

S26-4 Application of vanadyl compounds in the neuroregeneration therapy

○Kohji FUKUNAGA¹, Norifumi SHIODA²

¹Tohoku Univ. Grad. Sch. Pharm. Sci., ²Tohoku Univ. The 21century COE "CRESCENDO"

Biometals such as Fe, Zn, Cu, Mn are essential for biochemical functions in the central nervous system as well as in the peripheral organs. Among them, Zn and Cu are released or fluxed at the glutamatergic neurons, thereby eliciting neuronal plastic changes in the synaptic transmission. On the other hand, these functional metals account for production of radicals and aggregation of amyloid beta proteins in the pathological events of neurodegenerative disorders such as ischemia and Alzheimer's disease. Since these biometals account for diverse functions in the biochemical enzymatic activities, the beneficial effects of therapeutic approach with metal chelators in the neurodegenerative disorders are still controversy. We recently documented strong neuroprotective effects of vanadyl inorganic and organic compounds in rodent brain ischemia. The neuroprotective effect is partly mediated by the insulin-mimetic effects of vanadyl compounds, which are already known to stimulate insulin receptor kinase activity. In addition to the neuroprotective effect, vanadyl compounds promotes neurogenesis following brain ischemia in the subventricular zone and dentate gyrus subgranular zone in rodents. Especially, vanadyl pyroridone complex could enhance neurogenesis through stimulation of Akt and ERK pathways. Since vanadyl inorganic compound is used as supplement for health, we expect in future the novel neurodegeneration therapy using the vanadyl pyroridone complex in the neurodegenerative disorders.

Shioda N et al., Neuroscience 155: 876-887 (2008)