SUMMARY

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Fourty weanling albino rats of both sexes were utilized in this study. Zinc deficiency was induced by feeding the rats a diet containing all the essential nutrients except zinc, for one, two, four, six and eight weeks. Deionized water was given and the animals were kept in stainless-steel cages.

The brain was dissected out of the skull and part of it was fixed in buffered formol-saline, embedded in paraffin wax and sectioned serially at 15 micrometers for the histological purposes. They were stained with Hx and E to study the general structure, toluidine blue to show Nissl bodies, methyl green-pyronin for RNA and DNA, Kultschitsky's method for myelin and Bielschowsky's method for neurofibrils.

For the histochemical investigations, other specimens were frozen and sectioned at 15 microns. They were treated with different reactions to detect the activity of the enzymes; alkaline phosphatase, lactate dehydrogenase, NADH diaphorase, acetyl cholinestrase, nonspecific esterases, ATPase, succinic dehydrogenase and acid phosphatase.

For the quantitative study, the eye piece

micrometer was used to measure the diameters and the graphical method of Dornfeld et al. was used to calculate the total number of cells in the caudate-putamen. Volumetric measurements were done to calculate the size of the cells and their nuclei. Then the nucleo/cytoplasmic ratio was deduced.

Anorexia, growth retardation and skin change were observed in zinc deficient animals.

The total cell number of the caudate-putamen decreased while the vascularity increased. The sizes of the cells and their nuclei were reduced, however, the nuclei were affected more. Chromatolysis occured and DNA content of the nucleus decreased. The thickness and stainability of myelin and neurofibrils decreased .

The activity of alkaline phosphatase, lactate dehydrogenase, NADH diaphorase, acetylcholinesterase and nonspecific esterases decreased markedly in the nerve cells. However, the activity of succinic dehydrogenase remained unchanged. In contrast, the activity of ATPase and acid phophatase increased.