INTRODUCTION

Triple Negative Breast Cancer (TNBC) cannot be treated with targeted therapeutics and are clinically aggressive. There is growing evidence that low pH (acidity) of the tumour microenvironment tends to boost cancer aggressiveness. The acidity of extracellular microenvironment tends to correlate with the high proportion of cancer cells being relatively resistant to some cancer therapeutics. Strategic manipulation to raise pH of tumour cell microenvironment may help in discovery of new anti-cancer therapies. The de-seeded fruit head of the fruit oil palm (DFHCOP) is usually incinerated, and the ash filtrate used as ingredient of common food dishes such as ‘Aducha’ (made from cassava) in Nigeria. Anhydrous chemical derived from DFHCOP (C-A) has a high pH of 10.5 and is remarkably non-corrosive, although no known study has established the effect of DFHCOP-A in biological systems concerning altering the pH of the tumour microenvironment.

RESULTS

Effect of DFHCOP-A on triple negative breast cancer

DISCUSSION and CONCLUSION

In this study fig showed that all cancer groups both treated and untreated had elevated LDH. According to Warburg in the 1920’s the extracellular pH of the microenvironment of tumour cell is acidic owing to the production of lactate by anaerobic glycolytic pathway in hypoxia also known as Warburg effect. (Liberti & Locasale, 2016)

• Lactate is produced by the conversion of pyruvate to lactate and back which is catalysed by the enzyme lactate dehydrogenase (LDH).

• In another study by Jhan et al, 2017, LDH was found to contribute to TNBC cells being glycolysis - dependent and LDH knockdown inhibited tumour growth in xenograft mice.

• Owing to the avid production of lactate most tumours exhibit mild acidic extracellular pH (Liberti & Locasale, 2016; Marriott & Whitaker, 2010).

• The serum pH of normal mice in figure 26 is in tandem with the physiological value of 7.4 (Silva et al, 2009).

• Clearly the vehicle control exhibited mild acidity lower than pH 7.4 while the treated groups were elevated to normal. The serum bicarbonate level to some degree may elevate the subnormal pH without notably interference with normal blood pH.

• An alkaline pH leads to an increase in calcium binding hence a decrease in the fraction of ionized calcium (Goldstein, 1991). The ionized calcium (figure 27) was notably decreased by 30% in the low dose DFHCOP-A treatment.

• Calcium signalling can be initiated by entry from extracellular influx. Calcium influx has been recognized to play a role in breast cancer (Azimi et. al, 2014). Anti cancer drugs like cisplatin has been shown to interfere with intracellular calcium signalling while inducing apoptosis. (Busselberg & Floria, 2011. Cisplatin or carboplatin which contains metal platinum, is usually the first line of treatment in TNBC and other cancer types.

• In figure 24, high dose of DFHCOP-A stimulated increased oxidative stress activity while low dose had no effect on oxidative stress level.

• Elevated production of reactive oxygen species have been detected in various cancers, where they promote many aspects of tumour development and progression (Liu & Storz, 2010). As there is little or no literature of the effect of DFHCOP-A on breast cancer, a combination of its chemical components have been demonstrated to show beneficial or stimulatory effects on breast cancer (Lappo et. al, 2017 and Caug, 1934).

• The opposite effect of low and high DFHCOP-A treatment is in line with hormesis.

• Hormesis can be defined as a biphasic response to exposure to increasing amount of chemical substance, where low dose cause a stimulatory or beneficial response, and high dose cause inhibitory or toxicity. Limitations of this study include lack of resources to further explore DHFCOP.

• In conclusion, this study provides preliminary evidence that DFHCOP-A at low dose may be used as an adjunct in TNBC treatment to increase pH of extracellular space and may potentiate cancer drugs.

REFERENCES

ACKNOWLEDGEMENT

This research was part funded by AFRICAN RESEARCH LEAGUE CYCLE 2019

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