Investigating the functional roles of δ-catenin

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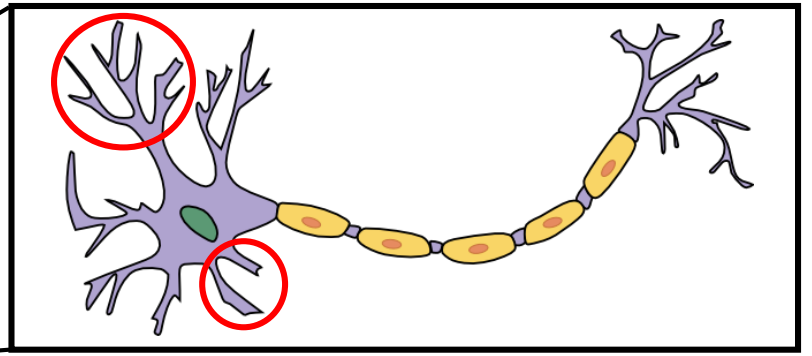
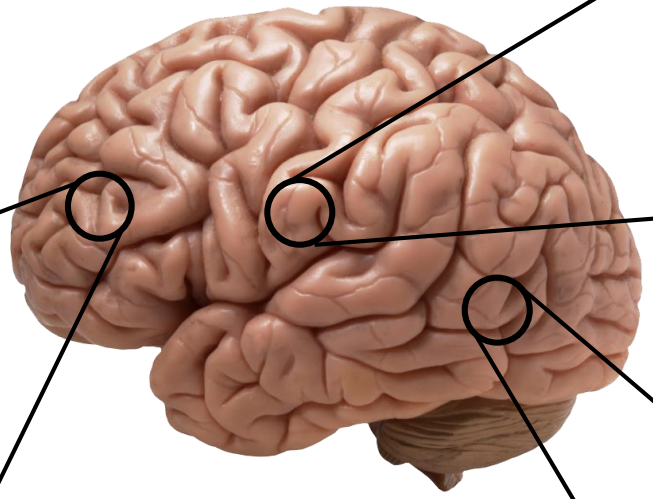
Mutations lead to neurological disorders

