

# Hormones In Havoc

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# Disclaimers

- I am not an endocrinologist

- I am not your doctor

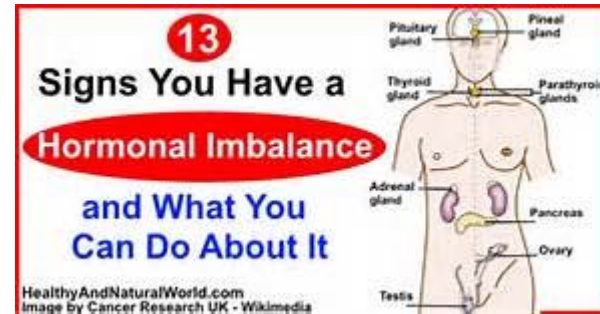
- I have no affiliation or sponsorships by any pharmaceutical companies



“Dr. Grosvenor, I think my hormones are off...”



# There are a lot of opinions out



# The main players...

Estrogen

Progesterone

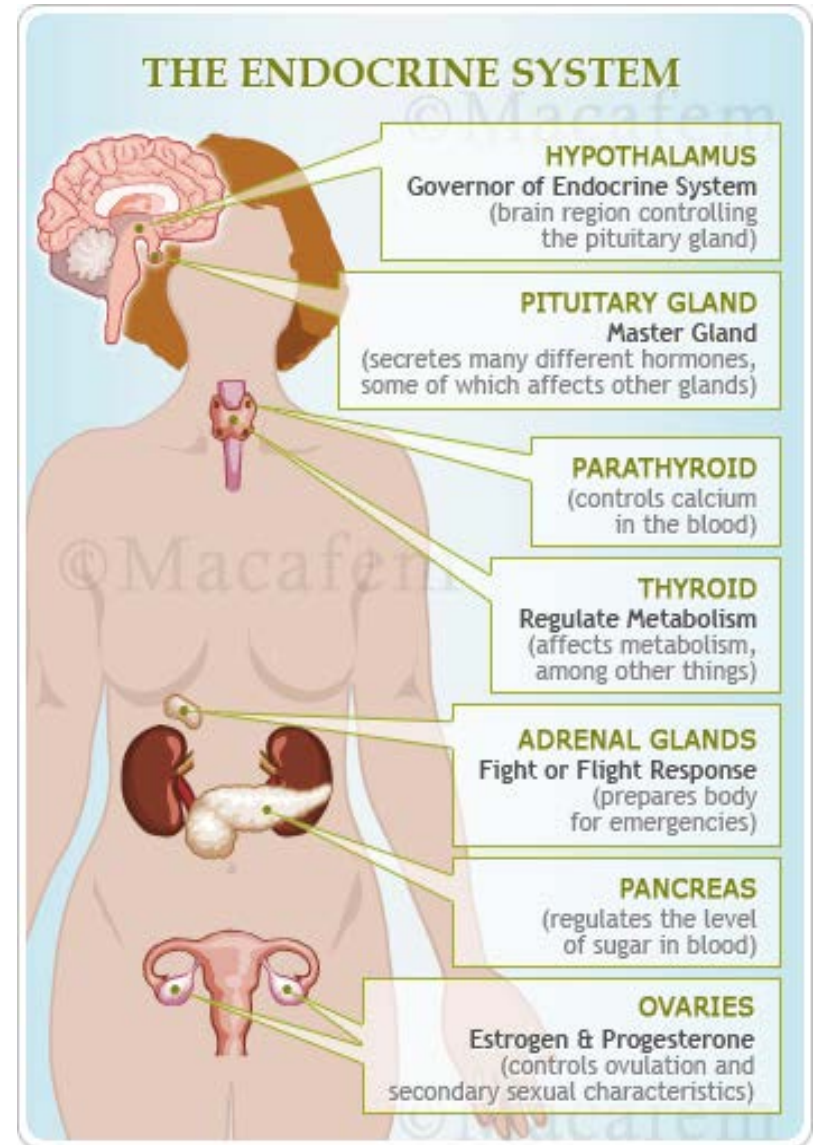
