Research involving nerve transplantation has shown that tissue rejection limits the neurologic recovery unless the host is immunosuppressed. This study investigates an alternative to permanent or temporary immunosuppression using a rat model with nerve transplants from Brown-Norway rat donors to bridge defects in the sciatic nerve of Lewis rat recipients as these two inbred strains differ at both major and minor histocompatibility loci. The specific aim of this study was to evaluate if predegenerated nerve grafts decreased the tissue rejection and improved the neurologic recovery of animals with allogenic nerve grafts to avoid the problems associated with either short- or long-term immunosuppression. The animals in the experimental groups received cyclosporin-A, predegenerated grafts, both, or neither. The predegenerated grafts were produced by division of the nerve three weeks prior to grafting to allow for Wallerian degeneration to occur. The outcome was assessed by measurements stressing functional recovery (sensory testing, gait analysis, joint flexion contracture), studies of muscle recovery (muscle weight and hydroxyproline concentration), and histologic studies (axonal counts and inflammatory reaction). The animals receiving the predegenerated grafts without cyclosporin did have an improved recovery (joint flexion contracture 35 degrees +/- 8 degrees and hydroxyproline ratio 1.52 +/- 0.16) as compared to the joint flexion contractures and hydroxyproline ratios of the allograft group of animals without either cyclosporin-A or pretreatment and the ungrafted control group (47 degrees +/- 18 degrees, 1.68 +/- 0.34, and 53 degrees +/- 15 degrees, 4.50 +/- 0.27, respectively, p less than 0.01). However, all the isograft groups and allograft groups with cyclosporin-A, regardless of whether the graft had been predegenerated or not, had greater neurologic recovery than the allograft group with predegenerated grafts but without cyclosporin-A by the same parameters (p less than 0.01). Allograft groups with short-term immunosuppression with cyclosporin-A did as well as isograft groups, and isograft groups with predegenerated grafts did not do any better than isografts without pretreatment (p less than 0.01) [1)].

1)
Trumble TE. Peripheral nerve transplantation: the effects of predegenerated grafts and immunosuppression. J Neural Transplant Plast. 1992 Jan-Mar;3(1):39-49. PubMed PMID: 1571398; PubMed Central PMCID: PMC2565135.