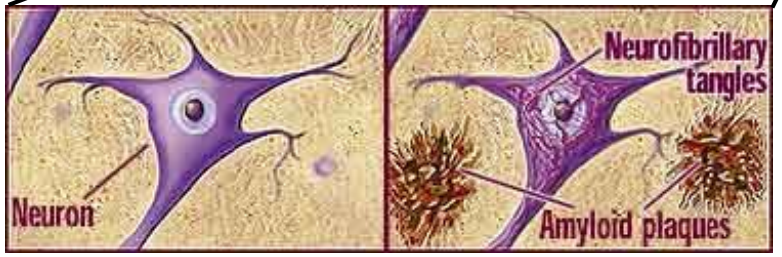
Too few or too many synapses



Autism

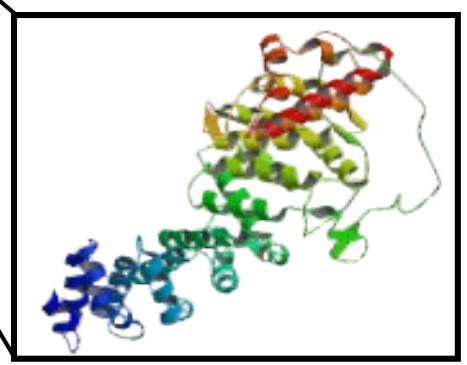


Plaques and tangles

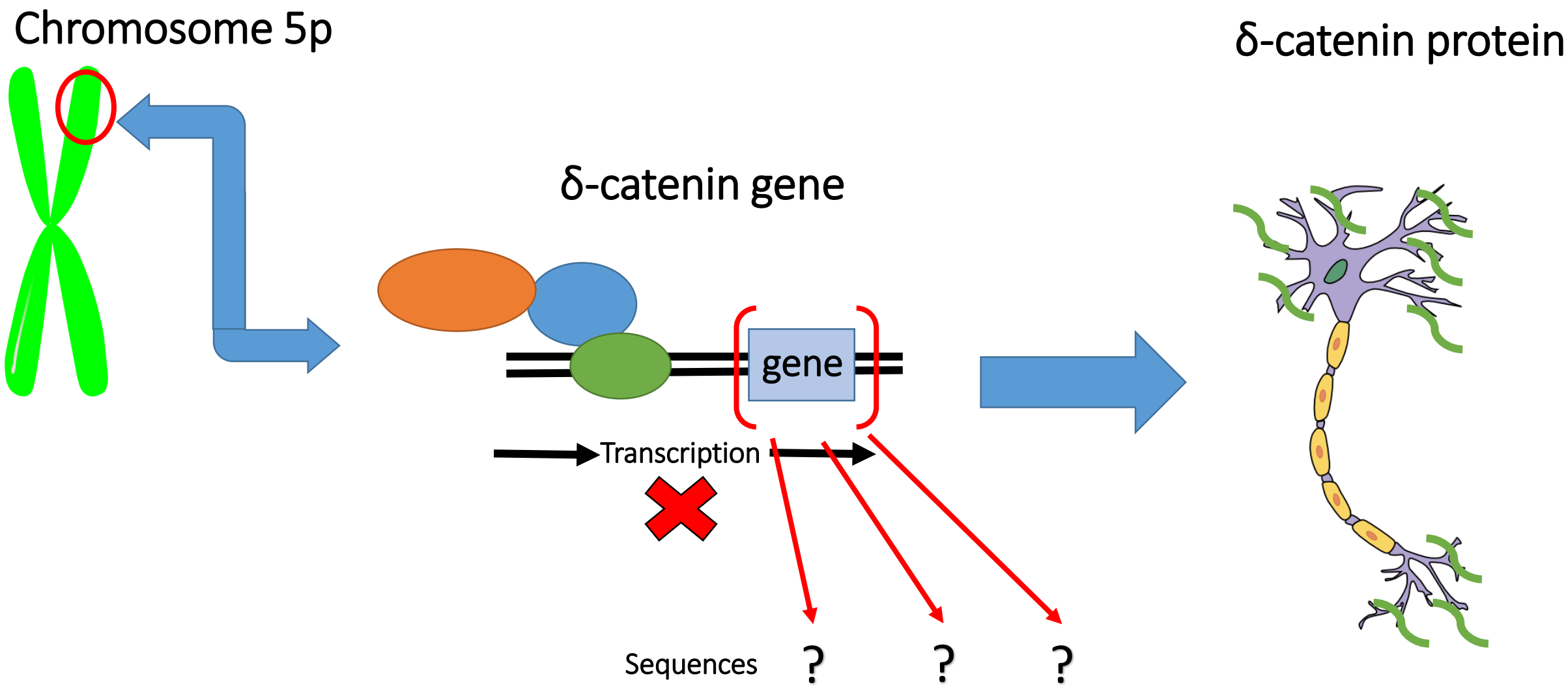