Testosterone

Insulin

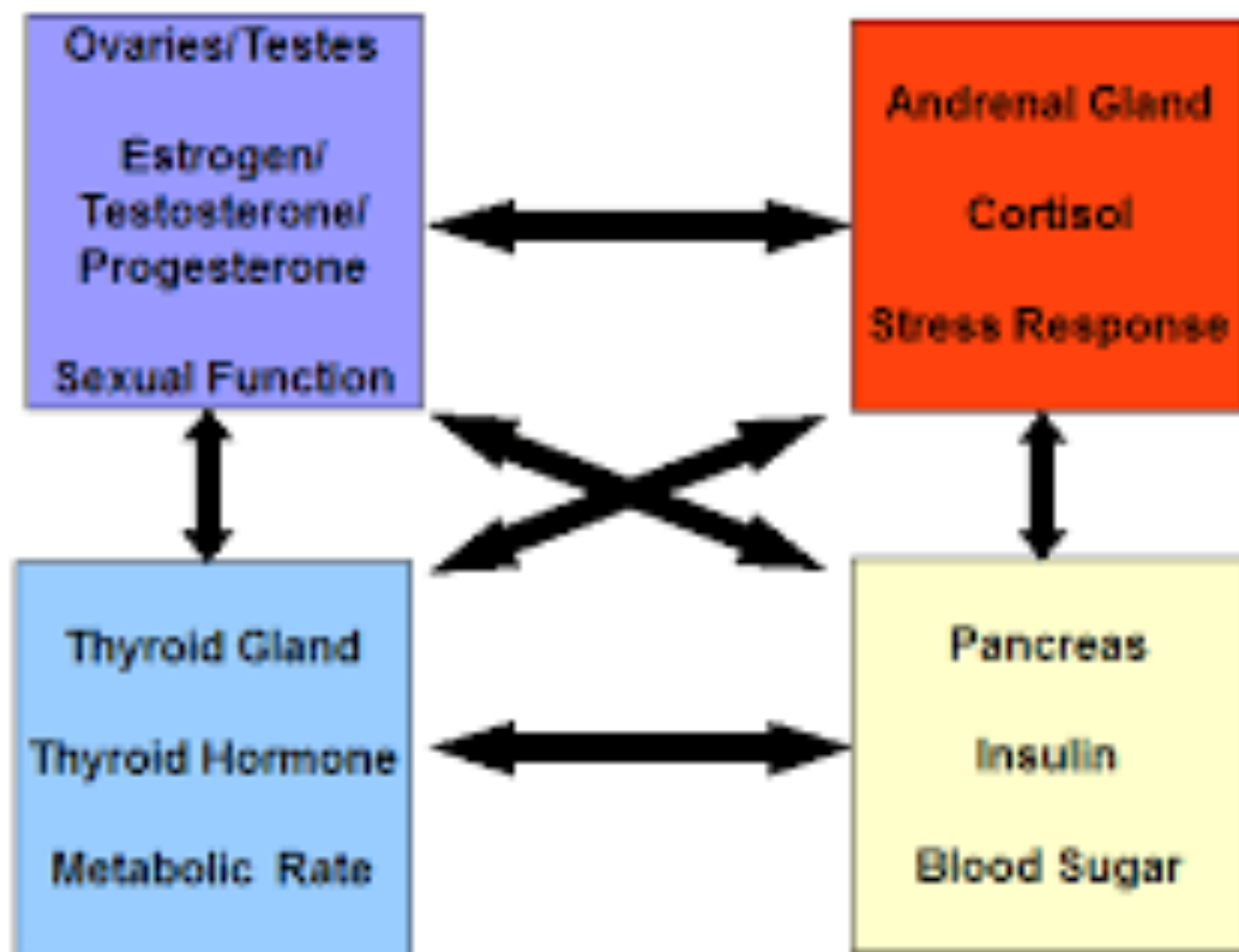
Thyroid hormones

Cortisol

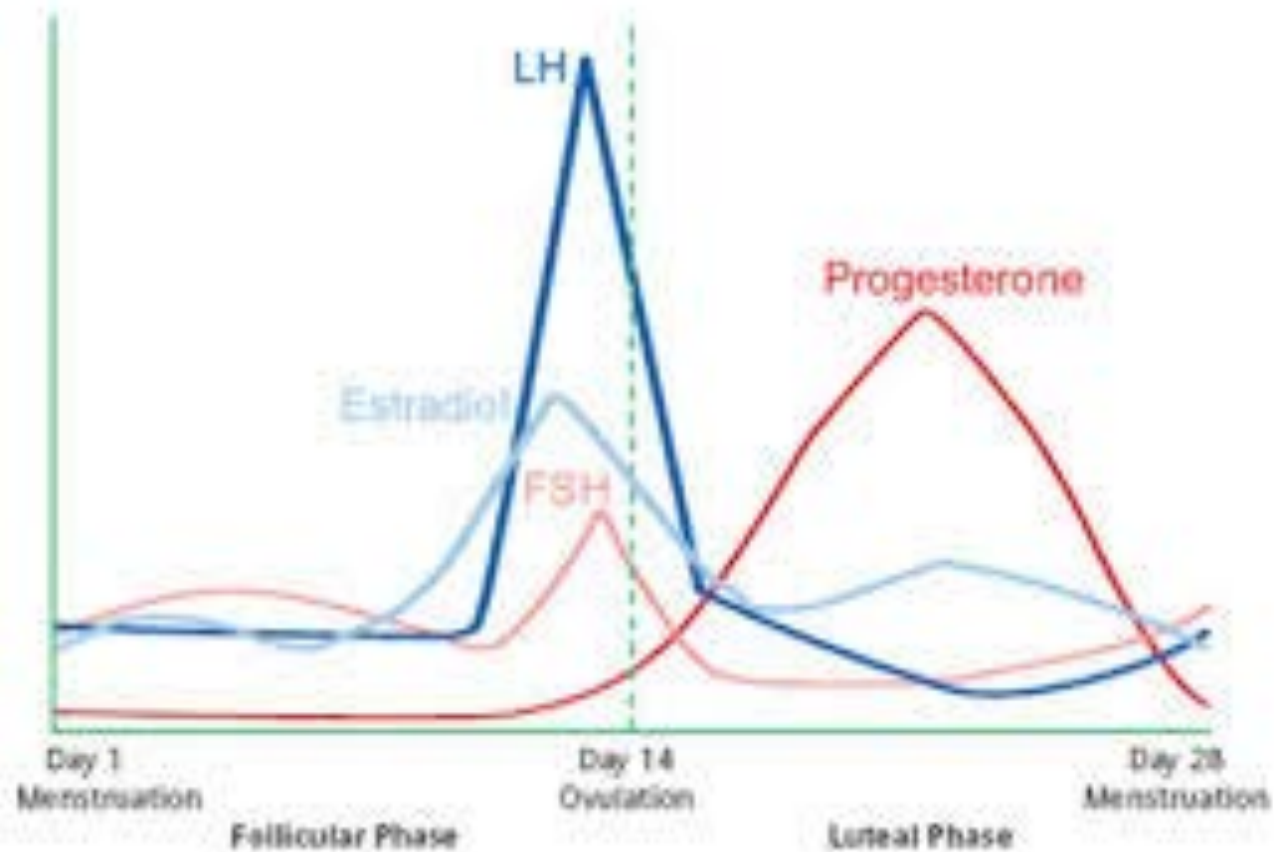
→ No hormone works in isolation-  
each acts with the other for optimal balance



