Gamma-tocotrienol (γT3) protects human neuroblastoma SH-SY5Y cells against buthionine sulfoximine-induced cell death

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- antioxidant

**Tocopherol (T)**

**Tocotrienol (T3)**
antioxidant

Tocopherol (T)
- α-
- β-
- γ-
- δ-

Tocotrienol (T3)
- α-
- β-
- γ-
- δ-

Methyl group (R)

saturated

3 double bonds

The Encyclopedia of Vitamin E; Osakada et al. 2004
Tocoltrienols

- neuroprotection
- anticancer
- cardioprotective effects

palm oil

- gamma-tocotrienol (γT3)

(Sen et al. 2007)
Tocotrienols

- neuroprotection
- anticancer
- cardioprotective effects

palm oil

- gamma-tocotrienol (γT3)

(Sen et al. 2007)
• γT3 protected rat astrocytes and neuron from oxidative stress-induced apoptosis

• Current study: to elucidate the role of γT3-mediated apoptosis pathway in human dopaminergic neurons
Methodology

Untreated Control  BSO  BSO + γT3  BSO + αT  γT3  αT

Cell-based assays:  Gene expressions  Protein expressions and modification

Gene expressions
Methodology

Cell-based assays:
- Gene expressions
- Protein expressions and modifications

BSO inhibits glutathione synthesis

αT as comparative isomer

Untreated Control

BSO

BSO + γT3

BSO + αT

γT3

αT
**Cell Viability**

![Cell Viability Chart]

**Cytotoxicity**

![Cytotoxicity Chart]

**Apoptosis**

![Apoptosis Chart]
**Cell Viability**

![Bar chart showing cell viability percentages for different treatments.](chart1)

**Cytotoxicity**

![Bar chart showing cytotoxicity percentages for different treatments.](chart2)

**Apoptosis**

![Bar chart showing apoptosis percentages for different treatments.](chart3)
Cell Viability

Cytotoxicity

Apoptosis

Untreated, 10uM BSO, 10uM BSO, 10uM BSO, 100nM γT3, 100nM αT

Untreated, 10uM BSO, 10uM BSO, 10uM BSO, 100nM γT3, 100nM αT

Untreated, 10uM BSO, 10uM BSO, 10uM BSO, 100nM γT3, 100nM αT
Reactive oxygen species (ROS) detection

Untreated control
10uM BSO
10uM BSO 100nM γT3
10uM BSO 100nM αT
Gene expressions

Gene expressions

Protein expressions

n= 3 separate experiments
*p < 0.05, significantly different from treatment with untreated control
Conclusions

* not related to ROS

* BSO-induced cell death: ↓ p53 mRNA and Bax protein

* So what
Sum-up

- γT3 and αT as potent neuroprotectants

- the molecular action?

- γT3 only: ↓ Bcl2 mRNA & protein

- Purpose?
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References