

Mechanism of Botulinum Toxin Type A in Enhancing Fat Graft Survival

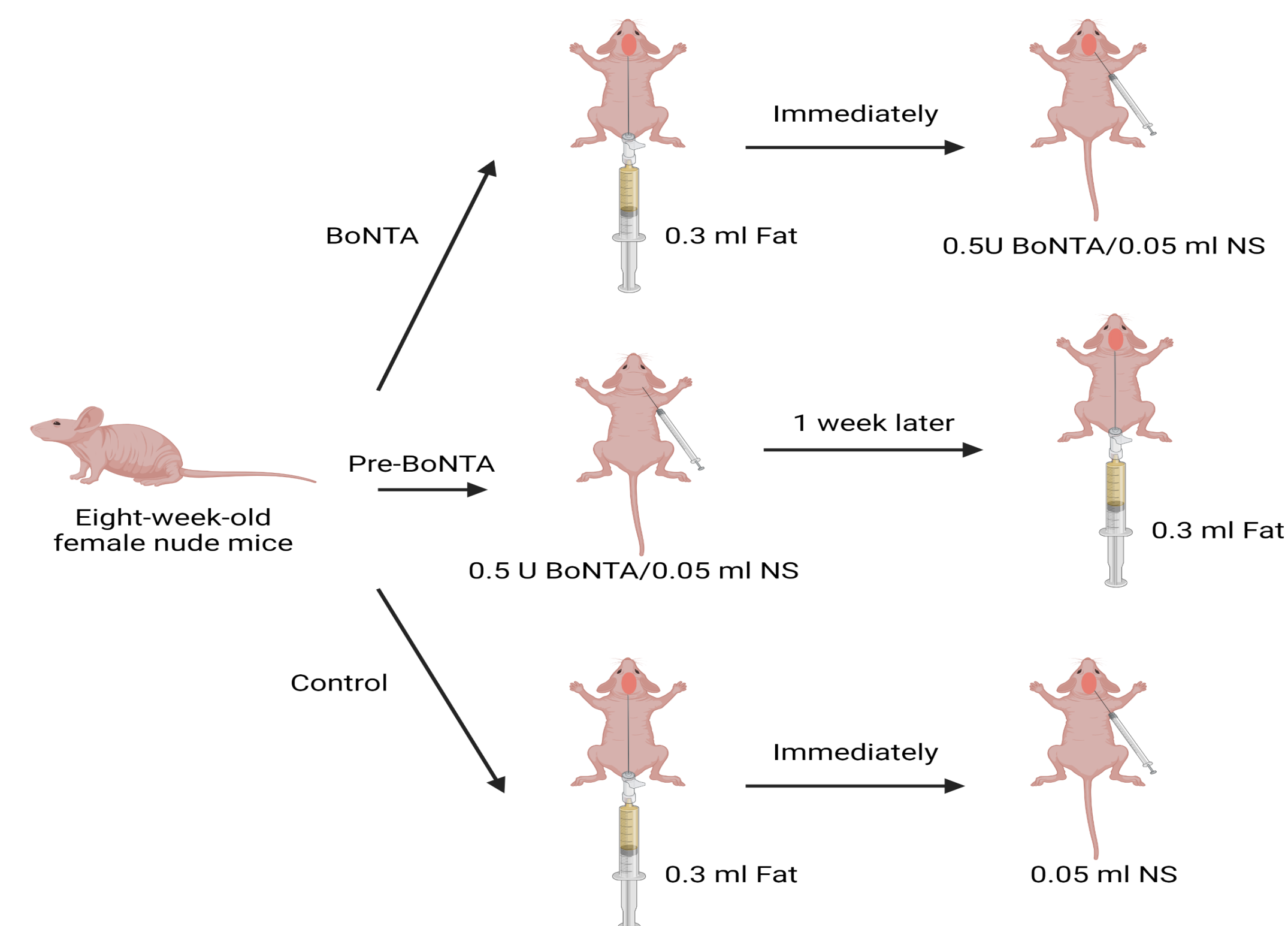
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Introduction

- **Objective:** To investigate how botulinum toxin type A (BoNT/A) enhances fat graft survival in the absence of muscle activity, aiming to clarify its non-muscle-mediated mechanisms.
- **Hypothesis:** BoNT/A improves fat graft retention through mechanisms beyond muscle paralysis. Using the muscle-deficient subcutaneous skull area of nude mice, we propose that BoNT/A promotes graft survival via non-muscular pathways when administered prior to fat grafting.

