



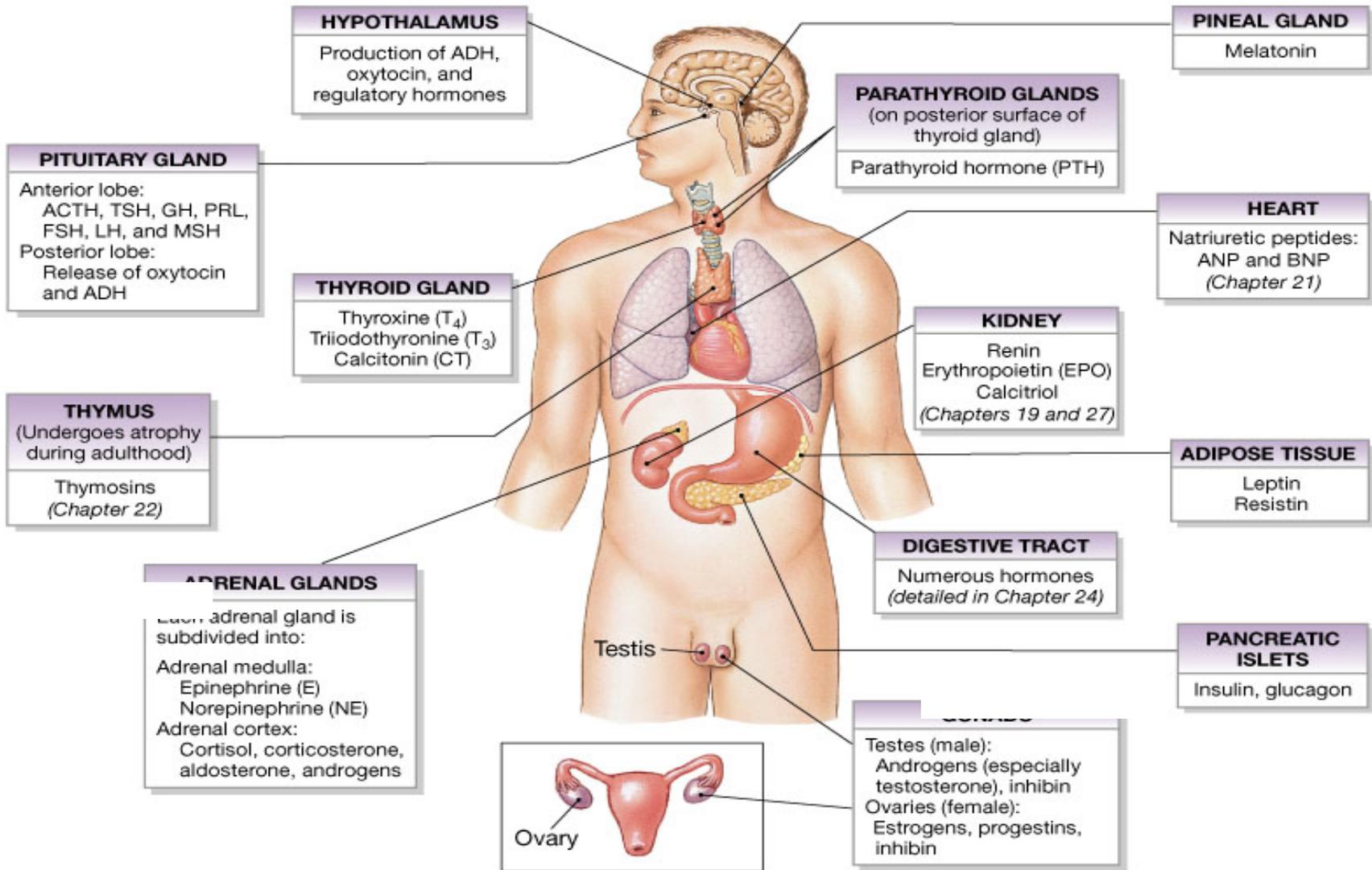
BRMI
CONFERENCE 2018

The Basics of the Endocrine System

May 12, 2018

Dick Thom, DDS, ND

The Endocrine System



Endocrine System

- A series of glands that release a hormone into the plasma, where it is dissolved and transported throughout entire body within 60 seconds.
- Every cell is exposed to the hormone, but not every cell responds to it. **For a cell to be able to respond to a hormone, the cell must have a functional hormone receptor.**
- A cell that responds will do so in various ways. The cells in the heart, pancreas, and brain respond to epinephrine differently. One thing that always happens is that a **cell will change its physiology in response to a hormone.**

Hormones

- Hormones can be **synergistic**; aldosterone and antidiuretic hormone (ADH) both help increase volume of fluid in body to raise blood pressure.
- Some hormones are **antagonists**; Atrial natriuretic peptide (ANP, produced by heart cells) is released when you have high blood pressure. It causes the kidney to secrete more water, so blood pressure can decrease. That is the opposite of ADH, which makes you urinate less.
- Some hormones are **permissive**; you need one in order for a second to do its job well. **Thyroid hormone is permissive for growth hormone** (you need thyroid hormone in order for GH to work). Not enough thyroid hormone can cause stunted growth, even if enough growth hormone is present.

Many changes in the body are a result of the **Endocrine System**

- **The Endocrine System regulates, coordinates and controls:**
 - Growth and development.
 - Male and female development.
 - How your body uses energy.
 - Levels of salts and sugars in your blood.
 - The amount (volume) of fluid in your body.
 - Appetite.
 - Many other body functions.



Some of the affects of these glands

Gland	What it Regulates
Pituitary	“Master Gland” that regulates all other Endocrine Glands, also releases growth hormone
Thyroid	Metabolism, body heat, bone growth
Parathyroids	Use of Calcium and Phosphorous
Hypothalamus	Links nervous system to endocrine system
Adrenal	Response in emergency or stressful situations, metabolism, blood pressure, salt balance
Pancreas	Blood sugar
Ovaries	Production of eggs; female characteristics
Testes	Production of sperm; male characteristics
Thymus	Parts of the immune system

Endocrine system

The symptoms of low thyroid or adrenal function can be masked by giving glandular extracts or synthetic hormones resulting in suppression and weakening of the glands. This is especially common when symptoms and lab tests “confirm” imbalanced organ function. BUT the real question is

“why is it out of balance?”

Endocrine system

Imbalanced hormones accelerate cellular deterioration - resulting in such conditions as brittle bones, blood vessel disease, changes in body stature, decreased organ function, decreased mental ability, decreased muscle and joint function, immune dysfunction, depression, flabby skin etc., etc.

REMEMBER - Finding the CAUSE of the hormone imbalance is the KEY!

Endocrine system

These conditions are the CONSEQUENCE of hormone imbalance of which symptom control has little to do with healing and ALWAYS has side effects and toxicities.

Symptom control medicine has little to do with healing. True healing can only begin when the cause and effect are included in the treatment process.

Endocrine system

Most (all?) of our patients are **stressed out**, typified by a need to hurry - to hurry in pursuit of what they believe will make them happy.

This usually results in **chronic disease** (most commonly diagnosed in **women over 40** and **men over 50**) because of hormonal imbalance (Adrenal? Thyroid? Ovary? Testes? ANY!!) resulting from the activation of an underlying latent miasm.



Your Hormones

HORMONES



Common Triggers of Hormone Imbalance

1. **Stress** - especially mental, raising cortisol (and insulin) levels.
2. **Eating habits** - irregular eating, or missing meals, not eating on schedule, caffeine (coffee, tea, chocolate) \Rightarrow very difficult to balance hormones.
3. **toxicity** common cause.
4. **microbial insult** (many (most) chronic dz due to chronic viruses), virus therapies to regain homeostasis within the cell.

Common Triggers of Hormone Imbalance

5. acute physical trauma (burns, etc.)
6. **subluxation/stenosis** - nerve root stress
7. **geopathic stressors**: grids across the earth (cats like to sleep on these areas); microwaves, amalgam (silver) fillings
8. **chronic dz.** → dysbiosis (A-I dz.); **chronic inflammation**
9. **surgeries** (removal of organs)
10. **allergies**
11. **iatrogenic**

Metals

Personal
Care Products

Industrial
Chemicals

Suspected
Endocrine
Disrupting
Chemicals

Pesticides
Herbicides
Fungicides

Synthetic &
naturally
occurring
hormones

Pharmaceutical
Drugs

To achieve an ideal hormone homeostasis, one must have optimal functioning of:

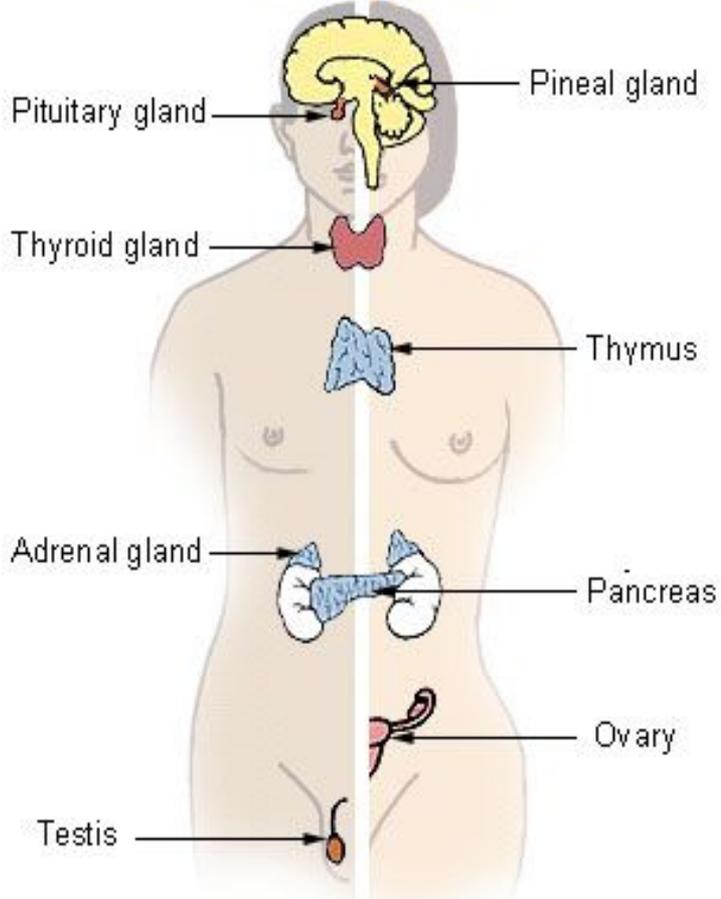
1. Pineal
2. Hypothalamus
3. Pituitary
4. Specific gland - thyroid, adrenal ovary etc.
5. Transport - free, in RBC, attached to carrier
6. Receptors

Suggested that up to 80% of females and 60% of men have hormonal imbalance creating a myriad of symptoms.

