

GINKGO BILOBA EXTRACT (EGb 761) PROTECTS Na,K-ATPASE ISOENZYMES DURING CEREBRAL ISCHEMIA

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Abstract : Disturbances of Na,K-ATPase activity are implicated in the pathophysiology of cerebral ischemia. Previous experiments have shown that EGb 761 protects Na,K-ATPase activity against one hour of cerebral ischemia. In the brain however, the 3 isoenzymes responsible for Na,K-ATPase activity may be differentially affected by various times of ischemia. In the present study, we investigated the effect of a longer period of ischemia, and the protection provided by a pre-treatment with EGb 761 on each of the 3 cerebral Na,K-ATPase isoenzymes. In control and EGb 761 pre-treated mice exposed to a 6 hr unilateral occlusion of the middle cerebral artery, Na,K-ATPase activity was decreased by 60% and lipid peroxidation was increased by 40% in the ipsilateral (ischemic) cortex compared to the contralateral one. In parallel, membrane integrity was altered. The alteration of Na,K-ATPase activity, as a whole, resulted from a decrease in the activity of the 3 isoenzymes. The two isoenzymes of high ouabain affinity however,

had their affinities decreased while the sensitivity of the lowest affinity isoenzyme was increased. Pre-treatment with EGb 761 abolished the differences observed between ipsi- and contralateral cortex, with the exception of the change in ouabain affinity of the low affinity isoenzyme. Ischemia also induced changes in Na,K-ATPase isoenzyme ouabain affinities in the contralateral cortex that were not prevented by EGb 761.

Key words : brain - lipid peroxidation - Na,K-ATPase - EGb 761 - cerebral ischemia - isoenzymes