Alzheimer's disease

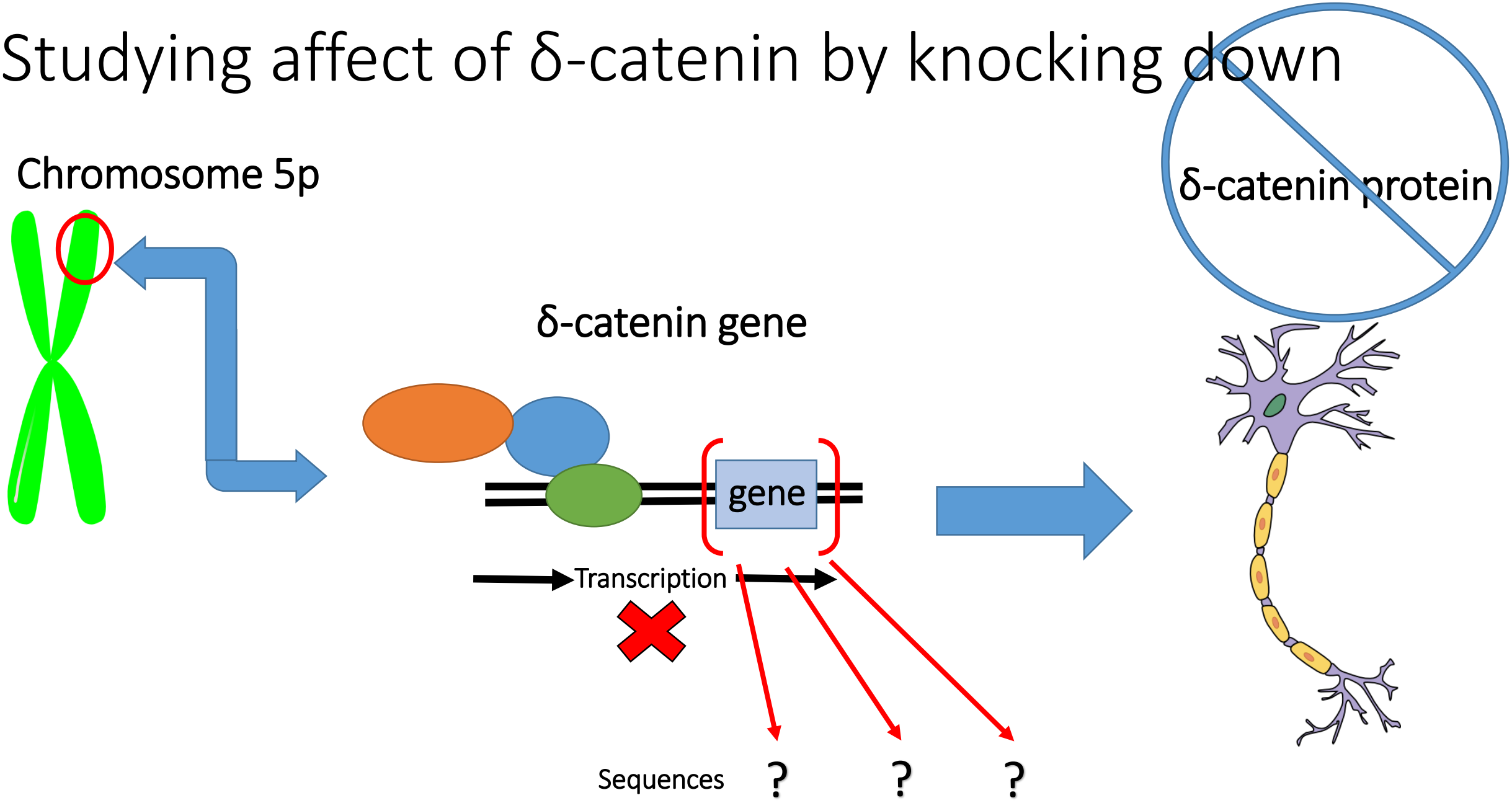
Delta-catenin 2



Studying affect of δ-catenin by knocking down

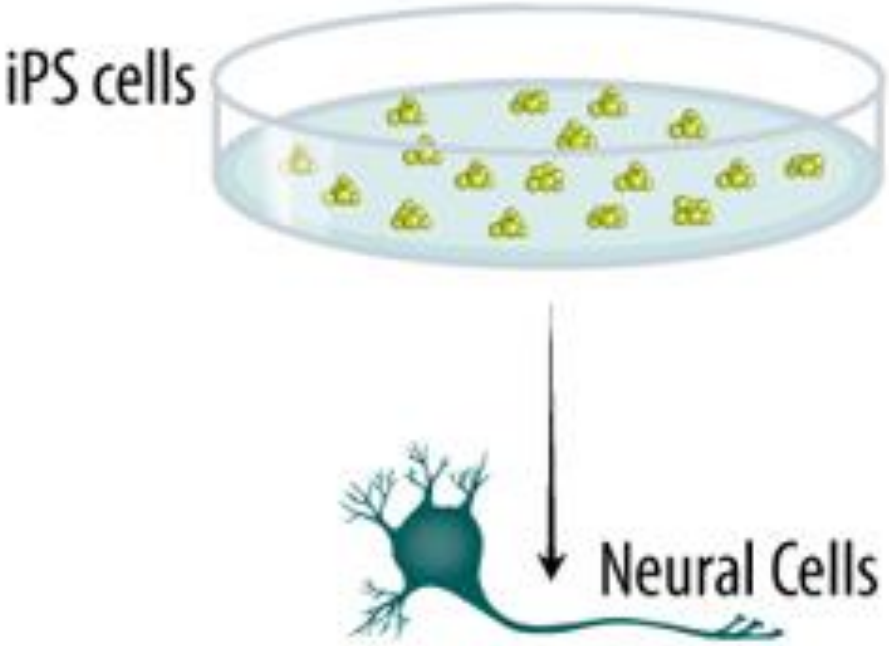


