

Effects of removal of gonads; menopause

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Removal of testes: Male hypogonadism

- Before puberty: Eunuchoidism
 - Permanent sterility-absence of testosterone
 - Pubertal changes do not occur
 - No growth of hair on face and trunk
 - Growth of larynx arrested-high pitched voice
 - Body configuration resembling adult female-abnormal deposition of fat on hips and breasts, narrow shoulders, broad hips
 - Muscles are soft and poorly developed

- Underdevelopment of external genitalia
- Tall stature due to delay in union of epiphysis.

After puberty-

- Atrophy of seminal vesicles and prostate
- Psychological changes-irritability and depression.
- Life span, intelligence are not affected.

Removal of ovaries

- Before puberty:
puberty does not sets in
menstrual flow does not appear
secondary sexual characteristics does not develop.

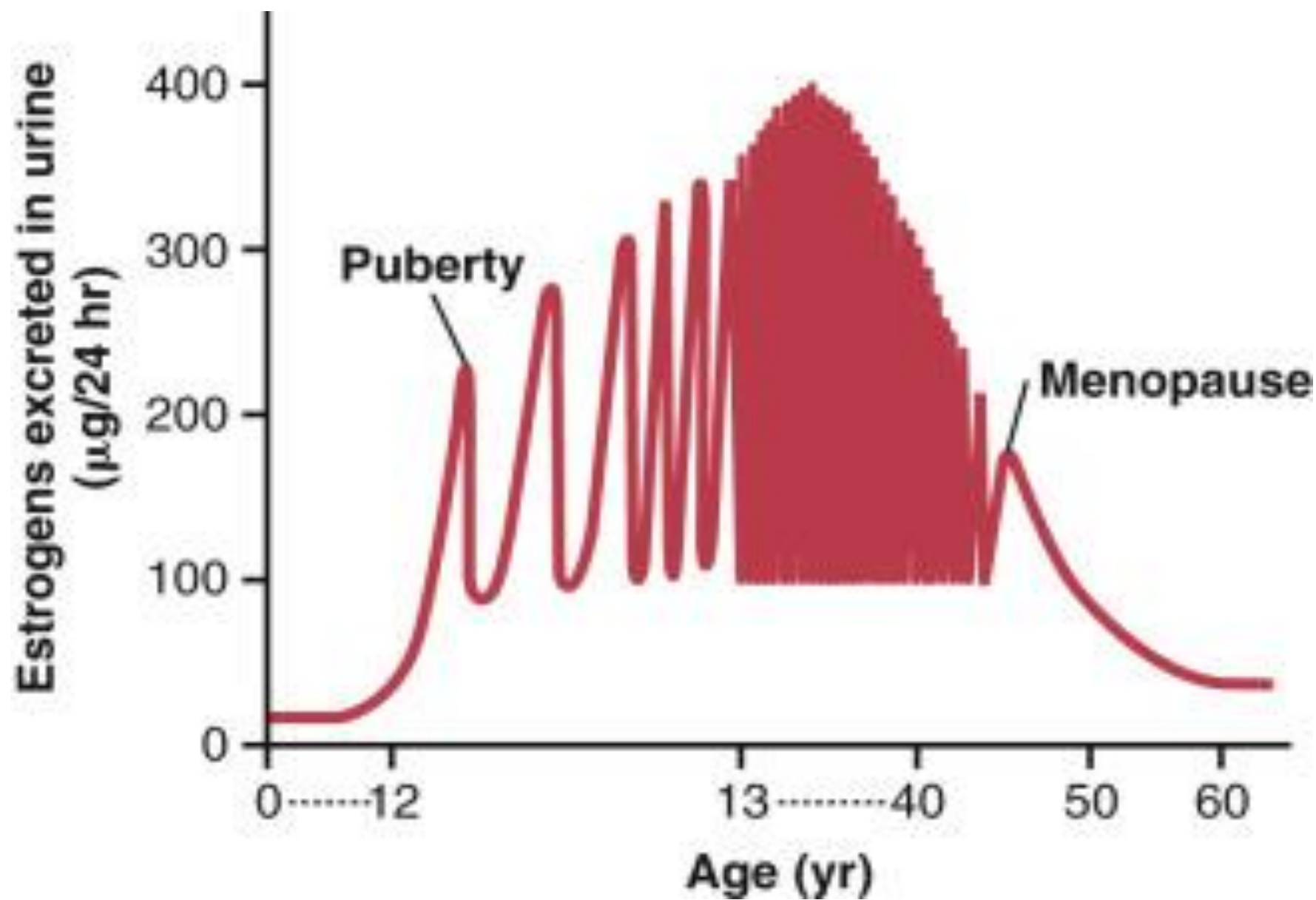
- Ovariectomy in adults:

