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Ionizing radiation for awakening LPS treated BV-2 microglia cells

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The aim of this study was to investigate the mobility of microglia when irradiated with low dose radiation (5.4 Gy/3 fr and 9 Gy/5 fr) after inhibiting by high dose lipopolysaccharide (LPS) in microglia cells. BV-2 microglia cells were treated with various concentrations of LPS to determine the optimal concentration to inhibit their mobility and the change of microglia's mobility was defined with wound healing assay. The same experiment was conducted to confirm the effect of low dose irradiation on microglia's mobility after treating with LPS. As a result, we saw that 2 µg/mL of LPS suppressed the mobility of movement distance greatly for microglia cells to 2.96 µm. So, then we selected a 2 µg/ml of LPS for BV-2 cells as optimal concentrations. We found that LPS (2 µg/mL) inhibited microglia cells mobility significantly to 1.62 µm ($p < 0.001$). Compared with the control group and the irradiated group, the control group and the RT5 group (9 Gy/5 fr) showed similar median movement distances (12.5 µm vs., 15.6 µm $p = 0.98$). That means 9 Gy radiation dose didn't inhibit mobility of microglia cells. But we couldn't see that 5.4 Gy/3 fr group made enhanced effect for mobility of microglia cells. When the control group and the LPS+RT5 (9 Gy/5 fr) group were compared, we could define ionizing radiation make enhance median mobility from inhibited status to as like normal condition. (control G 13.79 µm vs., LPS + RT5 12.14 µm, $p = 0.84$). In Summary, the activity of BV-2 cells was reduced by high dose LPS (2 µg/mL). It was also confirmed that the migration of suppressed BV-2 cells was similar to that of the control group when treated with low doses (9 Gy/5 fr) of radiation. We have found that low dose irradiation is one of the ways to increase the activity of microglia cells and we will continue to enhance mobility of microglia cells. If we know that ionizing irradiation can control microglia activity, we can use a radiation treatment for neurodegenerative disease such as Alzheimer's disease.

Biography

Weonkuu Chung did his Research Fellowship in Radiation Oncology Biology Lab, Duke Medical School, Durham, USA during March 1999- February 2000. During April 2009-February 2010 he worked as Professor in Radiation Oncology, Konyang University Hospital. From March 2010, he is working as Professor in Radiation Oncology, Kyung Hee University Hospital at Gangdong. He is a regular member of The Korean Society for Radiation Oncology, ESTRO and ASTRO.

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