## Hormonal Balance



# A typical cycle



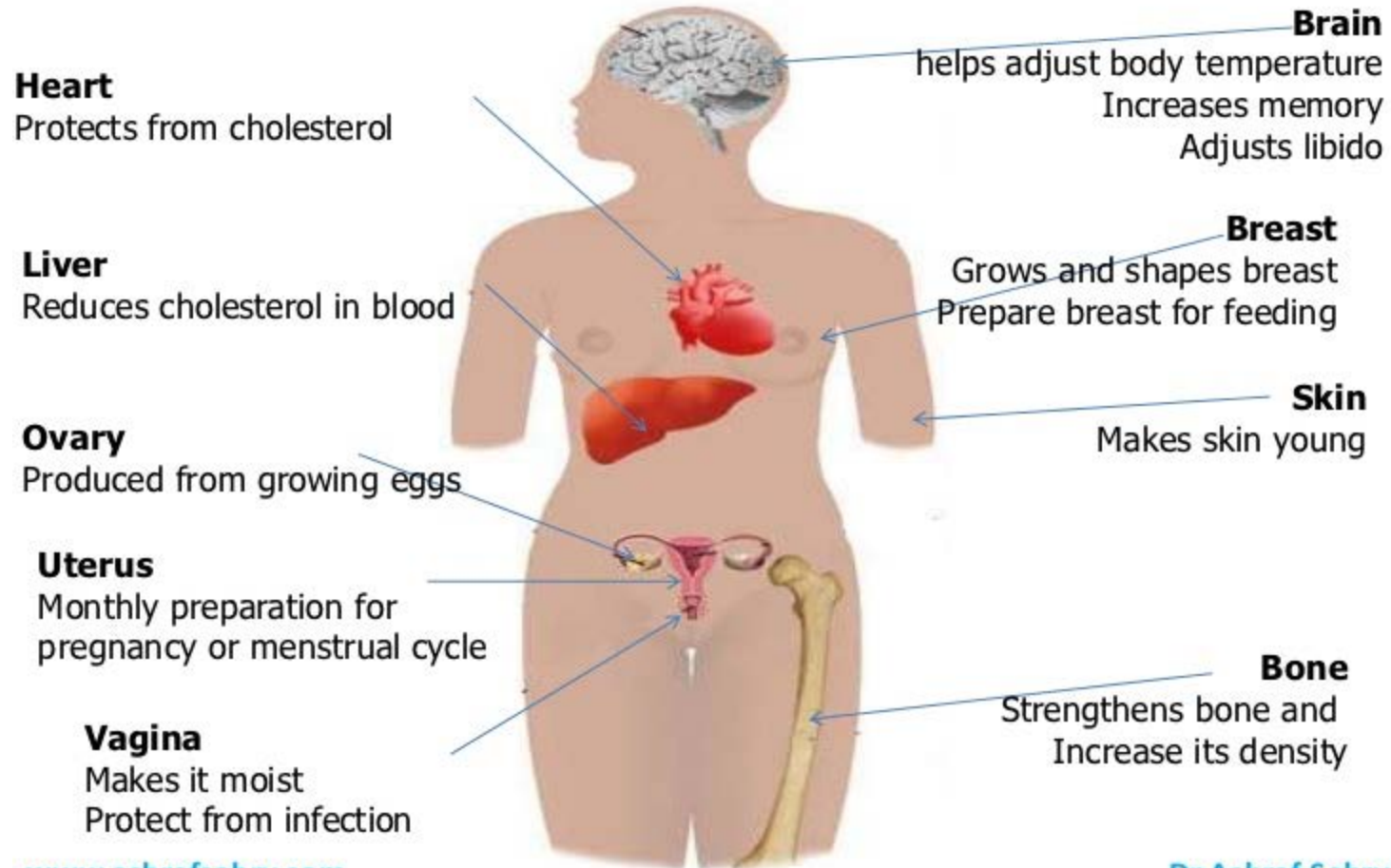
# Estrogen



- Hormone produced by the ovaries (small amounts by adrenal gland and adipose tissue)
- Responsible for typical female sexual characteristics (breasts, pubic/areolar hair)
- Controls growth of the lining of the uterus early in the menstrual cycle
- Instrumental in bone formation
- Men: part of sex drive and maturation of healthy sperm, produced by adrenal glands and testes



# Estrogen effect on a Women's Body



# Symptoms of estrogen deficiency

- Decreased libido
- Dry skin, loss of hair
- Lack of focus
- Mood swings
- Hot flashes
- Night sweats
- Painful intercourse
- Insomnia
- Irregular periods

Your body makes three main types of estrogen:



# Causes of estrogen deficiency

- Menopause
- Premature ovarian failure
- Hyperprolactinemia
- Type 1 Diabetes
- Use of GnRH analogues with endometriosis

# Progesterone

- The “other” sex hormone

- Produced by the ovaries after ovulation

- Prepares the body for pregnancy, or induces a period by dropping low if pregnancy does not occur