When ovaries are removed surgically in a sexually mature female, it leads to following effects:

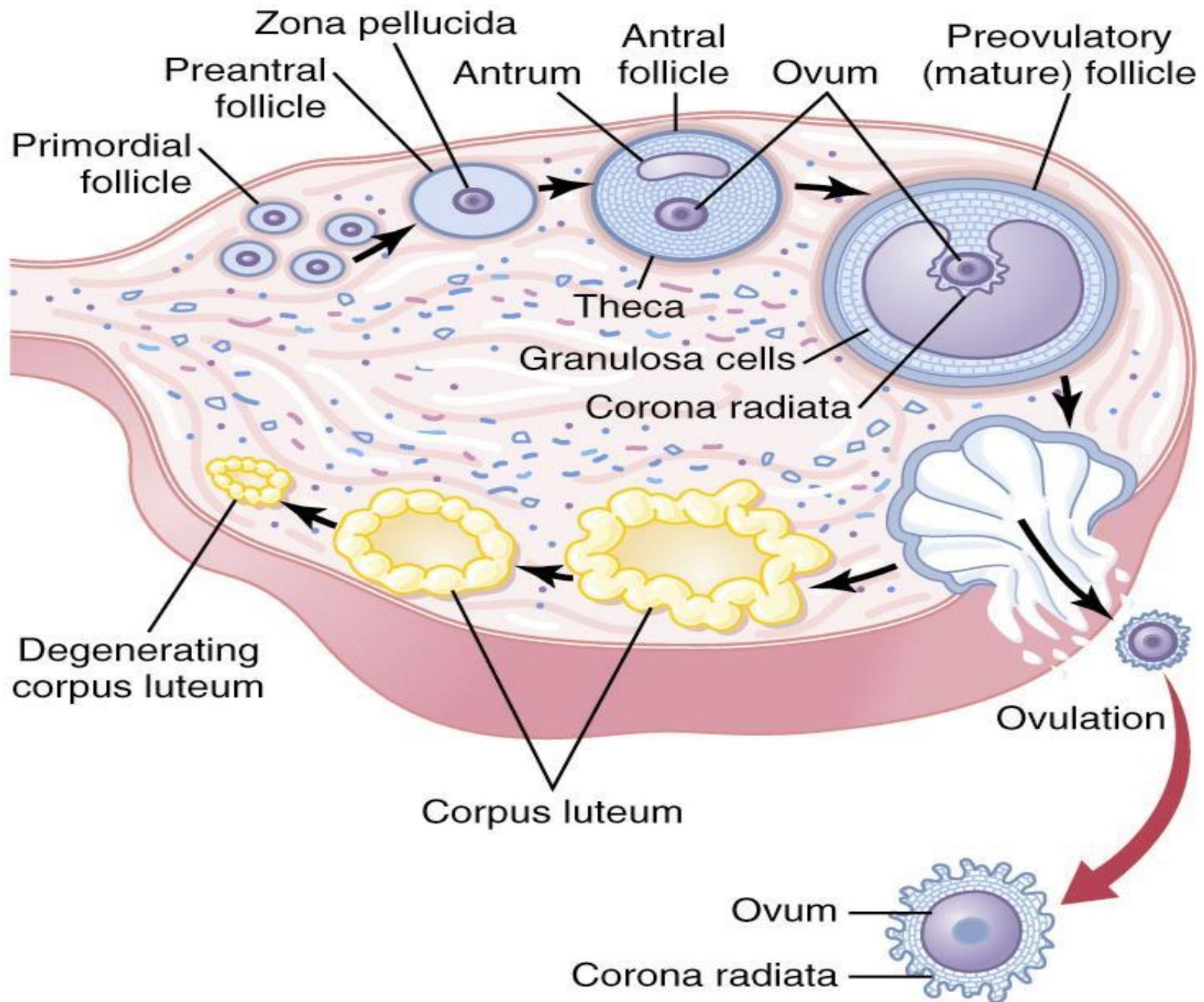
- Atrophy of genital tract (i.e. uterus, vagina and external genitalia),
- *Stoppage of menstruation permanently*
- *Breast changes.* Breasts may enlarge or get atrophied.
- *Vasomotor changes;* such as flushing of skin of face, neck and chest (hot flushes), feeling of warmth
- Emotional disturbances such as irritability and depression.
- Obesity –due to diffuse deposition of fat.

Menopause

- At age 45 to 55 years, the sexual cycle usually becomes irregular and ovulation often fails to occur. After a few months to a few years, the cycle ceases altogether.
- The period during which the cycle ceases and the female sex hormones diminish to almost none is called *menopause*.
- Perimenopause is period before menopause which starts 8-10 yrs before menopause.