Studying affect of δ-catenin by knocking down

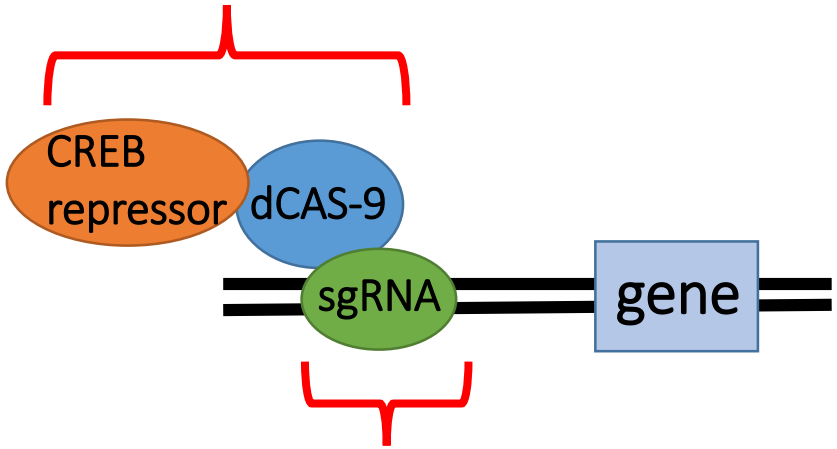


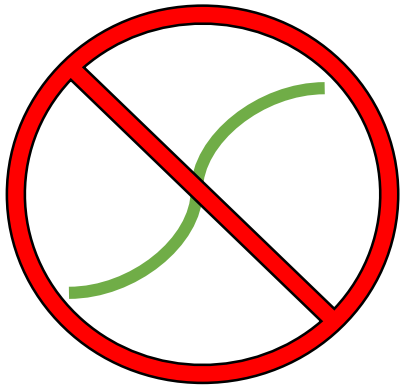
Step 1

Repressing δ-catenin gene in stem cells with CRISPRi