- Necessary to balance estrogen

- Production peaks by age 25 and gradually declines after that



# Symptoms of progesterone deficiency

- Painful breast changes
- Excessive hair growth
- Receding of head hair (extreme cases)
- Insomnia
- Increased PMS symptoms
- Anxiety
- Infertility
- Heavy periods
- Weight gain



# Drawbacks of progesterone deficiency

## -Pre-menopausal women:

- Endometrial hyperplasia, a precursor for uterine cancer
- Chronic anovulation, which leads to increased imbalance of estrogen:progesterone

## -Post-menopausal women:

- Levels fall to zero, compared to estrogen which only declines 40-60%
- Many of the 'typical' menopausal symptoms therefore can be attributed to lack of progesterone

# Causes of progesterone deficiency

- 'Peri-menopause' & Menopause

- Anovulation as a result of:

- Polycystic ovarian syndrome (PCOS)
- Immature hypothalamic-pituitary-ovarian (HPO) axis
- Low estrogen (excessive exercise, low body fat)
- Stress- "Progesterone steal theory"- progesterone used by the adrenal glands to make cortisol

# Cortisol



- "Fight or flight" or "Stress" hormone secreted by the adrenal glands
- Increases blood sugar, aids in metabolism, & suppresses the immune system
- All of these things can be of benefit if they are occurring appropriately
- Excessive stress or medical conditions such as Cushing's syndrome can create too much stress in the body, thus creating too much cortisol production
- Low levels can occur in Addison's syndrome or Congenital adrenal hyperplasia



# ADRENAL DISORDERS

## -Cushing's syndrome

- Overproduction of cortisol

## -Primary hyperaldosteronism

- Too much aldosterone, caused by a mass or excess growth of adrenal gland

## -Pheochromocytoma

- Mass in adrenal gland which causes too much adrenaline to be produced

## -Addison's disease

- Autoimmune condition, causes cortisol deficiency

## -Congenital adrenal hyperplasia



# THYROID HORMONES

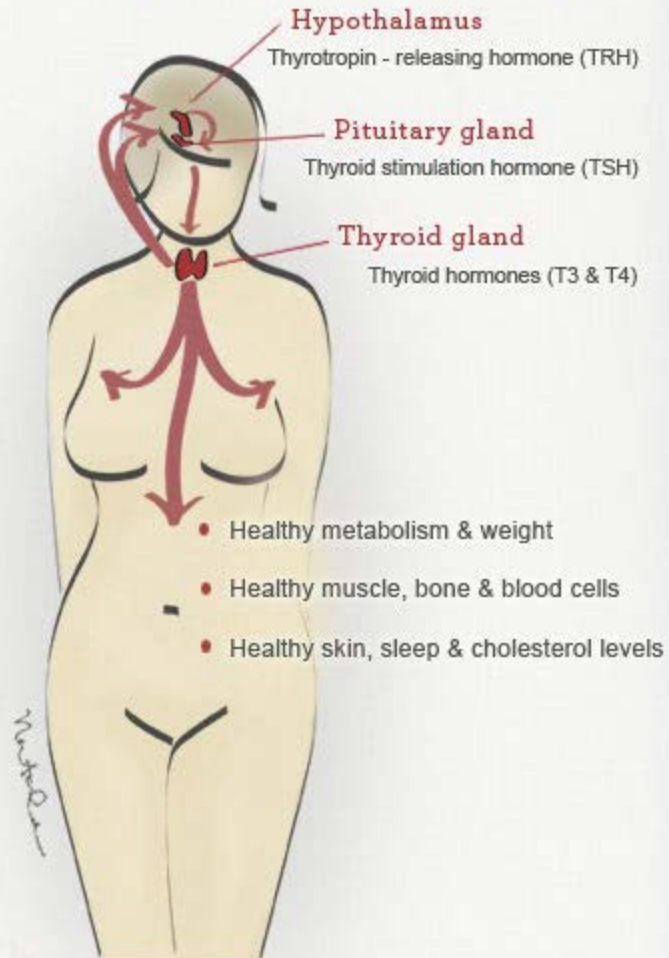


## -Multiple purposes:

- Thermal regulation
- Control the rate at which your body burns calories
- Regulate long bone growth
- Brain development
- Slow down or speed up heart rate
- Muscle strength

-As with all the hormones, too much or too little thyroid function can effect overall body function

## Your thyroid is the master gland



Your brain sends and receives messages to and from your thyroid in a feedback loop to keep your metabolism, weight, and much more in balance.

