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**COURSE TITLE: CELLULAR BIOCHEMISTRY**

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**ANSWERS**

1. Obesity is a medical condition in which excess body fat has accumulated to an extent that it may have a negative effect on health. Primary obesity can be defined as a state of excess adipose tissue in the body. People are diagnosed as obese when their body mass index (BMI), a measurement obtained by dividing a person's weight by the square of the person's height, is over 30 [kg](https://en.wikipedia.org/wiki/Kilogram)/[m2](https://en.wikipedia.org/wiki/Square_metre). Primary obesity can be caused by lack of physical activity, consumption of excessive food and junks and genetic factors. Primary obesity increases the risk of developing a number of diseases including: hypertension, type 2 diabetes mellitus, coronary heart disease, stroke, heart attack, heart failure, sleep apnea, gall stones and gall bladder disease, osteoarthritis and pickwickian syndrome. Treatment of primary obesity usually requires more than just dietary changes, exercise, counseling, support and sometimes medication can supplement diet to help patients conquer weight problems.
2. Secondary obesity means that a person has a medical condition that has caused them to gain weight.
* **How Drug Therapy Affects Secondary Obesity:**

Sometimes it is not the drug itself causing weight gain; however, it is the side-effects from the drug. Some drugs stimulate arcuate nucleus of the hypothalamus causing a large appetite, and as a result, more food is been consumed. Others may affect how your body absorbs and stores glucose, which can lead to fat deposits in the midsection of your body.

Drug-induced weight gain is a serious side effect of many commonly used drugs leading to noncompliance with therapy and to exacerbation of comorbid conditions related to obesity. Improved glycemic control achieved by insulin, insulin secretagogues or thiazolidinedione therapy is generally accompanied by weight gain. It is a problematic side effect of therapy due to the known deleterious effect of weight gain on glucose control, increased blood pressure and worsening lipid profile.

The atypical antipsychotic drugs (clozapine, risperidone and quetiapine) are known to cause marked weight gain. Antidepressants such as amitriptyline, mirtazapine and some serotonin reuptake inhibitors (SSRIs) also may promote appreciable weight gain that cannot be explained solely by improvement in depressive symptoms.

* **How congenital syndrome affects Secondary Obesity:**

There are some congenital conditions that can lead to secondary obesity such as;

1. Hypothyroidism**:** It is associated with decreased thermogenesis, decreased metabolic rate, and has also been shown to correlate with a higher body mass index (BMI) and a higher prevalence of obesity.
2. Polycystic ovarian syndrome (PCOS): It is a condition that affects a woman's hormone levels. Women with PCOS produce higher than normal amounts of male hormones. This hormone imbalance causes them to skip menstrual periods and makes it harder for them to get pregnant.Polycystic ovary syndrome is a condition that can affect a woman's ability to produce eggs. PCOS is linked with higher levels of circulating insulin, which is characteristic in type 2 diabetes
3. Cushing disease: It is a condition in which the pituitary gland releases too much adrenocorticotropic hormone (ACTH). The pituitary gland is an organ of the endocrine system. Cushing disease is a form of Cushing syndrome. Cushing disease can occur if you have high stress levels of the stress hormone cortical, in your blood. Cortisol increases our blood pressure and blood glucose levels and is one complication which can result from untreated Cushing's syndrome.

3) Aetiology of Cancer And Its Molecular Basis

Aetiology Of Cancer:

Cancer is caused by proliferation of cell. Such changes may be due to chance or to exposure to a carcinogens or mutagens. A carcinogen may be a chemical substance, such as certain molecules in tobacco smoke. The cause of cancer may be environmental agents, viral or genetic factors.

Cancer risk factor can be roughly into the following groups:

* Biological or internal factors, such as age, gender, inherited genetic defects and skin type.
* Environmental exposure, for instance to radon and UV radiation, and fine particulate matter.
* Occupational risk factors, including carcinogens such as many chemicals, radioactive materials and asbestos.
* Lifestyle-related factors.

Lifestyle-related factors that cause cancer include:

* Tobacco
* Alcohol
* UV radiation in sunlight.
* Some food-related factors, such as nitrites and poly aromatic hydrocarbons generated by barbecuing food).

Cancer causing factors related to work and living environments include:

* asbestos fibers
* tar and pitch
* polynuclear hydrocarbons (e.g. benzopyrene)
* Some metal compounds.
* Some plastic chemicals (e.g. Vinyl chloride).

Bacteria and viruses can cause cancer:

* Helicobacter pylori (H. pylori, which causes gastritis)
* HBV, HCV (hepatitis viruses that cause hepatitis)
* HPV (human papilloma virus, papilloma virus, which causes changes e.g. Cervical cells)
* EBV (Epstein-Barr virus, the herpes virus that causes inflammation of the throat lymphoid)

Radiation can cause cancer:

* ionizing radiation (e.g. X-ray radiation, soil radon).
* non-ionized radiation (the sun’s ultraviolet radiation).

Some drugs may increase the risk of cancer:

* certain antineoplastic agents.
* certain hormones.
* medicines that cause immune deficiency.

Molecular Basis Of Cancer:

Cancer is a group of diseases characterized by an autonomous proliferation of neoplastic cells which have a number of alterations, including mutations and genetic instability. Cellular functions are controlled by proteins, and because these proteins are encoded by DNA organized into genes, molecular studies have shown that cancer is a paradigm of acquired genetic disease. The process of protein production involves a cascade of several different steps, each with its attendant enzymes, which are also encoded by DNA and regulated by other proteins. Most steps in the process can be affected, eventually leading to an alteration in the amount or structure of proteins, which in turn affects cellular function. However where cellular function may be altered by disturbance of one gene, malignant transformation is thought to require two or more abnormalities occurring in the same cell. Although there are mechanisms responsible for DNA maintenance and repair, the basic structure of DNA and the order of the nucleotide bases can be mutated. These mutations can be inherited or can occur sporadically and can be present in all cells or only in the tumor cells. At the nucleotide level, these mutations can be substitutions, additions or deletions.