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CORRELATED CHANGES OF CONDUCTION VELOCITY AND OF SITES OF SYNAPTIC INPUT ON AXOTOMIZED MOTONEURONS. John B. Munson, John G. Scott*, and Lorne M. Mendell. Univ. of Florida Coll. of Med., Gainesville (JBM) and Duke Univ. Medical Center, Durham, N.C. (JGS and LMM).

Transection of cat motor axons results in a loss of synaptic input onto the soma and proximal dendrites of the axotomized motoneurons. In addition, conduction velocity of the axon proximal to the transection is diminished (Mendell, Munson and Scott, Brain Research, 1974). More specifically, conduction velocity declines progressively from an average of 80 m/s in normal motoneurons to an average of 50-60 m/s at 60-80 days postoperative. Diminished conduction velocities were seen 3 days postoperative; experiments at prolonged postoperative times remain to be conducted.

Integrity of synaptic input onto the motoneuron soma and proximal dendrites may be related to axonal conduction velocity of the axotomized motoneuron, since abnormally increased numbers of failures of Ia afferent input are seen on motoneurons conducting below 60 m/s. Surviving synapses between Ia afferents and these slow conducting axotomized motoneurons are restricted to distal dendrites, as inferred from the slow-rising EPSP's in these motoneurons. Axotomized (and normal) motoneurons conducting at greater than about 60 m/s possess the normal complement of Ia afferent inputs onto their soma and proximal dendrites as well as onto their distal dendrites. Reinnervation of axotomized motoneurons into muscle is accompanied by recovery both of normal conduction velocity and normal distribution of Ia synaptic input. (Research support derived from grants NS 08411, NS 34608, MH 10230 and GM 00929)

REDUCED INFORMATION PROCESSING CAPABILITIES FOLLOWING COMMISSUROTOMY IN THE MONKEY. R.K. Nakamura* and M.S. Gazzaniga. State University of New York, Stony Brook.

The well-known consequences of commissurotomy have suggested the presence of two separate mental systems in the chiasm, callosum, anterior commissure sectioned animal or man. In prior studies, it was suggested that the combined mental efforts of the two hemispheres are superior to those seen in the normal intact callosum animal. These studies left open the possibility that a decrement might be seen in the split if the behavioral task was more complex and involved, in some sense, greater processing capability. In the present study, split-brain monkeys and controls were compared on their ability to do two match-to-sample tasks, one color and one pattern, presented sequentially. The tasks were intermixed such that one (color) was started before and completed after the other (pattern), thus nesting one task inside the other. In such a test sequence, the inner pattern discrimination can be done with relative ease in all animals whereas the ability to remember the color match is severely impaired in the split but not the normal. It is as if the split-brain animal does not have the cortical capacity to put on "hold" one piece of information while processing another. With extensive training there was some evidence in one split out of four that the ability to perform close to the normal range was possible. The experiment showed that in some instances one half-brain was deficient in its overall capacity as compared to a normal intact whole brain. Aided by USPHS Grant #MH 17883-04.