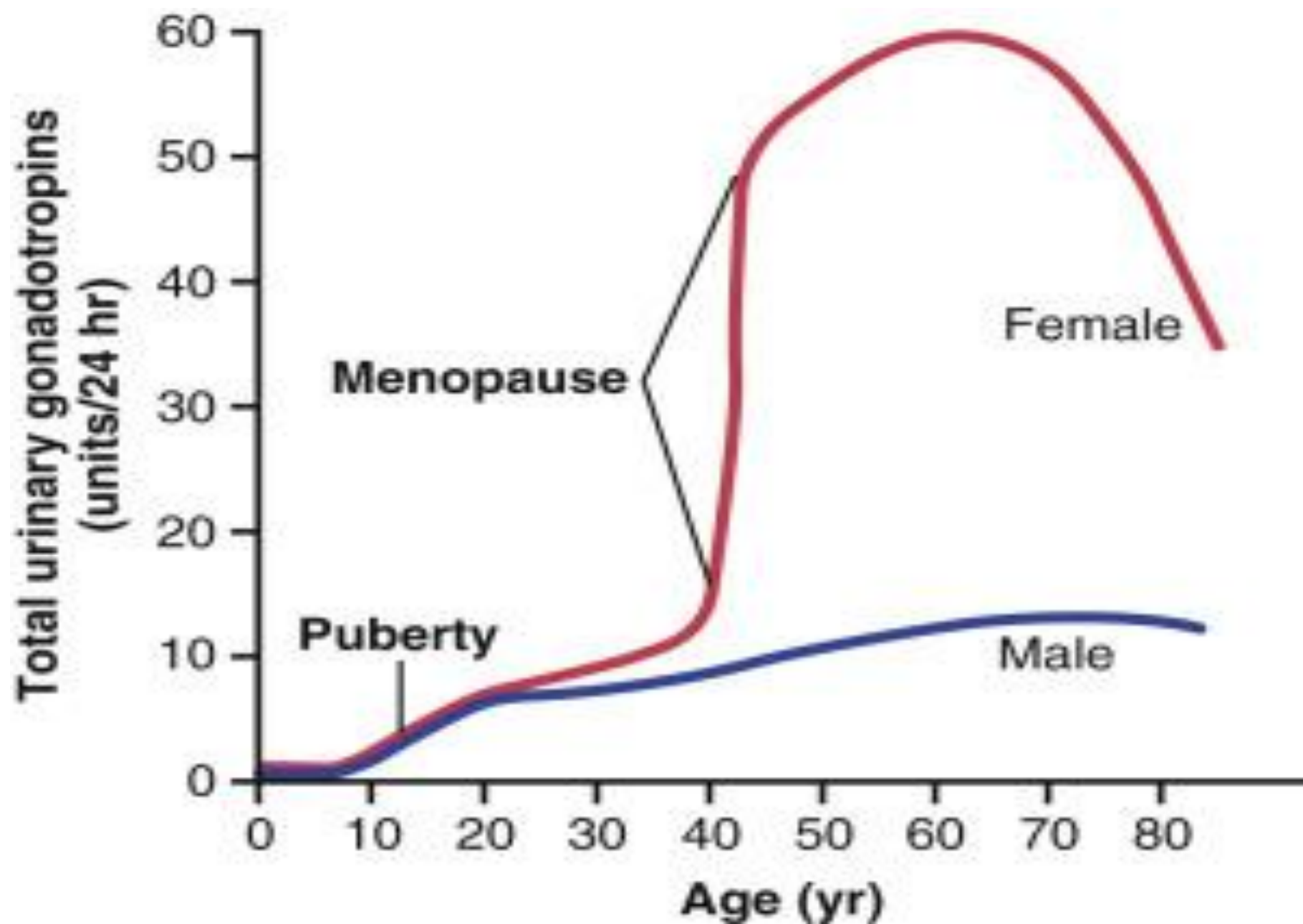


- The cause of menopause is “burning out” of the ovaries.
- Throughout a woman's reproductive life, about 400 of the primordial follicles grow into mature follicles and ovulate, and hundreds of thousands of follicles degenerate.
- At about age 45 years, only a few primordial follicles remain to be stimulated by FSH and LH, and the production of estrogens by the ovaries decreases as the number of primordial follicles approaches zero.