Repression machinery



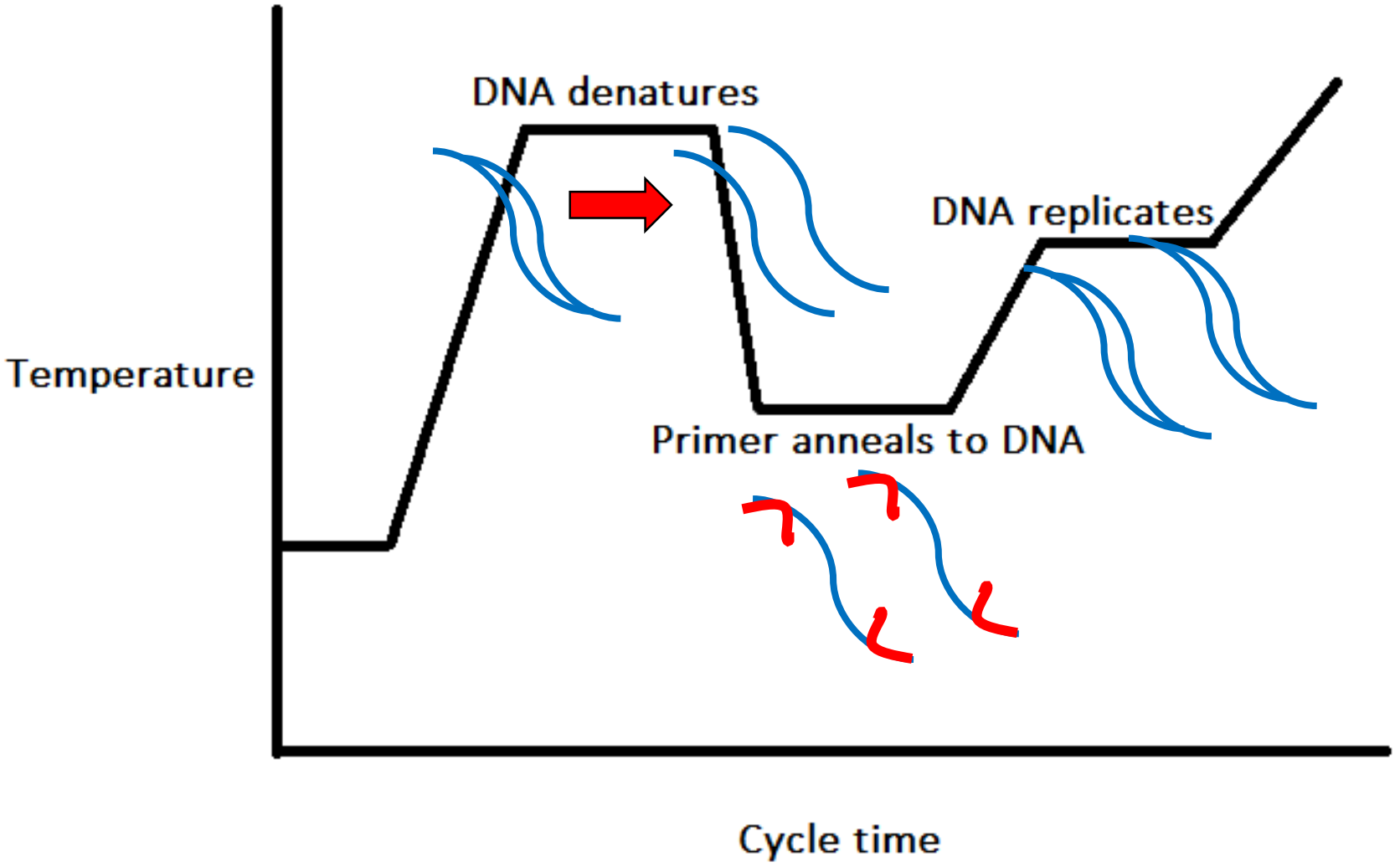


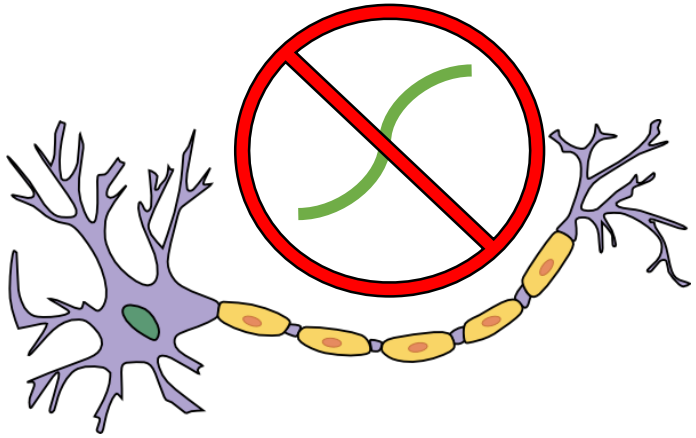
Locate gene

“dead” Cas9 system = binding, no cutting