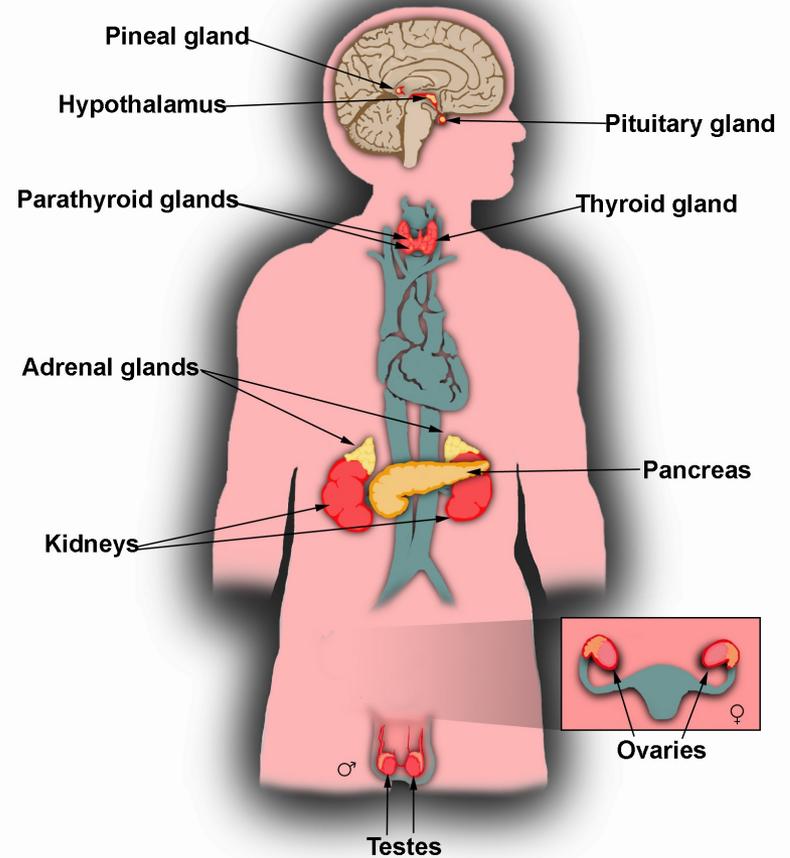
The Major Players

Major Endocrine Glands

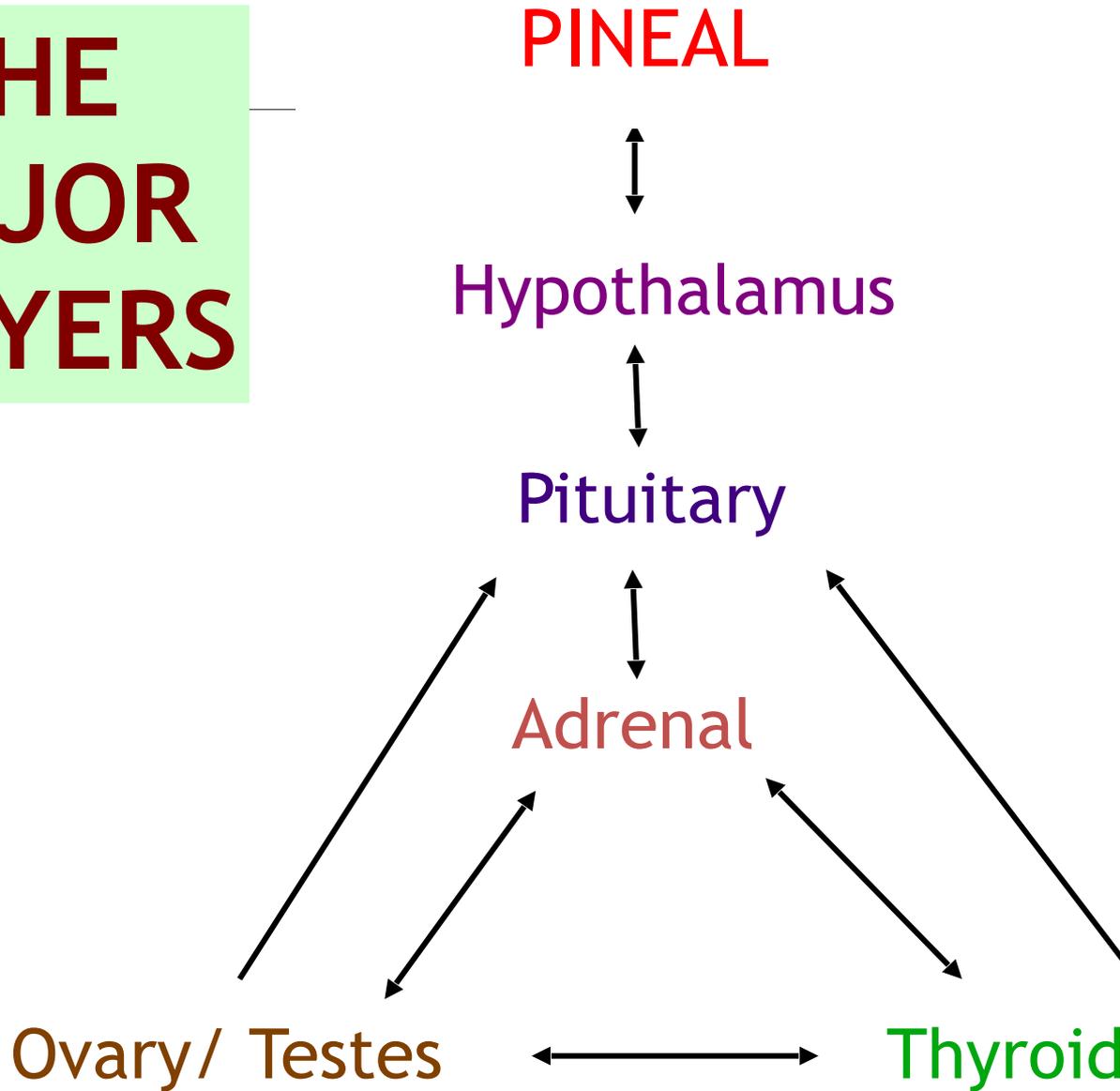
Male Female



The Endocrine System



THE MAJOR PLAYERS



PINEAL GLAND



The pineal gland is in the middle of the brain is the “master” gland regulating circadian rhythm

The Pineal Gland

- Shaped like a pinecone
- Pinealocytes secrete melatonin
 - A hormone that regulates circadian rhythms, it regulates sleep cycle
- “Pineal sand” is radiopaque
 - Mineral deposits within pineal gland (often fluoride)
 - Used as a landmark to identify other brain structures in X-Rays

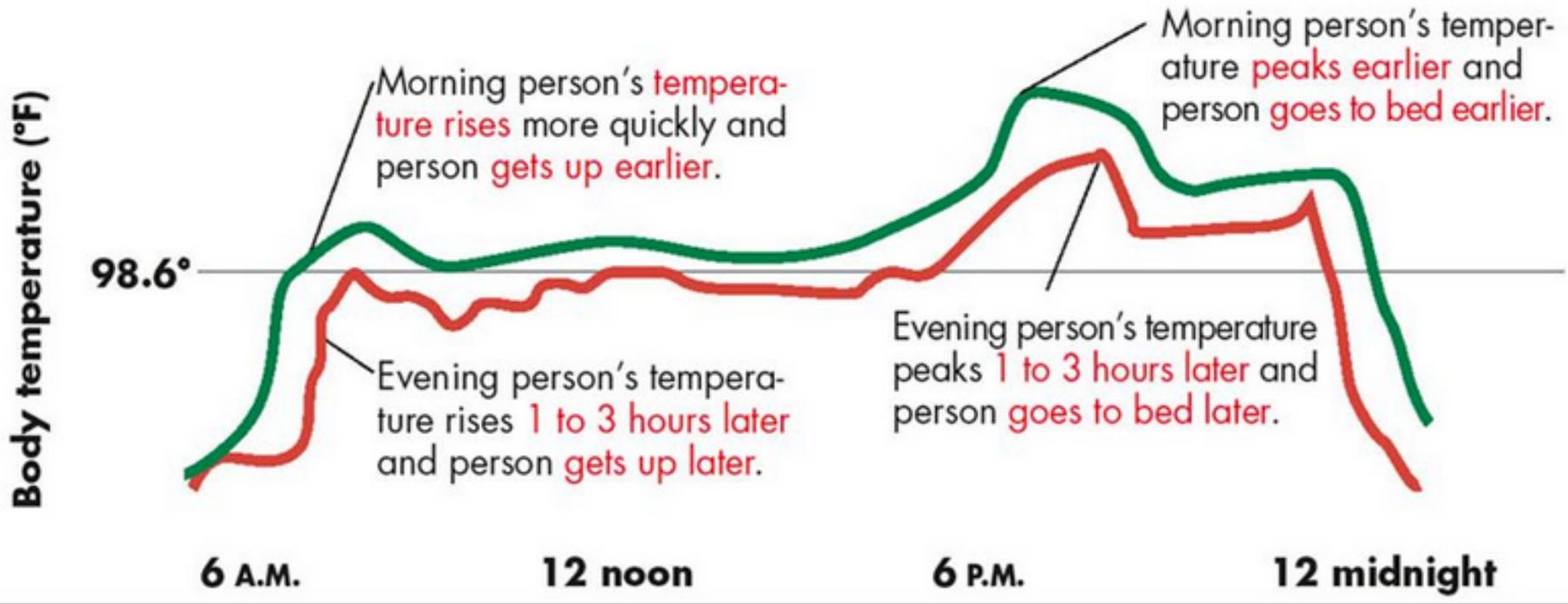


www.healthy-holistic-living.com/third-eye-kiss.html

Exploring the Third Eye, Your Pineal Gland



Your circadian rhythm for body temperature influences your sleep preferences



Changes in body temperature influence sleep preferences.

Number 1
treatment for
the pineal
is....



**Sleep in TOTAL
darkness**

And

DAILY SUNSHINE

Outside
A
Minimum
Of 30
Minutes



**Most common
symptom related to
Endocrine system?**

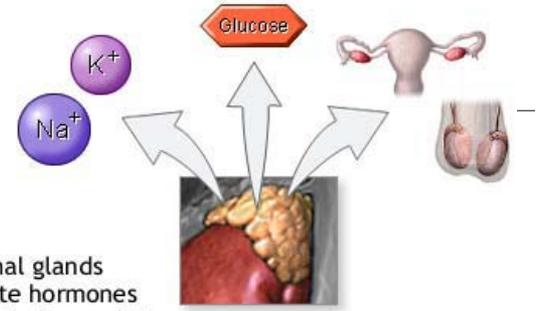
Many patients suffer a wide variety of symptoms that have *one* common denominator: low metabolic energy (fatigue).

Most metabolic problems fall into one of these categories:

1. Adrenal fatigue
2. Thyroid dysfunction
3. Toxic excess
4. Nutritional Deficiencies



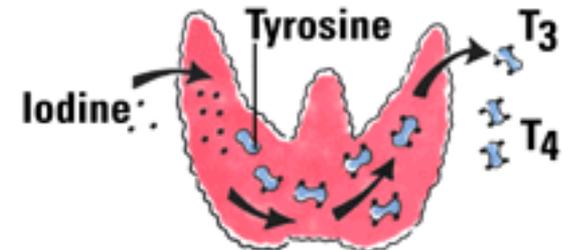
ADRENAL



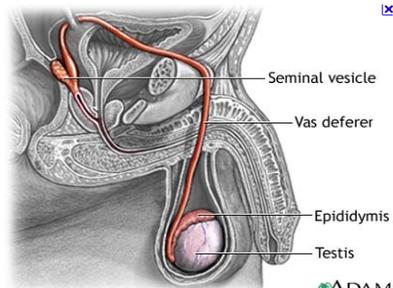
Adrenal glands secrete hormones which help regulate chemical balance, regulate metabolism and supplement other glands

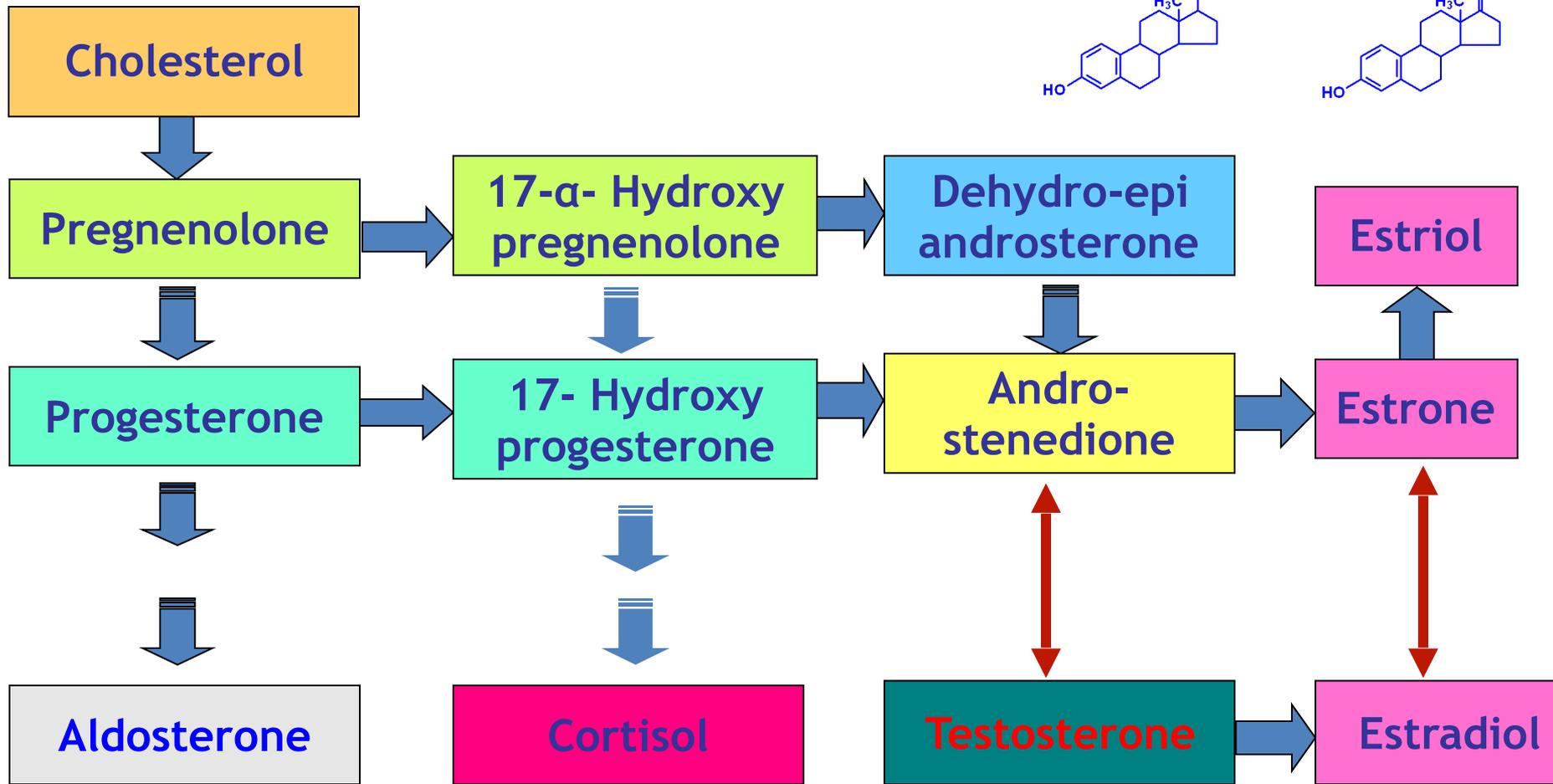
You can't treat one of these without treating the other two - always!