# **HYPO THYROIDISM**

# **HYPER THYROIDISM**

DRY, COARSE HAIR

LOSS OF EYEBROW  
HAIR

PUFFY FACE

ENLARGED THYROID  
(GOITER)

SLOW HEARTBEAT

ARTHRITIS  
COLD  
INTOLERANCE  
DEPRESSION  
DRY SKIN  
FATIGUE  
FORGETFULNESS  
HEAVY  
MENSTRUAL  
PERIODS  
INFERTILITY  
MUSCLE ACHES

WEIGHT GAIN

CONSTIPATION

BRITTLE NAILS

HAIR LOSS

BULGING EYES

SWEATING

ENLARGED THYROID  
(GOITER)

RAPID HEARTBEAT

DIFFICULTY  
SLEEPING  
HEAT  
INTOLERANCE  
INFERTILITY  
IRRITABILITY  
MUSCLE  
WEAKNESS  
NERVOUSNESS  
SCANT  
MENSTRUAL  
PERIODS

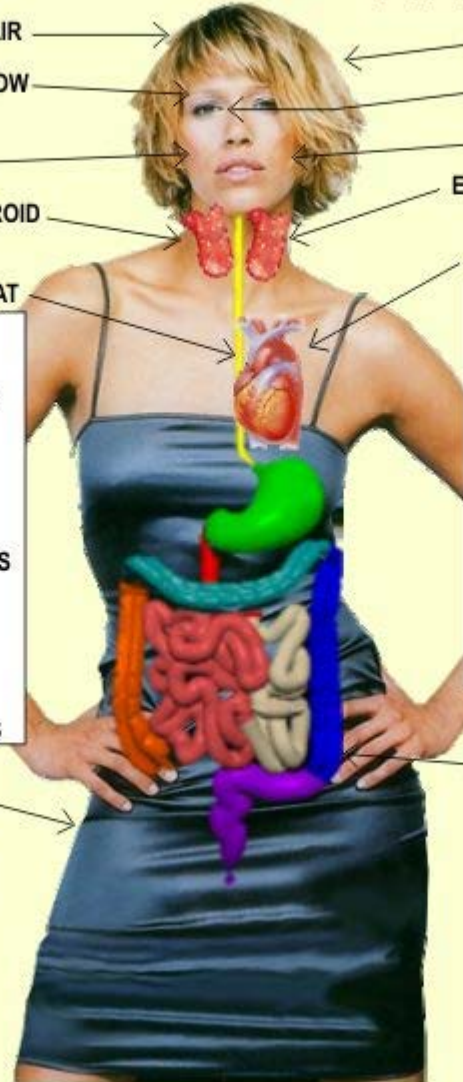
WEIGHT LOSS

FREQUENT  
BOWEL  
MOVEMENTS

WARM, MOIST  
PALMS

TREMOR OF  
FINGERS

SOFT NAILS



# Causes Low Thyroid Function

- Most common cause autoimmune disease or Hashimoto's thyroiditis
- Iodine deficiency
- Certain medications
- Prior radiation to the head or neck
- Age related atrophy of the thyroid gland

# Causes Elevated Thyroid function

- Graves' disease
- Thyroiditis
- Thyroid Nodules
- Excess iodine
  - -Watch those seaweed chips
- Excess thyroid medication



# Thyroid & Menstruation



- Disorders of the thyroid can cause irregular periods, heavy periods, and even loss of menstruation altogether
- This is primarily due to Thyrotropin-releasing hormone (TRH), which is actually secreted by the pituitary gland and has direct effects on the ovary
- Abnormal thyroid hormones also effect prolactin, sex hormone binding globulin (SHBG), and gonadotropin releasing hormone (GnRH)

# Insulin



- Peptide hormone produced by the beta cells of the pancreas
- Promotes absorption of glucose from the blood



