Acta Neurobiol. Exp. 1994, 54: 263

Effect of sodium tellurite on the myelogenesis in the rat CNS

Mieczysław Śmiałek and **Barbara Gajkowska**

Department of Neuropathology and Laboratory of the Ultrastructure of the Nervous System,
Medical Research Centre, Polish Academy of Sciences
3 Dworkowa St., 00-784 Warsaw, Poland

INTRODUCTION AND METHODS. Previous experimental studies on the intoxication with tellurium indicated that tellurites caused transient paralysis of hind legs and segmental demyelination in the peripheral nerves only in the period of the most active myelogenesis in the weanling rat (2). The aim of this study was to evaluate electron microscopic observation on the sodium tellurite, dose and time dependent neurotoxicity during myelogenesis in the weanling rat brain. Ten and fifteen days old rats were intoxicated ip. with a single dose (1.25 mg/kg) of Te^{+4} or with the same dose injected for five consecutive days. Cerebral cortex with the white matter border and optic nerve were harvested for electron microscopic studies in the 25 days old weanling rats.

RESULTS AND DISCUSSION. The rats intoxicated from the 10th to the 15th day of life seemed to be more sensitive than the animals that were administered the sodium tellurite between the 15th and the 20th day of life. Our studies showed a dose dependent vulnerability of the myelinated fibres in the maturing rat brain. A dynamics of the electron microscopic changes suggested primarily a degeneration of myelin sheath and myelin-forming glia with secondary changes in axons. This pathomechanism of tellurium neurotoxicity observed in the CNS differs from the tellurium neuropathy in the PNS, where Schwann cells are injured directly with secondary myeloclasis (3). Reaction of astroglia in this experimental observations - especially markedly increased gliofibrils may suggest that astroglia is involved in the repair process in the brain after intoxication with tellurium. The myelination process disturbances and myelinated fibres degeneration is related to the inhibition of squalene epoxidase activity, which results in the block of cholesterol synthesis following tellurium intoxication (1).

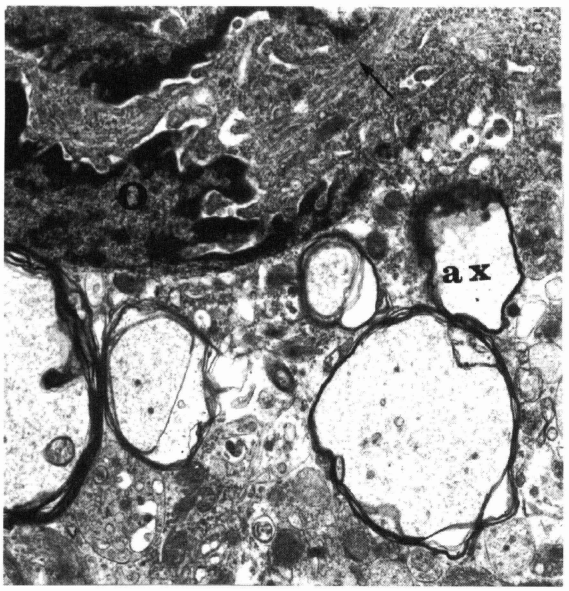

Fig. 1. Optic nerve. Magn. x 12.000, 5 time repeated dose of the Te^{+4} from the 10th to the 15th day of life. The oligodendrocyte nucleus (O) with invagination of the nuclear membrane and with enlarged RER and numerous gliofibrils (arrow), hypomyelination and degeneration of myelinated fibres (ax).

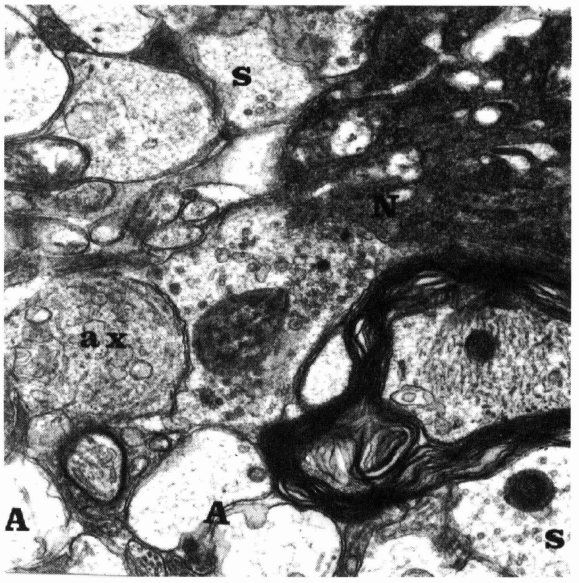

Fig. 2. .Cerebral cortex and white matter border. Magn. x 24.000. Dark neurone (N), oedematous synapses (S) and astrocytic processes (A). Neuronal fibres without myelin lamellae (ax) and with degenerated myelin sheaths.

1. Harry G.J., Goodrum J.F., Bouldin T.W., Wagner-Recio M., Toews A.D., Morell P. (1980) J. Neurochem. 52: 938-945.
2. Said G., Duckett S., Sauron B. (1981) Acta Neuropathol. (Berlin) 53: 173-179.
3. Takahashi T. (1981) Hokkaido J. Med. Sci. 56: 105-131.

Accepted 22 March 1994