Hypoxic - ischemic CNS lesions and epileptic seizures share many common pathophysiologic features. Basic mechanisms , either detrimental (excitotoxicity , free radicals,
inflammation , changes in permeability of the blood brain barrier , particularly necrotic and apoptotic cell
death) , or reparative (gliosis , neuroplasticity , neurogenesis , vascular proliferation) occur in
Both types of damage , but may be expressed in varying degrees, and may take place in different time
term.
Hypoxia , but also global and focal ischemia, CNS are in humans and in experimental models under certain conditions accompanied by epileptic seizures. Epileptic seizures vice versa
acutely and chronically affect cerebral blood flow (CBF) . CBF and cerebral metabolism is significantly
affected during status epilepticus (SE). CBF changes can significantly contribute to pathophysiological
consequences of seizures and may have links with some of their clinical manifestations (eg
Todd's postparoxysmální hemiparesis (MS Mathews et al. , 2008; Yarnell PR 1975)) .
Focal ischemia, CNS has often consequences in distant , but functionally linked areas (diaschisis) . There is a remote influence not only the blood flow and metabolism , but also
excitability (Andrews, RJ , 1991 Buchkremer - Ratzmann I. et al. 1996b) . Also in the focal
epilepsie1 often affecting the metabolism and perfusion in remote areas (Stubgen JP 1995).
Secondary epileptogenesis in areas remote primary epileptogennímu bearing is also known (eg the mirror focus (Morrell and F. de Toledo- Morrell L. , 1999 N. Tsuru , 1981 ; Wilder
B. J. and Morrell , F., 1967)) .

Common phenomena can also be found in studying the effects of repeated exposure epileptic
seizures or hypoxia / ischemia. When repeating insults may be resistance following exposure
increase or decrease the contrast . Epileptic tolerance (increasing resistance to repeated
seizures) has been documented as the model bikukulinových convulsions (Sasahira M. et
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1 International classification of epilepsies and epileptic syndromes (ICEES , 1989) distinguishes between epilepsy and epileptic syndromes
partial (1) , generalized (2) , without the possibility of determining whether partial or generalized (3) and special syndromes (4).
The term focal epilepsy (in English. Focal epilepsy) is as synonymous with partial epilepsy commonly used.
International classification of epileptic seizures (ICES , 1981) seizures generally divided into partial (1)
generalized (2) and unclassifiable (3) . Proposal of a new classification of epileptic seizures and epilepsy (ILAE , 2001
2006) criticizes the term partial (in English. Partial = partial , incomplete) and recommended it to replace the term focal (focal)
which better reflects the idea bout generated in a distinct part of the brain. In this dissertation are
terms focal and partial used as synonyms . The trend towards one or the other term (particularly verbal
connections) is elected according to traditional practices (eg, focal epilepsy and no partial epilepsy partial complex
focal seizures and not complex seizures , etc.)
al . , 1995) or in intrahipokampální application of kainate (Lere C. et al. , 2002). The phenomenon of kindling , ie
gradual mongering epileptic answer (and its generalization) repeated induction of focal

seizures is also well known (Racine RJ , 1972). Ischemic or hypoxic tolerance , better known
Today , the term ischemic or hypoxic preconditioning is known about since the middle of last
century . Ischemic preconditioning has been extensively studied mainly in the heart , but from about 90 flight
the last century, whether in the CNS (K Kitagawa et al. , 1990). Epileptic and ischemic tolerance can be
in addition cause cross , as was observed mitigate the consequences of focal ischemia due to previous
exposure seizures (Plamondon H. et al. , 1999) , or attenuation of consequences
experimental assistance of hypoxic preconditioning (Emerson MR et al . , 1999).
The study of common mechanisms of hypoxia / ischemia and seizures has
undoubted importance for clinical practice. It can contribute among others to understand the pathophysiology
symptomatic epilepsy, cerebrovascular disease (stroke) , posthypoxických Epilepsy
children postparoxysmálních neurological deficits or late consequences . In addition, however, leads
to a deeper understanding of the general principles of neural tissue response to various damaging goes on and on
allows you to search for new therapeutic strategies .
Attempting to capture in a single work all the interrelationships between hypoxia / ischemia and
epileptic seizures would be very unsubmissive , and certainly doomed to failure. Consequently, it focuses
on some selected functional consequences of epileptic seizures and hypoxia / ischemia in acute
experiments and their possible influence . The common denominator of this thesis is the thesis that i
stimuli and insults of relatively low intensity can , despite the absence of major structural changes (cell death) can lead to significant and often long-lasting consequences.

In the theoretical section summarizes the main findings relating to the remote consequences of focal lesions ,
hypoxic / ischemic preconditioning , and provide an overview of models of acute hypoxia , global and
focal ischemia and generalized seizures .