

membrane blebbing, chromatin condensation, and nuclear condensation and fragmentation. Furthermore, SK-N-SN cells were protected from 3HK induced cytotoxicity by prior elevation of HSPs expression. Our results show that the protective effect was abolished by HSP90 anti-sense oligonucleotides while not by HSP27 and HSP70 anti-sense oligonucleotides. Also, our result shows that HSP90 effectively inhibits caspases activities leading to the apoptosis. These results suggest that 3HK induces apoptosis in neuroblastoma SK-N-SN cells and that HSP90 is major contributing protein component of protection against 3HK induced apoptosis.

E135 An Analysis of Homeobox Genes in the Earthworm, *Eisenia andrei* (Annelida: Oligochaeta)

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The oligochaeta, *Eisenia andrei*, was surveyed for homeobox-containing genes using the method of polymerase chain reaction and subsequent sequence determination. Twenty distinct homeobox-containing gene fragments were identified. Ten of fragments are classified with Hox-type homeobox classes and other fragments show orthology with *caudal*, *Prh*, *Xlox*, *Lox* and *engrailed* homeobox classes. Detection of *Abd-B* type candidate genes, *Eahox19* and *Eahox20*, resemble to the result of same oligochaeta, *Stylaria lacustris* (ST-5; Snow and Buss, 1994) as well as leeches (*Lox21*; Irvine and Martindale, 1996). These studies suggest that this type gene exists in annelid lineage. Because of failure to discover of *Abd-B* homolog gene in polychaeta (Irvine et al., 1997), this type gene would have been preserved in

oligochaeta and leeches, whereas it has been lost in polychaeta during separation of these phyla.

E136 Molecular and biochemical characterization of mouse cardiac junctate

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Screening a cDNA library using canine junctin cDNA as a probe yielded mouse heart 3 complete cDNAs homologous to the human junctate known as a endoplasmic/sarcoplasmic reticulum single transmembrane Ca²⁺ binding protein. We named the proteins mouse junctate 1, 2 and 3. Mouse junctate 1, 2 and 3 are composed of 270, 259 and 215 amino acids. The apparent molecular weights (Mr) of mouse junctate in SDS-PAGE were between 40-50 kDa, whereas the reported Mr of the human junctate (299 aa) was 33 kDa. Western blot experiments showed that mouse junctate was expressed in heart, brain, spleen, lung, liver, kidney and stomach, but not in skeletal muscle. It was found that heart and brain tissues express unique isoforms which are different from other tissues. Immunohistochemical studies showed that junctate was localized in the heart tissues such as ventricles, atria and purkinje fibers.

E137 Hox Genes from the Earthworm *Perionyx excavatus* (Annelida, Oligochaeta) : New Sequence Information and Phylogenetic Analysis

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We classified the Hox genes of the oligochaeta, *Perionyx excavatus* using a PCR survey and phylogenetic analysis was performed. We were able to identify 10 different Hox-type homeobox fragments and 2 Non-homeobox fragments, Xlox and Phr class. Phylogenetic analysis reveals that the oligochaeta, *Perionyx excavatus* has at least three anterior (PG1-3), six medial (PG4-8), and one posterior (PG9-10) group genes. Especially, Pehox06 was thought to be a type of paralogous groups 2 gene. It is considered that this result provides the first evidence for the presence of *proboscipedia* (pb) class gene in the oligochaeta.

E138 Effects of Natural Products Fractionated from 18 Kinds of Korean Herbs on Cell Proliferation, Colony Forming Ability and DNA Topoisomerase I in Cultured Mammalian Cells

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The present study was performed to examine the effects of natural products fractionated from 18 kinds of Korean herbs on cell proliferation, colony forming ability and DNA topoisomerase I in cultured mouse NIH3T3 cells and two human cancer cell lines, HeLa and SW480. The natural products were fractionated with methanol (M), methylene chloride (D), ethylacetate (E), butanol (B) and water (W) in order. The *Rheum coreanum* Nakai M, *Caesalpinia*

sappan L. E and B, *Leonorus japonicus* Houtt M, *Salvia miltiorrhiza* D, *Commiphora molmol* Engl M and D, *Hedyotis diffusa* Willd H fractions showed a significant cytotoxic activity to the cultured mammalian cells. Among the fractions tested, the *Caesalpinia sappan* L. E and B, *Rheum coreanum* Nakai M, *Salvia miltiorrhiza* Bunge D dramatically inhibited the cell proliferation to 8.21%, 2.94%, 25.5% and 1.02%, respectively at a final concentration of 80 µg/ml for 48 hr. In this study, the effects of the fractions on the colony forming ability and topoisomerase I activity were also examined. The *Rheum coreanum* Nakai M, *Caesalpinia sappan* L. E and B fractions clearly inhibited the relaxation activity of DNA topoisomerase I and the ability of colony formation of human cancer cell lines as well.

E139 Neurotoxin-induced Cell Deaths in Nurr1-overexpressing Human Neural Stem Cells

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A loss of midbrain dopaminergic (DA) neuron is a pathological hallmark of Parkinson disease (PD), but the cause and mechanism underlying this loss in PD are poorly understood. Nurr1 is highly expressed in midbrain DA neurons, the major cell type lost in human PD, and its null mice have selective agenesis of DA neurons in substantia nigra and ventral tegment area. Thus, it is possible that Nurr1 gene may be one of the potential susceptibility factors for PD pathogenesis. To correlate the expression of midbrain-specific Nurr1 gene and cell death of DA neuron induced selectively by neurotoxins, we generated