

# 4<sup>th</sup> International Conference on Tissue Science and Regenerative Medicine

July 27-29, 2015 Rome, Italy

## Functions of natural pigments on gastric ulcer and cancer

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The natural pigments have many applications in inflammatory, and oxidative related damage as well as in cancer chemotherapy. Recently, precise cellular roles of natural pigments, such as modulator of key cellular signaling pathway on variety diseases, are elucidated. On based on antioxidant, anthocyanins reduced naproxen-induced gastric ulcer. Anthocyanins reduced the level of lipid peroxidation and increased the level of the antioxidant enzymes. Anthocyanins increased the expression of Nuclear factor E2-related factor 2 (Nrf2) which is trans activator for cellular defense genes. Interestingly, anthocyanins induced gastrointestinal-glutathione peroxidase expression via Nrf2 that bind to regions of antioxidant response element (ARE) in GI-GPX promoter. Otherwise, Shikonin, and genipin stimulates production reactive oxygen species (ROS) in gastric cancer cells. They induced apoptotic cell death in gastric cancer cells in a caspase dependent manner. They also induced cell cycle arrest at G2/M phase via regulation of p21 by early growth response1 (Egr1). The p21 contains promoter region of Egr1 binding motif. Transient expression of Egr1 in AGS cells enhanced shikonin and genipin-induced p21 promoter activity, whereas suppression of Egr1 expression by small interfering RNA attenuated the ability of shikonin and genipin induced p21 promoter activity. Anthocyanins improve gastric ulceration through Nrf2 associated with antioxidant enzymes, such as GI-Gpx pathways. And, shikonin and genipin induced cell damage in AGS cells through the Egr1/p21 pathways.

### Biography

Hyo-Ihl Chang has completed his PhD in 1987 from North Carolina State University. He has been Professor of College of Life Sciences & Biotechnology, Korea University since 1988. He was a dean of College of Life Sciences and Biotechnology, Korea University. Also he is a President of the Korean Society for Microbiology and Biotechnology in 2014. He has published more than 80 papers in reputed journals.

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