

REFERENCES

- 3βHSD (3beta-hydroxysteroid dehydrogenase)**
- Lower activity:**
- Alcohol: Chiao YB, et al. *Alcohol Clin Exp Res*. 1981 Spring;5(2):230-6.
 - PCBS: Andrie SA, et al. *Environ Health Perspect*. 2000 Oct;108(10):955-9.
 - Progesterins: Lee TC, et al. *J Clin Endocrinol Metab*. 1999 Jun;84(6):2104-10.
 - Isoflavonoids: DeLuca D, et al. *J Steroid Biochem Mol Biol*. 2005 Feb;93(2-5):285-92.
- Higher activity:**
- Hyperandrogenism: Simonian MH. *J Steroid Biochem*. 1986 Dec;23(6):1001-6.
 - Hypertensulinemia: DeChue TJ, et al. *J Clin Endocrinol Metab*. 1991 Jun;72(6):1308-11.
 - PCOS: Strauss JF 3rd. *Ann N Y Acad Sci*. 2003 Nov;997:42-8.
 - Forskolin: Bird IM, et al. *J Endocrinol*. 1996 Sep;150 Suppl:S165-73.
- 5α (5alpha-reductase)**
- Lower activity:**
- Flaxseed, isoflavones: Evans BA, et al. *J Endocrinol*. 1995 Nov;147(2):295-302.
 - EGCG: Hiripakka RA, et al. *Biochem Pharmacol*. 2002 Mar 15;63(6):1165-76.
 - Progesterone: Cassident DL, et al. *Obstet Gynecol*. 1991 Jul;78(1):103-7.
 - Saw palmetto: Dresta J, et al. *Cas Lek Cesk*. 2002 Oct 11;141(20):630-5.
- Higher activity:**
- Insulin resistance, obesity: Westerbacka J, et al. *J Clin Endocrinol Metab*. 2003 Oct;88(10):4924-31.
 - Essential HT: Soro A, et al. *Hypertension*. 1995 Jan;25(1):67-70.
 - DHEA: Stomati M, et al. *Gynecol Endocrinol*. 2000 Oct;14(5):342-63.
- 5β (5beta-reductase)**
- Lower activity:**
- Licorice: Tamura Y, et al. *Arzneimittelforschung*. 1979;29(4):647-9.
- Higher activity:**
- Insulin resistance, fatty liver: Westerbacka J, et al. *J Clin Endocrinol Metab*. 2003 Oct;88(10):4924-31.
- CYP11β1 (11beta-hydroxylase)**
- Lower activity:**
- Azoole antifungals: Ayub M, et al. *J Steroid Biochem*. 1989 Apr;32(4):515-24.
 - DHEA: Stomati M, et al. *Gynecol Endocrinol*. 2000 Oct;14(5):342-63.
- 11, HSD (11beta-hydroxysteroid dehydrogenase)**
- More cortisol:**
- Metabolic syndrome: Seckle JR, et al. *Recent Prog Horm Res*. 2004;59:359-93.
 - Inflammation: Cai QD, et al. *J Steroid Biochem Mol Biol*. 2001 May;77(2-3):117-22.
- Hypothyroid: Hoshino M, et al. Clin Endocrinol (Oxf).** 2006 Jan;64(1):37-45.
- Licorice: Ferrari P, et al. Hypertension**. 2001 Dec 1;38(6):1330-6.
- Less cortisol:**
- Hypertrophydism: Tamiyama M, et al. *Thyroid*. 1993 Fall;3(3):229-33.
 - Coffee: Atansov AG, et al. *FEBS Lett*. 2006 Jul 24;580(17):4081-5. *Epub* 2006 Jun 27
 - Ketocanzole: Stetfel P, et al. *Endocrine*. 2002 Aug;18(3):279-84.
 - Rosiglitazone: Berthame M, et al. *Am J Physiol Regul Integr Comp Physiol*. 2004 Nov;287(5):R1116-23.
