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ASSIGNMENT TITLE: DIABETES, OBESITY AND CANCER

1. WHAT DO YOU UNDERSTAND BY PRIMARY OBESITY

Primary Obesity or just Obesity is a pathological/ medical state resulting from the excessive intake of food in large quantity over an extended period of time which causes an accumulation of excess fat in the body with a combination of lack of physical activity and environmental issues. It does not just have to do with the body size but puts the body at risk to conditions such as heart disease, diabetes, high blood pressure and certain cancers.

It may be defined as a situation in a person where the body mass index (BMI) is equal to or greater than 30, and is closely related to both percentage body fat and total body fat. It is calculated as the subject's weight divided by the square of their height which approximates 30 pounds/ 13.60kg of excess weight or fat and hence “obesity”.

A few cases are caused primarily by genes, endocrine disorders, medications, or mental disorder and are referred to as “secondary obesity”.

2. HOW DOES DRUG THERAPY AND CONGENITAL SYNDROME AFFECT SECONDARY OBESITY

Secondary obesity is a situation where obesity is caused by a medical condition. These diseases include endocrine disorders, hypothalamic disorders and some congenital conditions like hypothyroidism, Cushing's syndrome, growth hormone deficiency along with certain mental illnesses and their treatment substances which causes the risk of obesity to be higher in patients with psychiatric disorders than in persons without psychiatric disorders.

The medications that may cause obesity or changes in body composition include insulin, sulfonylureas, thiazolidinedione, atypical antipsychotics, antidepressants, steroids, certain anticonvulsants (phenytoin and valproate), pizotifen, and some forms of hormonal contraception.

 The side-effects of the drugs used to treat mental illness or some other illnesses may alter appetite e.g. Antidepressants which interfere with serotonin, the neurotransmitter that regulates anxiety and mood while also controlling appetite. In particular, these changes may increase cravings for carbohydrate-rich foods, and result in increased food consumption, while others may affect how your body absorbs and stores glucose or example insulin which alters and increases how cells absorb glucose and hence stores excess body fat, which can lead to fat deposits in the midsection of your body.

The congenital syndromes may result in obesity as a result of absence or present of certain parts which control body metabolism or absorption e.g. hypothyroidism where the thyroid hormones T3 and T4 control cellular metabolism throughout the body, when there is not enough of them for any reason, this metabolic function slows and becomes impaired and causes un-metabolized food accumulation.

Also, Cushing’s syndrome Cushing syndrome occurs when your body is exposed to high levels of the hormone cortisol for a long time and can affect different parts of the body. High levels of cortisol result in a redistribution of fat, especially to the chest and stomach, along with a rounding of the face.

3. DISCUSS THE AETIOLOGY OF CANCER AND ITS MOLECULAR BASIS

Cancer is a group of diseases involving abnormal cell growth with the potential to invade or spread to other parts of the body.

ETIOLOGY

Anything that may cause a normal body cell to develop abnormally can cause cancer. Some cancer causes remain unknown while other cancers have environmental or lifestyle triggers or may be influenced by genetics. Many patients develop cancer due to a combination of these factors including:

Chemical or toxic compound exposures:

E.g. Benzene, asbestos, nickel, cadmium, vinyl chloride, benzidine, N-nitrosamines, tobacco or cigarette smoke (contains at least 66 known potential carcinogenic chemicals and toxins), asbestos, and aflatoxin

Ionizing radiation:

E.g. Uranium, radon, ultraviolet rays from sunlight, radiation from alpha, beta, gamma, and X-ray-emitting sources

Viruses:

E.g. Human papilloma virus (HPV), Epstein-Barr virus (EBV), Hepatitis viruses B and C, Merkel cell polyoma virus.

Bacteria:

 E.g. Helicobacter pylori infection increases the risk of several kinds of cancer (gastric adenocarcinoma, gastric lymphoma, mucosa-associated lymphoid tissue, and lymphoma)

Genetics:

Inherited genetic mutations play a major role in about 5 to 10 percent of all cancers. Researchers have associated mutations in specific genes with more than 50 hereditary cancer syndromes, which are disorders that may predispose individuals to developing certain cancers.

MOLECULAR BASIS OF CANCER

Mutation in genes results in altered proteins during cell divisions in somatic and germ line cells or other processes and may result in cancer cells formation

Cancer develops when the body’s normal control mechanism stops working. Old cells do not die and instead grow out of control, forming new, abnormal cells. The cancer cells grow and divide to create more cells and will eventually form a tumor which may contain millions of cancer cells.

In some cases, cancer cells may escape apoptosis unlike normal cells by increasing or decreasing expression of anti- or pro-apoptotic genes, respectively. Alternatively, they may inhibit apoptosis by stabilizing or de-stabilizing anti- or pro-apoptotic proteins, respectively thus making them immortal except by the use of radiation