# Insulin dysfunction

## -Type 1 Diabetes

- Autoimmune destruction of beta cells

## -Type 2 Diabetes

- Inadequate production of insulin by beta cells

## -Metabolic Syndrome

- Resistance of surrounding tissues to insulin production

## -Insulinoma

→ Estimated that one in three people diagnosed with hyperglycemia

# Symptoms of insulin dysfunction

- Brain 'fogginess', inability to focus
- Intestinal bloating
- Fatigue
- Weight gain
- Depression
- Increased hunger



# Testosterone



- Made in small amounts by the adrenal glands and ovaries in females
- Anabolic effects: growth of muscle mass, increased bone density
- Androgenic effects: male secondary sex characteristics, hirsutism in women
- Often implicated as the primary player in libido for both men and women; this has failed to be true in many large randomized studies
- Supplementation study in men demonstrated a 30% increase in death and heart attack

# So what to do if you have the following...?

-Fatigue

-Weight gain

-Bloating

-Decreased libido

-Irregular menses

-Difficulty concentrating

-Thinning hair, flaky skin

→ Sound familiar???? Because of the interconnectedness of our endocrine system, there are many culprits, and your doctor can help you sort out where the dysfunction lies

# The Workout...I mean Workup-



- Your doctor will want a thorough health history, as well as a history of your current symptoms
- She will likely perform a physical examination
- There may be imaging involved (Xray, ultrasound, etc.)
- And likely some blood work....

# Most common labs

-Laboratory testing typically involves a variety of these things:

- Blood count
- Metabolic panel
- Hgb A1c
- Insulin level
- TSH, or thyroid stimulating hormone
- Prolactin levels
- FSH level
- anti-Mullerian hormone

