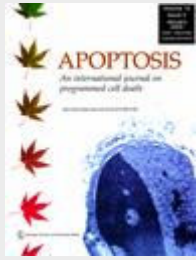




## Journal Article



## Garlic compounds induced calpain and intrinsic caspase cascade for apoptosis in human malignant neuroblastoma SH-SY5Y cells

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**Abstract** Malignant (N-type) neuroblastoma continues to defy current chemotherapeutic regimens. We tested the garlic compounds diallyl sulfide (DAS) and diallyl disulfide (DADS) for induction of apoptosis in human malignant neuroblastoma SH-SY5Y cells. Viability of human primary neurons was unaffected after 24 h treatment with 50 and 100  $\mu$ M DAS and 50  $\mu$ M DADS but slightly affected with 100  $\mu$ M DADS. Treatment with 50 and 100  $\mu$ M DAS or DADS significantly decreased viability in SH-SY5Y cells. Wright staining showed morphological features of apoptosis in SH-SY5Y cells treated with 50 and 100  $\mu$ M DAS or DADS for 24 h. ApopTag assay demonstrated DNA fragmentation in apoptotic cells. Apoptosis was associated with an increase in  $[Ca^{2+}]_i$ , increase in Bax:Bcl-2 ratio, mitochondrial release of cytochrome *c*, increase in cytosolic Smac/Diablo, and down regulation of inhibitor-of-apoptosis proteins and nuclear factor kappa B (NF $\kappa$ B). Activation of caspase-9 and caspase-3 indicated involvement of intrinsic pathway of apoptosis. Calpain and caspase-3 activities produced 145 kD spectrin break down product (SBDP) and 120 kD SBDP, respectively. Also, caspase-3 activity cleaved inhibitor of caspase-activated DNase (ICAD). Results strongly suggested that the garlic compounds DAS and DADS suppressed anti-apoptotic factors and activated calpain and intrinsic caspase cascade for apoptosis in SH-SY5Y cells.

**Keywords** Apoptosis - Calpain - Caspases - Garlic compounds - Neuroblastoma

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References secured to subscribers.

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