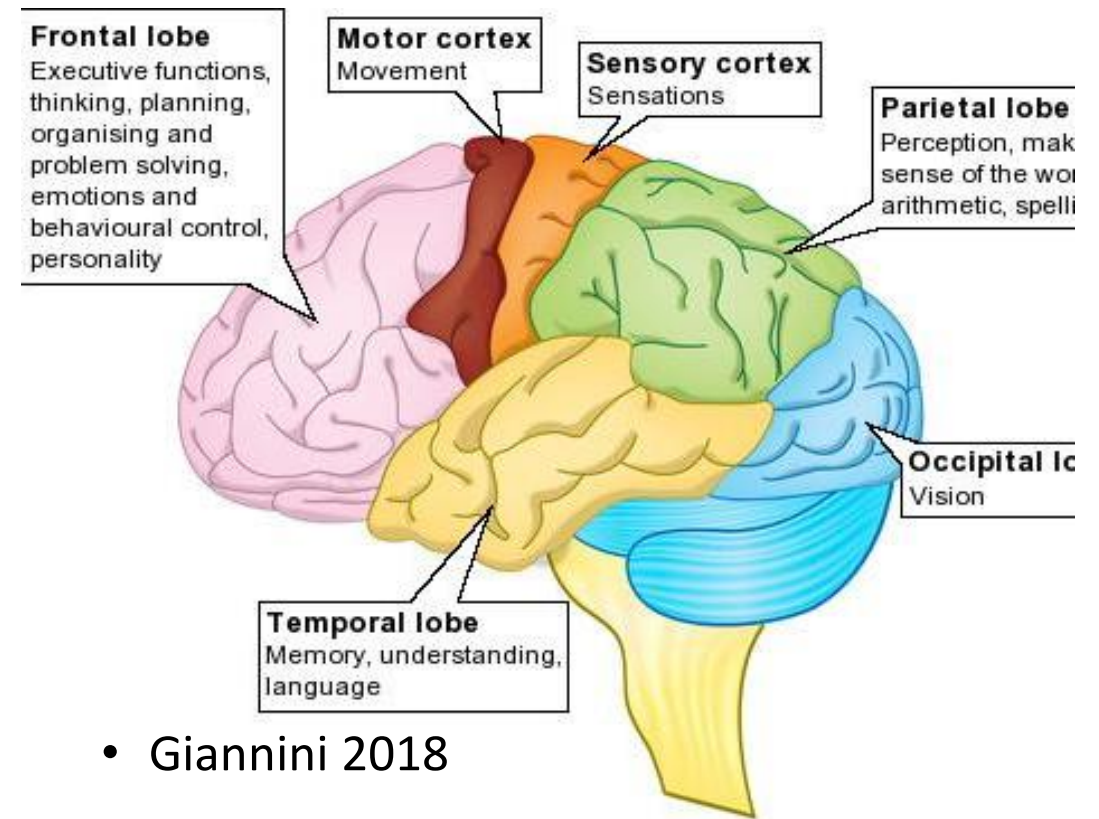
Estrogen & Progesteron INTERACT with Dopamine

Estrogen:

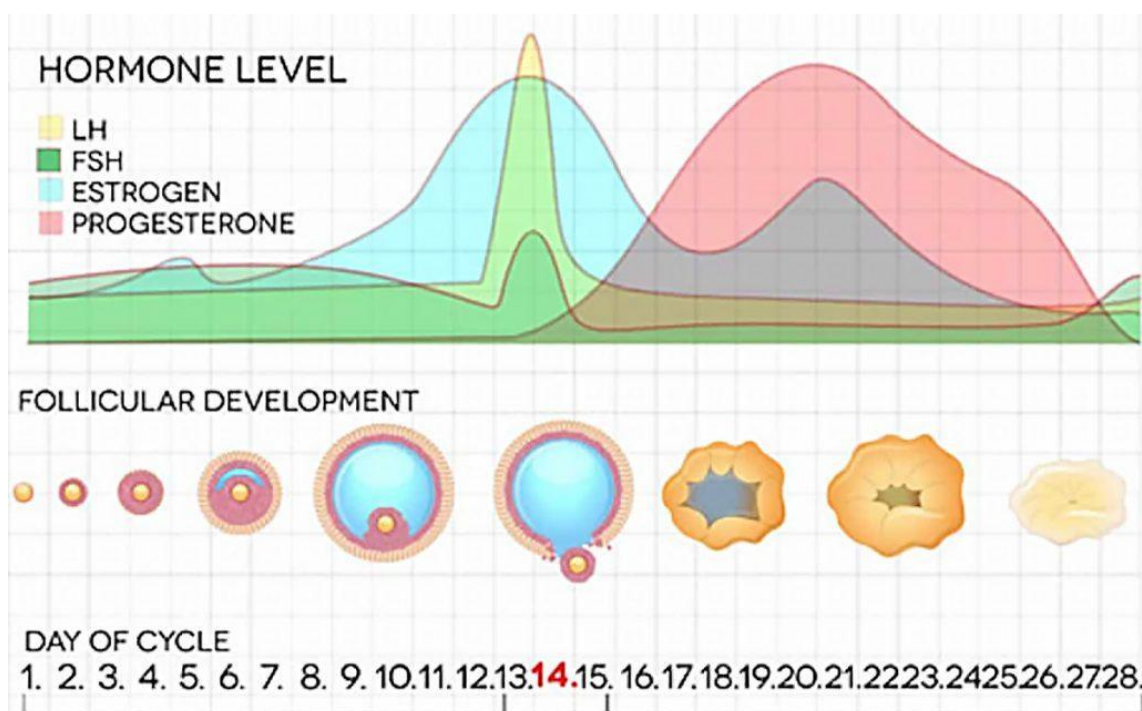
- **Increases dopamine** synthesis and decreases its degradation
- **Upregulates** dopaminergic receptors
- Effect of estrogen esp. in Prefrontal Cortex
- Impacts working memory function by affecting dopamine levels
- Effects on limbic regions: estrogen influences emotional and motivational behaviors

Progesteron:

- Effect of progesterone on dopaminergic systems **depends primarily on the previous priming by estrogen**



Why increased Mood Changes during the cycle in ADHD women?



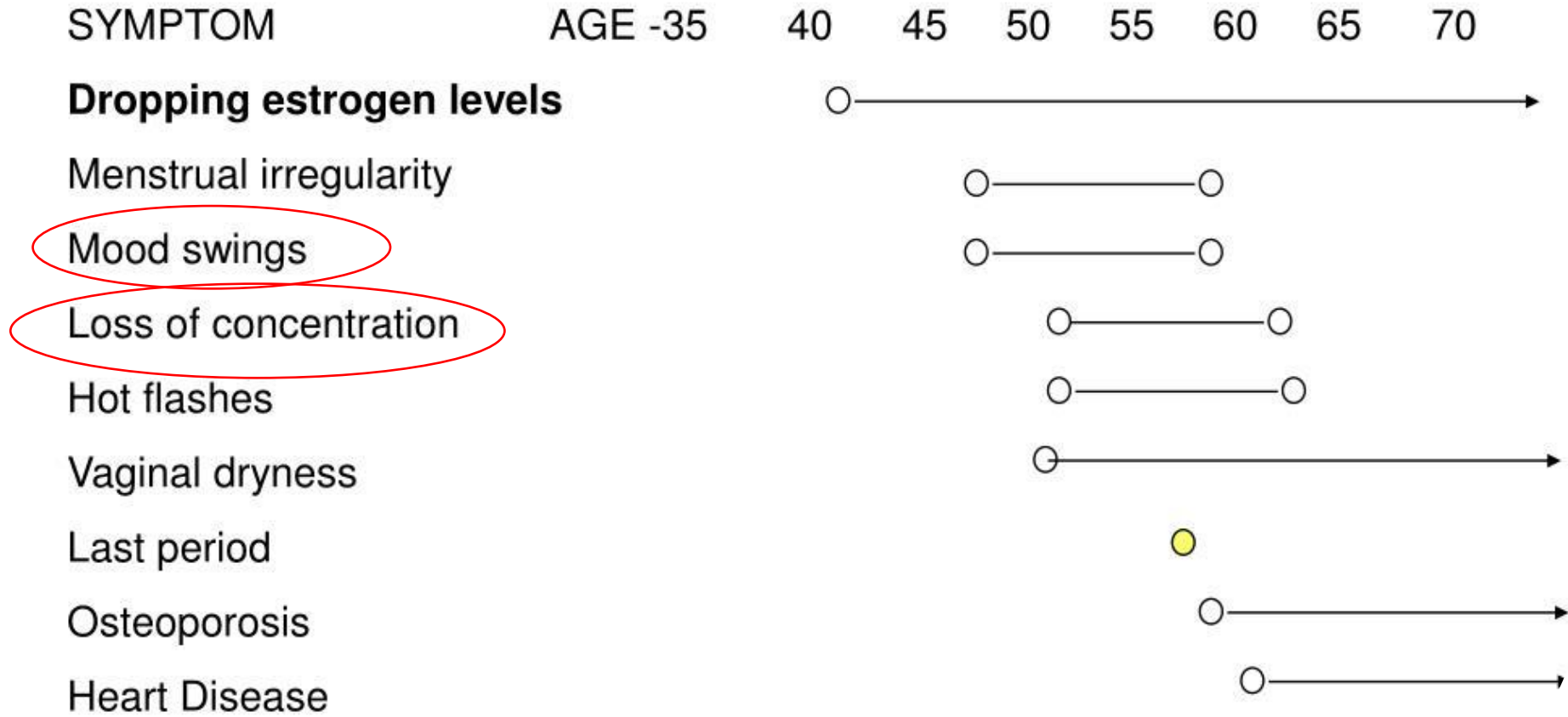
- **Estrogen acts as dopamine agonist**, increases dopamine activity!
- In ADHD women: low prefrontal dopamine AND low estrogen in 3rd + 4th week of the cycle: reinforce each other

