

Supawadee Jitpakdeebordin 2007: Quantitative Comparison of neuronal Nitric Oxide Synthase (nNOS) in Hippocampal Neurons of Young and Old Cattle. Master of Science (Veterinary Anatomy), Major Field: Veterinary Anatomy, Department of Anatomy. Thesis Advisor: Associate Professor Theerasak Prapong, Ph.D. 92 pages.

Hippocampus of 2 young cattle (1 yr.) and 2 old cattle (10 yr.) were collected from slaughter houses. After measuring their weight and dimension, the tissue samples were randomly picked up to prepare with paraffin technique. Some prepared tissue samples were stained with Luxol Fast Blue to study microscopic structures and components. Neurons in each area (DG, CA3 and CA1) of hippocampus were also counted. Other prepared tissue samples were processed with immunohistochemistry by using anti-nNOS and ABC technique. Color intensity of pigments, occurred from immunoreactivity, within cytoplasm of neurons in each of hippocampus from both groups of cattle was assessed by using image analysis software (Olympus Microimage<sup>®</sup>) under microscopes.

Comparing between young and old cattle, hippocampus from those had same size and weight. It was found that old cattle had slightly high number of neurons in CA3 when comparing to the young whereas other areas had similarity of neuron population. There was no significant difference ( $p > 0.05$ ) of color intensity of pigment in cytoplasm of neurons of each area between the young and the old. The results of this study showed that hippocampus of cattle had already reached to maximum development at the age of 1 year but the development of neurons in CA3 area of old cattle was higher than the young. However, when comparing the quality of nNOS, an endogenous enzyme in neurons generating Nitric Oxide (NO) for being used as one of neurotransmitter substances, between the young and the old, there was no different result. Unlike this study, other research reports illustrated the increase of neuronal Nitric Oxide Synthase (nNOS) in old aged human and animals. It was proposed that elevation of nNOS referred as NO amount would cause the deficit of neurons and would affect to the hippocampus. This deficit is the one of causes of dysfunction of learning and memory. Nevertheless, some studies found no difference of nNOS among different ages of animals.

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Thesis Advisor's signature

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