

Learning Objectives

After reading this supplement, the participant should be able to:

1. List the specific androgens in women and their biochemical precursors.
2. Describe the mechanisms of androgen production in women.
3. Identify the major causes of androgen deficiency in women.
4. List the differences in androgen effects on sexual function in men and women.
5. Summarize the important research findings on androgen replacement in oophorectomized women.
6. List the potential benefits of combined estrogen-androgen replacement in women.
7. Describe a simple management algorithm for evaluating and treating androgen insufficiency in women.

Section 1: Androgen Production and Mechanisms

Henry G. Burger, M.D., Ph.D. 77(Suppl 4):S3–5 Androgen production in women

After reading this article, the participant should be able to:

1. Identify the androgens found in women and their biochemical precursors.
2. List the important causes of androgen deficiency in women.
3. Describe the major sources of androgen production in women.

Evan R. Simpson, Ph.D. 77(Suppl 4):S6–10 Aromatization of androgens in women: current concepts and findings

After reading this article, the participant should be able to:

1. Distinguish the roles of estrogen and androgens on target tissue sites.
2. Identify the effects of androgens on estrogen synthesis in women.
3. Describe the major mechanisms of androgen production in women.

Abdul Traish, Ph.D., et al. 77(Suppl 4):S11–8 Role of androgens in female genital sexual arousal: receptor expression, structure, and function

After reading this article, the participant should be able to:

1. Identify the major sources of peripheral androgen synthesis in women.
2. Distinguish the role of the ovaries and adrenals in female androgen production.
3. Describe the process by which androgens are converted to estrogen in peripheral tissue sites.

Richard F. Spark, M.D. 77(Suppl 4):S19–33 Dehydroepiandrosterone: a springboard hormone for female sexuality

After reading this article, the participant should be able to:

1. Describe the role of dehydroepiandrosterone (DHEA) as a precursor of androgen synthesis in women.
2. Identify major causes of low DHEA production.
3. Treat conditions associated with low DHEA production.

Section 2: Androgen Effects on Female Health

Constantine Dimitrakakis, M.D., et al. 77 (Suppl 4):S26–33 Androgens and mammary growth and neoplasia

After reading this article, the participant should be able to:

1. Identify the effects of androgens on estrogen-induced mammary stimulation.
2. List potential benefits and risks of androgen supplementation of estrogen replacement therapy with regards to breast cancer risk.

Morris Notelovitz, M.D., Ph.D. 77(Suppl 4):S34–41 Androgen effects on bone and muscle

After reading this article, the participant should be able to:

1. Describe the role of androgens in bone and tissue remodeling in women.
2. Distinguish the effects of androgen, estrogen and progesterone on osteoblast formation in women.
3. List potential benefits and risks of androgen supplementation of estrogen replacement therapy with regards to bone and muscle mass in women.

Lorraine Dennerstein, Ph.D., et al. 77(Suppl 4):S42–8 Hormones, mood, sexuality, and the menopausal transition

After reading this article, the participant should be able to:

1. Describe the effects of menopause on mood, well-being and sexual function in women.
2. Identify the effects of aging and hormonal changes on sexual function and mood in postmenopausal women.
3. Identify the methodological problems in epidemiological studies of the menopause.

Barbara B. Sherwin, Ph.D. 77(Suppl 4):S49–54
Randomized clinical trials of combined estrogen-androgen preparations: effects on sexual functioning

After reading this article, the participant should be able to:

1. Describe the effects of combined androgen-estrogen replacement on sexual function in randomized clinical trials (RCT's).
2. Distinguish between the potential effects of physiological and supra-physiological levels of androgen replacement in these trials.
3. Identify potential risks of supra-physiological androgen replacement.

John Bancroft, M.D. 77(Suppl 4):S55–9
Sexual effects of androgens in women: some theoretical considerations

After reading this article, the participant should be able to:

1. List the differences in androgen effects on sexual function in men and women.
2. Describe the potential role of androgens in the brain.
3. Identify critical research questions in understanding androgen effects in women.

Section 3: Androgen Deficiency States and Sequelae

Jan L. Shifren, M.D. 77(Suppl 4):S60–2
Androgen deficiency in the oophorectomized woman

After reading this article, the participant should be able to:

1. Describe the effects of oophorectomy on mood and sexual function in women.
2. List the potential benefits and risks of androgen replacement therapy on oophorectomized women.
3. Summarize the important research findings on androgen replacement in oophorectomized women.

Philip M. Sarrel, M.D. 77(Suppl 4):S63–7
Androgen deficiency: menopause and estrogen-related factors

After reading this article, the participant should be able to:

1. Describe the mechanism by which estrogen replacement can lead to decreased androgen availability in women.
2. List the potential benefits of combined estrogen-androgen replacement in women.
3. Identify the specific symptoms associated with declining estrogen levels in postmenopausal women.

Susan R. Davis, M.D. 77(Suppl 4):S68–71
When to suspect androgen deficiency other than at menopause

After reading this article, the participant should be able to:

1. Identify potential causes of androgen deficiency states in women.
2. List the potential risks and benefits of androgen replacement in androgen deficiency states in women.
3. Describe the effects of androgen deficiency on mood and sexual disturbances in women.

Gloria A. Bachmann, M.D. 77(Suppl 4):S72–6
The hypoandrogenic woman: pathophysiologic overview

1. Compare and contrast the effects of hypoandrogenic and hyperandrogenic states in women.
2. Describe the range of symptoms typically associated with androgen deficiency in women.
3. Identify potential mechanisms involved in androgen deficiency in women.

Section 4: Clinical Assessment and Diagnosis

James A. Simon, M.D. 77(Suppl 4):S77–82
Estrogen replacement therapy: effects on the endogenous androgen milieu

After reading this article, the participant should be able to:

1. Distinguish between androgen deficiency states and other similar hormonal conditions in women.
2. Describe the effects of estrogen replacement therapy on androgen production in women.
3. Identify potential advantages of combined androgen-estrogen replacement therapy in the treatment of postmenopausal symptoms.

André T. Guay, M.D. 77(Suppl 4):S83–8
Screening for androgen deficiency in women: methodological and interpretive issues

After reading this article, the participant should be able to:

1. List the available assays and laboratory measures for assessing androgens in women.
2. Identify the advantages and disadvantages of the available assays.
3. Describe the laboratory work-up for a woman with symptoms of low androgen.

Raymond C. Rosen, Ph.D. 77(Suppl 4):S89–93
Assessment of female sexual dysfunction: review of validated methods

After reading this article, the participant should be able to:

1. Describe the methods used currently for assessing female sexual function in clinical trials.
2. Identify strengths and weaknesses of the major instruments for assessing female sexual function.
3. Compare the advantages and disadvantages of physiological versus subjective methods of assessing sexual function in women.

Glenn D. Braunstein, M.D. 77(Suppl 4):S94–9
Androgen insufficiency in women: summary of critical issues

After reading this article, the participant should be able to:

1. List the essential issues in evaluating androgen deficiency states in women.
2. Describe a simple management algorithm for evaluating and treating androgen insufficiency in women.
3. Identify important gaps for further research.