
Abstract
Pyridoxal phosphate and pyridoxamine phosphate, the catalytically active forms of vitamin B(6), influence brain function by participating at stages in metabolism of proteins, lipids, carbohydrates, other coenzymes and hormones. Vitamin B(6) participates in the metabolism of amino acids in the form of decarboxylation, transamination, deamination, racemization and desulfhydration reactions. The crucial roles that these coenzymes play in the maintenance of functional integrity of the brain become evident when one realizes that some compounds implicated as neurotransmitters are synthesized and/or metabolized by the aid of the vitamin B(6)-dependent enzymatic reactions. These include dopamine, norepinephrine and serotonin, tyramine, tryptamine, taurine, histamine, gamma aminobutyric acid, and even acetylcholine indirectly. In recent years, the above-mentioned biogenic amines have become of considerable interest to neurobiologists who are investigating the etiology and the pathological manifestations of many disorders of the central nervous system such as Parkinsonism, Huntington's chorea, minimal brain disfunction, schizophrenia, depression, sleep disorders and seizure disorders. Vitamin B(6) deficiency in these cases is characterized by anemia, growth retardation and alteration in neuronal function, including neuropathies, hyperirritability, hyperexcitability and convulsions. The importance of vitamin B(6) in the study of brain function assumes still greater significance when one considers the effects of nutritional deficiencies on growth and development of the brain and mental processes and in the involvement of vitamin B(6) in some inborn errors of metabolism which result in mental retardation. Vitamin B(6) deficiency results in a lowered concentration of Coenzyme A in blood, in reduced absorption and storage of vitamin B(12), and in increased excretion of vitamin C. Furthermore, vitamin B(6) acts synergistically with vitamin E to control metabolism of unsaturated fats, with vitamin C in tyrosine metabolism and with niacin in its action and participates in niacin synthesis. In addition, vitamin B(6) deficiency results in insufficiency of insulin and in alteration of the functions of adrenal and pituitary glands, since it is involved in the synthesis of growth hormone, follicle-stimulating hormone, luteinizing hormone, aldosterone, glucagon, cortisol, estradiol, testosterone and epinephrine. It is hoped that by understanding the factors that regulate the synthesis, binding, storage and degradation of pyridoxal phosphate in the brain, a better insight into the role of vitamin B(6) in neurobiology may be gained.