THYROID



OVARY/ TESTES

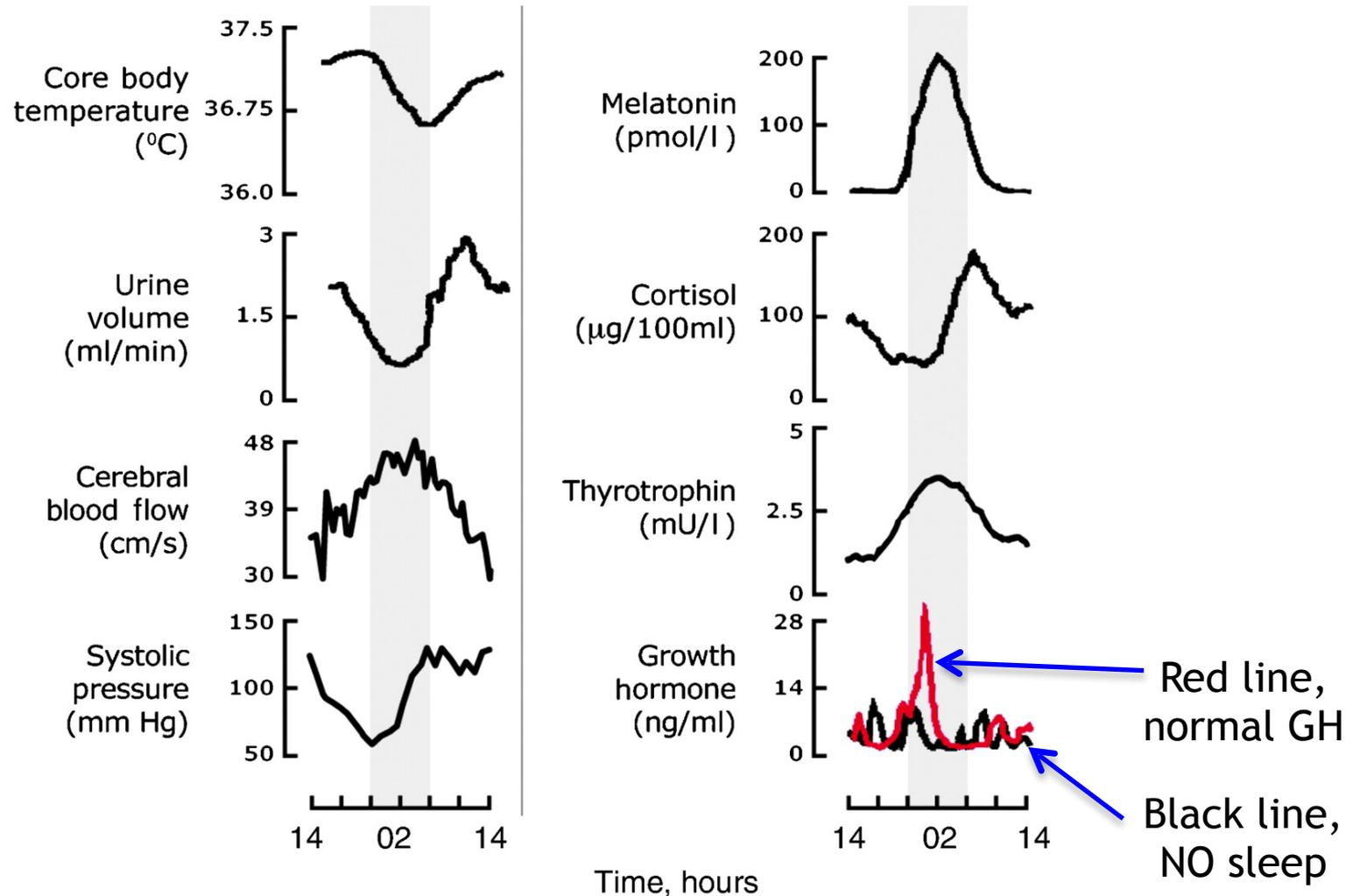






Hormone Testing

Representative physiological and endocrine circadian cycles in humans held under constant routine conditions.



Michael Hastings et al. J Endocrinol 2007;195:187-198

Cortisol Testing:

Saliva - ASI

The vials are very stable, even after 10 days at room temperature only changes by 10% (it changes because bacteria start to metabolize it). There are no enzymes so it is stable.

Free cortisol will correspond to ASI results
J Steroid biochemistry 1987; 27: 81-94

Serum - represents bound and does not give a sense of rhythm

Urine – new testing also collects 4 different samples
Dried Urine Testing for Comprehensive Hormones (DUTCH)

Test	Description	Result	Ref Values
------	-------------	--------	------------

NLASI CUSTOM ASI

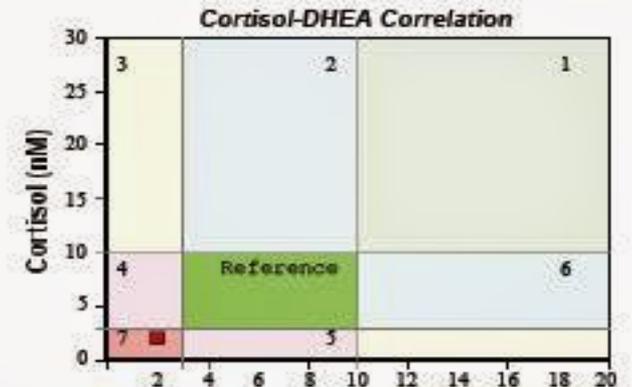
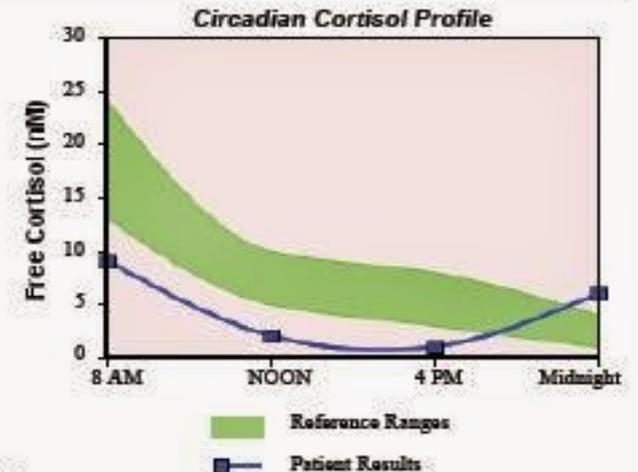
TAP	Free Cortisol Rhythm		
	06:00 - 08:00 AM	9 Depressed	13-24 nM
	11:00 - Noon	2 Depressed	5-10 nM
	04:00 - 05:00 PM	1* Depressed	3-8 nM
	10:00 - Midnight	6 Elevated	1-4 nM
	Cortisol Load:	18	23 - 42 nM

* Interpret in context of other values.

DHEA	Dehydroepiandrosterone	2 Depressed	Adults (M/F): 3-10 ng/ml
------	------------------------	-------------	--------------------------

KEY: CORTISOL-DHEA CORRELATION

1. Adapted to stress.
2. Adapted with DHEA slump.
3. Maladapted Phase I.
4. Maladapted Phase II.
5. Non-adapted, Low Reserves.
6. High DHEA.
7. Adrenal Fatigue.

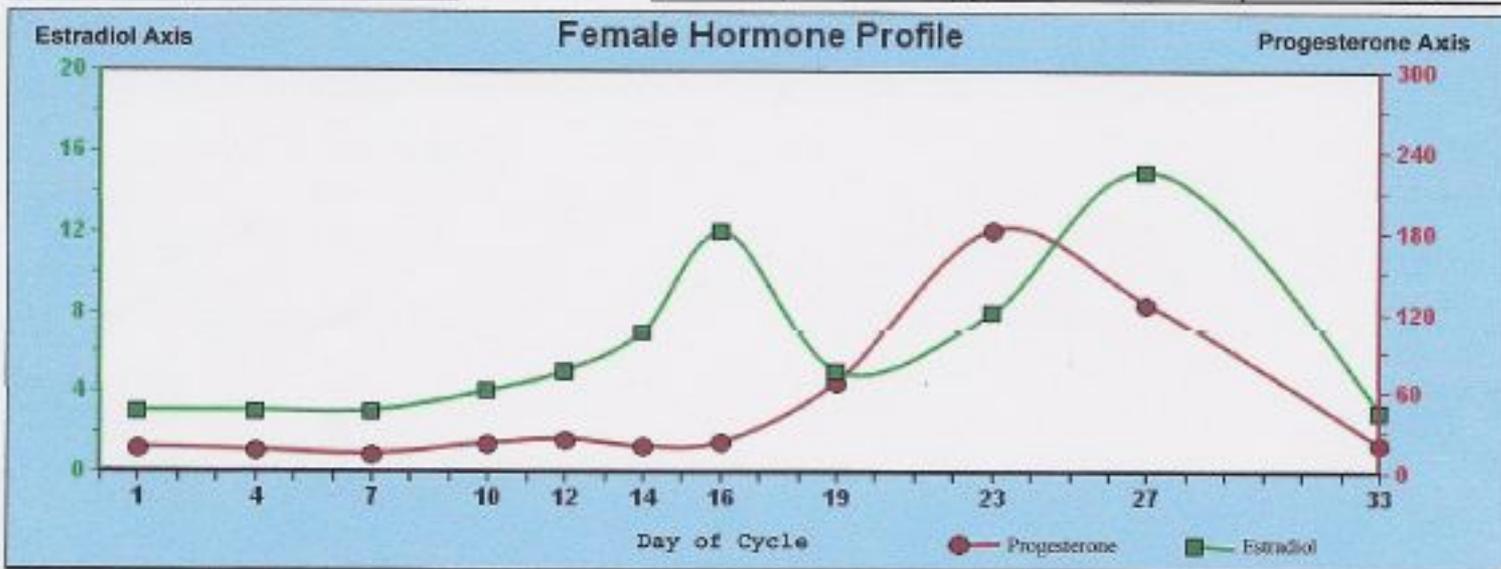


eFHP Expanded Female Hormone Panel

Day of Cycle	Day	1	4	7	10	12	14	16	19	23	27	33
Estradiol	pg/ml	3	3	3	4	5	7	12	5	8	15	3
Progesterone	pg/ml	18	16	13	21	24	19	22	67	182	127	20

Cycle Information	Start	06/15/2010
	End	07/17/2010
	Length	32
	Average	33

Ranges	Phase	Estradiol	Progesterone
	Follicular	5 - 13 pg/ml	20 - 100 pg/ml
	Preovulatory	10 - 30 pg/ml	
	Luteal	7 - 20 pg/ml	65 - 500 pg/ml



Test	Description	Result	Ref Values
DHEA	Dehydroepiandrosterone	5 Normal	Adults (M/F): 3-10 ng/ml
TTF	Free Testosterone	27 Elevated	Borderline: 5-7 pg/ml Normal: 8-20 pg/ml