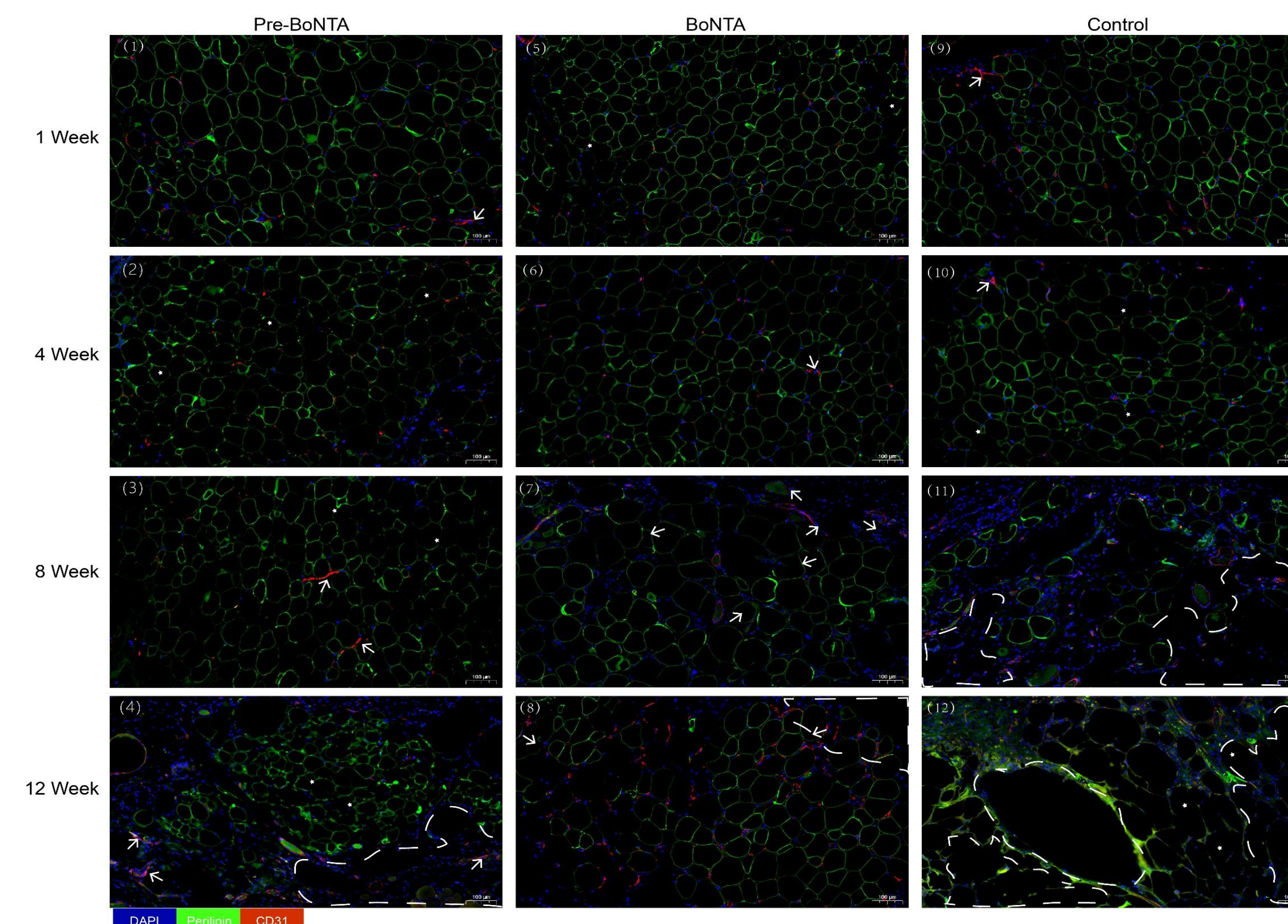
Methods



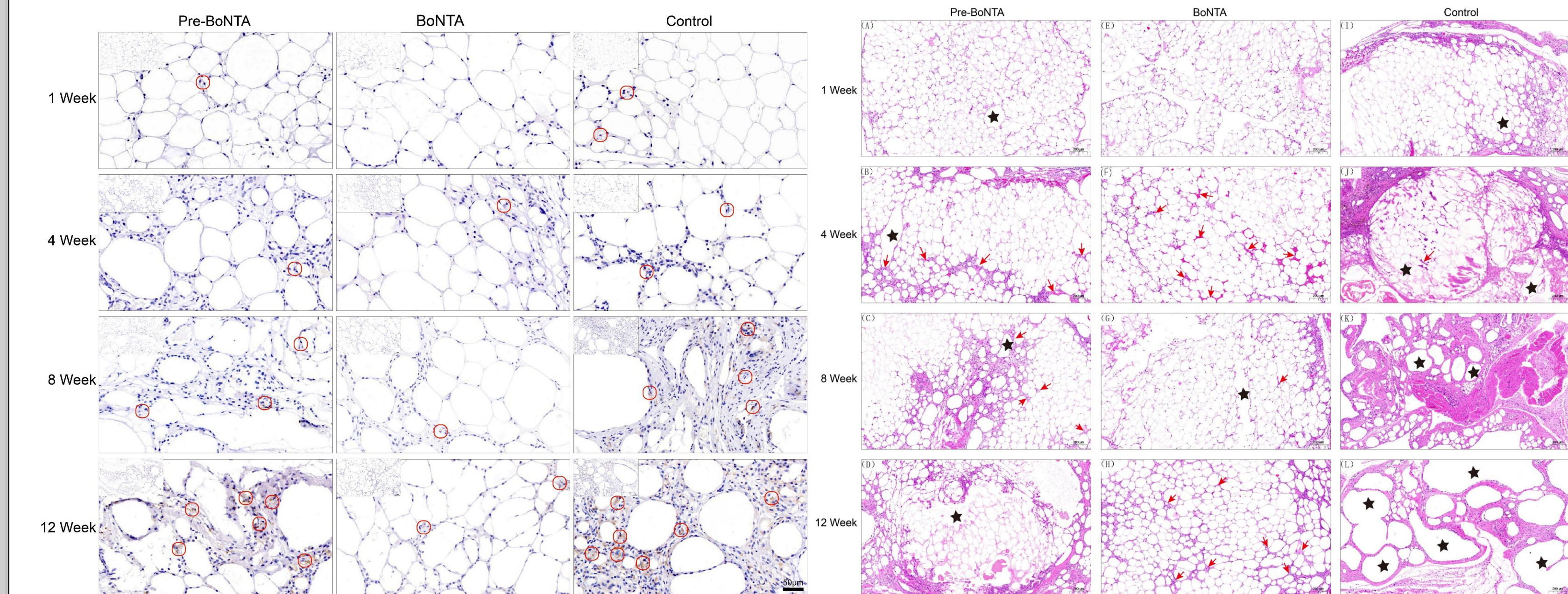
- Observations at 1, 4, 8, and 12 weeks post-transplantation included graft volume, collagen deposition, fat integrity, and markers for fibrosis, inflammation, and adipogenesis..

Results

Fat graft survival was significantly improved in BoNT/A-treated groups, with reduced fibrosis, lower inflammation, increased adipogenesis, and enhanced vascularization compared to controls.



Results Continued



Discussion

- BoNTA significantly improves fat graft survival and quality, beyond its known neuromuscular blocking effects.
- Mechanisms include enhanced angiogenesis, reduced inflammation, and preservation of adipocyte integrity.
- Both Pre-BoNTA and BoNTA injection strategies were effective, with BoNTA showing slightly better histological outcomes.
- No significant difference in vascular density was observed, likely due to both interventions mitigating ischemic injury during the critical early phase.
- Volume-based measurements may overestimate fat retention, highlighting the need for functional graft assessment methods.
- This study confirms non-muscle-mediated effects of BoNTA, providing a theoretical basis for optimizing clinical strategies.