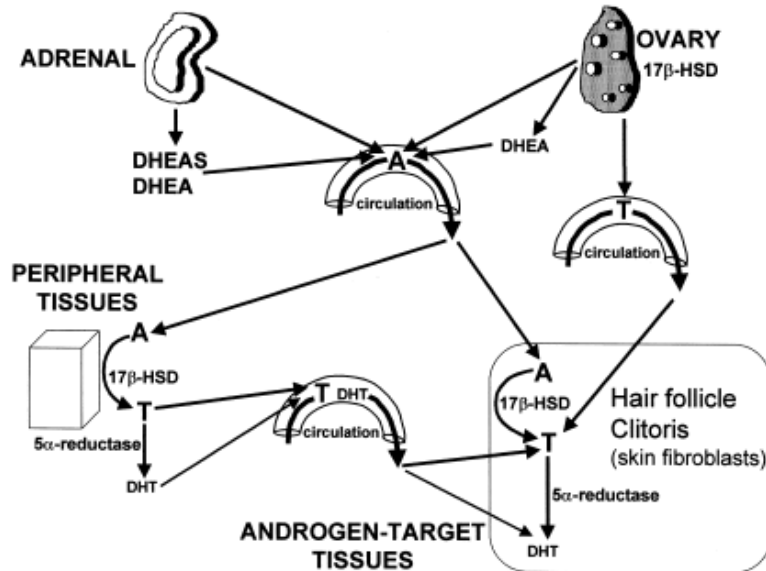


# Hirsutism

**Definition:** The presence of terminal (coarse) hair in locations at which hair is not commonly found in women. It includes facial hair on the cheek, above the upper lip, and on the chin. The presence of midline chest hair is also significant. In addition, a male escutcheon, hair on the inner aspects of the thighs, and midline lower back hair entering the intergluteal area are hair growth patterns compatible with androgen excess. A moderate amount of hair on the forearms and lower legs by itself may not be abnormal, although it may be viewed by the patient as undesirable and may be mistaken for hirsutism.

**Virilization:** temporal balding, deepening of voice, decreased breast size, increased muscle mass, loss of female body contours, and clitoral enlargement



**Notes:**

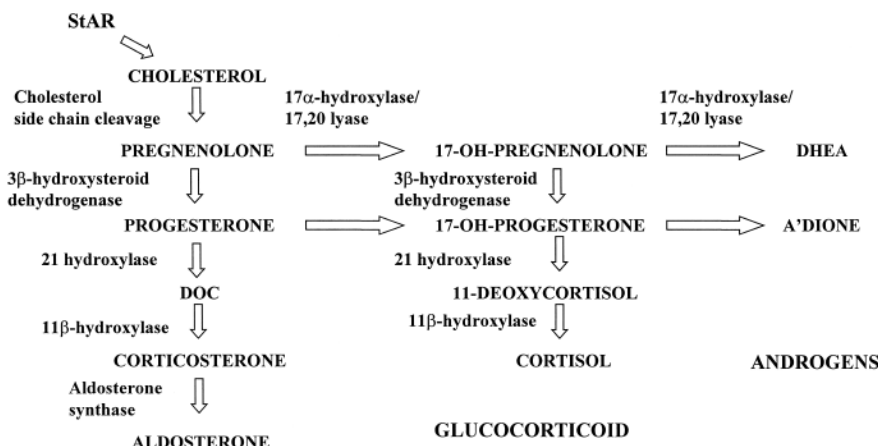
1) Neither DHEA nor androstenedione have significant androgenic activity and must be converted to testosterone and/or DHT peripherally (skin and fat; ~2/3 of total testosterone in women) to exert an androgenic effect. DHT is required for full androgenic effect.

2) Both adrenals and ovaries release DHEA and androstenedione while only ovaries directly release testosterone (~1/3 of total testosterone).

3) Androgenic effect determined by synthetic conversion to DHT, receptor content, and catabolism of DHT to estradiol or inactive metabolites.

Causes of hirsutism (sources of excess androgens): The usual differential is between PCOD and CAH

- 1) Ovaries – PCOD (hyperthecosis – severe variant of PCOD), tumor (Sertoli-Leydig cell, hilus cell)
- 2) Adrenals – Congenital Adrenal Hyperplasia (CAH), Cushing’s D, tumor, glucocorticoid resistance
- 3) Excess peripheral conversion of DHEA (no androgen activity) to testosterone (common in obesity)
- 4) Excess peripheral conversion of testosterone to dihydrotestosterone in target organs
- 5) Hyperprolactinemia, hypothyroidism (TRH stimulates prolactin)
- 6) Medications
- 7) Idiopathic (serum testosterone normal; difficult to differentiate from #4)



**Notes:**

1) 21-hydroxylase deficiency is the most common cause of CAH and leads to an increase in 17OH-Preg, esp after stimulation with ACTH.

2) 3beta HD deficiency is the second most common cause of CAH and leads to an increase in DHEA and 17OH-Preg.

**Case 1:** A 26 yo woman presents with the complaint of excess facial hair for more than one year; menses regular; two previous normal pregnancies. No other symptoms. Physical exam is unremarkable except for some dark hairs on upper lip and chin with no signs of virilization. Which of the following should be ordered:

- a) Total testosterone
- b) DHEA-S
- c) TSH and prolactin
- d) Sex Hormone Binding Globulin (SHBG)
- e) 17-hydroxyprogesterone
- f) LH, FSH
- g) ACTH stimulation test: measure pre- and post- adrenal androgens, cortisol, and intermediates
- h) Dexamethasone suppression test
- f) Imaging study of the ovaries and adrenals

COVER THE REST OF THE PAGE UNTIL THE ANSWER IS GIVEN!!!