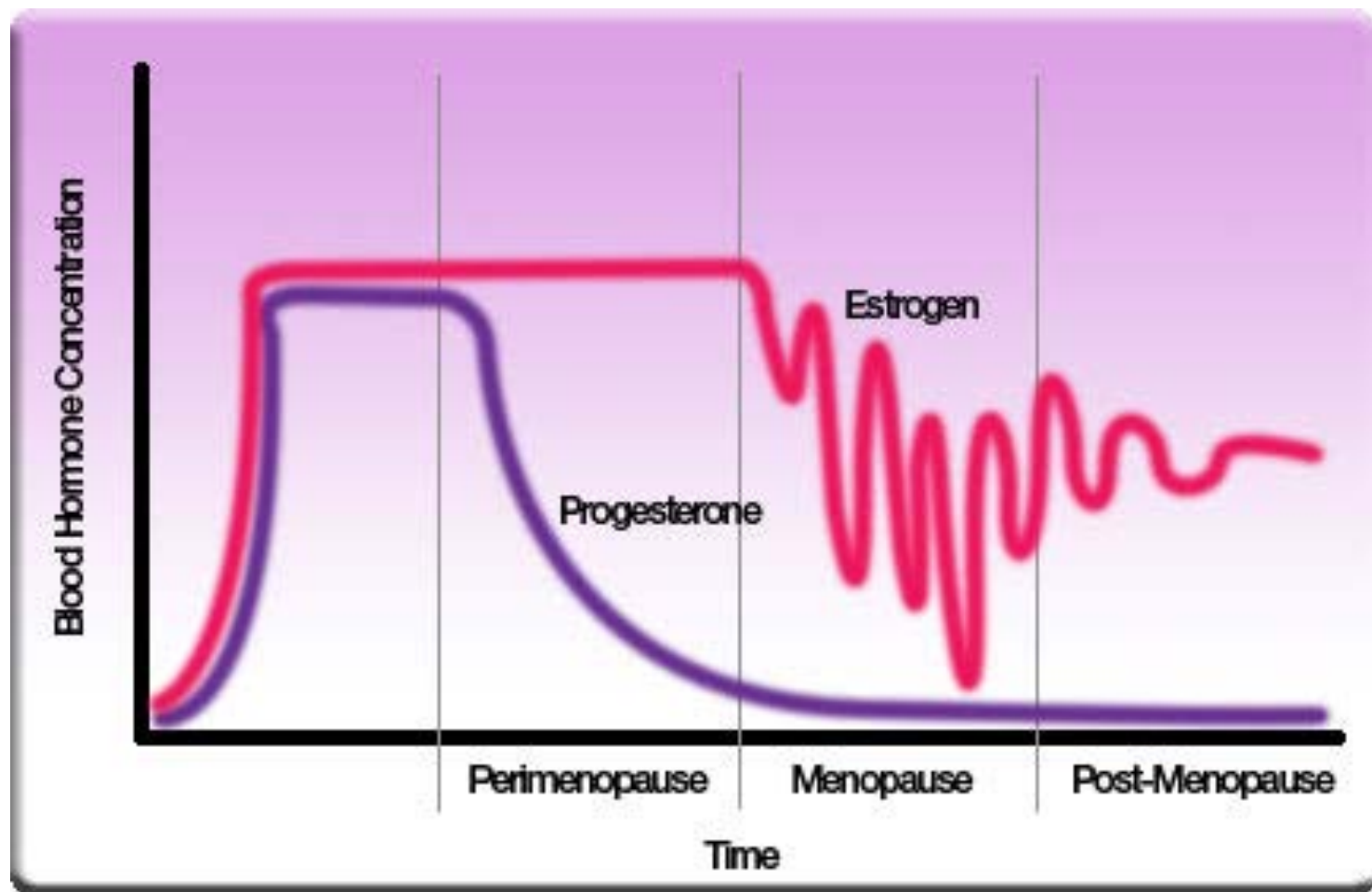


But wait! You forgot to check **estrogen and progesterone!**



Serum estrogen and progesterone levels, routinely monitored in postmenopausal women in the past, are no longer recommended as a means for monitoring menopausal symptoms, due to their highly variable levels throughout a given day

Most recent guidelines recommend monitoring symptoms and not chasing fluctuating levels





# Hormone replacement, 30 seconds or less



-Lots of confusion about hormone replacement in the last 20 years

- Rx dropped 50% between 2002-2006

-Millions of women perhaps suffering unnecessarily, due to worries about dangers of hormone replacement

-WHI study:

- Large RCT healthy menopausal women aged 50-77 years (average age 63!)
- Slightly increased risk breast cancer, thromboembolic events (blood clot), & stroke
  - 8 more cases of breast cancer and 8 more strokes cases per 10,000 person years
- Decreased risk for fractures and colon cancer
  - When used for more than 5 years

# ELITE TRIAL



-“Early versus Late Intervention Trial with Estradiol”

-Hypothesized that hormone therapy acts as a preventative, not combative agent, in atherosclerosis/heart disease, and therefore average older age of women (63) in WHI study skewed data

-Results show that hormone therapy significantly slowed progression of atherosclerosis when used in women of younger age for an average of 10 years (average age of initiation 48-49)

-Significant differences in mortality rates and rates of heart disease even 16 years after discontinuation

# What does this mean for me



-Main message from the WHI became that HRT should not be universally prescribed, nor should it be given for 'secondary reasons' like prevention of osteoporosis or to protect from colon cancer

- Interestingly, was previously being universally prescribed to prevent heart disease

-It does not mean that hormone replacement is a bad idea if you are symptomatic

-It does mean that an individualized approach to each patient is the way to go, with an individualized stratification of risk factors

-Best time to treat is early in the menopausal transition, for a period of not more than 5-6 years ideally

-Recommend against discontinuation if symptoms continue to be severe (in the absence of risk factors)

-Longer period of use recommended in cases of early surgical menopause or premature ovarian failure

# Types of replacement



## -Estrogen alone or with progesterone:

- -Oral
- -Transdermal
  - Felt to be safer because avoids 'first pass' effect at liver, also felt to be better for decreased libido

## -Vaginal

- Safe!!

## -Bioidentical

- Not regulated for strength, efficacy, or safety by FDA
- Just because its "natural" doesn't make it safe, and isn't safety why women quit HRT in the first place?

## -Testosterone?

- Not proven to be helpful for vasomotor symptoms, libido effect debatable and typically not after 6 months
- Potential for substantial increase in cardiovascular risk

# Other options

## -Lifestyle modifications

- Avoiding the “fun” stuff- caffeine, alcohol, sugar
- Layering clothing
- Avoiding stress
- Exercise!

## -SSRIs

## -Gabapentin

## -Vitamin E

## -Osphena

- Oral non-hormonal agent for vaginal dryness



THE END...