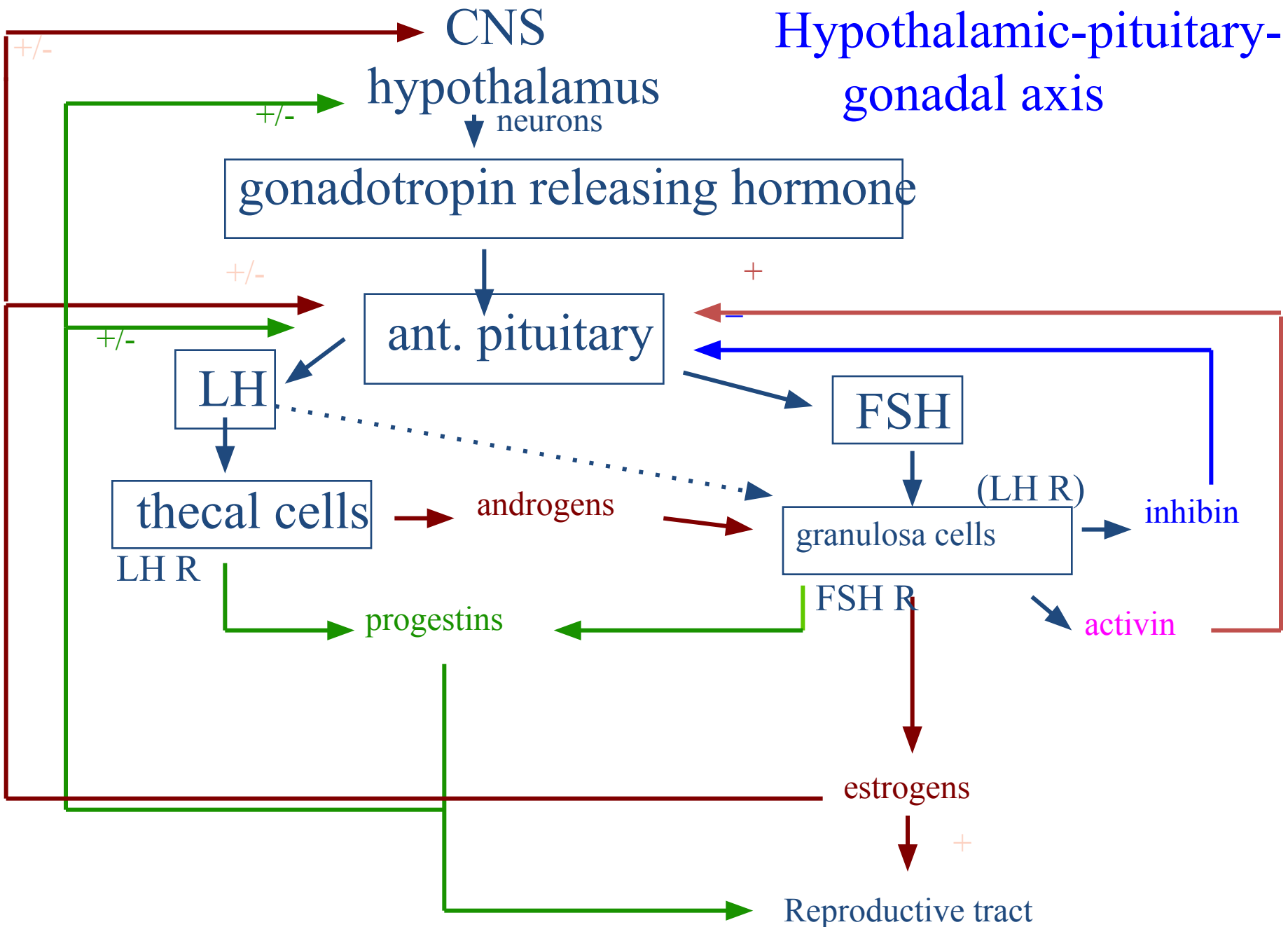


Hormonal changes

- Increase in levels of – FSH, LH
- Decrease in levels of- estrogen, progesterone and inhibin.
- estrogen levels are generally <30 pg/mL, and progesterone levels are often <1 ng/mL of plasma during menopause.



Hypothalamic-pituitary-gonadal axis



Clinical features

“hot flushes” characterized by extreme flushing of the skin

- psychic sensations of irritability, depression
- fatigue, Short-term memory loss
- Sleep disturbances
- Headaches
- anxiety
- decreased strength and calcification of bones throughout the body.
- Atrophy of the vaginal epithelium
- Changes in vaginal pH-less acidic
- Decrease in vaginal secretions-dryness

- These symptoms are of sufficient magnitude in about 15 percent of women to warrant treatment.
- Daily administration of estrogen in small quantities usually reverses the symptoms, and by gradually decreasing the dose, postmenopausal women can likely avoid severe symptoms.