- 17-β-hydroxylase**
- Lower activity:**
- Smoking: Yeh J, et al. *J Steroid Biochem*. 1989 Oct;33(4A):627-30.
 - Antiinflamm: Weber MM, et al. *Clin Invest*. 1993 Nov;71(11):933-8.
 - Spironolactone: Kossor DC, et al. *Mol Pharmacol*. 1991 Aug;40(2):321-5.
- Higher activity:**
- Hypertrophy: Ushiba H, et al. *Eur J Endocrinol*. 2002 Mar;146(3):375-80.
 - Hypertensulinemia: Nestler JE, et al. *N Engl J Med*. 1996 Aug 29;335(9):617-23.
 - Stress: Shtamm R, et al. *J Clin Endocrinol Metab*. 2005 Jan;90(1):279-85. *Epub* 2004 Oct 19.
 - Alcohol: Chiao YB, et al. *Alcohol Clin Exp Res*. 1981 Spring;5(2):230-6.
- 17,20 lyase**
- Lower activity:**
- Hypertrophy: Ushiba H, et al. *Eur J Endocrinol*. 2002 Mar;146(3):375-80.
 - Azoole antifungals: Ayub M, Levell MJ. *J Steroid Biochem*. 1989 Apr;32(4):515-24.
 - Dioxins: Moran FM, et al. *Biol Reprod*. 2003 Jan;68(1):244-51.
 - Licorice: DeLuca D, et al. *J Steroid Biochem Mol Biol*. 2005 Feb;93(2-5):285-92.
- Higher activity:**
- PCBS: Andrie SA, et al. *Environ Health Perspect*. 2000 Oct;108(10):955-9.
 - DHEA: Stomati M, et al. *Gynecol Endocrinol*. 2000 Oct;14(5):342-63.
 - Anti-epileptics (valproate): Nelsen-DeGrave VL, et al. *Endocrinology*. 2004 Feb;145(2):799-808. *Epub* 2003 Oct 23.
- 17β-HSD (17beta-hydroxysteroid dehydrogenase)**
- Lower activity of 17_β HSD type I (e.g., resulting in less E2 or testosterone)**
- Phytoestrogens: Karaisen A, et al. *Adv Exp Med Biol*. 2002;505:151-61.
 - Licorice: Armanini D, et al. *N Engl J Med*. 1999 Oct 7;341(15):1158.
 - Paequalin JR, Ebert C. *Gynecol Endocrinol*. 1999 Jun;13 Suppl 4:11-9.
 - Tamoxifen: Speirs Y, et al. *J Steroid Biochem Mol Biol*. 1993 Nov;46(5):605-11.
- Higher activity of 17βHSD type I (e.g., resulting in more E2 or testosterone)**
- Alcohol: Sarkola T, et al. *Alcohol Alcohol*. 2000 Jan;35(1):84-90.
 - Abdominal obesity: Corbould AM, et al. *Int J Obes Relat Metab Disord*. 2002 Feb;26(2):165-75.
 - DHEA: Bonney RC, et al. *J Steroid Biochem*. 1983 Jan;18(1):59-64.
- CYP19 (Aromatase)**
- Lower activity:**
- Dioxins: Drelich HJ, et al. *Toxicol Appl Pharmacol*. 1998 Jan;148(1):50-5.
 - Phytoestrogens: Karaisen A, et al. *Mol Cell Endocrinol*. 2001 Jan 22;171(1-2):151-62.
 - EGCG, green tea catechins: Kapiszewska M, et al. *Br J Nutr*. 2006 May;95(5):989-95.
 - Chrysin: Edmunds KM, et al. *Reprod Nutr Dev*. 2005 Nov-Dec;45(6):709-20.
- Higher activity:**
- Inflammation: Cutolo M, et al. *Ann N Y Acad Sci*. 2006 Nov;1089:538-47.
 - Licorice: Takachi T, et al. *Am J Chin Med*. 1991;19(1):73-8.
 - Vitamin D3: Lou YR, et al. *J Steroid Biochem Mol Biol*. 2005 Feb;94(1-3):151-7. *Epub* 2005 Feb 17.