Thyroid (serum) testing



Minimal check

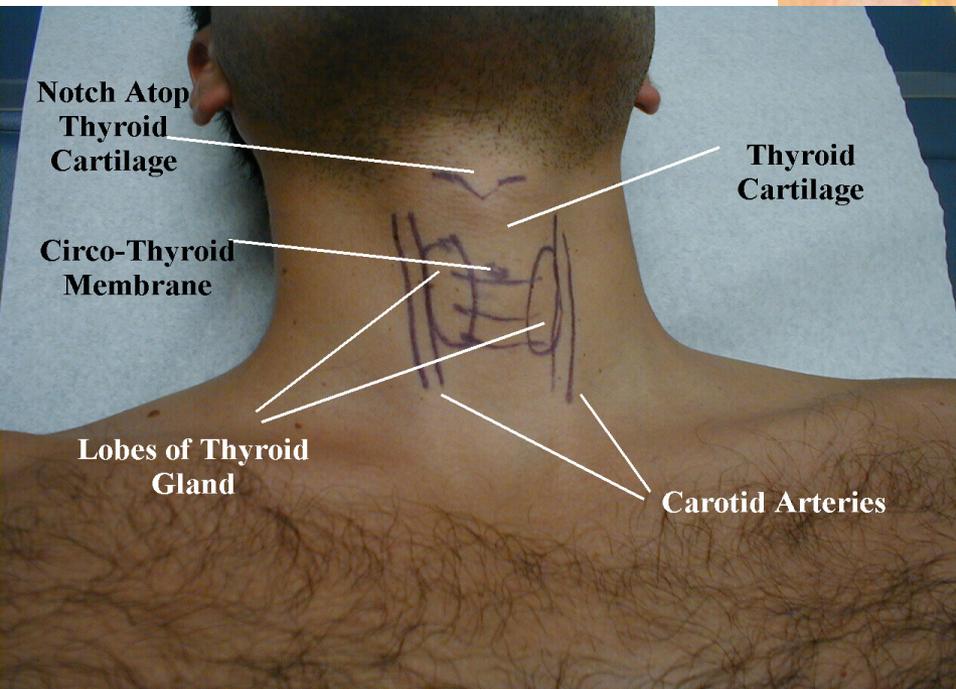
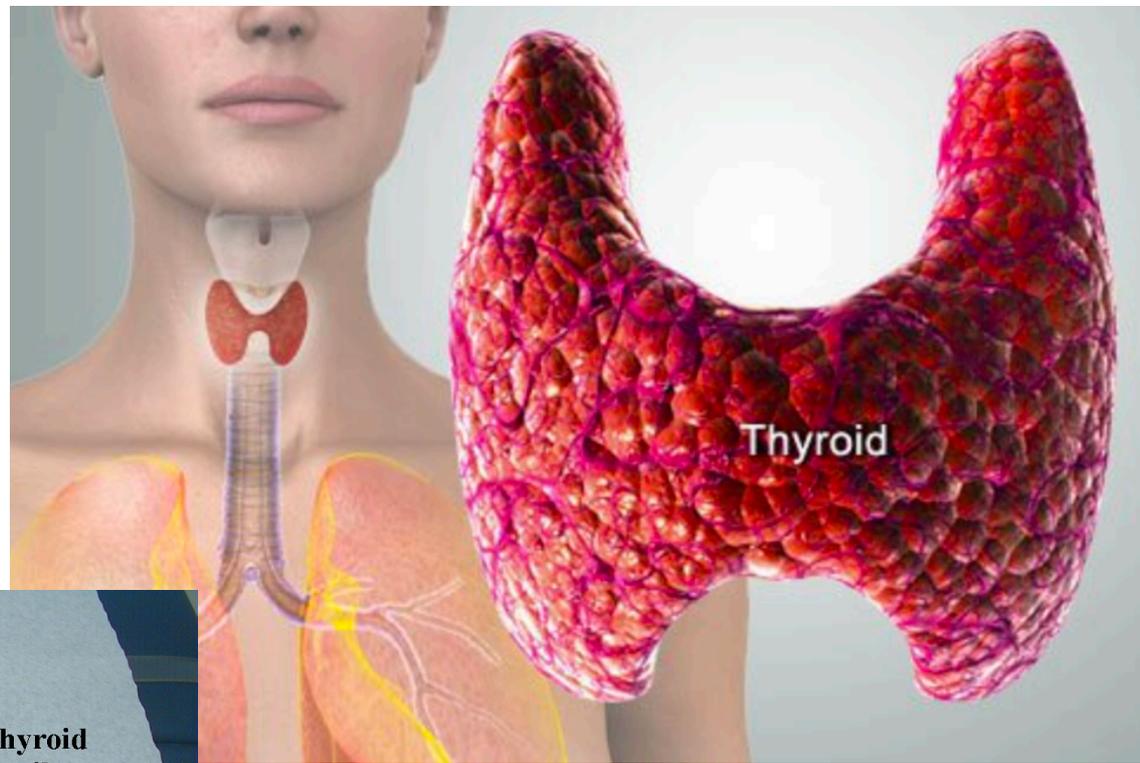
- TSH
- free T4
- free T3

Additional

- TPO (thyroid peroxidase antibodies)
- reverse T3

- tests for gluten
- Vitamin D

Thyroid location

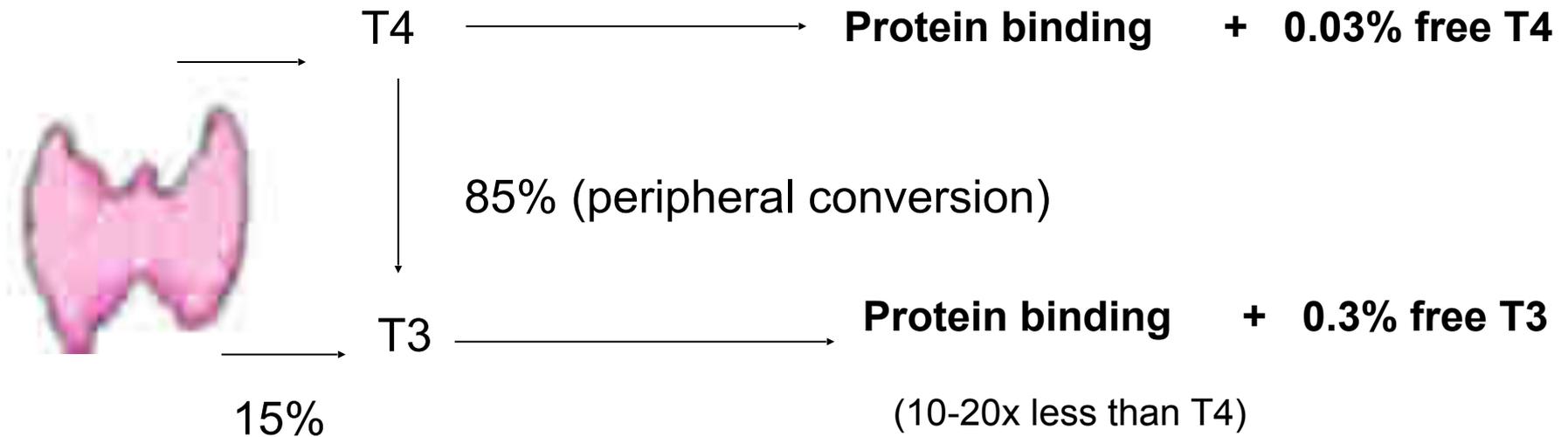


Normal Daily Thyroid Secretion Rate:

