Aging rodents in stroke research

Jukka Jolkkonen
A.I.Virtanen Institute for Molecular Sciences and Biomedicine, University of Eastern Finland

The number of elderly people will increase dramatically in next few years and many of them are prescribed CNS-active medication such as anticholinergics, antidepressants, neuroleptics, and hypnotics for the purpose of primary care and treatment of behavioral disturbances. Polypharmacy is common. The same elderly people are at a high risk of cerebrovascular events, which could potentially be exaggerated by concomitant psychotropic medications. Here, I will summarize the findings from a series of experiments designed to replicate real-world scenarios in which elderly individuals at high risk of stroke are administered CNS-active medications. Male Wistar rats aged 24 months were administered galantamine, risperidone, fluoxetine, or zopiclone prior to inducing stroke using the Rose Bengal model (photothrombosis). Medication was continued for 20 days thereafter. Sensorimotor recovery was assessed by beam-walking test over the follow-up. Subsequently, infarct size was measured. Photothrombosis consistently produced a cortical infarct with a transient impairment in forelimb function and a permanent impairment in hindlimb. Surprisingly, age did not appear to significantly affect stroke severity or functional outcome. Moreover, the tested medications, with exception of risperidone, showed no significant impact on functional sensorimotor recovery. In conclusion, despite facing practical challenges, complex study designs, and higher costs, use of aged animals in stroke research enhances scientific rigor and facilitates the translation of findings from rodent models to human clinical contexts.