PROCEEDINGS OF THE XXIIth ANNUAL MEETING OF THE JAPAN NEUROSURGICAL SOCIETY

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President :

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1. Embryological Study about the Motor Nerve Endings

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Motor nerve endings of human gastrocnemius muscle were studied embryologically by the BIELSCHOW SKY—Suzuki's silver impregnation method. Muscle fibers of the 10th week fetus were premature and had many nuclei in axial position. Motor nerves were very fine. They branched and anastomosed each other energetically and went through among the premature muscle fibers without any connection. At 11th week fetus muscle fibers were still premature but their cross striations began to appear. Muscle nuclei locating peripherally in the muscle fibers were first observed at the 16th week fetus. But motor nerve fibers had no special connection with the muscle fibers even at this specimen. They had a lot of ringlets-and nets-formation or fibrillar loosening on their fibers. BOEKE thought them the precursors of motor end plates, but I could not agree with him. Precursor of motor end plate that consisted of 2 round SCHWANN cells and a small vague end net was observed first at the 17 week specimen. No muscle nuclei participated to form end plate at this specimen. Arborisations in the end plate were simple. End networks were round, polygonal etc. but small. Generally speaking, the length of branches connecting with motor end plate were short but later they became longer. Number of nuclei of end plates were only 2 or 3 even at newborn infant specimen,

because muscle fibers were relatively slender. At new born infant end plates connected to long nerve fiber increased remarkably.

2. A Study on Degenerative Changes of Neuromuscular Junction in Skeletal Muscle after Denervation by Electron Microscope

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Using albino mice, normal figures and degenerative changes of neuromuscular junction in a gastrocnemius after denervation of sciatic nerve by electron microscope are examined.

In control animals, a few number of axon terminal branches are in contact with ditches of sarcoplasm surface with intervening crevice, "Primary Synaptic Cleft", formed by both axolemma and sarcolemma. The sarcolemma has many crease-like crevices, "Second Synaptic Cleft", directly connected with the "Primary Synaptic Cleft".

Both endplate sarcoplasm and terminal axoplasm contain various organellae such as mitochondria, endoplasmic reticulum, synaptic vesicle and so on.

On the opposite side of neuromuscular junction, the terminal axon is covered by Schwann cell.

(1) 24 hours after denervation:

The mitochondriae are swollen and their cristae are obscure. The vesicles decrease markedly.

(2) 48 hours after denervation:

The axon becomes atrophied and the primary synaptic cleft is enlarged. Moreover, organellae of the axon decrease in number.

(3) 3-5 days after denervation:

Almost all of terminal axons disappear and Schwann cells protrude into the synaptic region. These Schwann cells are hypertrophied and contain abundant organellae.

(4) 7 days after denervation:

The Schwann cells replace completely the dead spaces which were made by disappearance of terminal axons, and in connection with sarcolemma with an inter-nesting cleft.