Blood-brain barrier (BBB) is a metabolic interface between blood and brain that has both restrictive and permissive properties. It helps in the maintenance of an optimal neuronal microenvironment required for the normal neurological functions.

The gate keeping role of the BBB is basically maintained by a combination of special endothelial transport properties, reflected morphologically as highly impermeable tight junctions, a lack of fenestration and a scarcity of pinocytotic vessels. It is generally accepted that BBB in the new-born of some species is less restrictive than it is in adult. High permeability in developing brain may be the result of leak in interendothelial junctions which are consequence of vascular sprouting. The inefficient functional capacity of developing BBB is attributed to low transendothelial electrical resistance, which progresses gradually leading to tightness and fitness of this barrier. It is the task of the BBB to guarantee the transfer of special compounds between blood and extracellular fluid and to exclude the others. Thereby, the BBB ensures the supply of the brain with essential substances but warrants that the composition of neuronal environment remains in homeostasis.

There are numerous pathological and experimental conditions in which barrier function is compromised and that lead to loss of regulation of neuronal microenvironment, consequently neuronal dysfunction. BBB dysfunction has been
implicated in seizures, intracranial tumour, diabetes, hypertension, inflammatory diseases, dementia, AIDS, etc.

The problems of environmental contamination is the result of increasing industrialization, urbanization and highly developed agricultural practices. Industrial toxicants are continuously released in the environment and exposure to such toxicants is likely to pose serious health problems and ecological disturbances. Many heavy metals enter the environment from the agricultural run off, industrial effluents power plants, etc. and they enter the body via food chain. The indiscriminate use of pesticides is posing a serious threat to human health. These agricultural chemicals leave behind residues in food and produce ill effects when their concentration exceeds tolerance level. These toxicants enter the body through food, water, air and cause damage to various vital organs. The central nervous system (CNS) may be the target for toxic effects of certain chemicals present in the general and work environment, including the unintentional inhalation of pollutants, absorption of synthetic food and drink additives and numerous drugs and many of them are lipophilic in nature. The lipophilic property allows them to cross the BBB. If these compounds are not biotransformed to easily excretable metabolites, these lipophilic xenobiotics may accumulate in lipid rich tissue such as brain. It is now realized that a considerable component of overall central neurological effect of a xenobiotic is indirectly mediated by the BBB. In addition, the deleterious effects of one xenobiotic on the functional integrity of BBB may promote the passage of another chemically related neurotoxic species. Since BBB is very important in maintaining optimal neuronal microenvironment required for normal functioning of brain, any damage to this barrier by a toxicant may ultimately cause CNS damage. Any exposure of a toxicant at an early life might be associated with some biochemical lesions, thereby causing BBB disruption or delay in BBB maturation.

In view of increasing exposure to humans to a variety of xenobiotics, it has become imperative to investigate the toxic effects of chemicals on the BBB function. Rat was chosen as an experimental model because of easy availability and handling. The main objective of the present study was to evaluate the possible effects of xenobiotics such as glutathione depletors, metals and pesticides on developing and well developed BBB. BBB permeability under glutathione depleted conditions was used as an model to investigate the status of BBB under various pathological and diseased conditions where glutathione depletion is known to occur. Brain...
endothelial cells were found to be the target site for free radical injury. Development of free radical scavenging system in the microvessels of growing as well as adult rats were also studied in the present study.

The experimental findings of this investigation should provide a better understanding of the biochemical mechanisms of BBB dysfunction and should also determine the possible involvement of BBB dysfunctions in determining the higher susceptibility of growing individuals towards xenobiotic exposure during early stages of life. Such an adverse effect on BBB system in developing brain may cause irreparable and long lasting central nervous system dysfunction.