

General Introduction

The male reproductive system of the rat consists of the testis, the epididymis and the accessory sex organs including the different paired lobes of the prostate and seminal vesicles. Androgens are the principal effectors of the reproductive function in the male system. In the testis, they maintain the production of the male gametes, both qualitatively as well as quantitatively. In addition, they control the growth, development, differentiation and function of the male accessory sex glands as well as the epididymis. The epididymis can be divided into three regions, the caput, the corpus and the cauda. The sperm gains motility and hence the ability to fertilize, upon passage through the epididymis. Under the influence of androgens, the accessory organs synthesize and secrete the constituents of the semen which aid in the survival and maintenance of the sperm. The prostatic lobes contribute various proteases and divalent cations like zinc whereas the seminal vesicles synthesize protease inhibitors and energy substrates. Together these factors allow the clotting and lysis of the semen after ejaculation ensuring the proper delivery of the sperm. The principal androgens in the male system are testosterone (T) and dihydrotestosterone (DHT), although the adrenal androgens (androstenedione) are also found in the circulation. Testosterone is synthesized in the Leydig cells of testis after stimulation by luteinizing hormone. DHT is derived from testosterone by the enzymatic reduction of the double bond in the A ring of testosterone by 5- α reductase. DHT has two fold higher affinity for the androgen receptor and hence is a more potent androgen. In circulation, the androgens remain complexed with testosterone binding globulin (TeBG/ steroid hormone binding globulin, SHBG) and are excreted as glucuronide conjugates. A fraction of the circulating androgens are converted to estrogen by the adipose tissue.