Premenstrual week:

- 2x 'low': ADHD women may be more impaired
- May explain increased mood instability and increased ADHD severity ...

Menopause Timetable

Women may enter menopause earlier than they realize. Estrogen levels usually drop before menopausal symptoms are seen. Below, the typical ages for various symptoms.



Sources: "Perimenopause: Preparing for the Change" by Nancy Lee Teaff and Kim Wright (Prima Publishing, 1996);
"Perimenopause: Changes in Women's Health After 35" by Drs. James E. Huston and L. Darlene Lanka
(New Harbinger, 1997).

What can you do about it?

PMDD

- Contraceptives, continuously (without stopweek), esp. for somatic symptoms
- SSRIs for mood symptoms
- Temporary higher dose of ADHD meds??

PPD

- SSRIs
- Estradiol (sublingual, transdermal)

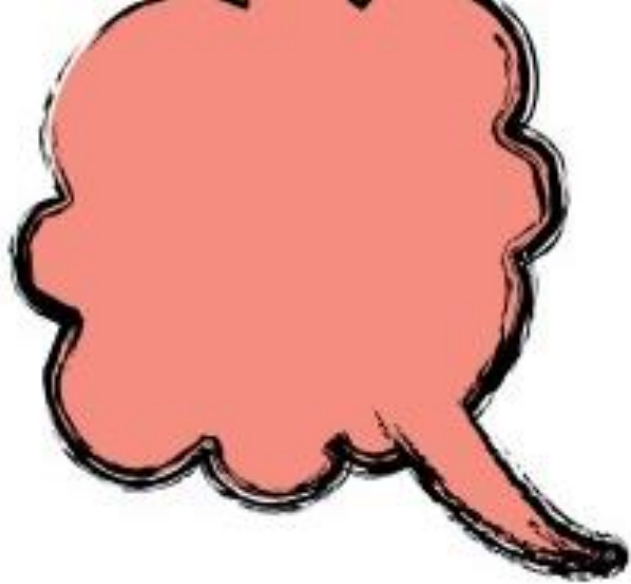
Climacteric Mood Symptoms

- SSRI / SNRI
- Estradiol
- SSRI + estradiol
- DHEA



Thank you!





Q & A

