DIABETES, OBESITY AND CANCER

QUESTION 1: What is primary or simple obesity?

Obesity is a medical condition in which excess body fat has accumulated to an extent that it may have a negative effect on the health and in its primary type, is not associated with any clinical conditions. This means that it is not related to any preexisting medical conditions that may cause obesity, but its primary cause is a combination of excess food intake, lack of physical activity and genetic susceptibility.

QUESTION 2: How does congenital syndrome and drug therapy affect obesity?

DRUG THERAPY:

Drug induced weight gain is a serious side effect of many commonly used drugs leading to noncompliance with therapy and to exacerbation of co morbid conditions related to obesity. This means that the drugs commonly used to try to solve obesity may even lead to more weight gain and at the same time other effects of obesity like congestive heart failure and diabetic ketoacidosis, among others.

The atypical antipsychotic drugs like clozapine, olanzepine, risperidone and quetiapine are known to cause marked weight gain.

CONGENITAL SYNDROME:

Severe obesity is a characteristic feature of many congenital and genetic disorders, such as AHO, Alstrom–Hallgren syndrome, Bardet–Biedl syndrome, Beckwith–Wiedeman syndrome, Carpenter syndrome, Cohen syndrome and Prader–Willi syndrome (PWS), the latter being one of the most common syndromic forms of obesity in children . In addition to being overweight, children with genetic syndromes associated with obesity typically have characteristic physical findings, including dysmorphic features, developmental delay and mental retardation.

Prader–Willi syndrome

PWS is a congenital neurodegenerative disorder caused by genetic abnormalities of the long arm of chromosome 15, usually secondary to the deletion of paternal DNA, leading to the lack of the *SNRP* gene, which occurs sporadically. Clinically, PWS results in hypotonic infants and later in insatiable obese, mildly retarded, behaviorally disturbed adolescents and adult. Most patients have reduced GH

Secretion and hypogonadotropic hypogonadism, suggesting hypothalamic–pituitary

Dysfunction. Genetic testing usually confirms the clinical diagnosis. There is no effective treatment for most of the problems associated

with PWS. Nevertheless, 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. Obesity

management is crucial in the care of the patients with PWS; limiting access to food

through close supervision and physical barriers is usually recommended.

QUESTION 3: Outline the etiology of cancer and its molecular basis.

ETIOLOGY OF CANCER

Cancer arises from factors within the cell and external factors within the environment e.g. inherited mutation and interplay of environmental factors like chemicals thus, etiology of cancer is multi factorial; physical, chemical, hormonal, metabolic and genetic factors all have a role to play in the development of cancer.

All these factors cause mutation of genes during replication therefore replication causes cancer. Carcinogens are mutagens and vice versa. In summary, carcinogens whether physical or chemical can cause DNA damage which leads to mutation, and mutation causes cancer. Every normal cell has DNA repair mechanisms that correct the defects that occur during replication. Carcinogens and hereditary mutation affects the repair genes and cancer results. About 50% of human cancer is due to the deletion or mutation of this repair gene known as ANTI ONCOGENE/ONCOSUPRESSOR GENE.

Oncogens which are different from oncogenic viruses are normal components of DNA that are capable of causing cancer when activated but are normally suppressed by the anti-oncogenes. These protect the individual from getting cancer. When the gene is mutated/deleted, cancer then results.

MOLECULAR BASIS OF CANCER

Normal cells tend to replicate and at the appointed time are removed from the body through a process called APOPTOSIS. The molecular basis of this is seen in the shrinking of telomeres on the chromosomes of normal cells. Cancer cells are able to escape apoptosis of the normal cell cycle. They accomplish this by producing an enzyme called telomere polymerase that lengthens the telomeres, extending cell life instead.

In this way, the cancer cells escape apoptosis and are therefore immortalized. All normal cells receive signals for apoptosis. Chemical compounds that cause cancer destroy these signals; hence cells continue to multiply uncontrollably.