# HYPERFORIN INDUCES CELL DEATH IN TRIPLE NEGATIVE BREAST CARCINOMA CELLS AND UPREGULATES PRO-APOPTOTIC GENES

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## INTRODUCTION

- Breast cancer is the most frequent cancer among women worldwide, and causes the highest cancer-related deaths.
- Current treatments that include radiation therapy, chemotherapy, targeted therapy, hormonal therapy, and surgery may have disadvantages such as development of adamant cancer cells or increase in toxicity of drugs in the patient's body.
- Natural products have long been considered as an alternative for cancer therapy (e.g. paclitaxel and doxorubicin).
- Anticancer properties of naturally occurring hyperforin, a compound of the plant St John's wort, were investigated against triple negative subtype of breast cancer cells (MDA-MB-231).
- This subtype has distinct molecular profile and metastasis patterns, aggressive behavior, and lack targeted therapies.

## OBJECTIVES

- This study aims to examine and compare the performance of hyperforin against paclitaxel in inducing in vitro cell death in MDA-MB-231 and to investigate the possible activation of apoptotic pathways and oncogenes using genomic approaches.

## MATERIALS & METHODS

- The cytotoxic effect of hyperforin on MDA-MB-231 cells was determined using the MTT, ROS, cell cycle, apoptosis and DNA fragmentation assay.
- The potential cell death pathway was further confirmed using the RT2 Profiler PCR microarray.
- The effectiveness of hyperforin was compared with the clinically used drug, paclitaxel (taxol).

## RESULTS & DISCUSSION

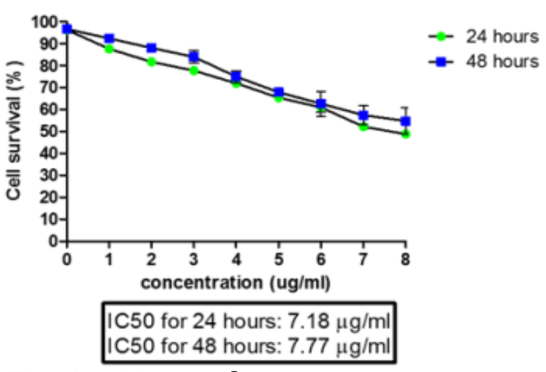



Fig 1: Hyperforin

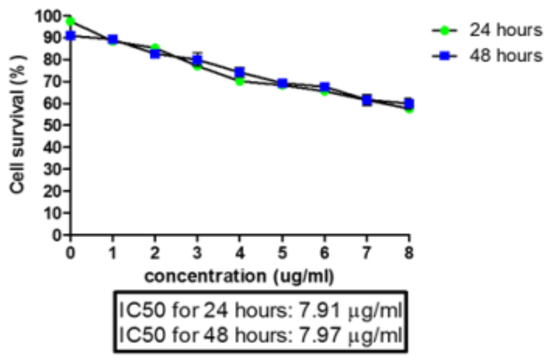



Fig 2: Taxol

**Hyperforin effectively induce *in vitro* cell death in MDA-MB-231 cells at 24 hours.** A lower IC50 is needed to induce cell death in both MCF-7 cells at 24 hours compared with 48 hours.

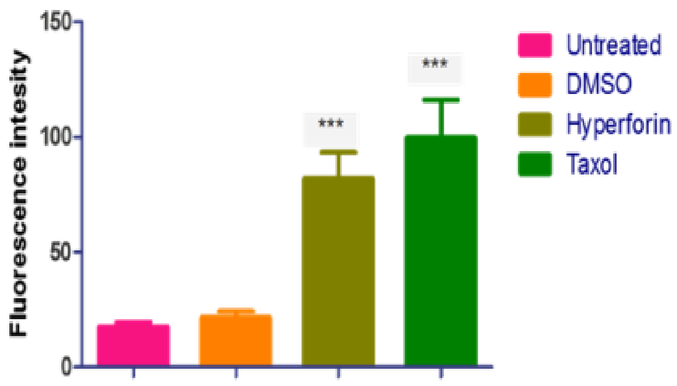



Fig 3: Release of ROS

**Hyperforin effectively induce release of ROS.** This indicating occurrence of damage to cell membrane and potential activation of cell death through mitochondrial pathway

