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MEDICINE AND SURGERY

BIOCHEMISTRY ASSIGNMENT(BCH313)

DIABETICS, OBESITY AND CANCER

QUESTION

1. What do you understand by primary or simple obesity?
2. How does congenital syndrome and drug therapy affects obesity.
3. Outline the etiology of cancer and its molecular basis.

ANSWER

1. Primary or simple obesity is characterized by a normal or increased growth with an acceleration of bone maturation. When longitudinal growth slows down in the presence of obesity, a hormonal disturbance should be sought. At this stage, it is not associated with clinical conditions.
2. Drug therapy and obesity

A number of drugs are capable causing obesity; drugs such as birth control pills, steroids and antidepressants. This is because these drugs possess varying abilities to increase and appetite stimulate carbohydrate craving and cause weight gain over prolonged periods of administration. Psychotropic drugs with more pronounced amitripyline induce weight gain. Selective serotonin reuptake inhibitors decrease transiently bodyweight during the first few weeks of treatment and may then increase body weight; weight gain tends to be most prominent some mood stabilizers. Atypical antipsychotic tend to cause more weight gain than the convenient ones. Some of the medications might interfere with central nervous functions regulating energy balance which are neurotransmitters, neuromodulators, cytokines and hormone interacting with the hypothalamus.

Congenital syndrome and obesity.

Severe obesity is a characteristic feature of many congenital and genetic disorders. Congenital syndromes like Prader-Willi syndrome, Cohen syndrome, Down syndrome, Bardet-Biedl syndrome and Turner syndrome are associated with obesity in children.

Children with Down syndrome are more likely to have higher levels of hormones associated with obesity; hormones such as leptin. The normal role of leptin is to suppress appetite and regulate body weight. Obese people do not respond to leptin properly because they have some leptin resistance. Down syndrome may have a genetic predisposition to more severe leptin resistance.

Prader-Willi syndrome (PWS) is a complex neurodevelopmental disorder due to errors in genomic imprinting with loss of imprinted genes that are paternally expressed from the chromosome region. PWS is considered most common known genetic cause of morbid obesity in children. The subject are frequently unable to sense when they are full after eating and this leads to weight gain Unless food intake is strictly controlled, subject with PWS will be severely obese. PWS result to constant and inexorable hunger that drives patients to engage in problematic hunger behaviors with affected individuals who do not fill satisfied after completing a meal. Most patients have reduced GH secretion and hypogonadotropic hypogonadism, suggesting hypothalamic–pituitary dysfunction. There has been encouraging results have been observed with the early administration of GH, resulting in accelerated growth and decreased body fat; sex hormone replacement may also be beneficial.

1. Etiology of cancer

Cancer applies to a group of diseases in which cells grow abnormally. It may be defined as “malignant neoplasm’’. Abnormal cells divide uncontrollably and they destroy blood tissue. Cancer arises from factors within the cell and the external factors within the environment making the etiology of cancer multifactorial. These factors could either be genetic (due to mutations), hormonal (steroid hormones), physical (X-rays, UV-rays, gamma rays, e.t.c), chemical (aniline, asbestos), metabolic and environmental factors. These factors cause mutations in genes during replications. Such genes have 50% chance of being passed to the offspring.

Age increases the occurrence of cancers. It usually begins from one cell which begins to divide and multiply. Sometimes the immune system is able to fight the cell but as age increase, the system becomes weak.

Carcinogens are substances that promote the formation of cancer. This is usually due to ability to destroy genome or destruction of cellular metabolic processes. Examples are nickel, radon, benzene,etc

Oncogenic viruses get integrated into the host DNA leading to multiplication of viral gene overtaking the normal host causing uncontrollable multiplication of cells.

Molecular basis of cancer

Normal cells tend to replicate normally and when they get older and can no longer perform effectively they are removed by apoptosis (programmed cell death). The molecular basis of this is seen in the shortening of telomeres on the chromosomes of normal cells. Cancer cells are able to escape apoptosis of the normal cell cycle. They accomplish this by production of the enzyme telomere polymerase which lengthens the telomeres on the chromosome. In this way, apoptosis is escaped and immortality is attained by cancer cells. All normal cells receive signals for apoptosis but chemical compounds that cause cancer destroy these signals hence, cells continue to multiply uncontrollably.