Obesity related insulin elevation causes lowered steroid-hormone-binding globulin (SHBG) level. Decreased SHBG leads to increased free estradiol and androgens and these hormones are then available to stimulate the growth of estrogen and androgen receptor expressing breast and prostate cancers.

D-11 BIOCHEMISTRY OF METABOLIC SYNDROME AND EXPERIMENTAL ANIMAL MODELS

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Increases in metabolic syndrome incidence depending on dietary habits are observed in recent years. Role of fructose containing drinks in the increase of metabolic syndrome incidence is inevitable. For this reason fructose induced metabolic syndrome models are generated in order to reveal the underlying mechanisms of metabolic syndrome and to develop treatment models. Hence, I will try to express the metabolic syndrome models and the formation biochemistry of metabolic syndromes in the light of current knowledge in this presentation.

D-12 THE BIOMARKERS OF OSTEOPOROSIS AND METABOLIC BONE DISEASE

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Osteoporosis is a chronic disease and increases the risk of fragility fractures which is a very important social and economic problem in many countries of the world. Early diagnosis of reduced bone mass or osteoporosis and fracture prevention treatment is important. An ideal examination of diagnosis and follow-up method of osteoporosis should indicate both loss of bone mass and fracture risk. Biochemical markers of bone turnover are non-invasive and efficient tool to evaluate bone diseases. Osteoelastic and osteoclastic ratio of bone matrix can be detected by either measuring leading active enzymes of bone forming and resorbing cells or measuring bone matrix components which released to circulation during bone remodelling. These markers have advantages in bone cycle such as being unexpensive, non-invasive, reusable and to be able to show bone cell activity. But the disadvantages of these markers are inequality of sensitivity and specificity and lack of full research of some markers. As a result, in this speech we plan to make an assessment about bone biomarkers which is used to measure drug efficacy only to help bone mineral density in studies, is seen in articles about bone, is measured almost only for research, doesn’t exist in routine laboratory tests and is reached only by some academic personnel.

D-13 LABORATORY OVERVIEW OF BONE MARKERS

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Bone remodeling is characterized by temporal and spatial coupling of bone formation and resorption that is necessary for normal bone structure maintenance and skeletal growth. A wide range of biochemical markers provide information on bone cells known as bone turnover markers (BTM) which can be divided as markers of bone resorption and formation. The measurement of BTM can reflect either enzymatic activities characteristic of the bone-forming (alkaline phosphatase), or resorbing cells or bone matrix components released into circulation during resorption (collagen type I telopeptides). Although different assays for many markers have been adapted to automated biochemical analyzers making them rapid and cost-effective in clinical laboratories, none of the currently available bone markers have shown to be advantageous over others with regard to their clinical utility. The recent report of Joint Working Group of International Foundation of Osteoporosis (IOF) and International Federation of Clinical Chemistry on Standardization of Bone Turnover Markers recommend; one bone formation marker (serum PINP) and one bone resorption marker (serum CTx) to be measured by standardized assays for the prediction of fracture risk and monitoring of osteoporosis treatment in adults. To addresses the limitations of variability IOF and National Bone Health Alliance have implemented different complimentary activities around the harmonization and the use of all BTMs. However all those traditional BTMs have been used for years to decide the fracture risk prediction and largely for treatment monitoring that show earlier changes following the beginning of treatment allowing useful measurements to be observed about 1 to 3 months. Nowadays there has been a new approach which bases on our understanding of bone metabolism. Related with that periostin, cathepsin-K, sclerostin, diIikkop-1, RANKL, FGF-23/klotho/ostecalcin, sphingozine-1-phosphate and microRNAs are considered as new biomarkers. Also the clinical use of those biochemical markers has not been fully established, their relationship with fracture risk has still have question marks and their use as treatment monitoring tools needs to be studied. Why we are working on them, as all those new mentioned markers can tell us about the osteocyte activities and distinguish the bone compartments that they might be helpful for exploring the physiological and pathological links between the bone and other organs, and to monitor systemic diseases.

D-14 EFFECT OF EXERCISE ON LABORATORY RESULTS IN OSTEOPOROSIS

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Osteoporosis is an osteometabolic disease which increases the risk of fracture and impairs bone quality and microarchitecture of the bone tissue is characterized by the loss of bone mass. Although osteoporosis has different classifications based on the age of a person, localization of the disorder, bone tissue involved, etiology and histological appearance, it is increasingly becoming widespread in both females and males. Although sex hormones are often reported to be effective in the development of osteoporosis, menopause and lack of physical activity are also important risk factors. Physical activity affects the bone structure by mechanical forces directly, and by hormonal factors indirectly. Mechanical forces lead to the preservation of bone mass during a physical activity by activating ground reaction forces with the contractile activity of the muscles. It is important to maintain bone health through appropriate exercise approaches, in which type, density, frequency, and length of the activity are adjusted. Exercise activates osteocytes which lead to the release of growth factors and cytokines, resulting in increased osteoblastic activity. The measurement of bone biomarkers is important in identifying the responses of bone cells to exercise. Serum bone alkaline phosphatase (B-ALP) and serum osteocalcin indicate new syntheses in bone. After appropriate exercise, biochemical markers increase significantly. Long-term moderate intensity exercise affects the production of osteoclastogenetic and antosteoclastogenetic cytokines by promoting the formation of peripheral blood mononuclear cells. Exercise exerts its effect by changing the balance between osteoclastogenetic cytokines and antosteoclastogenetic cytokines. With the formation of hematopoietic cells around the bone, similar changes occur at the micro level. These affect osteoclasts which promote bone resorption, osteoblasts which are responsible for bone formation and autogenesis by producing bone-loader signals. Bone biomarkers indicate that exercise plays an important role in bone health.