

Alteration of the α -Tocopherol Content in the Brain and Peripheral Nervous Tissue of Dysmyelinating Mutants

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ABSTRACT

In the brain of quaking and shiverer mutants, vitamin E content was normal when related to both wet weight and dry weight. When related to lipid extract, phosphorus, and polyunsaturated fatty acids, vitamin E was slightly increased only in the quaking mutant. In the sciatic nerve from trembler mutants, vitamin E was 134% of control values in the dry material, but normal in relation to wet weight. It was 260% in the lipid extract and 716% based on phosphorus. In relation to total fatty acids, there was a threefold increase in trembler mutants. Interestingly, it was increased approximately three times when related to 18:2 n-6, 20:4 n-6, and 20:5 n-3, and seven times when related to 22:6 n-3. The fact that the amount of vitamin E in fresh weight was normal, suggests that vitamin E plays a role in some nonmembrane material, such as the extracellular matrix or the basal lamina.

Index Entries: Tocopherol; vitamin E; myelin; trembler; shiverer; quaking; sciatic nerve.

INTRODUCTION

Nervous system tissues contain one of the highest concentrations of lipids. Most of these lipids are found in membranes. The lipid turnover in some membranes is extremely low (myelin for example), and in some cells, such as neurons and oligodendrocytes, there is no cellular turnover. The membranes of such cells contain high amounts of polyunsaturated fatty acids. On the other hand, nervous tissue consumes very large

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