T4 = 100 ug/day

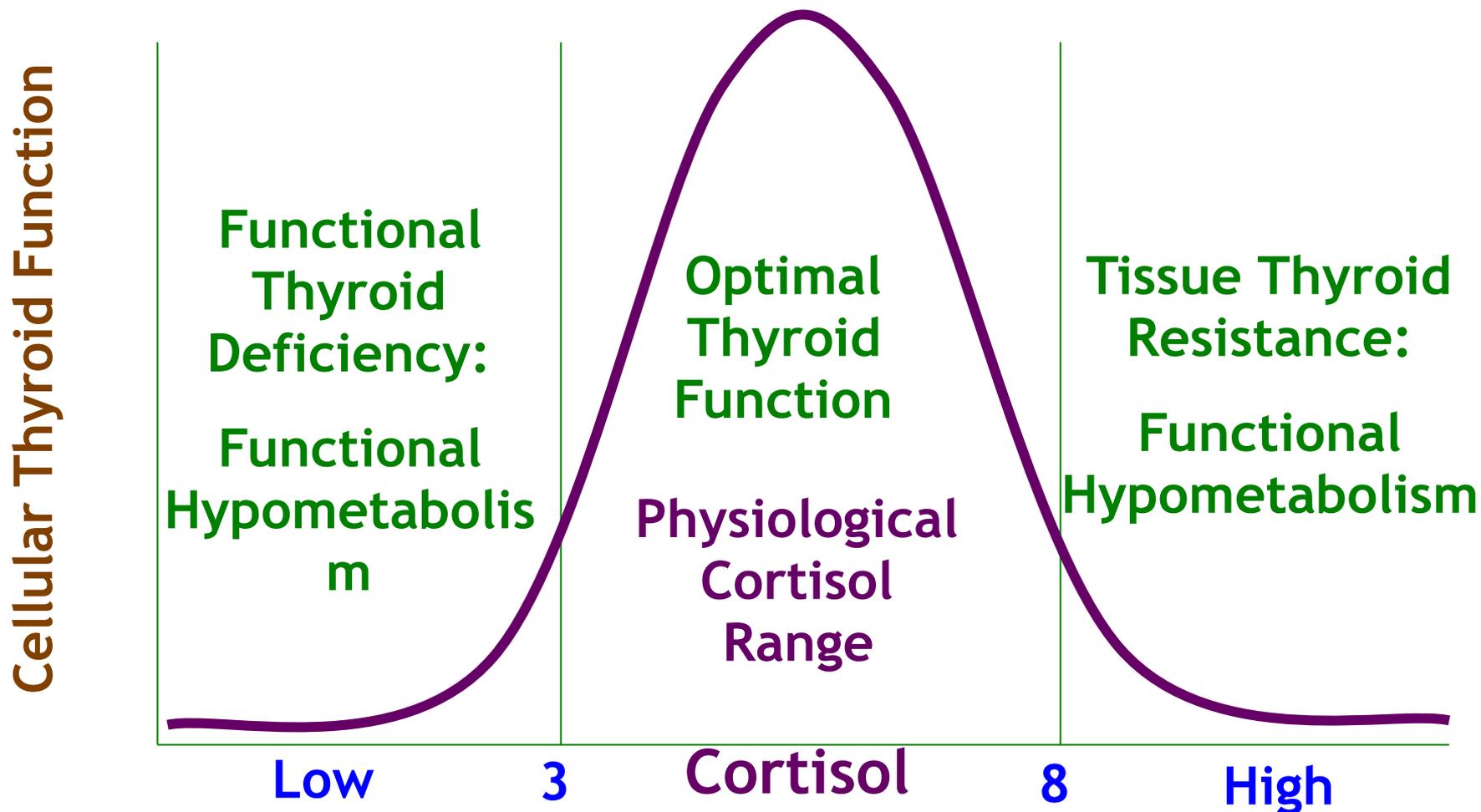
T3 = 6 ug/day

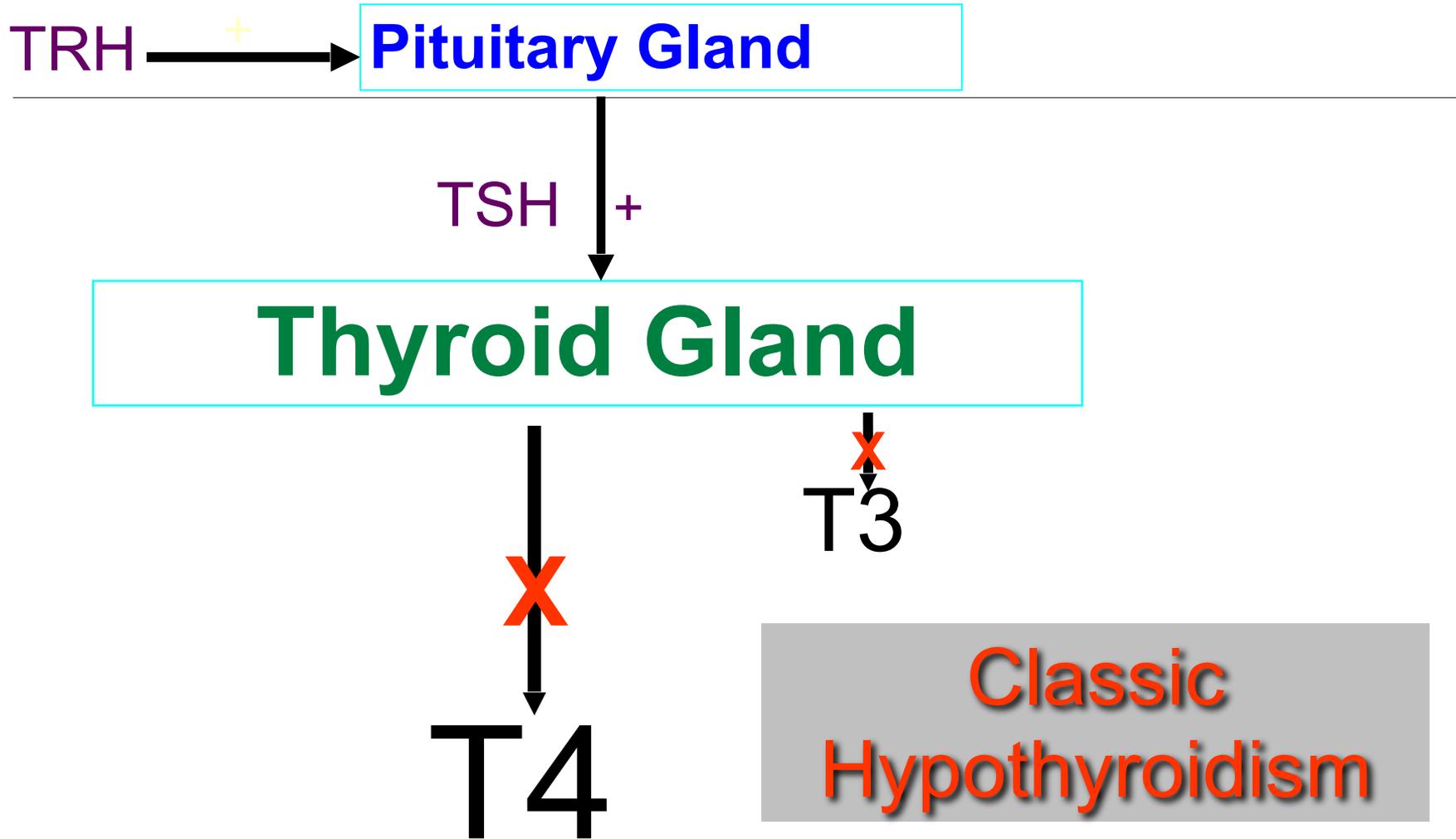
(ratio T4:T3 = 14:1)



T3 is ACTIVE hormone

Normal Thyroid Function Requires **Normal Adrenal Function**
Optimal thyroid receptor function is at a saliva cortisol level
of 3-8





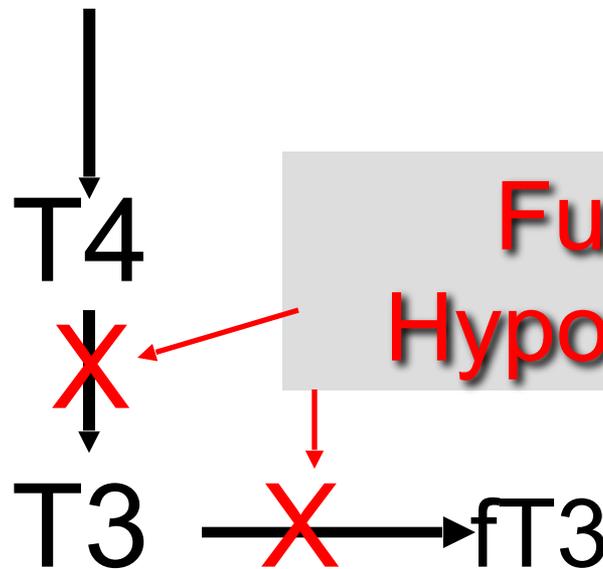
High TSH, low free T4, low free T3

TRH $\xrightarrow{+}$ Pituitary Gland

TSH \downarrow +

Thyroid Gland

Normal TSH
Normal T4
Low T3



Functional Hypothyroidism

Levothyroxine (T_4)

1/2 life few weeks (5 - 7 days)



5° deiodinase



Triiodothyronine (T_3) (12 hrs)

(**active** hormone)



5°(3) deiodinase



T_2 - (few hours)

(inactive metabolite)



5 deiodinase



Reverse T_3 - (few days)

(inactive)



5 (3) deiodinase



T_2 - (few hours)

(inactive metabolite)

As the body temp drops, 5 DI enz drops faster than 5° DI enz so have slightly higher T_3 which permits an increase in metabolism so an increase in temperature.

When overheated, the reverse is true, rT_3 can inhibit the conversion of T_4 to T_3

Factors That Inhibit T4 to T3 Conversion

Nutrient Deficiencies

- Vitamin A
- Vitamin B2
- Vitamin B6
- Vitamin B12
- Vitamin E
- Chromium
- Copper
- Iodine
- Iron
- Selenium
- Zinc

Medications

- Beta Blockers
- Birth Control Pills
- Estrogen Replacement
- Fluoride supplementation
- Iodinated Contrast Agents
- Chemotherapy
- Lithium
- Opiates
- Phenytoin
- Theophylline
- SSRIs

Factors That Inhibit T4 to T3 Conversion

Miscellaneous

- Aging
- Alcohol
- Cigarette Smoking
- Cruciferous Vegetables
- Diabetes
- Fasting/ starvation
- Growth Hormone Deficiency
- Hemochromatosis
- Lead
- Mercury
- Pesticides
- Surgery
- Radiation
- Stress
- Obesity

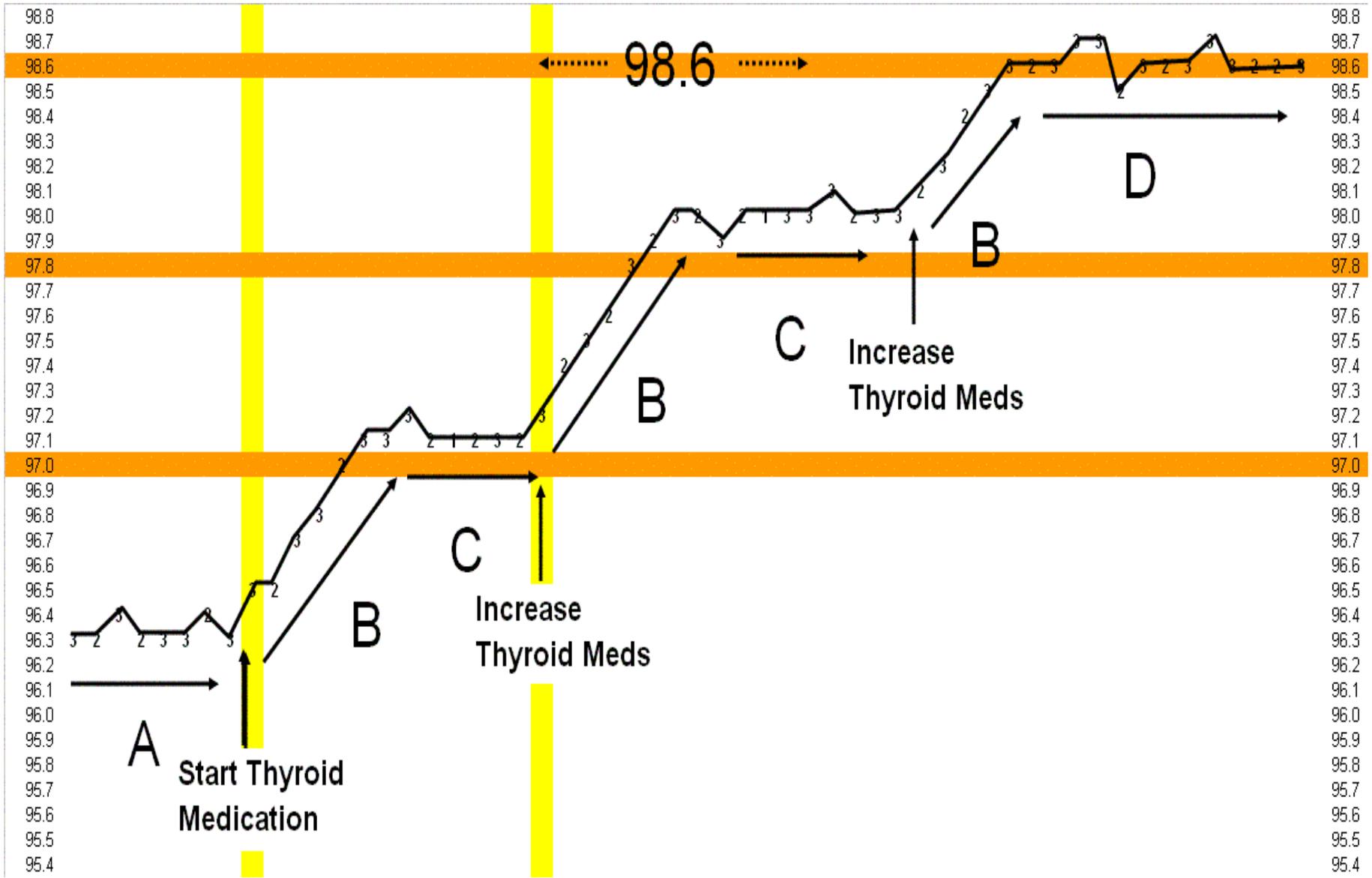
Basal Body Temperature

As life evolved & organisms became more sophisticated, the biochemistry of life required greater stability in thermo-regulation. The development of a stable body temperature allowed mammals to evolve elaborate neuronal systems that could tolerate variations in temperature. This consistency allows for homeostatic organ function to occur. The body temperature of humans is very accurately regulated to within a few tenths of a degree.

The ideal temperature (noon-time) is **98.6°F +/- 0.3°F**

How is the temp. regulated to within such a tight temp?

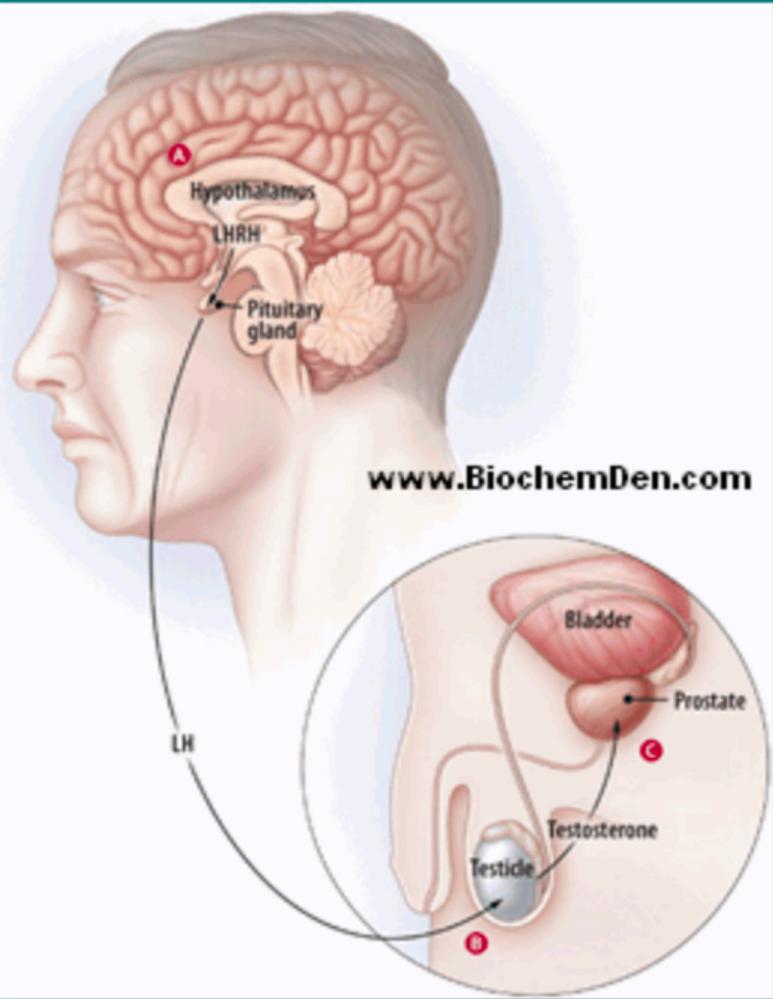
Via ENZYME systems



Dr John Tintera, the father of the hypoadreno- corticism idea says 60% of patients with low BBT are **NOT** hypothyroid.

