Journal of Steroids & Hormonal Science

OPEN ACCESS Freely available online

Commentary

Role of Androgen: Overview

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COMMENTARY

Androgens are C-19 steroid hormones produced predominantly by the testis and adrenal cortex [1].Androgens, the most prominent male sex steroids, are essential for the formation of the male phenotype throughout embryogenesis and the attainment of sexual maturity at puberty. Androgens are still required for the maintenance of male reproductive function and behavior throughout maturity. Androgens impact a wide range of non-reproductive tissues, including skin, bone, muscle, and the brain, in addition to its effect on reproduction [2]. The androgen receptor, a member of the vast superfamily of ligand-activated nuclear hormone receptors, is where androgens, primarily Testosterone (T) and 5-Dihydrotestosterone (DHT), exert the majority of their actions [3]. Androgens have two natural ligands: testosterone and its more potent metabolite, 5-dihydrotestosterone, both of which bind to AR and trigger transcriptional activation of target genes. As a result, male phenotypic and reproductive function, as well as other tissues such as bone and muscle, are promoted and maintained [4]. Androgens' reproductive and anabolic effects are mediated by their interaction with the androgen receptor, a ligand-activated transcription factor that belongs to the steroid thyroid hormone-retinoid-vitamin D superfamily of nuclear receptors [5]. The androgen receptor is known to mediate almost all of androgen's actions, with the exception of its conversion to oestrogen by the enzyme aromatase in particular target cells. Non-receptor-mediated activities involving androgen interaction with circulating sex hormone-binding globulins, on the other hand, are minimal [6]. Androgens in women play a variety of physiological roles that are currently unknown. Androgen receptors have been found in a variety of anatomical locations, implying that they have a role in human physiology across numerous systems. Androgens have direct effects as well as serving as precursor hormones for the production of ovarian and extragonadal oestrogen. Testosterone and dihydrotestosterone bind to nuclear androgen receptors throughout the body, activating androgens target genes in the process. When it comes to androgenic effects on target tissues like skin and hair follicles, dihydrotestosterone is the more potent of the two steroids [7]. Androgen action appears to be influenced by the existence and activity of 5-areductase/aromatase enzymes, which convert testosterone to the active dihydrotestosterone or inactive androstenedione/estradiol. Androgens have a crucial role in bone mineralization, with both direct and indirect actions via oestrogen aromatization. Lower androgen levels have been linked to bone loss in premenopausal, perimenopausal, and postmenopausal women, while DHEAS levels have been linked to bone mineral density in postmenopausal women [8]. The findings of studies evaluating changes in androgen levels with age in adult females are inconsistent, varied in nature due to design and exclusion criteria, and typically limited to the reproductive or post reproductive state. Furthermore, many investigations are hampered by the assays employed to assess androgen levels, particularly in the case of total testosterone, which raises concerns about sensitivity, specificity, accuracy, and precision. Several studies report total or free testosterone levels without providing SHBG levels at the same time [7]. The prostate is a small sex accessory gland that surrounds the urethra at the base of the bladder and is about the size of a walnut. Prostate secretions make up a significant portion of the total seminal plasma volume in human ejaculate. A basement membrane contact separates the prostate epithelium from the supporting stroma, forming glandular acini. Differentiation, secretory function, metabolism, morphology, proliferation, and survival are all mediated by androgens in various prostate tissue compartments. There are three distinct cell types in the prostate epithelial cell compartment: basal cells in the basement membrane, luminal columnar secretory cells, and a small fraction of neuroendocrine cells [8].

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Received: December 29, 2020, **Accepted:**January 14, 2021, **Published:** January 21, 2021

Citation: Neonpough R (2021) Role of Androgen: Overview. J Steroids Horm Sci. 12:2

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