P7-59 Biologically Active Compounds from An Endozoic Fungus Associated with the Giant Jellyfish *Nemopilema nomurai*

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The endobiotic environment is the habitat of many groups of microorganisms within the tissues of plants and animals and also is a complex milieu in association with specific microbial biota. These ecological interactions exist not only between the host and their endozoic organisms, but also between the endozoic bacteria and fungi, which share a common substrate. Their host provides organic nutrition or habitat and endozoic organisms act as chemical guards. Unlike free-living marine microorganisms, they biosynthesize unique secondary metabolites in special ecological niche, which have interesting pharmacological properties as novel pharmaceutical agents. To search for bioactive secondary metabolites and understand the ecological function of these compounds, 12 bacterial and 12 fungal strains were isolated from the inner tissue of the marine jellyfish *Nemopilema nomurai*. Investigation of microorganisms associated with the jellyfish *Nemopilema nomurai* led to the isolation of a strain of fungus J08NF7 that exhibited antibacterial activity to Gram-positive bacteria and very high toxicity against brine shrimp *Artemia salina* (LD50 0.18μg/mL). Bioactivity-guided fractionation of the culture broth yielded a new cytochalasin (1), in addition to cytochalasin B (2), tentoxin (3), and dihydrotentoxin (4). Their structures were elucidated on the basis of FABMS and 1D and 2D NMR (principally COSY, HMBC and HSQC). The compounds were evaluated for cytotoxicity against a small panel of human solid tumor cell lines (A549, SK-OV-3, SK-MEL-2, XF 498, and HCT15), and compounds 1, 2 exhibited considerable activity.

P7-60 Metabolomic Application to the Discrimination of S*crophularia* spp. According to the Geographic Origin

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Dried roots of *Scrophularia* spp. have been used in Oriental medicine as a treatment for fever, swelling, constipation, pharyngitis, neuritis, and laryngitis. In Korean herbal market, there are three types of commercially prevalent *Scrophularia* spp., *Scrophularia buergeriana* cultivated in Andong and Uisung, and *Scrophularia ningpoensis* imported from China. In this study, 44 *Scrophularia* spp. sample from three different origins were collected and characterized using high performance liquid chromatography-time of flight-mass spectrometry (HPLC-TOF-MS). Multivariate analysis such as principal component analysis (PCA) of HPLC-TOF-MS data showed that the metabolite compositions of the samples from different regions were remarkably different from one another. Compared to Andong samples, samples from Uisung and China had significantly higher levels of some organic acids including palmitic acid, gulonic acid and citric acid. Andong samples contained significantly more 8-*O*-(E-*p*-methoxy-cinnamoly)-harpagide and raffinose. Likewise, these 44 *Scrophularia* spp. samples showed appropriate distinction according to their geographic origins by PCA of NMR data. Contributing signals identified using S-plot were in line with the results of HPLC-TOF-MS. These two metabolomic approaches provided useful information about different chemical characteristics of *Scrophularia* spp. according to their geographic origins.

P7-61 Anticancer Activity of *Kochiae fructus* in HT-29 Human Colon Cancer Cells

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Natural products are widely used in pharmacological applications, due to their potential for biological activity. Therefore, we established a screening of natural products as anticancer agents utilizing HT-29 human colon cancer cells. During the course of screening for anticancer agents, we have found a methanolic extracts of *Kochiae fructus* (KFM) from natural and it induced cytotoxicity and apoptosis in HT-29 cells. The KFM showed highly cytotoxic effects via the MTT reduction assay, LDH release assay, and colony formation assay. As expected, we also detected apoptotic bodies on Hoechst staining. To examine the functions on apoptosis, we used a flow cytometric analysis. The apoptotic cells were distributed according to the cell cycle phase by shown sub-G1 DNA content. These results indicate that KFM may contains bioactive materials and it could be a potential candidates as cancer chemotherapeutic against human colon cancer cells.

P7-62 GSK-3b-Nrf2 Signaling Pathway for Neuroprotection in Alzheimer's Disease

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β-Amyloid peptide (Aβ) is the major component of senile plaques accumulated in the brains of patients with Alzheimer's disease (AD) and has been reported to cause neuronal cell death via oxidative stress. Therefore, attention has been focused on identifying redox-sensitive transcription factors and their target genes protecting against Aβ-induced oxidative cell death. Nrf2 plays a pivotal role in the transcriptional regulation of antioxidant proteins and detoxification enzymes and blocks apoptosis caused by a wide array of death signals. Ectopic expression of Nrf2 rescued cells from Aβ-induced cytotoxicity, apoptosis, intracellular accumulation of reactive oxygen species and oxidative damages. Moreover, Nrf2 overexpression increased the expression of γ-glutamylcysteine ligase (GCL), a rate-limiting enzyme in cellular glutathione biosynthesis and heme oxygenase-1 (HO-1), a key enzyme in heme degradation process. Conversely, knockdown of Nrf2 gene expression with siRNA or dominant negative mutant Nrf2 exacerbated Aβ-induced oxidative cell death. To further elucidate the upstream regulator for Nrf2 activation, we have focused on glycogen synthase kinase-3β (GSK-3β). Inhibition of Ab-induced GSK-3β activation by pharmacological inhibitors such as LiCl led to nuclear accumulation Nrf2 and transcriptional activation of Nrf2 downstream target genes and protected against Aβ-mediated oxidative cell death. In another experiment, some dietary and medicinal phytochemicals attenuated Aβ-induced oxidative cell death via suppression of GSK-3β and subsequent activation of Nrf2. Taken together, these findings suggest that GSK-3β-Nrf2 signaling pathway may act as a survival mediator against AD.