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### Effect of Turbid Water on Tissues of Fishes in the Stream of Imha Reservoir

Sam Hwan Yu, Ki Ae Kim, Jae Hwan Lim, Jong Eun Lee and Eul Won Seo\*

*Department of Biological Science, Andong National University, Andong 760-749*

This study aims to examine the effect of turbid water on fish in the stream flows entering Imha reservoir in terms of shape. 3 sites of turbid water area and other 3 sites of non-turbid water area were water quality, the element contents and composition of soil around the sites were examined, and the changes in tissues of fish are observed. Although water quality of the sites turned out to be clean, in case of suspended solid (SS), the control area showed relatively low contents while that of the experimental area showed higher turbidity. To clarify the cause of turbid, soil around each site was analyzed. As a result, it turned out that the main elements were Vermiculite (V), Illite (I), Kaolinite (K), Quartz (Q) and Feldspar (F), and that the experimental area contained high contents of clay minerals such as Vermiculite (V), Illite (I) and Kaolinite (K), while the control area clastic minerals such as Quartz (Q) and Feldspar(F). Thus, the findings of the soil examination indicate that the major elements of turbid water are clay minerals such as Vermiculite (V), Illite (I) and Kaolinite (K). While fish breathe, such clay minerals attach between secondary lamellas, which hinders gas exchange of the gills, and thus results in lesions such as epitherial separation, clubbing, and hypertrophy of secondary lamellas, as well as vacuolating of kidney tissues and hypertrophy of skin tissues. Therefore, we suggest that turbid water causes breathing difficulties and tissue disorders of fishes with long exposure to muddy water and results in high risk of mortality as well.

**Key words:** Turbid water, soil elements, gills, kidney

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### Water Extracts of Rhei Rhizoma Prevent Production of Reactive Oxygen Species and Loss of Mitochondrial Membrane Potential in a Hypoxia Model of Cultured Neurons

Il Soo Moon

*Department of Anatomy, College of Medicine, Dongguk University, Gyeongju 780-714, Korea*

Rhei Rhizoma (RR; 大黃) consists of the underground parts (rhizome and root) of *Rheum officinale* Baill. and *Rheum palmatum* L. (Polygonaceae), and is widely used in Southeast Asian folk medicine to alleviate liver and kidney damage. In this study we investigated into the efficacy of RR water extracts in supporting neuronal survival in a hypoxia model of cultured rat hippocampal neurons. When RR was added to the culture media on 10 days in vitro (DIV10) and assessed cell viability on DIV13, RR exhibited no cytotoxicity up to 10 µg/ml and had neurosupportive effects at 2.5 µg/ml in normoxia. When a hypoxic shock was given on DIV13 assessed cell viability, RR exhibited neuro-protective effects on 5 days post-shock. H<sub>2</sub>DCF (2',7'-Dichlorodihydrofluorescein diacetate) and JC-1 (5,5',6,6'-tetra-chloro-1,1',3,3'-tetraethylbenzimidazolylcarbocyanine iodide) stainings showed that RR effectively suppresses ROS production and prevents dissipation of MMP in hypoxia. Our results proves efficacy of RR in ameliorating neuronal health.

**Key words:** cell culture, hippocampal neuron, hypoxia, MMP, Rhei Rhizoma, ROS