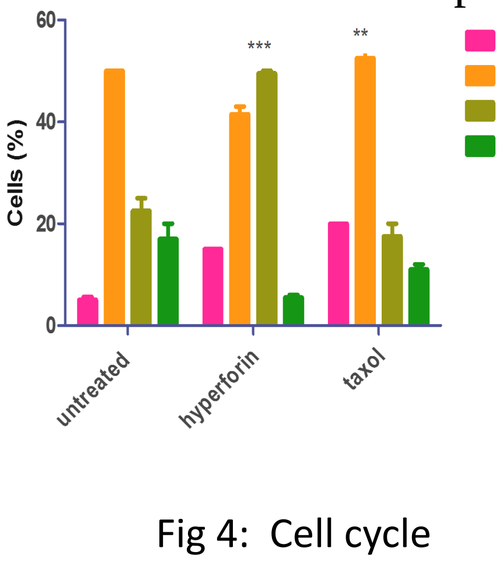



Fig 4: Cell cycle

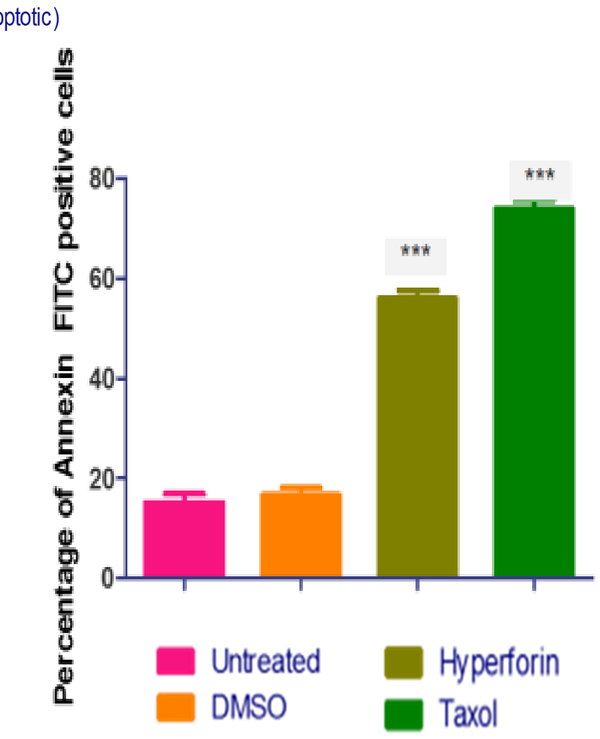
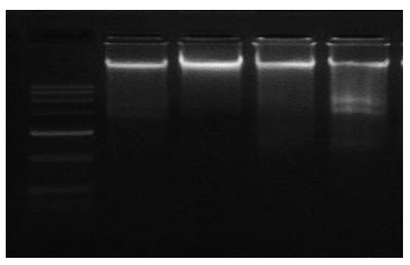



Fig 5: Apoptosis



Lane 1: hyperforin
Lane2: untreated
Lane 3: Untreated
Lane 4: Paclitaxel

Fig 6: DNA fragmentation

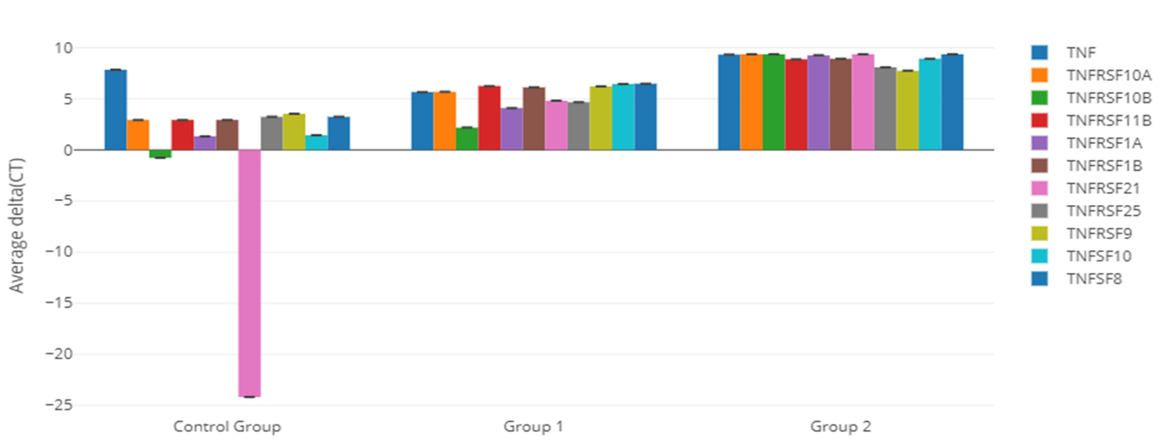



Fig 7: Untreated hyperforin taxol

**Hyperforin induces upregulation of several pro-apoptotic genes,** responsible for receptor mediated cell death

## CONCLUSION

- Investigation of hyperforin as a potential anticancer agent against this subtype and understanding the pathways regulated may allow identification of potential alternative for treatment.

## ACKNOWLEDGEMENT

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