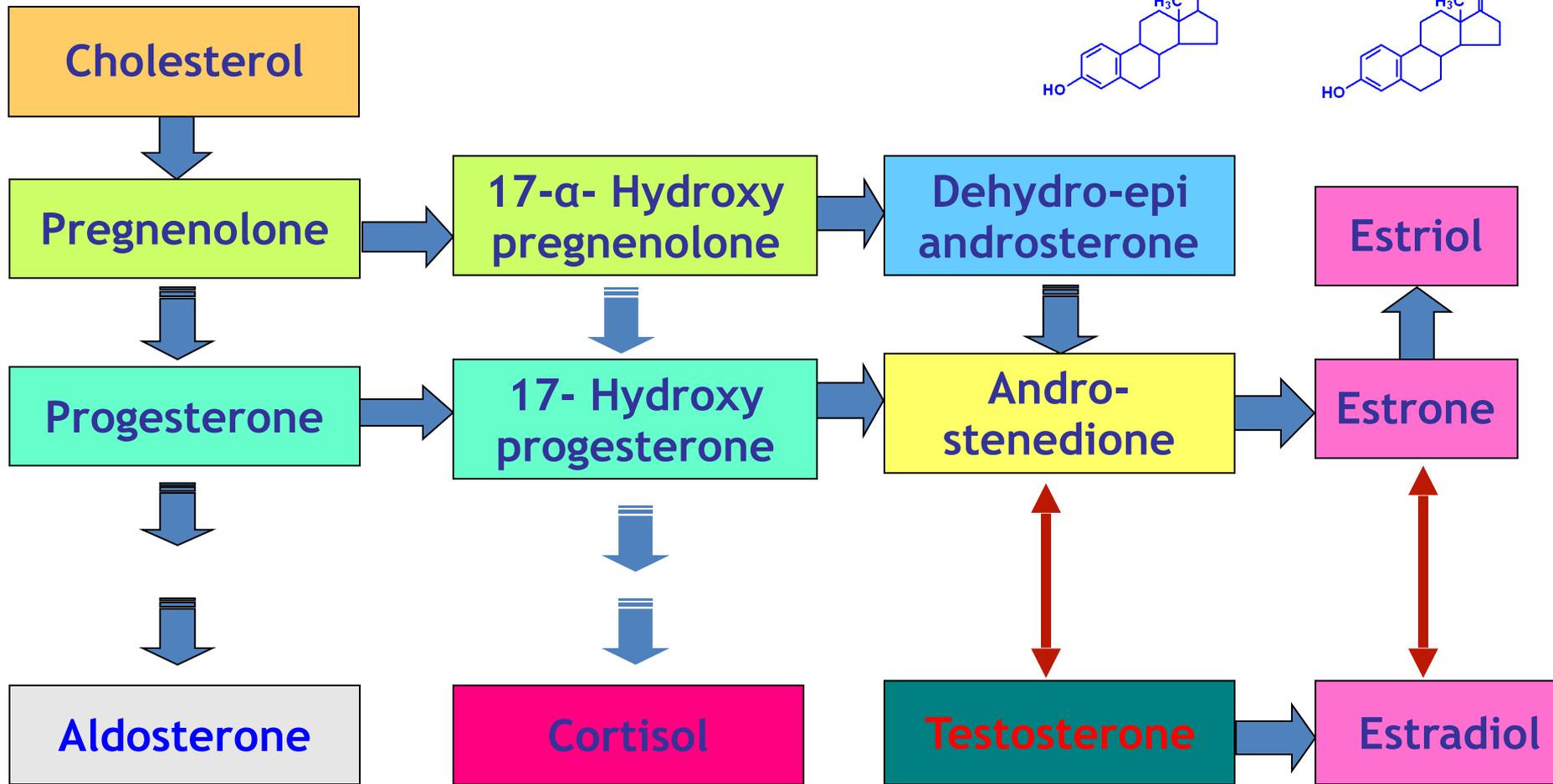
High cortisol levels suppress TSH as high cortisol with a low metabolic rate is an adaptation to the low utilization of glucose. The use of thyroid will make them feel well, but it will burn them up.

A MAJOR contraindication to thyroid replacement therapy is low adrenal function

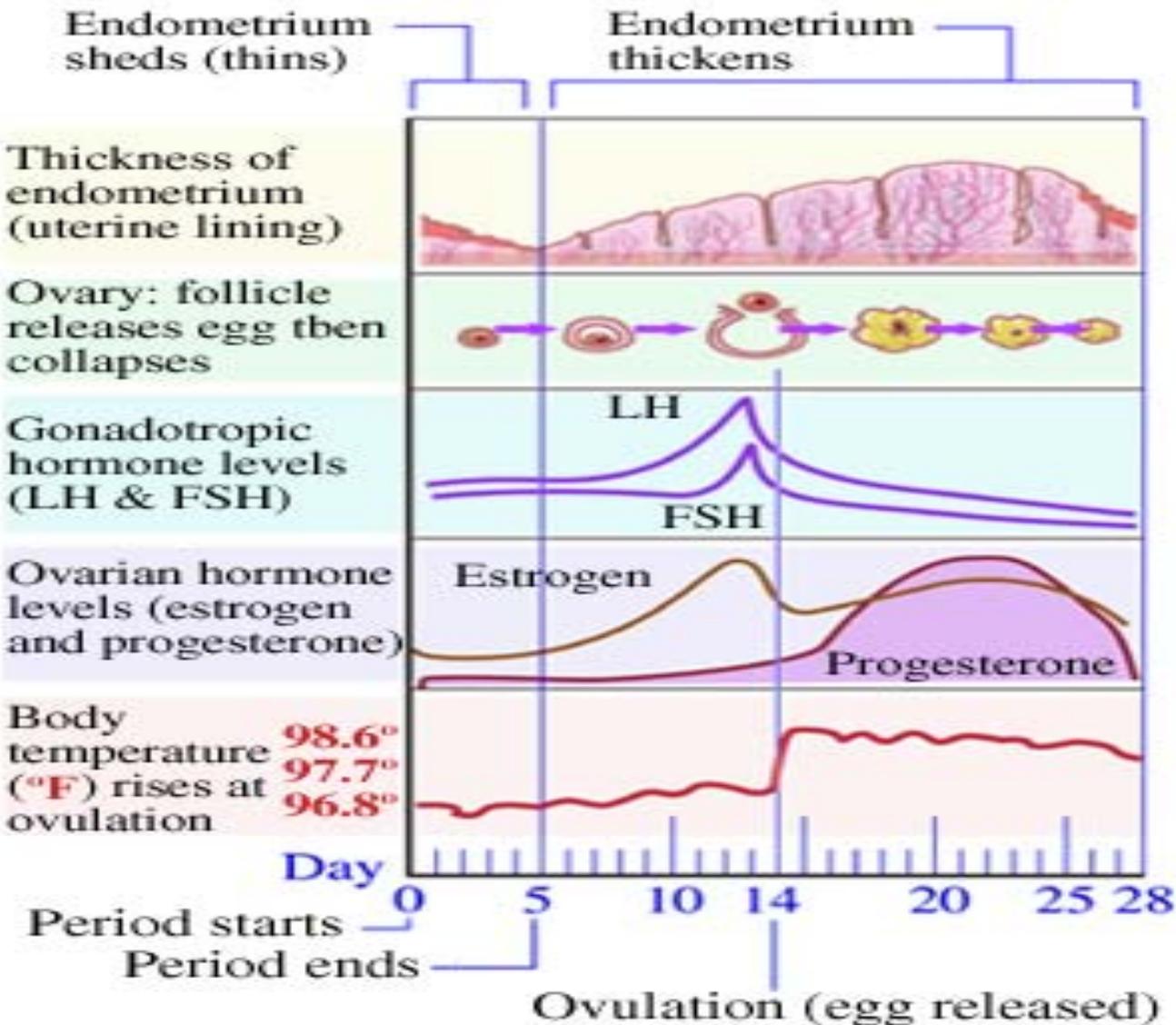


Gonads

Androgens
Progesterone
Estrogen



Phases of the menstrual cycle



**Number 1
treatment for
the Menstrual
Cycle is?**



**Sleep in TOTAL
darkness**

Except



Except:

- **Day Before**
- **Day of**
- **Day After**

**FULL
MOON**

General support for the menstrual cycle

Flax, Chia, Hemp seeds
Fish or Hemp Oil
(2000 - 3000 mg DHA/EPA)

Folliculinum

WAXING

D 8

“DOING”

FOLLICULAR

Hypophysinum

MENSES

NEW MOON

D1

OVULATION

Ovarinum

FULL MOON

D15

P.M.S.

LUTEAL

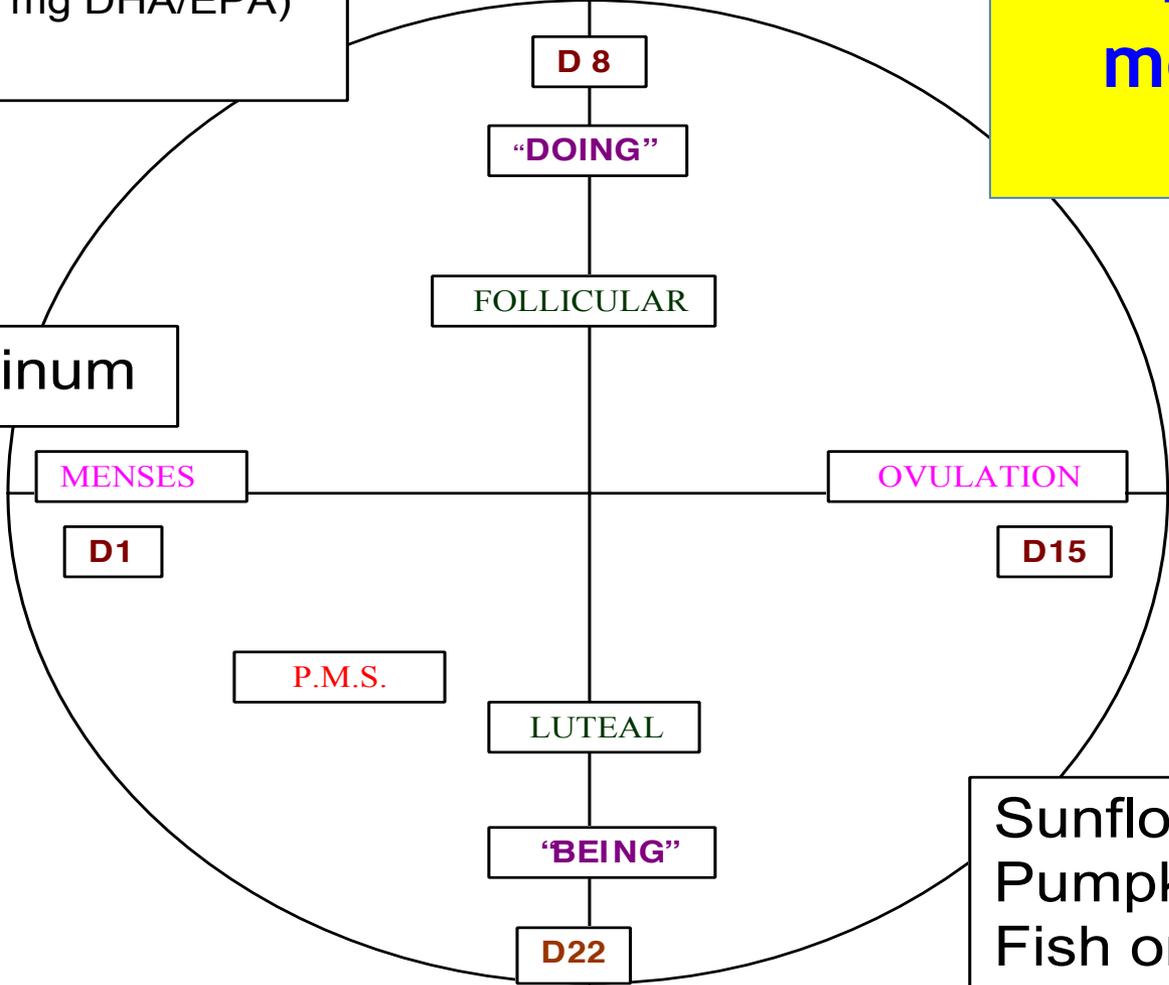
“BEING”

Sunflower, Sesame
Pumpkin seeds
Fish or Hemp oil
EPO (500 mg GLA)