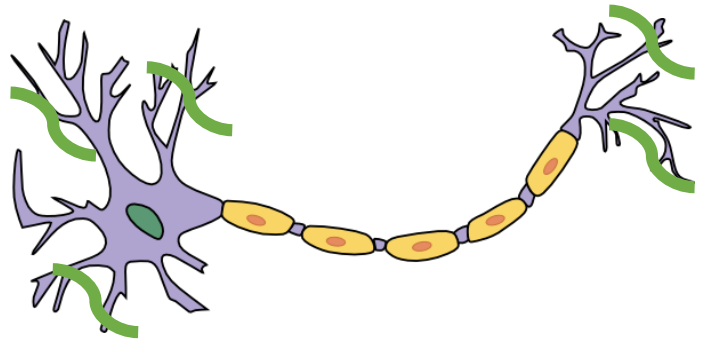
Step 2

Amplifying δ-catenin mRNA with qPCR



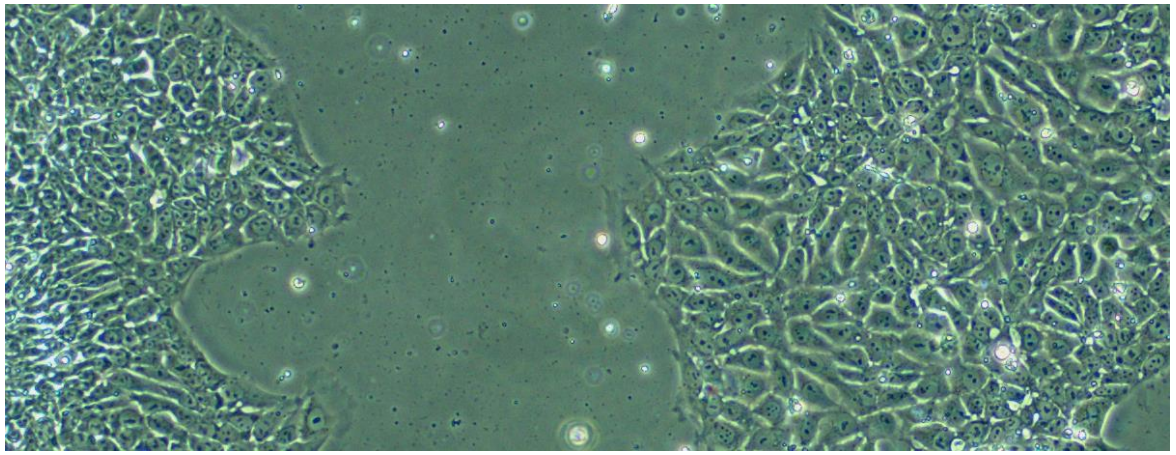


Experimental

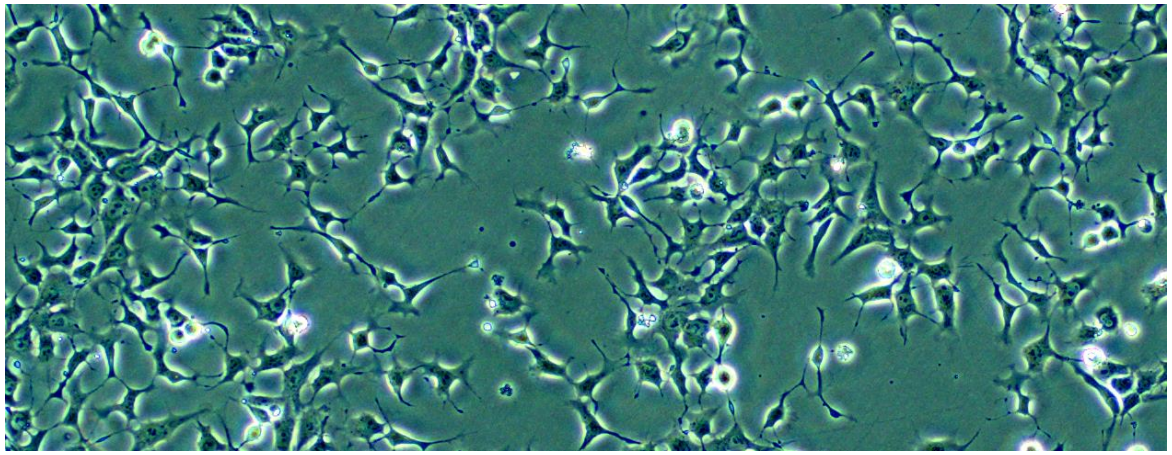


