

# CYTOTOXIC EFFECTS OF CAPSAICIN AND CAPSICUM EXTRACTS ON NEUROBLASTOMA CELLS



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## Introduction and Aim of the study:

Capsaicin, a hot pepper alkaloid, has been shown to stimulate the release of serotonin and dopamine in SH-SY5Y neuroblastoma cells. Binding on vanilloid receptor 1 (TRPV1) is one of the cellular mechanisms responsible for this effect. On the other hand TRPV1 are involved in cell proliferation and apoptosis.

The aim of the present experiments was to investigate the effect of the potential anticancer agent capsaicin on B104 neuroblastoma cells.

## Materials and methods:

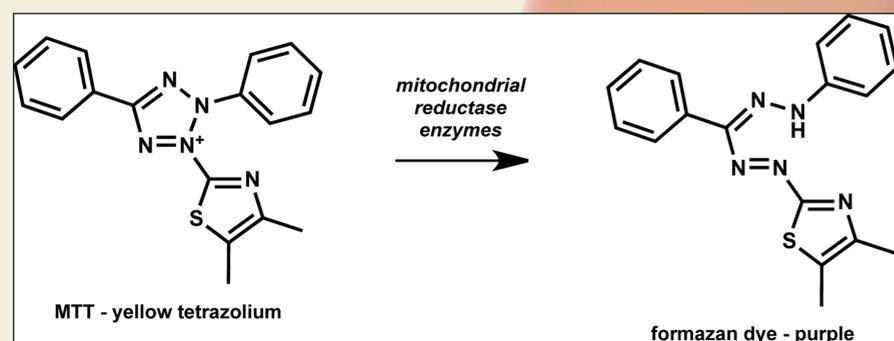
Capsicum ethanolic extracts isolated from 4 different genotypes of hot species of *Capsicum annuum* L. and capsaicin solutions in different concentrations and time of exposures were investigated.

• B104-cells: rat neuroblastoma cells – model for neuronal tissue

MTT and LDH assays were used to determine viability and cell death in B104 neuroblastoma cells.

MTT assay is a colorimetric assay for measuring metabolic activity and determining viability of cell.

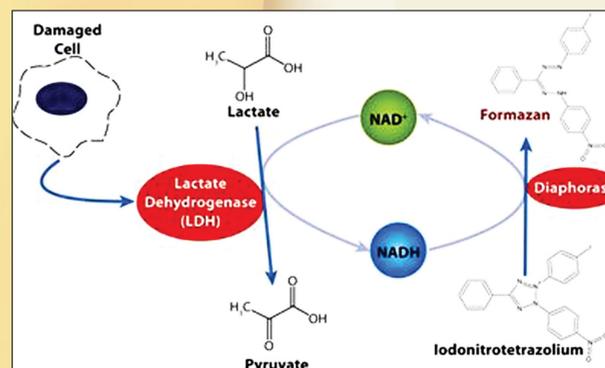
MTT((3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) is a yellow tetrazole and reduced in living cells to a purple formazan.



The absorbance of this coloured solution can be quantified by measuring at  $\lambda=500-600\text{nm}$ , by a spectrophotometer.

LDH method is used to measure cell membrane integrity and determine cell death.

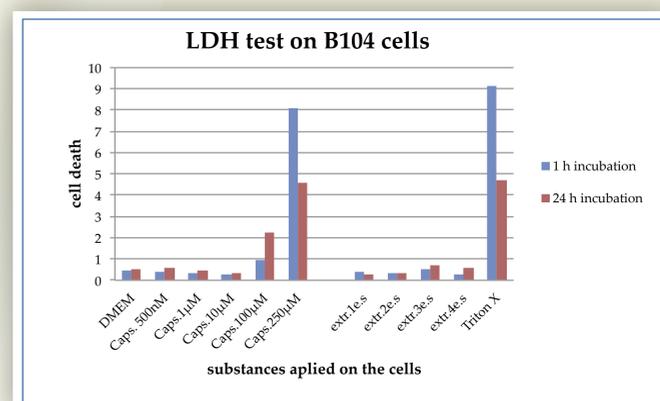
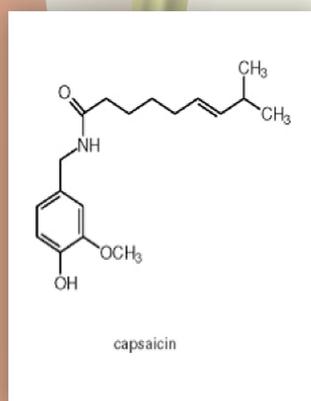
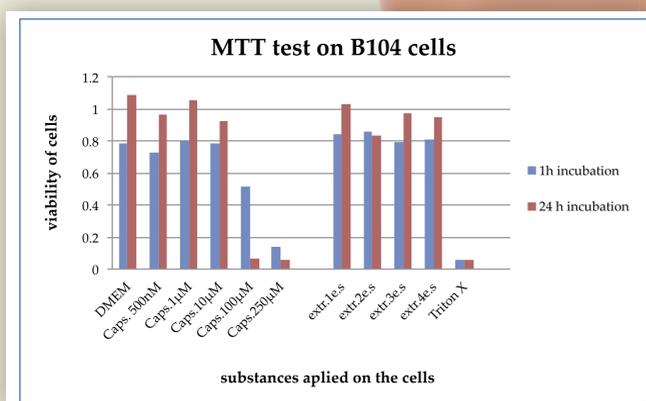
LDH (lactate dehydrogenase) is a cytosolic enzyme – exits the cell in case of necrosis.



The absorbance of this colored solution can be quantified by measuring at a wavelength 492 nm by a spectrophotometer.

## Results:

Capsaicin (500nM, 1  $\mu\text{M}$ , 10 $\mu\text{M}$ ) did not influence significantly viability or cell death of B104 cells when it was applied for 1 or 24 hours incubation. There was a significant cytotoxicity of high concentrations of capsaicin (100 $\mu\text{M}$ ), after 24 hours incubation and for capsaicin (250 $\mu\text{M}$ ), even when cells are treated for 1 hour. Interestingly, ethanolic capsicum extracts which contained capsaicin (0.5mM to 2.1mM) did not show any cytotoxic effect.



## Conclusion:

Our results indicate that capsaicin in high concentration has cytotoxic effects on neuroblastoma cells. The effects are time and concentration dependent. Our data are in line with previous findings in which capsaicin increased caspase-3 activity after treatment for 24 hours. We assume therefore, that other compounds (carotenoids, vitamins, and other polyphenolic substances) within the ethanolic extract interact antagonistic with the cytotoxic effect of capsaicin.

**Acknowledgement:** We thank to DAAD organization that contributed for this collaboration, and to prof. K Nieber that allowed this kind of experiment at the Institute of pharmacy, Leipzig University, Germany

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