

Similarities in SLITRK Gene Mutations and the Development of Neurological Disorders

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Introduction

- Can SLITRK mutations be used to identify links between neurological disorders?
- SLIT and NTRK-like proteins with six family members.
- Each mutation leads to the development of a neurological condition.

Methods

- Two taxa and 13 sequences analyzed.
- Neighbor Joining in MAFFT to align sequences with default parameters for phylogenetic trees.
- Maximum Likelihood used for tree construction with a bootstrap value set to 500.
- Dopamine receptor D4 used as an outgroup.
- MUSCLE aligner to identify conservation.

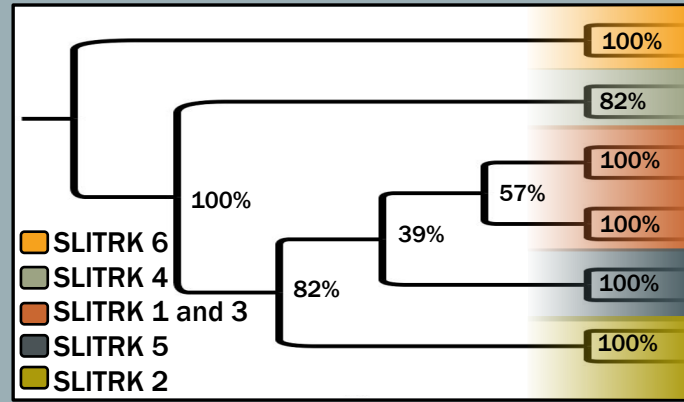


Figure 1: SLITRK mutations without an outgroup. Bootstrap values shown.

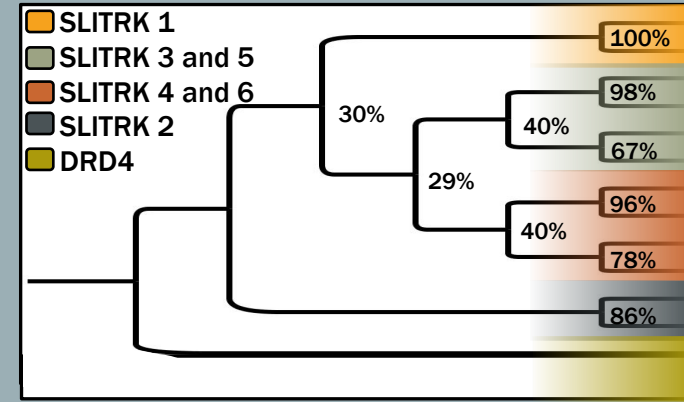


Figure 2: SLITRK mutations with DRD4 outgroup. Bootstrap values shown.

SLITRK5	TGGACCAGCTGAAGTCACTCATCCAAATCGACC	TGCATGACAATCCTTGGGATTGTACCT
SLITRK3	TGGAACACTTGAATGCCATGTGCCAGATAGACC	TCAATGAGAATCCTTGGGACTGCACCT
SLITRK2	TGGATCAGCTCCCGGCTTTCATCCAGATAGATCT	TGCAGGAGAACCCCTGGGACTGTACCT
SLITRK1	TGGACCAGTTAACCTCCATCATCCAGATAGACC	TCCACGGAAACCCCTGGGAGTGTCTCT
SLITRK4	TTGATCAGTTGCAATCTCTTACACAGATTGACT	TGGAGGGCAACCCATGGGACTGTACTT
SLITRK6	TGGATGATCTTGATTGCTAACCAGATTGACCT	TGAGGATAACCCCTGGGACTGTCTCT
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Figure 3: MUSCLE Multiple Sequence Alignment view showing partial and fully conserved areas among SLITRK gene mutations.

Results

- SLITRK1 and SLITRK3 are sister taxa when an outgroup is not used. (fig. 1)
- SLITRK3 and SLITRK5 are sister taxa along with SLITRK4 and SLITRK6 with an outgroup present. (fig. 2)
- SLITRK2 diverges separately and doesn't have a homologous pair. (fig. 1,2)
- High conservation among the SLITRK family members. (fig. 3)

Findings/Conclusion

- SLITRK1, 3, and 5 mutation detected in cerebral cortex.
- Causes impaired corticostriatal circuitry performance.
- SLITRK1, 3, and 5 are all linked to developing Trichotillomania.
- SLITRK2 and 4 mutation in Myotonic Dystrophy type 1.
- SLITRK4 and 6 link between neurological conditions is undetermined. Future study should be conducted to identify possible links.

Acknowledgement

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