Control

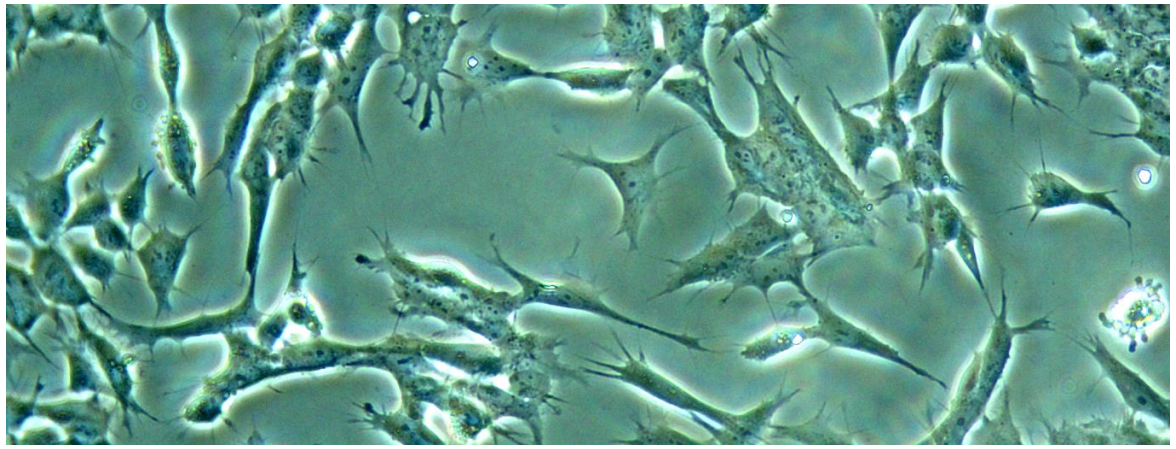
Stem cell differentiation into human neurons



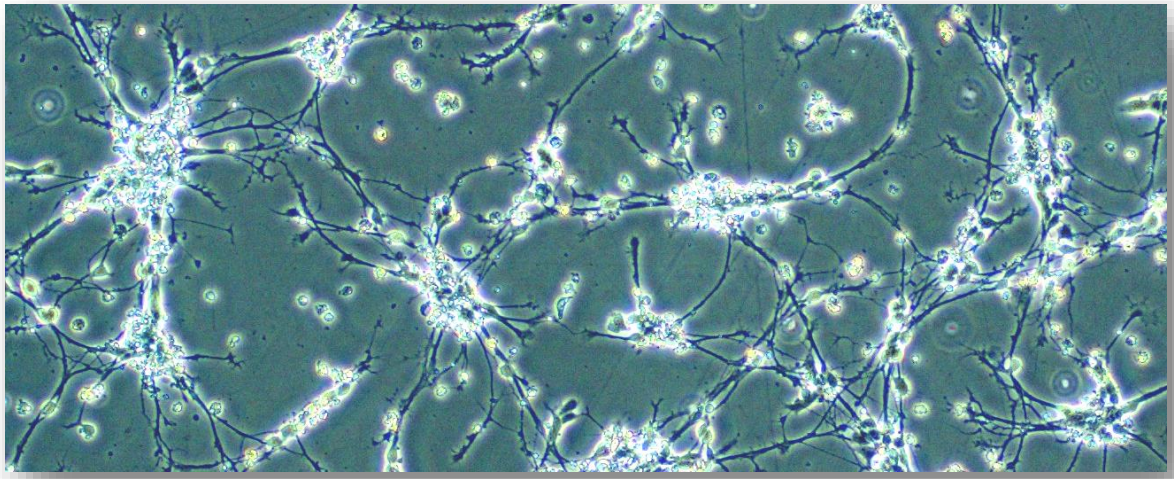
Before differentiation (10x)



