

# In Rats with Traumatic Brain Damage, Electroacupuncture Therapy is Affected by Ageing in the Cerebral Metabolic System

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## Abstract

We are going through a significant demographic shift towards an older population as a result of economic growth and medical advancements. The social and financial costs of this transition have been significant for governments. Alterations in neurochemistry, structure, and function of the brain frequently occur together with ageing. According to studies, age is the main risk factor for several cerebrovascular illnesses, including stroke and Traumatic Brain Injury (TBI). Elderly patients frequently have less favorable clinical outcomes and a greater death rate than younger ones. As a result, it is becoming more crucial to establish any connections between ageing and illness prognosis.

**Keywords:** Traumatic brain injury

## Introduction

This study concentrated on TBI, which in China is a significant cause of mortality in trauma victims. The US Centers for Disease Control and Prevention estimate that 2.5 million persons in 2010 experienced brain injuries. With a total death rate of between 20%–30%, falls (35%) and car accidents (17%) were the most frequent causes. Additionally, as people age and population density rises, the prevalence of TBI may keep rising. Despite small improvements in neurosurgery, TBI still leaves patients with a poor quality of life and a long-term impairment. In practical practice, the rehabilitative impact is weak, especially in elderly patients.

The improvement of motor function, which is strongly connected to brain remodeling, is demonstrated to be a major pathway for functional recovery following central nervous system damage. The therapeutic

impact is severely diminished by the fact that brain plasticity significantly decreases with age. As a result, the significance of age-appropriate, focused rehabilitation therapies and neurorehabilitation nursing has gained more emphasis. Nevertheless, there are few and non-individualized treatment options for TBI.

Acupuncture, a crucial element of Chinese traditional medicine, is used to treat age-related brain illnesses including Alzheimer's disease and stroke in addition to standard rehabilitation techniques. The mechanism of acupuncture treatment has been linked in studies to brain plasticity, but the age-related metabolic mechanism of acupuncture activity is yet unknown. As neuroimaging techniques advance, non-invasive, high-resolution detection techniques may track the rate of glucose metabolism in the brain using 18F-fluorodeoxyglucose, which is identified by the radioisotope 18F. One such approach is Positron Emission Computed Tomography (PET/CT). It is commonly used to examine cerebral metabolic systems and the level of neuronal activity in the brain.

In conclusion, it is crucial to investigate the brain's compensatory mechanisms in response to brain damage from the standpoint of ageing. In the present work, old and young rats with TBI treated with electro acupuncture underwent small-animal PET/CT. In order to produce fresh evidence for age-specific rehabilitation treatments in the clinic, we looked at the impact of ageing on the recovery of motor capacity and the longitudinal brain metabolic mechanism of electro acupuncture therapy in rats with TBI.

Also, this study has several drawbacks. First, in order to look at how ageing affects brain remodeling, we chose rats that were 18 months old. Future research should think about categorizing rats older than 18 months into successive age stages (e. g., 18 months, 21 months, 24 months, 30 months, etc.) and spanning numerous ageing time points in order to discover additional age-dependent metabolic alterations in the brain. Second, to clarify the crucial role of brain metabolism in the recovery of motor function following TBI, molecular and protein detection tools for ageing research must be included.

Overall, this study showed that both old and young rats might benefit from electro acupuncture for improving motor function in the afflicted limb; however, old rats needed a longer intervention period than young rats. The electro acupuncture treatment's major area of attention for the effect of ageing on brain metabolism was one specific hemisphere. When electro acupuncture was used on older rats, it resulted in an increase in the cerebral metabolism of brain regions related to sensorimotor function in the left (the hemisphere that had been injured ipsilaterally), whereas when electro acupuncture was used on younger rats, it resulted in an increase in the cerebral metabolism of brain regions related to sensorimotor function in the right (the hemisphere that had not been injured). These results add to our knowledge of the aging-related brain metabolic processes of electro acupuncture.

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