BIOCHEMICAL PARAMETERS, HEXOKINASE II EXPRESSION AND METHYLATION OF BREAST CANCER PATIENTS IN LAGOS, NIGERIA

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ACCEPTANCE

This is to attest that this dissertation is accepted in partial fulfillment of the requirements for the award of Master of Science (M.Sc.) degree in Biochemistry in the Department of Biological Sciences, College of Science and Technology, Covenant University Ota.

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DECLARATION

It is hereby declared that this research work titled "**Biochemical Parameters, Hexokinase II Expression and Methylation of Breast Cancer Patients in Nigeria**" was undertaken by Udegbe, Sandra Amarachi. It is based on my original study in the Department of Biological Sciences, College of Science and Technology, Covenant University, Ota, under the supervision of Prof. E.E.J. Iweala and the ideas and the views of other researchers have been dully expressed and acknowledged.

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CERTIFICATION

This is to certify that Miss **UDEGBE, SANDRA AMARACHI** (Matric No: **09CP010123**) carried out this research work in partial fulfillment of the requirements for the award of Master of Science (M.Sc.) degree in Biochemistry of Covenant University, Nigeria.

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DEDICATION

This research work is dedicated to God Almighty for the completion of this work. I thank you Lord.

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Udegbe Sandra A.

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GLOSSARY

Fru-2,6-BP	fructose-2,6-bisphosphatase
G-6P	glucose-6-phosphate
GLUT	glucose transporter
GPI	glucose-6-phosphate isomerase
GSK-3β	glycogen synthase kinase-3β
H_2O_2	hydrogen peroxide
HK	Hexokinase
miRNA	microRNA
mRNA	messenger RNA
DCIS	Ductal carcinoma *in situ*
LCIS	Lobular carcinoma *in situ*

ABSTRACT

Breast cancer is the most common cancer among women and the second most common cancer in the world. It is a leading public health problem, with over one million new cases and 459,000 related deaths annually. Studies have revealed the importance of differential biochemical parameters and glucose metabolism in the development of critical biomarkers for accurate diagnosis and treatment of breast cancer. Forestalling the heavy burden of breast cancer is predicated upon the delineation of its related biomarkers hence the aim of this study which was to assess the biochemical parameters and expression and methylation of Hexokinase II gene of breast cancer patients in Nigeria. In this line of investigation, using standard methods, the expression and methylation of hexokinase II and some biochemical parameters including Alanine transaminase (ALT), Aspartate transaminase (AST), Alkaline phosphatase (ALP), Low density lipoprotein (LDL), High density lipoprotein (HDL) and triglycerides (TRIG) were examined in the plasma of 50 breast cancer patients attending the cancer clinic of Lagos State University Teaching Hospital (LASUTH) and 10 healthy control subjects. Students T-test was used to compare the test and control samples with ($P<0.05$) considered as significant. The data obtained indicates that there were no significant ($P<0.05$) differences in the AST, ALP, LDL and TRIG while there was a significant difference in the values of ALT (0.166±0.019U/L) and HDL (48.042±5.737mg/dL). There was also a significantly higher expression of Hexokinase II in the breast cancer patients. The hexokinase gene of the breast cancer patients were seen to be unmethylated as opposed to the control which were methylated. The data obtained from this study indicates the possible implication of ALT and HDL in breast cancer disease in Nigeria and their potential to be further developed into biomarkers for diagnosis of the disease. Also, the significant expression and unmethylation of Hexokinase II shows its possible association with breast cancer progression in Nigerian patients. The findings from this study provide a deeper understanding of breast cancer and a wider scope for improvement in the diagnosis and management of the disease.