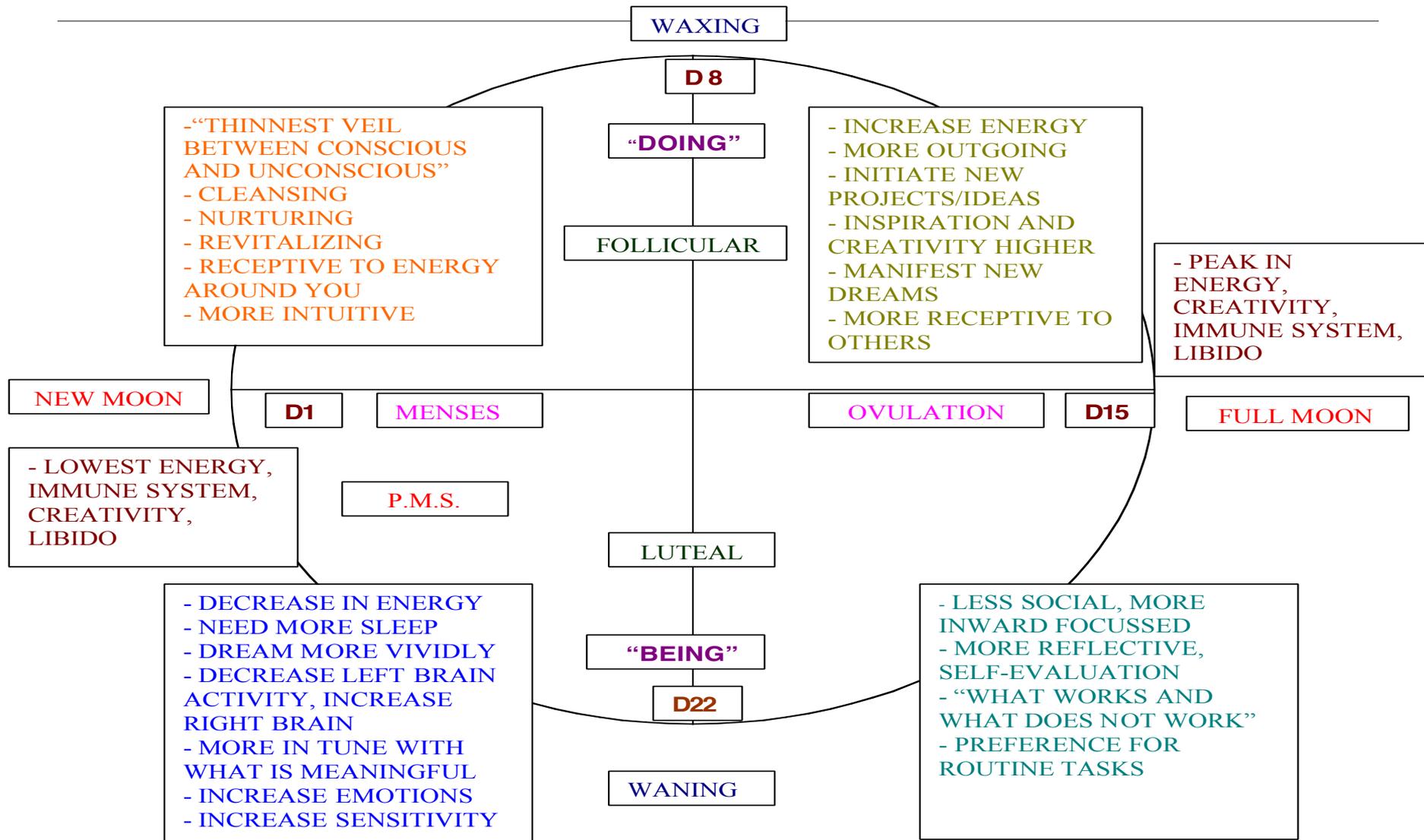
D22

WANING

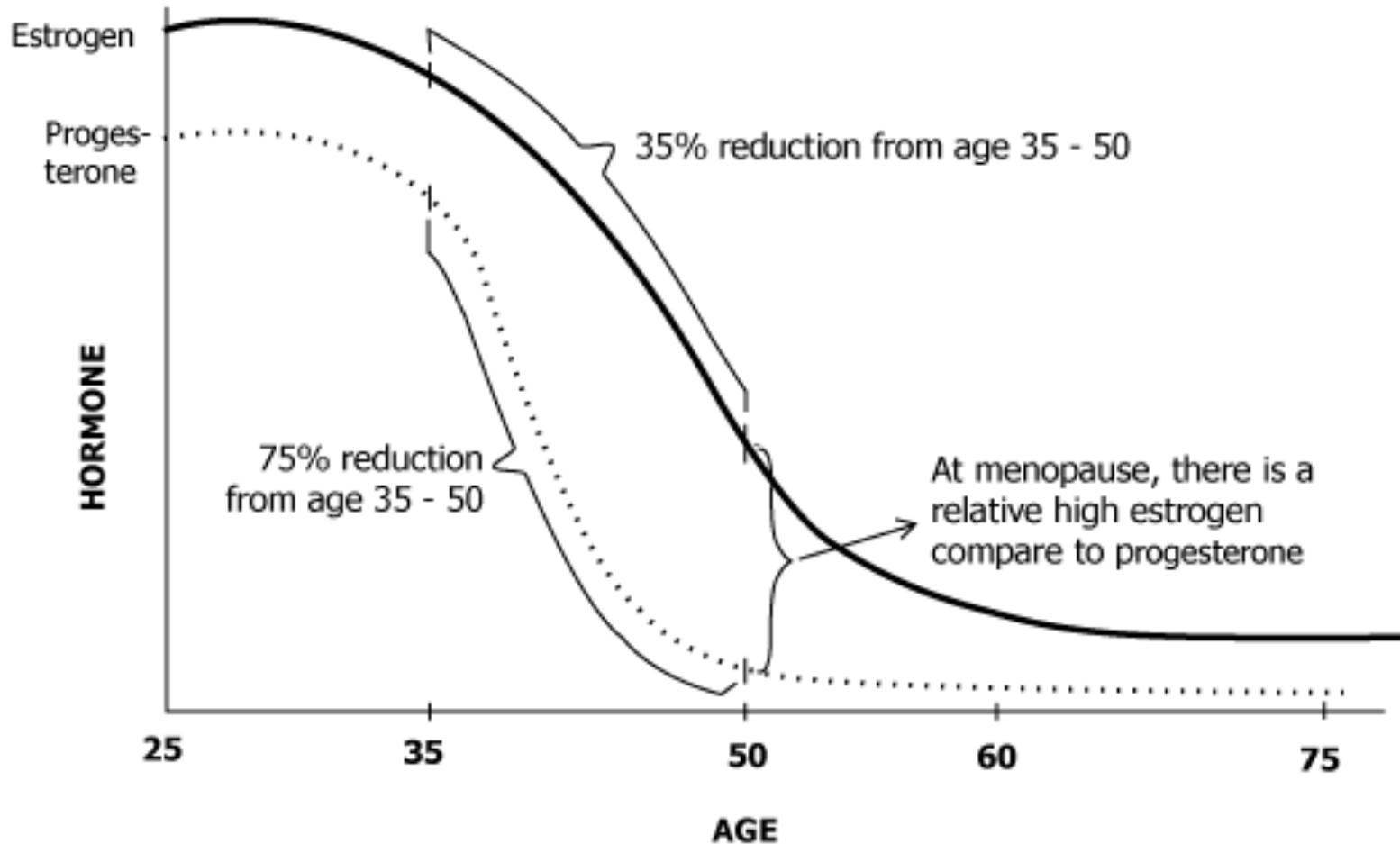
Luteinum



MONTHLY RHYTHMS



Changing hormone levels – Estrogen/ progesterone are relative to each other



Balancing Female Hormones

- All the BASICS
- B complex (Liquid B, Multi B, Active B)
- Magnesium
- EFA's: Fish oil, EPO, flax, borage, etc.
- Homeopathics:
 - HFE Ovarian drops
 - HAD Adrenal drops
 - HTHY Thyroid drops
- Organotherapies:
 - Hypophysinum 200K
 - Folliculinum 200K
 - Ovarinum 200K
 - Luteinum 200K
- Single remedies

Balancing Female Hormones

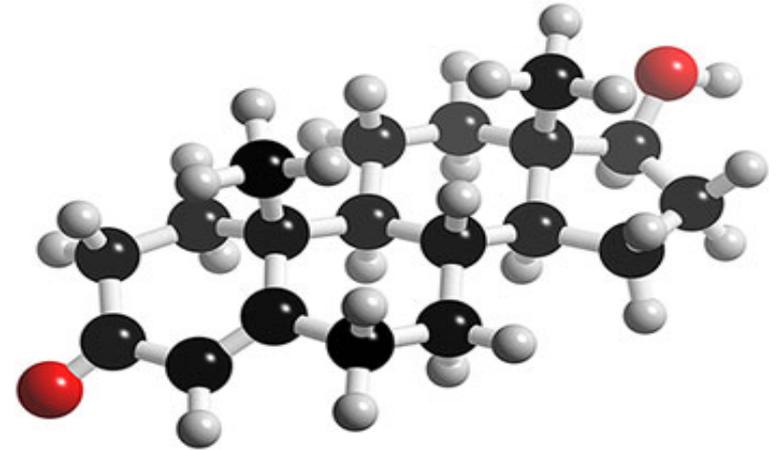
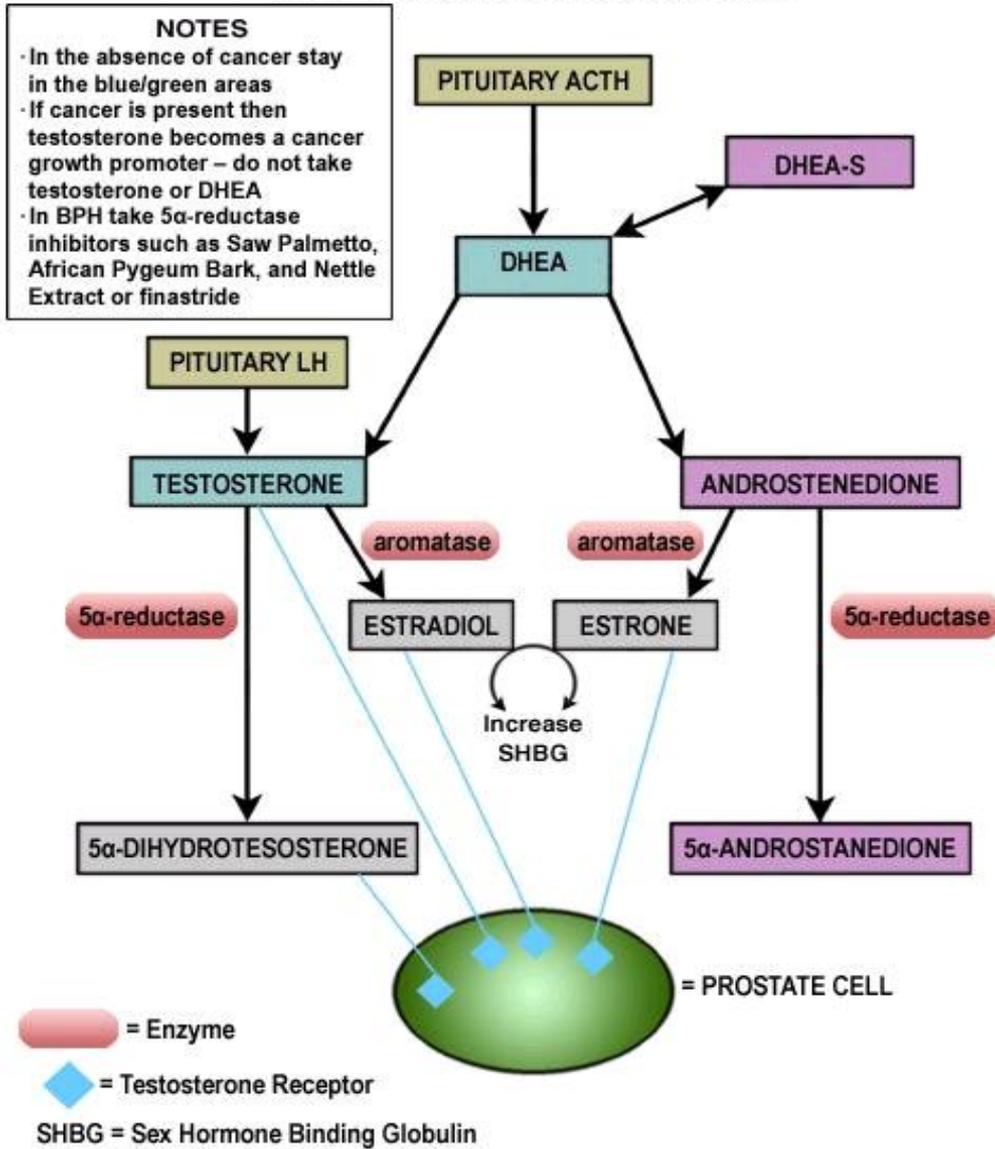
Progesteronic:

- Dioscorrea
- Glycyrrhiza glabra
- Smilax spp.
- Aletris farinosa
- Capsella bursa pastoris
- Gingko biloba
- Cratageus oxycantha
- Avena sativa
- Chamaelirium luteum
- Humulus lupulus
- Hypericum perforatum
- Leonorus
- Urtica dioica
- Rubus idaeus
- Scutellaria baicalensis
- Vitex agnus-castus
- Viburnum prunifolium

Phytoestrogenic:

- Medicago sativa
- Angelica sinensis
- Trifolium pratense
- Glycyrrhiza glabra
- Arctium lappa
- Foeniculum vulgare
- Salvia officinalis
- Achillea millefolium
- Allium sativa
- Calendula officinalis

MALE HORMONE PATHWAYS



Testosterone

Testosterone

Fetus - test. and its metabolite dihydrotestosterone (DHT) are necessary for formation of internal/ external male genitalia.

