MEDICAL BIOCHEMISTRY ANSWERS

1. Simple obesity or primary obesity is as a result of increased consumption of food and decreased energy usage. “Energy balance” is the relationship between “energy in” (food calories taken into the body through food and drink) and “energy out” (calories being used in the body for our daily energy requirements). But in simple obesity you are not using the energy which is gotten from food and the relationship between the amount of Calories we eat in the diet and the amount of energy we use in the body determines our body weight so not using the energy leads to overweight and then obesity which is dangerous to our health
2. There is probably no medical condition for which a safe and effective form of pharmacotherapy is more highly desired than obesity. Neither is there a condition for which effective treatment would spare so much suffering for so many individuals. There is abundant evidence from epidemiological and interventional studies to suggest that morbidity from diabetes, cardiovascular disease, cerebrovascular disease, osteoarthritis, sleep apnea, and certain cancers could all be reduced in proportion to a reduction in body fat content.

Congenital obesity is the excessive accumulation and storage of fat in the body that is present during infancy and/or childhood. Obesity may be diagnosed as an isolated clinical finding or as a part of syndromic findings. Monogenic forms of childhood obesity are very rare.

The epidemic of obesity is also affecting children with congenital heart disease (CHD). Two main causes have been described: physical activity restrictions and interventions for weight gain in infancy, when many lesions cause undernutrition . These interventions often include consumption of increased calories and foods with high fat and sodium content , Although nutritional requirements and physical functional capacity change as these children grow older and their heart lesions are successfully treated, the inappropriate dietary behaviors and physical inactivity are frequently maintained across childhood , The family frequently influences these unhealthy behaviors, both directly, restricting physical activity, for example, and indirectly, by setting an unhealthy model. When parents are obese, as one example, the risk of obesity in their children is increased.

In the obese, modifications in body constitution (higher percentage of fat and lower percentage of lean tissue and water) can affect drug distribution in the tissues For slightly liposoluble molecules (e.g., digoxin, antipyrine), the equilibrium distribution volume (V), total and per kilogram weight, is significantly less than that of control subjects. With lipophilic drugs (e.g., barbiturates, benzodiazepines), this parameter is significantly increased, explaining the prolongation of the plasma elimination half-life. For drugs that are almost equally soluble in water and oil (methyl xanthines, aminoglycosides), the V is slightly increased in the obese. The other main factors involved in drug diffusion in the tissues are binding to plasma and tissue proteins, and regional blood flow. In the obese the binding of drugs to albumin does not seem to be altered.

1. THE AETIOLOGY OF CANCER AND ITS MOLECULAR BASIS

All cancers are caused by changes to genes in our body. Genes are units of information in every cell of our bodies. Genes tell our bodies which proteins to make based on the type of cell and its needs. Some genes tell our bodies how to fix damage accumulated over time from normal aging, environmental toxins, sun exposure, dietary factors, hormones, and other influences. These damage-controlling genes can repair cells or tell cells when to stop growing and die if there is too much damage to repair.

Cancer is a disease that occurs when cells in our body are damaged and cannot be repaired. These cells can begin to grow and divide abnormally and escape our body’s normal control processes. These abnormal cells are cancer cells.

Cancer cells can grow together as masses called tumors which replace normal cells in tissue or organs. Cancer cells can interfere with the normal functioning of the organ where they arose, and they can also spread to surrounding tissue or through the blood and lymph tissue to other organs. When cancer cells spread beyond their original site to other organs it is called "metastasis." Substances that cause cancer are called carcinogens, have been identified both by studies in experimental animals and by epidemiological analysis of cancer frequencies in human populations (e.g., the high incidence of lung cancer among cigarette smokers. many agents, including radiation, chemicals, and viruses, have been found to induce cancer in both experimental animals and humans.

 Cancer usually develops slowly, often involving multiple steps (damage to multiple genes), over a period of several years. Cancer can usually be

treated. Depending on what step or stage the cancer is found, it often can be cured.

Molecular basis;

Non lethal genetic damage (mutations) lies at the heart of carcinogenesis. Such mutations may be acquired by the action of environmental agents, such as chemicals, radiation, and viruses, or it may be inherited in the germ line. The alteration of genetic content occur by {point mutation, translocation between two chromosomes, and increase of copy number of particular genes this called (amplification).

The genetic hypothesis of cancer implies that a tumor mass results from the clonal expansion of a single precursor (progenitor) cell that has carried the genetic damage.

The targets of genetic damage (mutation) are:

1- Proto-oncogenes cellular genes that promote normal growth and differentiation,.

2- Cancer-suppressor genes (anti-oncogenes) the growth-inhibiting genes.

3- Genes that regulate programmed cell death, or apoptosis.

4- Genes that regulate repair of damaged DNA.

Oncogenes and cancer:

Oncogenes, or cancer-causing genes, are derived from protooncogenes, by retroviral transduction (v-oncs) or by influences that alter their behavior in situ, thereby converting them into cellular oncogenes (c-oncs).

Protein products of oncogenes (onco-proteins):