**Assignment Title: NEOPLASIA
Course Title: Introduction to Histopathology
Course Code: ANA 404**

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**Question**

**1. Write on cancers epidemiology in Africa generally, and Nigeria in particular.**

**2. Critically examine the involvement of angiogenic genes in the development and progression of osteosarcomas.**

1. **Cancer is an increasing problem in Africa because of aging and growth of the population as well as increased prevalence of risk factors associated with economic transition (including smoking, alcohol, obesity, physical inactivity, and reproductive behaviors), and of certain infectious agents of importance in cancer etiology. According to United Nations population estimates (“World Population Prospects - Population Division - United Nations,” n.d.), the population of Africa between 2010 and 2030 is projected to increase by 60% overall (from 1.03 billion to 1.63 billion) and by 90% for those 60 and older (from 55 million to 103 million), the age at which cancer most frequently occurs**

**Despite this growing burden, cancer continues to receive a relatively low public health priority in Africa, largely because of limited resources and other pressing public health problems, including communicable diseases such as Acquired Immune Deficiency Syndrome (AIDS)/Human Immunodeficiency Virus (HIV) infection, malaria, and tuberculosis. Another factor may be a general lack of awareness among policy makers, the general public, and international private or public health agencies, concerning the magnitude of the current and future cancer burden on the continent and its economic impact.**

**Data was analyzed from 2 population based cancer registries in Nigeria, the Ibadan Population Based Cancer Registry (IBCR) and the Abuja Population Based Cancer Registry (ABCR) over a 2 year period 2009–2010. Data are reported by registry, gender and in age groups. The age standardized incidence rate for all invasive cancers from the IBCR was 66.4 per 100 000 men and 130.6 per 100 000 women. In ABCR it was 58.3 per 100 000 for men and 138.6 per 100 000 for women. A total of 3393 cancer cases were reported by the IBCR. Of these cases, 34% (1155) were seen among males and 66% (2238) in females (Jedy-Agba et al., 2012). In Abuja over the same period, 1128 invasive cancers were reported. 33.6% (389) of these cases were in males and 66.4% (768) in females. Mean age of diagnosis of all cancers in men for Ibadan and Abuja were 51.1 and 49.9 years respectively. For women, mean age of diagnosis of all cancers in Ibadan and Abuja were 49.1 and 45.4 respectively. Breast and cervical cancer were the commonest cancers among women and prostate cancer the most common among men. Breast cancer age standardized incidence rate (ASR) at the IBCR was 52.0 per 100 000 in IBCR and 64.6 per 100 000 in ABCR. Cervical cancer ASR at the IBCR was 36.0 per 100 000 and 30.3 per 100 000 at the ABCR (Jedy-Agba et al., 2012)**

**The problem of cancer in Nigeria is appreciable with almost about 100,000 new cancer cases being reported in the country each year (Awodele, Adeyomoye, Awodele, Fayankinnu, & Dolapo, 2011)**

**A desk review of the level of occurrence and pattern of distribution of different cancer types in Lagos and Ibadan cancer registries over a 5 year period (2005-2009) was carried out. The results obtained showed a total number of 5094 cancer patients registered between 2005 and 2009 in both Lagos (60%) and Ibadan (40%) cancer registries. Breast cancer accounted for the majority of cases (20.2%), followed by cervical cancer (7.9 %), fibroid (4.4%), liver (4.4%), stomach (4.3%), brain (3.9%), pancreas (3.8%), prostate (3.3%), lung (3.0%) and cancer of the kidney (0.7%). This confirms earlier findings that breast, prostate, liver and cervical cancers account for the majority of cases of cancers in Nigeria.**

1. **Osteosarcoma is the most common primary malignancy of bone. It arises in bone during periods of rapid growth and primarily affects adolescents and young adults. The 5-year survival rate for osteosarcoma is 60%–70%, with no significant improvements in prognosis since the advent of multiagent chemotherapy. Diagnosis, staging, and surgical management of osteosarcoma remain focused on our anatomical understanding of the disease(Broadhead, Clark, Myers, Dass, & Choong, 2011, p. 4).**

**Tumor angiogenesis is essential for sustained osteosarcoma growth and metastasis. Without a supporting vasculature, osteosarcoma cells would be unable to obtain the nutrients and oxygen necessary for proliferation. Metastasis to the lungs and bone, the most common sites for osteosarcoma spread, also relies on the formation and maintenance of blood vessels (Hicklin & Ellis, 2005, p. 1021). A balance between pro-angiogenic and antiangiogenic factors regulates angiogenesis, and this balance is tipped towards the favor of neovascularisation by tissue hypoxia, acidosis, oncogene activation, and loss of tumor suppressor gene function. A hypoxic and acidotic microenvironment exists around proliferating osteosarcoma cells, and these conditions stimulate deubiquitinating of von Hippel Lindau protein. Von Hippel Lindau protein releases hypoxia-inducible factor-1*α* (HIF-1*α*), allows HIF-1*α* to bind to the promoter region of the vascular endothelial growth factor (VEGF) gene and upregulates it. TGF-*α*, and fibroblast growth factor (FGF) may also upregulate VEGF (DVORAK, 2005, p. 1841). As previously mentioned, angiogenesis is regulated by the balance between pro-angiogenic and antiangiogenic factors. Antiangiogenic proteins such as thrombospondin 1, TGF-*β* troponin I, pigment epithelial-derived factor (PEDF) and reversion-inducing cysteine rich protein with Kazal motifs (RECK) are downregulated in osteosarcoma. These antiangiogenic molecules are particularly important for embryogenesis and physiological processes such as wound healing and menstruation; however, they also play a protective mechanism against osteosarcoma progression.**

**For example, troponin I and PEDF are expressed predominately within the avascular zones of the cartilaginous growth plate and are likely to contribute to growth plate resistance to osteosarcoma invasion from a typical metaphyseal location. In addition to inhibiting angiogenesis, PEDF exerts direct effects on osteosarcoma cells. Also, in a murine model of orthotopic osteosarcoma, tumor volume was reduced by PEDF, which was associated with reduced microvascular density. There was decreased tumor metastases and reduced size of metastatic tumors in lung.**

**References**

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