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NEUROPROTECTIVE EFFECT OF PIRACETAM AGAINST LPS-INDUCED NEUROINFLAMMATION USING EOC-20 CELL: OXIDATIVE STRESS

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ABSTRACT

Piracetam is a nootropic drug which acts as memory enhancers, neuron enhancers as well as cognitive enhancers. Piracetam has broad indication. It can be used to treat dementia, vertigo, sickle cell anemia and also as well as Alzheimer Disease (AD). The exact mechanism of action of this drug is still unknown so that many studies were conducted to determine it. In this study, piracetam was used to determine the neuroprotective effect against neuroinflammation. The microglial (EOC-20) cells were pre- treated with different concentration of piracetam (0.01, 0.1, 1, 10 and 100 µg/ml) before induced with LPS. The effects of treatment were compared between concentration, control and LPS alone. Griess assay and ROS assay were conducted and showed the decreased in nitric oxide (NO) and reactive oxygen species (ROS) level. DPPH assay also was conducted and showed that piracetam had mild antioxidant activity. In conclusion, high concentration of piracetam was approved of had the ability to protect cell from oxidative stress due to its antioxidant properties. Therefore, piracetam do exihibit neuroprotective effect on LPS- induced EOC-20 cell.

CHAPTER 1

INTRODUCTION

1.1 Background of study

Alzheimer's disease (AD) is a neurodegenerative disorder. It is characterized by progressive loss of memory and many other cognitive functions that later leads to dementia. This disease is the most common cause of dementia in the elderly. Globally, there are more than 36 million of people were diagnosed with AD and this number is expected to increase over the next few decades (Reitz, Brayne, & Mayeux, 2011). This high number of cases has made AD as one of the leading cause of death after cancer, stroke and myocardial infarction.

Pathological event of AD can be characterized on a macro level as loss of brain tissue. AD patient's brain shows atrophy where the brain shrinks and reduces in size (Weintraub et al., 2011). Cerebrospinal fluid (CSF) will fill the space that previously occupied by brain tissue and affecting all its functions. Thinking and planning ability of the patient decline due to damage of cortex area. The ability in memorizing also will be decline because of severe shrinkage of hippocampus which is also part of the brain.