

The Reproductive System and Its Physiology

Name

Institution

Reproduction in humans

Reproduction is the method by which humans provide survival of our species. It involves the fusion of 2 gametes, spermatozoan and egg. In human, these gametes are numerous and specific for the male and female (Mueller, Hassel, & Grealy, 2015, p. 3). Reproduction in humans is performed by male and female reproductive systems (Shaw, Luesley, & Monga, 2011, p116). The main organs of the male genital system are testicle and gonads. The female genital system includes vagina, ovaries, and uterus. Main events in human reproduction are the production of sperms and egg, copulation, and fertilization (Kidder, 2016, p.24).

Sperms appear in seminiferous tubules present in male sex organ testis. This method is known as spermatogenesis. The precursors of the sperm cell the diploid spermatogonium divide mitotically to supply various spermatogonia and differentiate into spermatocytes (Kidder, 2016, p.29). Spermatocytes endure cell division biological process to provide four haploid spermatids. Spermatids differentiate and change into sperm cell (Granata et al., 2011, p.73). Sperms are single-celled male gametes with a head and a tail (Kidder, 2016, p.30). Ovum, sex cell is made within the ovaries of the female system. This method is thought as gametogenesis. The development of ovary start typically and soon regress due to the absence of oocytes (Watson, 2015, p.10). Diploid oogonia and first oocytes made in the fetus and by the time they are born, females have concerning 1–2 million oocytes. In oocytes, the primary cell division (meiosis I) can be initiated then stopped (Schroeder, 2017, p.8). No more development happens until the woman becomes sexually mature. The stage of parturition starts before labor pains begin (Kidder, 2016, p.27). Development may be influenced by the status of chromosomes in different ways from the endocrine system and gonads (Shaw, Luesley, & Monga, 2011, p.116).

The Role of Hormones in Reproduction

Reproductive hormones play an essential role in all aspects of sexual development and differentiation. I will look at two significant chemical types of hormones: 1) steroids, which include testosterone and oestradiol; 2) peptides, which include prolactin and gonadotrophins. The posterior pituitary releases vasopressin, also known as antidiuretic hormone and Oxytocin (Kelly, 2006, p.20). Oxytocin cause milk production in suckling women. It helps in the contraction of uterine walls during birth. According to Widmaier et al., (pg.381), Oxytocin is the key factor in affiliative behavior. Adrenal cortex and the gonads produce sex steroids. Apart from the reproduction role, they have a wide variety of metabolic effects. Sexual differentiation is fostered by androgen. Together with oestrogens, they are responsible for the development of secondary sexual behavior at puberty. Progestogens and oestrogens are responsible for the maintenance and establishment of pregnancy and lactation in women while androgen is crucial for spermatogenesis in men. Both oestrogens and androgens are responsible for sexual arousability or sexual desire and response. In most cases, as the level of progesterone and possibly oestrogen rises, there is a dramatic switch from a negative to positive feedback triggered when persistently increasing estradiol concentrations reach a critical point. This explains why LH proceeds ovulation in the menstrual cycle (Hall, & Guyton, 2011, p.1039).

Oestrogens are produced by the adrenal cortex in both women and men for post-menopausal women, peripheral aromatization, mostly in adipose tissue of androstenedione is an important source of oestradiol. Progesterone is produced in the corpus luteum of the ovary. It also occurs as an intermediate stage in the production of other hormones in the adrenal cortex and gonads (Hall, & Guyton, 2011, p.1040). In female androstenedione can be converted into oestradiol in the tissue. This is an important source of dihydrotestosterone. Approximately fifty percent of female androstenedione comes from the ovary and the rest from the adrenal cortex.

The testis produces hormones that are responsible for the development of the fetus as male. Without normal testis, the fetus would develop as female (Widmaier et al., 2011, p.382). It explains why maleness require more active intervention, while femaleness is just a default position. Sexual determination and development of sexual identity are explained in various stages, e.g., chromosomal, gonads, hormones, sexual organs, gender identity and gender assigned at birth (Hall, & Guyton, 2011, p.1042). In a fascinating process, these stages lead on the next.

In the male fetus, the testis produces steroids like testosterone as early as the 8th week set off. Later steroidogenesis is reduced, but testis continues to grow. It is a very important stage for differentiation of male external and internal genital organs (Yarber, & Sayad, 2013, p.200). The testis of the fetus is stimulated by placental human chronic gonadotrophin (HCG) and also gonadotrophins that dominate during the second half of pregnancy. In the female fetus, the formation of the reproductive organs does not rely on the steroid and steroidogenesis is less. The placenta produces high circulating oestrogens (Schroeder, 2017, p.9).

The Physiological Role of Hormones in Reproduction

During birth, the male baby has half circulating testosterone hormone as the adult male (Schulster et al., 2016, p.435). Growth of pubic hair and the development of breast start at the age of 13 in women. The somatic role of androgens in the growth of body hair and also increases the activity of sebaceous glands (Cohen, 2016, p.208).

Ovarian hormones such as progesterone and estrogen modulate female sexual desire. Estradiol plays a vital role in the physiology of both male and female sexual behavior. Estrogens are even are more effective than testosterone in augmenting libido in castrate. Reproductive endocrinology is the study of the hormones in which steroids hormones is some of them. Steroids such as androgens, [testosterone and its derivate] estrogens, [estradiol and its

derivate], and progesterin's [progesterone and its derivate] are synthesized from cholesterol and secrete primarily by gonads. The steroids are active for the proper development of sperm and eggs; sexual behaviour development of secondary sex characters and maintenances of pregnancy. All vertebrates gonads secrete estradiol; testosterone and some type of progesterone. Therefore, during the year 1950 and 1960, it was proved that human testis and fish ovary secrete the same compound testosterone while the physiological response of the steroid through all vertebrates animals is the same. Morphological abnormalities of the reproductive system in man are associated with chromosomal abnormalities, but disorders of sexual behavior are not. The type of sexual behavior associated with abnormal sex chromosomes depends upon more on fundamental characteristics of the developing gonads than on the chromosomal factors (Schroeder, 2017, p.7).

In humans, steroid hormones have a relatively small effect on the frequency and timing of sexual activity except at the extremes of concentration [e.g., the decline in potency and libido following the failure of pituitary testicular function and enhanced libido accompanying androgen excess]. The decline in the sexual potency which occurs with aging with males is not due to lack of androgen; because testosterone secretions remain almost constant with advancing years. In human with true androgen deficiency, testosterone treatment causes marked improvement in libido, but in psychogenic importance, the secretion of testosterone is generally normal, and androgen administration has little effect on humans. Oestrogen treatment causes a striking decline in libido and potency due to inhibition of pituitary LH secretion of testosterone. Androgen treatment may increase sexual drive doing no alteration of its direction in the homosexual human male who often shows no overt evidence of androgen deficiency. In the heterosexuality adjusted women, androgen administration may increase libido and

responsiveness to sexual stimulation. This theory relates to the action of the genes and chromosomes (Hall & Guyton, 2011, p.1050).

In conclusion, egg and sperm cells are formed through meiosis, which is a nuclear division that ends in haploid cells that creates mature gametes. Once completed, the sperm begins as a round cell and then generates a tail which gives it mobility to swim to an egg and fertilize it. Fertilization is achievable with the female reproductive system and the male reproductive system. Altogether, this system is an amalgamation of functional organs and hormones that cooperate to generate life.

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