

# Androgens

# Review: What is Menopause?

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- Please review the first video in this series “Physiology of Menopause”
- Ovarian reserve (fertility) declines with age
- Ova maturation and release are the key contributors to estradiol (E2) and progesterone (P) levels throughout the fertile years
  - E2 and P have *numerous* actions in the body
- Ovarian fertility cycle stops at age 45-55
- Ovarian ova production stops, E2 and P drop to minimal levels
- Systems that benefitted from E2 and P experience functional decline

# Review: Low Estrogen: Signs & Symptoms

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- Hot flashes
- Insomnia
- Low sex drive
- Mood changes
- Brain fog
- Vaginal dryness
- Joint pain
- Decreased bone mineral density

# Review: Menopause Clinical Concerns

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- Low E symptoms:
  - Hot flashes (76.1%)
  - Insomnia, disrupted sleep (65.7%)
  - Low libido/Vaginal dryness (58.9%/55.8%)
  - Depression/Irritability/Anxiety (46.2%/45.1%/30.5%)

# Androgens in Menopause

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- The major circulating androgens are testosterone and DHEA-s
- Androgens are made in the adrenals and ovaries
  - Postmenopausal oophorectomy reduces T levels by 40%
  - Adrenals the only sex hormone source post menopause w/ oophorectomy
  - Postmenopausal E2 made from androgens in circulation
  - Chronic stress, suppressed HPA axis highly significant for menopausal women
- DHEA and Testosterone replacement:
  - Bone mineral density
  - Libido
  - Better mood
  - Improved sleep
  - Reduced anxiety

# Adrenal Hormones

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- Adrenal DHEA is the main T and E2 source in menopause
- In chronic stress, low adrenal output, menopause symptoms more severe
- Cortisol circadian rhythm dysfunction negatively impacts sleep, metabolic health, cardiovascular health, and inflammation at all ages
  - These systems experience additional functional decline in menopause due to low estrogen

# Benefits of Testosterone

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- Secondary estrogen precursor after menopause
- Growth- muscle mass & stamina
- Libido & sexual function
- Healthy weight
- Healthy bone
- Skin, hair health
- Mood & memory
- Cardiovascular health

# Benefits of DHEA

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- Primary estrogen precursor after menopause
- Supports muscle & bone health
- Supports Sexual function
- Supports Brain health
- Supports Immune function
- Supports cardiovascular health



# Benefits of HRT: Androgens

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- DHEA declines with age and may not rebound with adrenal support
- Low doses of 5-15mg oral DHEA may help:
  - Libido
  - Energy
  - Mood
  - Muscle mass and joint pain
  - Metabolism
  - Not FDA approved for these indications
- Vaginal DHEA (Prasterone 6.5 mg) has been approved by the FDA for vaginal dryness

# Testing TRT?

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- Serum Total T
  - SHGB bound and bioavailable T
- Serum calculated free T
  - Uses the Vermeulen calculation of binding proteins and total T to estimate free T
  - Most accurate free T measurement
- How does the DUTCH test help?
  - **Monitor androgen *metabolites* which show tissue activity**
  - Monitor adrenal health: stress support, anxiety, depression
  - Sleep and energy → nighttime cortisol, melatonin, circadian rhythm
  - Mood → neurotransmitter metabolites, inflammatory patterns

# DUTCH Androgens

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- Urine T shows “bioavailable” T, not total (bound + free)
- Testosterone in urine can be falsely low due to genetic differences in testosterone detox pathways
- Deleted UGT2B17 enzyme, circulating testosterone will not be glucuronidated (Glucuronidated T (TG) is what is measured in urine)
- T will follow multiple other pathways
- 5 $\alpha$ -androstane-3 $\beta$ -diol and androsterone not affected by UGT2B17 deletion polymorphism and can reflect tissue androgen activity