Results:

Testosterone 78 (normal <65); DHEA-S and SHBG are normal  
Hyperandrogenemia is confirmed. What is the differential diagnosis and plan?

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Repeat:

Testosterone 85; DHEA-S, prolactin, thyroid, and 17OH-Prog are all normal  
What is the differential diagnosis and what are the alternatives for further workup?  
What is the treatment?

**Case 2:** A 26 yo woman presents with the complaint of excess facial hair for more than one year; menses are regular; two previous normal pregnancies. No other symptoms. Physical exam is unremarkable except for some dark hairs on upper lip and chin with no signs of virilization.  
Testosterone 35 (normal <65), DHEA-S normal  
What would you recommend?

**Case 3:** A 26 yo woman presents with the complaint of excess facial hair for more than one year; missed her last two periods; two previous normal pregnancies. No other symptoms. Physical exam is unremarkable except for some dark hairs on upper lip and chin with no signs of virilization.  
Testosterone 335 (normal <65), DHEA-S is normal, SHBG is low  
What would you recommend?

**Case 4:** A 26 yo woman presents with the complaint of excess facial hair and acne since puberty; menses always irregular; no pregnancies. No other symptoms. Physical exam is unremarkable except for lots of dark hairs on upper lip and chin, male pattern pubic hair, and severe acne on face and back, but no signs of virilization.  
Testosterone 135 (normal <65), DHEA-S borderline high, SHBG low  
What would you recommend?

**Case 1:** A 26 yo woman presents with the complaint of excess facial hair for more than one year; menses regular; two previous normal pregnancies. No other symptoms. Physical exam is unremarkable except for some dark hairs on upper lip and chin with no signs of virilization. Which of the following should be ordered:

- a) Total testosterone
- b) DHEA-S
- c) TSH and prolactin
- d) Sex Hormone Binding Globulin (SHBG)
- e) 17-hydroxyprogesterone
- f) LH, FSH
- g) ACTH stimulation test: measure pre- and post- adrenal androgens, cortisol, and intermediates
- h) Dexamethasone suppression test
- f) Imaging study of the ovaries and adrenals

**Answer:** Depends on your level of suspicion for each possible diagnosis. If there are truly no other signs or symptoms and menses are regular, then a total testosterone and possibly a DHEA-S and/or SHBG can be measured on the first visit.

Results:

Testosterone 78 (normal <65); DHEA-S and SHBG are normal  
Hyperandrogenemia is confirmed. What is the differential diagnosis and plan?

**These results are consistent with androgen excess. Likely diagnoses include PCOD, medications, mild CAH, or hyperprolactinemia. A tumor is unlikely when the testosterone is <200. A normal DHEA-S does not eliminate CAH.**

**Review all medications and supplements, review menstrual history (the more irregular, the more likely it is PCOD rather than CAH), and measure the testosterone, DHEA-S, 17-hydroxyprogesterone, prolactin, TSH, free T4.**

Testosterone 85; DHEA-S, prolactin, thyroid, and 17OH-Prog are all normal  
What is the differential diagnosis and what are the alternatives for further workup?  
What is the treatment?

**The data is still most consistent with PCOD but CAH cannot be ruled out. LH and FSH will not be definitive unless the ratio is >2 (which is highly suggestive of PCOD). However, many patients with PCOD will not have a ratio >2.**

**Alternative #1: Assume that she has PCOD and start BCP's and spironolactone. Repeat the testosterone in one month to see if it is suppressed. If not suppressed, consider Alternative #2.**

**Alternative #2: Give dexamethasone .25 mg qHS for one to two weeks and repeat the testosterone. This is not a perfect test since some patients with PCOD will reduce their androgen production when treated with dexamethasone (reason unknown). However, if it works, you have discovered an effective therapy even if they do not have CAH.**

**Alternative #3: ACTH stimulation test – unfortunately, these are very expensive and sometimes not definitive in diagnosing CAH. In addition, only a small percentage of patients with hirsutism actually have CAH so the return will be low. However, if the hirsutism is moderate to severe, long-lasting, or there are signs of virilization the likelihood of CAH increases. In addition, if there is an elevation in DHEA-S or 17OH-Prog the likelihood also increases. In these cases, a specific diagnosis may be helpful. On the other hand, CAH is**

**treated with dexamethazone regardless of the specific enzyme defect so that Alternative #2 is still a reasonable approach.**

**Case 2:** A 26 yo woman presents with the complaint of excess facial hair for more than one year; menses are regular; two previous normal pregnancies. No other symptoms. Physical exam is unremarkable except for some dark hairs on upper lip and chin with no signs of virilization.

Testosterone 35 (normal <65), DHEA-S normal

What would you recommend?

**Reassure her, consider spironolactone and/or referral to dermatology, repeat a morning testosterone one or two times over the next 6 months for confirmation.**

**Case 3:** A 26 yo woman presents with the complaint of excess facial hair for more than one year; missed her last two periods; two previous normal pregnancies. No other symptoms. Physical exam is unremarkable except for some dark hairs on upper lip and chin with no signs of virilization.

Testosterone 335 (normal <65), DHEA-S is normal, SHBG is low

What would you recommend?

**Image the ovaries and adrenals**

**Case 4:** A 26 yo woman presents with the complaint of excess facial hair and acne since puberty; menses always irregular; no pregnancies. No other symptoms. Physical exam is unremarkable except for lots of dark hairs on upper lip and chin, male pattern pubic hair, and severe acne on face and back, but no signs of virilization.

Testosterone 135 (normal <65), DHEA-S borderline high, SHBG low

What would you recommend?

**Order testosterone, DHEA-S, 17OH-Progesterone**

**If still high: either dexamethasone 0.25 mg qHS for a week or ACTH Stim.**

**If testosterone suppresses, continue dexamethasone**