Puberty - deepening of voice, growth of facial and body hair, stimulate sexual behavior, initiates sperm formation

Adult - maintain muscle mass and strength, bone mass, normal hair growth, libido, and sperm production.

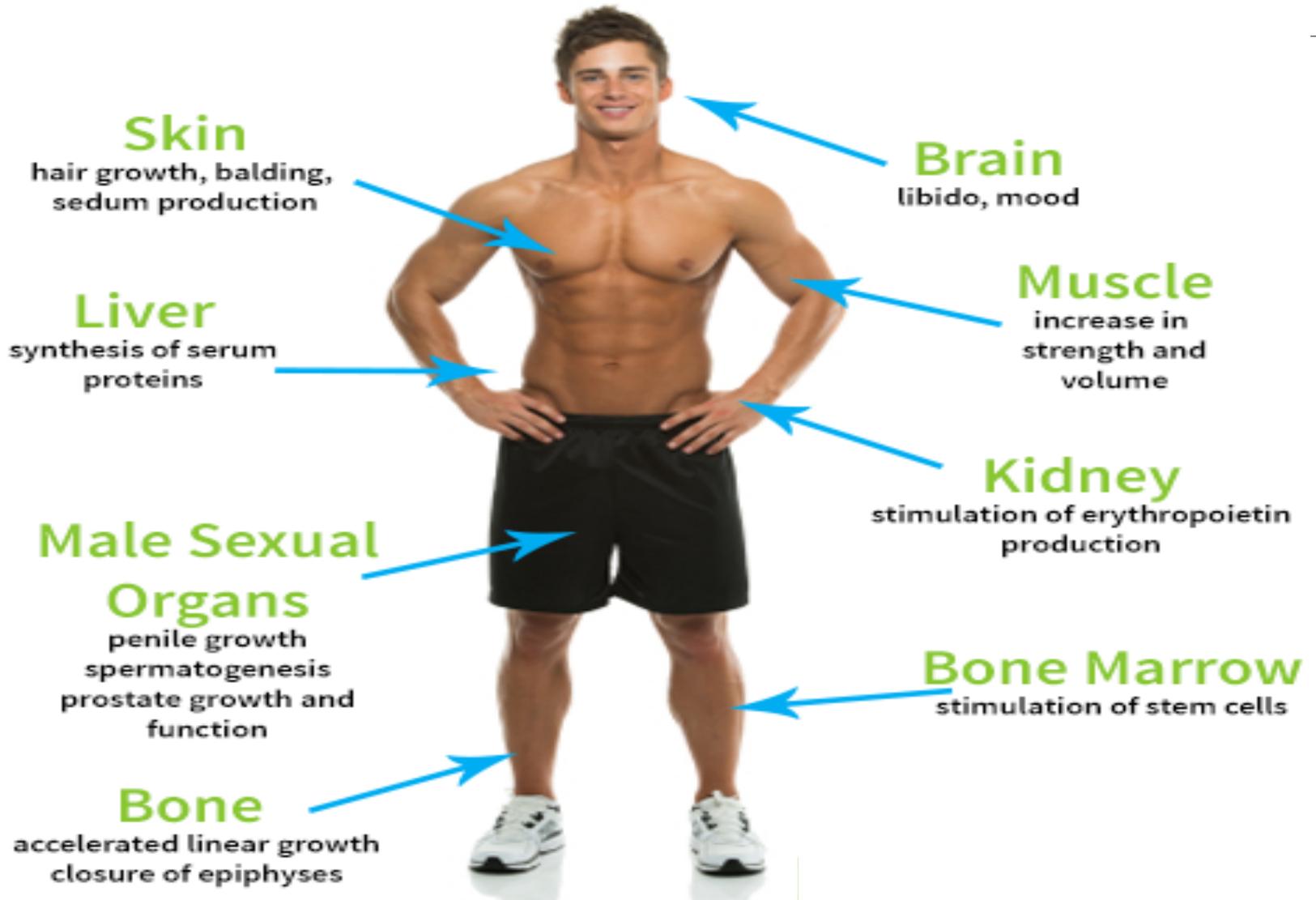
Testosterone

- Normal range is wide
 - 270 -1070ng/dl in males
 - 6-86ng/dl in women
- Secretion surges 8x a day, peaks at 8AM & lowest at 10 PM
- Between 25-50 yrs old, test. levels decrease by about 50% while estrogen levels rise by 50% which produces a variety of symptoms.
- One of its functions during pregnancy is the signaling of the genetically male embryo to develop as a male.

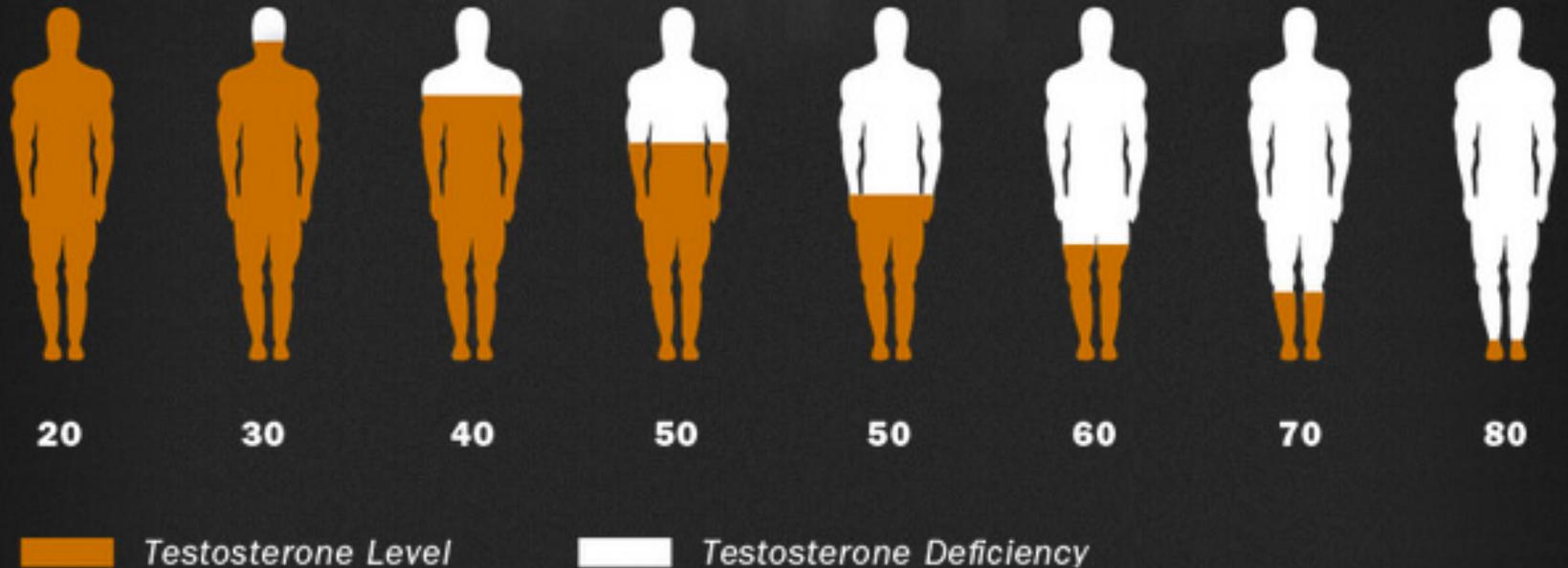
Testosterone

- It is responsible for a sense of well being, sexual libido and vital energy.
- In young women signals the growth of pubic and axillary hair.
- It also stimulates the skin to produce more oil, contributing to teenage acne, but also gives shine to the hair and a healthy glow to the skin.
- There are receptors in the nipples, clitoris and vagina, making these areas sensitive to sexual stimulation.
- It also helps the normal functioning of bones, muscles, helping to maintain growth of these tissues.

TARGET ORGANS OF TESTOSTERONE



MALE TESTOSTERONE PRODUCTION WITH AGE



MODERN MEN LACK TESTOSTERONE

If you are suffering from low testosterone you may experience the following:



01

FATIGUE AND
LOSS OF STAMINA



02

POOR SEXUAL
PERFORMANCE



03

REDUCED
SEX DRIVE



04

LACK OF JOY
& HAPPINESS



05

MUSCLE
WEAKNESS

Testosterone replacement

via gels, creams, capsules, lozenges, patches, injections, or pellets implanted under the skin.

Several brand names include:

Androderm

AndroGel

Axiron

Fortesta

Striant

Testim

Testopel

Testred

(and many more)

Testosterone Warnings

- Gels and topical solutions have a black box warning about risks to children as accidental exposure may result in:
 - Penis or clitoris enlargement
 - Pubic hair growth
 - Increased erections and libido
 - Aggression
 - Aging of bones

Testosterone Warnings- Protection

- Cover application site with clothing
- Wash hands after application
- If accidental skin to skin contact, wash affected areas immediately
- Be careful about exposure via bed sheets, upholstery, pillows, clothing
- Pregnant women should not touch the product

Testosterone Adverse Affects

- In 2015, the FDA issues guidance regarding a possible increased risk of stroke and heart attack.
- Possible SE include excessive conversion to estrogen, over-stimulated libido, acne, excessive development of male breasts, weight gain, edema, sleep apnea, urinary obstruction, and high RBC count.
- May increase risk of prostate cancer and worsen BPH

Too much estrogen in men?

In men, testosterone combines with enzyme aromatase to produce estrogen when and where needed. Estrogen sensitive areas include brain. Most men have a problem with too much estrogen. The aromatase displaces testosterone at the receptor sites and "turns off" testosterone driven activities and at times is stuck in the "off" position.

Illness, drugs, dietary imbalances, lifestyle accelerate this process and raise estrogen levels to unhealthy heights.

Too much estrogen in men?

Common causes of elevated estrogen levels are:

- Age related increases in aromatase activity
- Changes in liver function
- Obesity
- Alcohol abuse
- Drug abuse (amphetamines, marijuana, cocaine)
- Zinc deficiency
- Ingestion of estrogen enhanced foods or environmental substances
- Drug related estrogen imbalances (e.g. OTC pain relievers, anti-inflammatory drugs (e.g. ibuprofen, aspirin); antibiotics, anti-fungals, cholesterol lowering drugs, anti-depressants, heart/ BP meds.)

Too much estrogen in men?

Also, increased estrogen tricks the brain that a supply of testosterone is adequate which slows down natural production of testosterone. The estrogen saturates testosterone receptors in the hypothalamus region. This then reduces secretion of LH, which is the stimulus for the gonads to produce testosterone. Increased estrogen also increases the production of sex hormone-binding globulin (SHBG) which binds free testosterone and makes it unavailable to cell receptor sites.

And high est. and low test leads to increased risk of MI or CVA problems and also BPH

Testosterone for Women

- Is produced in the adrenal and ovaries and may be linked to libido
- May help some sx's of menopause such as hot flashes, sweating, insomnia, mood, anxiety, memory, low sexual desire
- It may increase acne and abnormal hair growth

Increasing Testosterone Levels

1. Zinc- oysters, fish, beans, fermented foods
2. Vitamin D (over 50 ng/ml at least)
3. Limit processed sugar
4. Increase vegetable carbohydrates and healthy fats (olive oil, coconut, raw nuts, avocados, grass fed meat)
5. High intensity interval training, strength training
6. Stress management is key
7. Patent products with L-arginine, fenugreek, avena sativa, beet root, tribulus

