IL-10 Plasmid DNA Delivery in NOD Mice for The Prevention of Autoimmune Pancreatic β-Cell Destruction

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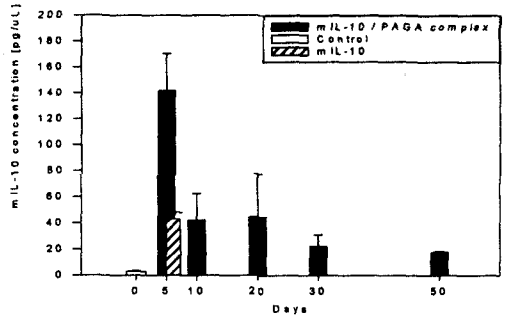
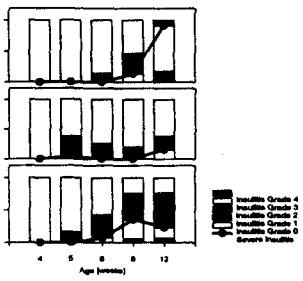
Recently, we have reported that biodegradable poly [-(4-aminobutyl)-L-glycolic acid] (PAGA) can condense and protect plasmid DNA from DNase I. In this study, we investigated whether the systemic administration of pCAGGS mouse IL-10 (mIL-10) expression plasmid complexed with PAGA can reduce the development of insulitis in non-obese diabetic (NOD) mice. PAGA/mIL-10 plasmid complexes were stable for more than 60 minutes, but the naked DNA was destroyed within 10 minutes by DNase I. The PAGA/DNA complexes were injected into the tail vein of 3 week-old NOD mice.





Serum mIL-10 level peaked at 5 days after injection, could be detected for more than 7 weeks. The prevalence of severe insulitis at 12 week-old NOD mice was markedly reduced by the intravenous injection of PAGA/DNA complex (15.7%) compared to that of naked DNA injection (34.5%) and non-treated controls (90.9%). In conclusion, systemic administration of pCAGGS mIL-10 plasmid/PAGA complexes can reduce the severity of insulitis in NOD mice.

The study presents the PAGA/DNA complex has the potential for the application of the prevention of autoimmune diabetes mellitus.