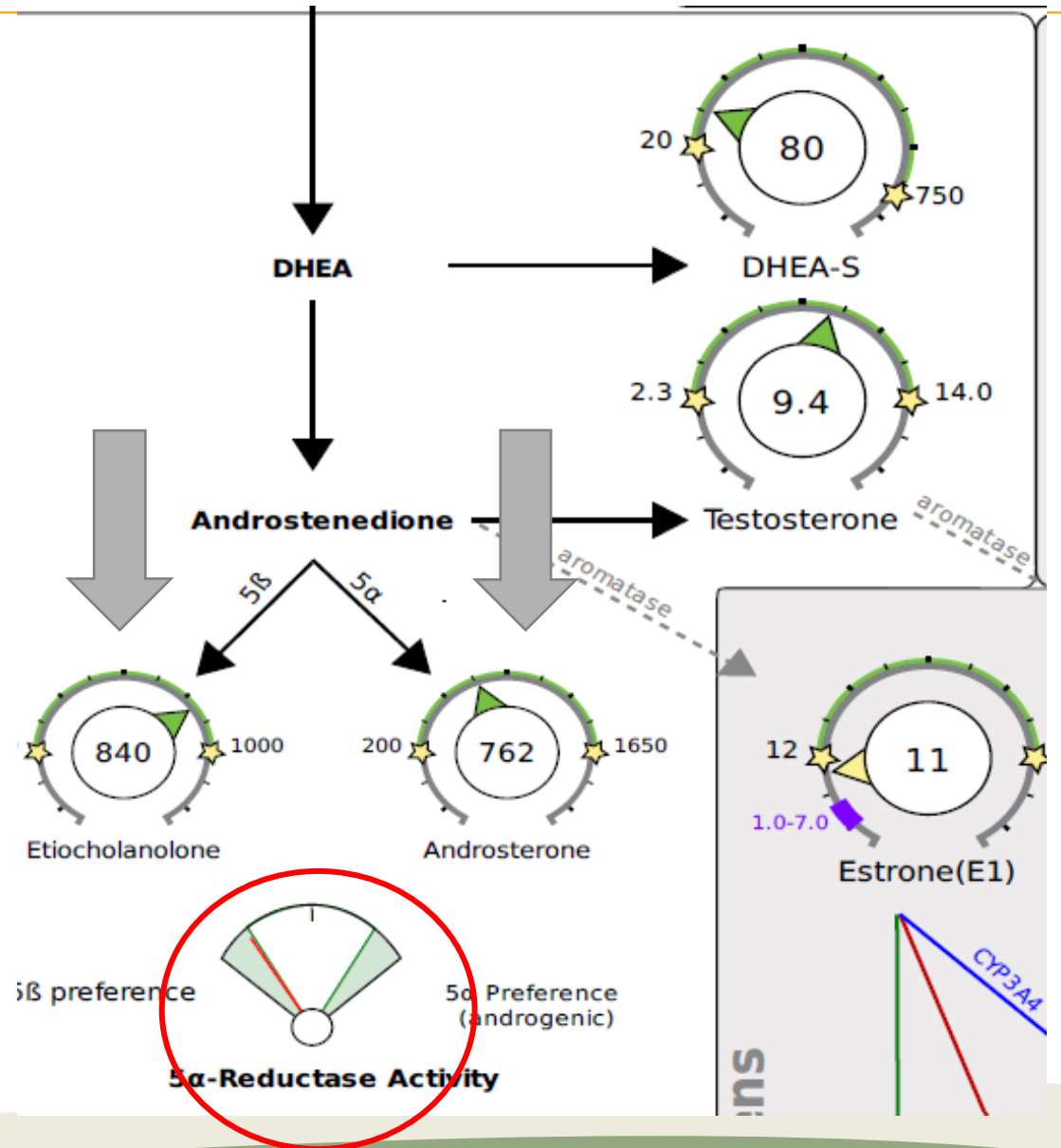
# DUTCH Androgens

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- Androgen *metabolites* reflect tissue activity
- 5a-reductase enzymes in the peripheral target tissue (muscle, skin, bone, hair follicles)
- 5b-reductase enzymes in the liver detoxify circulating parent hormones
- Alpha metabolites (5a-androstenediol, androsterone) reflect androgen levels *in the peripheral target tissue*
- Beta metabolites (5b-androstenediol) reflect androgen detox *in the liver*

# Androgen Metabolites

- Androgen metabolites can show levels of 5b (liver) versus 5a (target tissue) androgen activity
- Androsterone (5a) is in the normal range
- Etiocholanolone (5b) is higher in the normal range
- Although there is more 5b, 5a is normal indicating normal tissue levels of androgens



# Androgens in Menopause: Summary

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- Women with low androgens tend to have more severe menopause symptoms
- Androgens like DHEA and testosterone are used as a part of HRT but only vaginal DHEA for vaginal dryness has FDA approval
- Testosterone and DHEA do not reliably raise libido
- Testosterone and DHEA may improve muscle mass, mood, libido, protect bones, and cardiovascular health
- Typically, menopausal women start with E2 + P and then consider DHEA and/or T if it seems to fit

# Thank You!

If you are interested in learning more about hormones, each week we hold one-hour long mentorship sessions! Once you are a registered DUTCH provider, you can book these through our online scheduling link. Please call to get registered today.

**For questions, contact:**

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