- CYP21 (21alpha-hydroxylase)**
- Lower activity:**
- Late-onset adrenal hyperplasia: Carmina E, et al. *J Endocrinol Invest*. 1984 Apr;7(2):89-92.
 - Primary adrenal insufficiency: Nikfarjan L, et al. *Eur J Endocrinol*. 2005 Jan;152(1):95-101.
 - Resveratrol: Supramaniam V, et al. *Horm Res*. 2005;64(6):280-6. *Epub* 2005 Nov 1.
 - DHEA: Stomati M, et al. *Gynecol Endocrinol*. 2000 Oct;14(5):342-63.
- Higher activity:**
- Sodium depletion: Tremblay A, et al. *J Biol Chem*. 1991 Feb 5;266(4):2245-51.
 - High prolactin: Kao MM, et al. *J Cell Biochem*. 1999 Feb 1;72(2):286-93.
- CYP11A**
- Lower activity:**
- Excess sugar: Peters LP, Teel RW. *Anticancer Res*. 2003 Jan-Feb;23(1A):399-403.
 - Excess omega 6 fats: Lord RS, et al. *Altern Med Rev*. 2002 Apr;7(2):112-29.
 - Oral contraceptives: Jenstrom H, et al. *Carcinogenesis*. 2003 May;24(5):991-1005.
 - Cimicifuge: Galbraith RA, Michnovicz JJ. *N Engl J Med*. 1989 Aug 3;321(5):269-74.
- Higher activity:**
- Strawberries, blackberries, raspberries: Sowers MR, et al. *J Nutr*. 2006 Jun;136(6):1588-95.
 - Soy isoflavones: Lu LJ. *Cancer Res*. 2000 Mar 1;60(5):1299-305.
 - Caffeine: Sowers MR, et al. *J Nutr*. 2006 Jun;136(6):1588-95.
 - Thyroxine: Michnovicz JJ, Galbraith RA. *Steroids*. 1990 Jan;35(1):22-6.
- CYP11B1**
- Lower activity:**
- Hops: Henderson MG, et al. *Xenobiotica*. 2000 Mar;30(3):235-51.
 - Biologicals: Doosdar H, et al. *Toxicology*. 2000 Apr 3;144(1-3):31-8.
 - Grapefruit: Giemannar B, et al. *Bioorg Med Chem*. 2006 Apr 15;14(8):2606-12.
- Higher activity:**
- PAHs, PCBs: Carpenter DO, et al. *Environ Health Perspect*. 1998 Dec;106 Suppl 6:1263-70.
- CYP3A4**
- Lower activity:**
- Grapefruit: Fukuda K, et al. *Pharmacogenetics*. 1997 Oct;7(5):391-6.
 - Rosennary: Zhu BT, et al. *Carcinogenesis*. 1998 Oct;19(10):1821-7.
 - Wild yam: Wu WH, et al. *J Am Coll Nutr*. 2005 Aug;24(4):235-43.
 - Peppermint oil: Dresser GK, et al. *Clin Pharmacol Ther*. 2002 Sep;72(3):247-55.
- Higher activity:**
- Hypothyroidism: Liddle C, et al. *J Clin Endocrinol Metab*. 1998 Jul;87(7):2411-6.
 - Pesticides: Bradlow HL, et al. *Environ Health Perspect*. 1995 Oct;103 Suppl 7:147-50.
 - Smoking or caffeine: Sowers MR, et al. *J Nutr*. 2006 Jun;136(6):1588-95.
- COMT—Methylation support**
- Rule out Hg toxicity: Houston MC. *Altern Ther Health Med*. 2007 Mar-Apr;13(2):S128-33.
 - Rule out oxidative stress: James SJ, et al. *Am J Clin Nutr*. 2004 Dec;80(6):1611-7.
 - Reduce stress: Dubey RK, et al. *J Clin Endocrinol Metab*. 2004 Aug;89(8):3922-31.