3-alpha Hydroxysteroid Dehydrogenase

By Ronald Steriti, ND, PhD
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Metabolism

3-alpha HSD converts:

- 5-alpha DHT into 3-alpha Androstanediol

3-alpha Adiol is a weak androgen (when compared 5-alpha DHT). It is considered a storage form since 3-alpha HSD is bi-directional. The enzyme 3-beta HSD converts 5-alpha DHT into 3-beta Adiol.

5alpha-DHT is formed from circulating testosterone by the action of the type 2 steroid 5alpha-reductase (5alpha-R) and its action is terminated by the action of a reductive 3alpha-hydroxysteroid dehydrogenase (3alpha-HSD) which forms the weak androgen 3alpha-androstanediol. (Jin and Penning 2001)

Deficiency

3alpha-Hydroxysteroid dehydrogenase type III deficiency has been proposed as a novel mechanism for hirsutism. In genital skin of hirsute women, reduced AKR1C2 gene expression and 3alpha-HSD activity results in decreased DHT metabolism and elevated tissue levels of DHT. (Steiner, Chang et al. 2008)

Breast and Prostate Cancer

3-alpha HSD, along with the other enzymes involved in testosterone and DHT metabolism, play a role in breast and prostate cancer. (Penning and Byrns 2009)

Glaucoma

Decreased 3 alpha-HSD activity has been found in peripheral blood lymphocytes from patients with primary open angle glaucoma. (Weinstein, Iyer et al. 1996)

Inhibition

The phytoestrogens genistein, daidzein and coumestrol, which are found in soy. (Blomquist, Lima et al. 2005) (Wong and Keung 1999)
Glycyrrhetinic acid (in licorice) specifically inhibited microsomal 3 beta-HSD enzyme activity by what appears to be a competitive inhibition mechanism, causing a build-up of the intermediate, 5 alpha-dihydroaldosterone. (Latif, Conca et al. 1990)

Retinol and 13-cis-retinoic acid competitively inhibits 3 alpha-hydroxysteroid oxidation by retinol dehydrogenase RoDH-4. (Karlsson, Vahlquist et al. 2003)

Indomethacin, a prostaglandin blocker and NSAID drug, powerfully inhibits 3alpha-HSD reduction (Sanders 2007)

C18, C19 and C21-hydroxysteroids and ketosteroids. (Blomquist, Lima et al. 2005)

**Increased**

Sulphobromophthalein (Benzenesulfonic acid). A variety of pharmaceutical drugs are prepared as salts of benzenesulfonic acid and are known as besylates or besilates. (Matsuura, Tamada et al. 1996)
References


