Nerve Regeneration After Pretreatment of the Heterogenous Nerve Transplant with Con A

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Con A has been shown to prolong the survival period of heterogenous graft. This paper studied the effect of Con A pretreatment of heterogenous nerve graft on neural regeneration. 1000ml Ringer's solution (4 degree) containing Con A 50mg was infused through aorta into Japanese large ear rabbits. After infusion, the tibial nerve was removed for transplant. Under anesthesia, Wistar rats were operated with a segment (5mm) of right sciatic nerve resected at a site of 10mm below the lower margin of piriformis muscle. Rabbit nerve 8mm long pretreated with Con A was transplanted to the distal and proximal ends of the rat sciatic nerve using 9/0 atraumatic suture. At 4, 8, 12 post-operation weeks, the transplanted nerves and its adjacent distal and proximal segment of the sciatic nerve were removed. The central segment of the transplant nerve and distal segment of sciatic nerve 10mm from the distal stump were fixed in 2.5% paraformaldehyde, postfixed in 1% osmium tetroxide and embedded in epon 618. Ultra-thin sections were cut and observed under electron microscope. Proximal segment of sciatic nerve and its attaching transplant, distal segment of sciatic nerve and its attaching transplant were fixed with formalin, stained with Bielschowsky silver method, and paraffin sectioned. On the silver stained section taken from various post-operation days, regenerated nerve fibers were seen crossing from the proximal stump to the transplanted nerve and through the distal stump to distal segment of sciatic nerve. Some regenerated nerve fibers were arranged irregularly at the proximal and distal ends. Transplanted nerve of 4 weeks post-operation and the regenerated nerve fibers in the distal segment of sciatic nerve were more sparse and fewer than that of long survival period. Transplant nerves of various survival period, under electron microscope could be seen that there were many regenerated axons. The regenerated axons contained neurofilaments, microtubules and mitochondria etc., some regenerated axons were wrapped around by myelin sheath forming myelinated fibers, non-myelinated fibers were dispersed between the myelinated fibers. Myelinated and non-myelinated fibers were wrapped by the same Schwann cell, there were still small amount of lymphocytes, residual degenerated fibers and collagen fibers. In the distal segment of sciatic nerve regenerated myelinated and non-myelinated fibers also could be seen, but the nerve bundles were smaller than those seen in the transplant and more collagen fibers were seen between the Schwann cells, fibroblasts could be seen. Four weeks after operation, the density of regenerated axons was rather low, there remained small amount of degenerated fibers. Small amount of lymphocytes appeared at the early stage of nerve transplant indicated that the heterogenous graft which has pretreated with Con A came across a week immuno-rejection reaction, but that the nerve fibers of the host could still regenerated.