Effect of aging on the reproductive systems biology essay

Reproduction is the process by which organisms generate offspring. Whilst the reproductive system is essential to keeping a species alive, it is not essential to keeping an individual alive. Reproduction is a characteristic that all living things have in common and one of the things that sets them apart from non living things.

Effects of aging on the male reproductive system

The male reproductive system consists of the testes, a series of ducts and glands and a penis. Sperm are produced in the testes and are transported through the reproductive ducts (including the epididymis, vas deferens, ejaculatory duct and urethra). The reproductive glands (including the seminal vesicles and prostate gland) produce secretions that become part of semen, the fluid that is ejaculated from the urethra. As males age testicular tissue mass decreases, sperm production decreases and erectile function changes.

Men, unlike women, do not experience a sudden change in fertility as they age. Instead, changes occur gradually during a process known as andropause. Andropause is a term used to describe a male menopause characterized by a decrease in testosterone. Although not an officially recognized medical term, the notion of andropause has existed since the 1940s. This relates to the slow but steady reduction of the production of the hormones testosterone and dehydroepiandrosterone in middle-aged men which is associated with a decrease in leydig cells (found adjacent to the seminiferous tubules in the testes).

The female menopause is a complete cessation of reproductive ability caused by the cessation of the female reproductive system. Andropause is a decline in certain male hormones but it does not cause a man’s reproductive system to stop working altogether.

The frequency, duration, and rigidity of erections gradually decline throughout adulthood. Levels of testosterone (the male sex hormone) tend to decrease, reducing sex drive (libido) for some men. Sexual responses may become slower and less intense. While this may also be related to decreasing testosterone levels, it can also result from other psychological or social changes related to aging. The impact of low levels of testosterone has also been connected to other symptoms associated with aging including; nervousness, depression, impaired memory, the inability to concentrate, fatigue, insomnia, hot flushes and sweating.

Erectile dysfunction (male impotence) is characterized by the inability to develop or maintain an erection of the penis sufficient for satisfactory sexual performance and it is often associated with the aging process. However, erectile dysfunction is more likely to be the result of a medical or psychological problem rather than simple aging. Medications can cause some men to be unable to develop or maintain an erection. In addition, any disorder that impairs blood flow in the penis or causes injury to the nerves has the potential to cause erectile dysfunction. Although it is not an inevitable part of aging, incidences increase with age: about 5 percent of 40-year-old men and between 15 and 25 percent of 65-year-old men experience erectile dysfunction.

Blood flow to the penis decreases with age. Other changes include decreases in penile sensitivity and ejaculatory volume, reduced forewarning of ejaculation, orgasm without ejaculation, more rapid detumescence (the return of an erect penis to its natural flaccid state) state, and a longer refractory period (the recovery phase after orgasm before being arousable again).

A process called sclerosis may mean that the tubes that carry sperm become less elastic. The testes continue to produce sperm, but the rate of sperm cell production slows. The epididymis, seminal vesicles, and prostate gland lose some of their surface cells but continue to produce the fluid that helps carry sperm.

Approximately 50% of men suffer from a condition known as benign prostatic hypertrophy (BPH) in which the prostate gland enlarges with age and some of the prostate tissue is replaced with fibroid tissue. This can cause problems with ejaculation and with urination as this partially blocks the urethra (the tube that drains the bladder). Vesicoureteral reflux (backup of urine into the kidneys) may develop if the bladder is inadequately drained, eventually resulting in kidney failure if untreated.

Fertility varies from man to man. The volume of fluid ejaculated usually remains the same, throughout life, however, with age there are generally fewer living sperm in the fluid. Prostate cancer becomes more common as men age and bladder cancel is common in older men. Testicular cancers generally occur more often in younger men.

Effects of aging on the female reproductive system

Menopause is the permanent end of menstrual periods and the end of fertility in women. The average age of menopause for women in the UK is 52. However, menopause may occur normally in women as young as 40. Menopause is considered premature when it occurs before age 40 (also called premature ovarian failure).

During the reproductive years, menstrual periods usually occur in approximate monthly cycles, with an egg released from the ovary about 2 weeks after the first day of a period. For this cycle to occur regularly, the ovaries must produce enough oestrogen and progesterone hormone.

A distinctive transitional period called perimenopause occurs during the years before and for one year after the last menstrual period. During perimenopause, oestrogen and progesterone levels fluctuate widely, menstrual periods and ovulation become irregular, and symptoms (such as hot flushes) may occur. Eventually, menstrual periods and ovulation end permanently, and pregnancy is no longer possible.

Around menopause changes in the genital organs occur rapidly. The tissues of the labia minora, clitoris, vagina, and urethra atrophy. This atrophy can result in chronic irritation, dryness, and a discharge from the vagina which can increase the likeliness of vaginal infections developing. The lining of the vagina becomes thinner, drier, and less elastic and this may make sexual intercourse painful and may increase the risk of inflammation (vaginitis). The labia minora, clitoris, uterus, fallopian tubes and ovaries all decrease in size. The lining of the urethra becomes thinner, and the urethra becomes shorter.

Because of these changes, microorganisms can enter the body more easily, and some women develop urinary tract infections more easily.

With aging, there is a decrease in the amount of muscle and connective tissue, including the muscles, ligaments, and other tissues that support the bladder, uterus, vagina, and rectum. As a result, the affected organs may prolapse (sag or drop down). This can cause a feeling of pelvic pressure or fullness and possible difficulties urinating and/or pain during sexual intercourse. The muscles that control the flow of urine out of the bladder become weaker and stress incontinence can develop. Some women develop urge incontinence, which is an abrupt, intense urge to urinate that cannot be suppressed. Because there is less oestrogen to stimulate milk ducts, the breasts decrease in size and may sag (also due to connective tissue decreasing and fibrous tissue being replaced with fat).

Despite these changes, woman can and still do enjoy sexual activity. In addition, after menopause, the ovaries and adrenal glands continue to produce small amounts of testosterone which can: help maintain the sex drive, slow the loss of muscle tissue, and contribute to an overall sense of well-being.

Other symptoms thought to be connected to the menopause are mood changes, depression, irritability, hot flushes, anxiety, nervousness, sleep disturbances/insomnia, loss of concentration, headache, and fatigue. However, these symptoms may not directly be related to the decreases in oestrogen levels that occur with menopause as many other factors (such as aging itself or a medical problem) could explain the symptoms.

After menopause the decrease in oestrogen levels causes changes that can continue to negatively affect overall health. As oestrogen decreases, the amount of collagen (a protein that makes skin strong) and elastin (a protein that makes skin elastic) also decrease. Thus, the skin may become thinner, dryer, less elastic, and more vulnerable to injury.

Oestrogen decreases can also often leads to a decrease in bone density and sometimes to osteoporosis

because oestrogen helps maintain bone. Bone becomes less dense and weaker, making fractures more likely.

After menopause, levels of lipids, particularly low-density lipoprotein (LDL bad cholesterol), increase in women while levels of high-density lipoprotein (HDL good cholesterol) decrease. These changes in lipid levels may also partly explain why atherosclerosis and thus coronary artery disease become more common among women after menopause. Until menopause, the high oestrogen levels may protect against coronary artery disease.