Magnesium has a profound effect on neural excitability; the most characteristic signs and symptoms of Mg deficiency are produced by neural and neuromuscular hyperexcitability. These create a constellation of clinical findings termed tetany syndrome (TS). TS symptoms include muscle spasms, cramps and hyperarousal, hyperventilation and asthenia. Physical signs (Chvostek's, Trousseau's or von Bonsdorff's) and abnormalities of the electromyogram or electroencephalogram can usually be elicited. Signs and symptoms of TS are frequently encountered in clinical practice, especially among patients with functional or stress-related disorders. The role of Mg deficit in TS is suggested by relatively low levels of serum or erythrocyte Mg and by the clinical response to oral Mg salts, which has been demonstrated in controlled studies. Among the more serious neurologic sequelae of TS are migraine attacks, transient ischemic attacks, sensorineural hearing loss and convulsions. Mg deficiency may predispose to hyperventilation and may sensitize the cerebral vasculature to the effects of hypocarbia. Mg deficiency increases susceptibility to the physiologic damage produced by stress, and Mg administration has a protective effect; studies on noise stress and noise-induced hearing loss are taken as an example. In addition, the adrenergic effects of psychological stress induce a shift of Mg from the intracellular to the extracellular space, increasing urinary excretion and eventually depleting body stores. Drugs used in neurology and psychiatry may affect Mg levels in blood and may diminish signs of tetany, making assessment of Mg status more difficult. Pharmacologic use of Mg can decrease neurologic deficit in experimental head trauma, possibly by blockade of N-methyl-D-aspartate receptors. In conjunction with high doses of pyridoxine, Mg salts benefit 40% of patients with autism, possibly by an effect on dopamine metabolism.