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The Adaptive Immune System Has a Critical Role in Promoting Nerve Regeneration across Acellular Nerve Allografts

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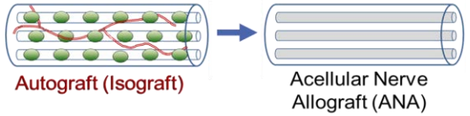
Introduction

- Due to disadvantages of nerve autografting, alternatives are being increasingly used and desired for nerve defect repair.



- These alternatives have limits for the repair of nerve defects. We still do not understand why these limits are present, or how to overcome these limits.

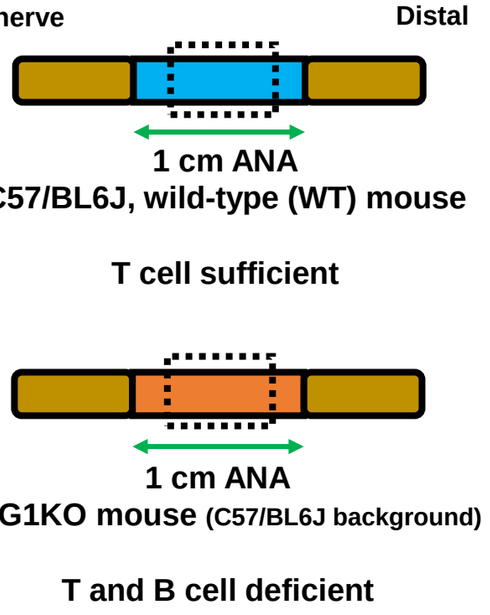
- We determined whether the adaptive immune system (T & B cells) has a role in nerve regeneration across initially acellular nerve autograft alternatives.

Methods

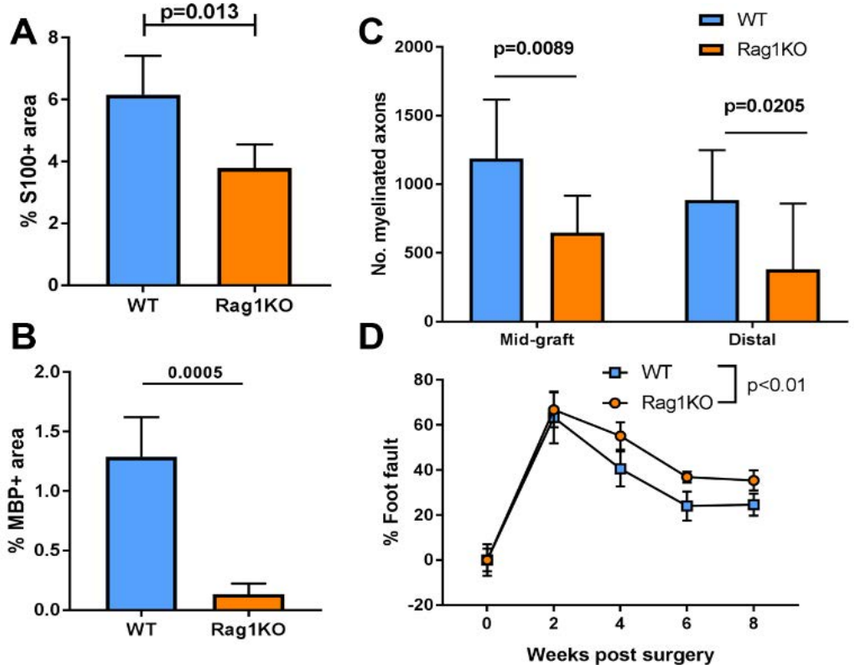
- Acellular nerve allografts (ANAs) were generated using a chemical detergent protocol.

- One (1) cm ANAs were used to repair sciatic nerve gaps in Rag1KO (lacking both T and B cells) or wild-type (WT; control) mice.

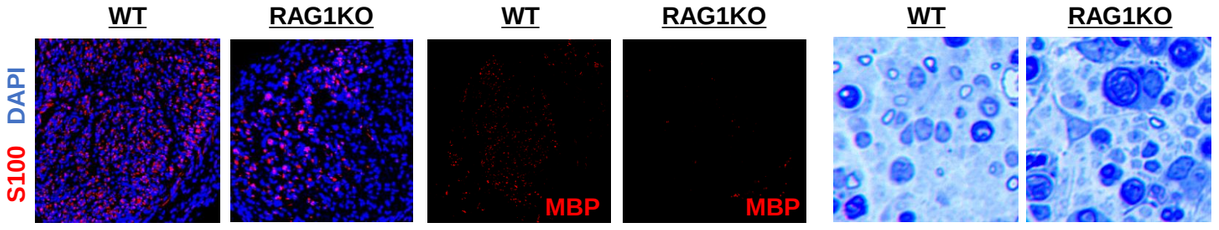
- Regeneration was quantified using histology, immunofluorescence, and a grid walk test.



Results



WT vs Rag1KO mice were assessed for nerve regeneration after ANA repair. After 2 weeks, Rag1KO Schwann cell (S100) quantities and myelin basic protein (MBP) within ANAs was reduced compared to WT (**A, B**). At 4 weeks, Rag1KO had reduced numbers of myelinated axons compared to WT (**C**). Starting from 4 weeks, Rag1KO had a persistent increase in foot faults compared to WT (**D**). Mean ± SD, n≥5/group; p values shown. Images below.



Conclusions

- This data suggests adaptative immune cells promote regeneration across ANAs.