1st day after differentiation (10x)

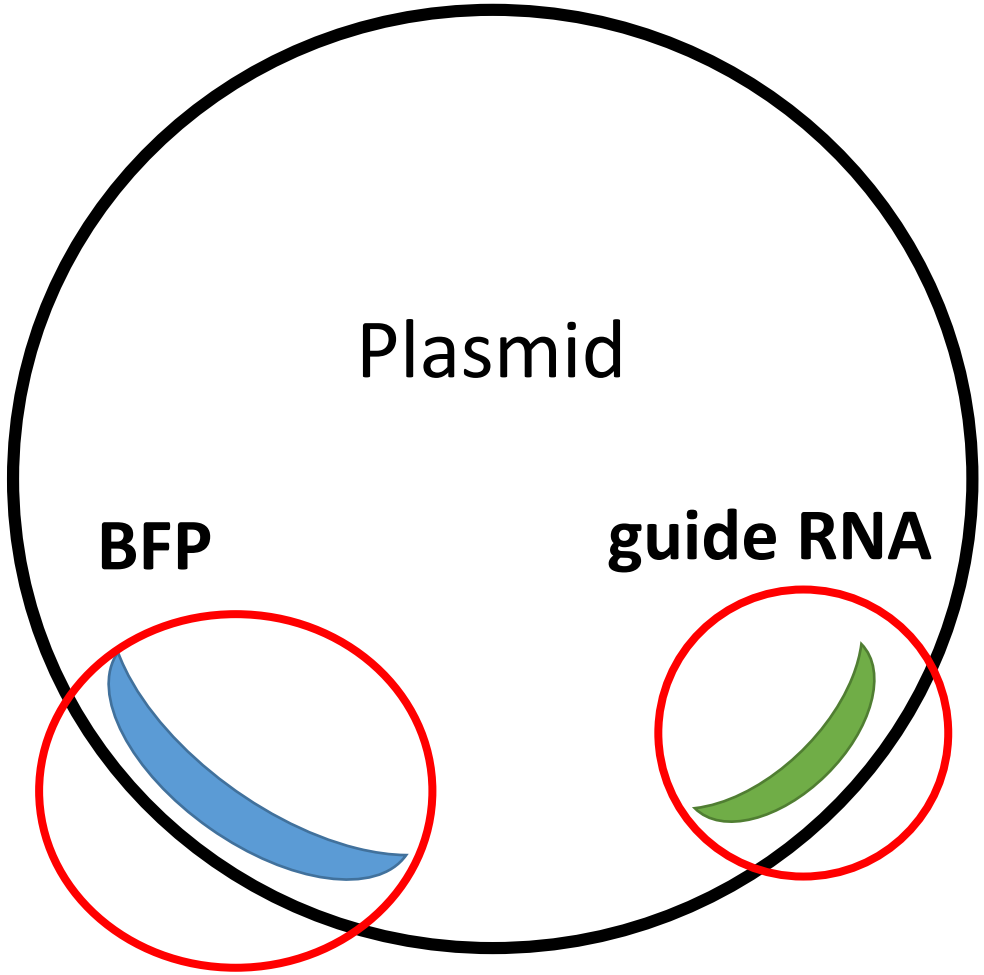


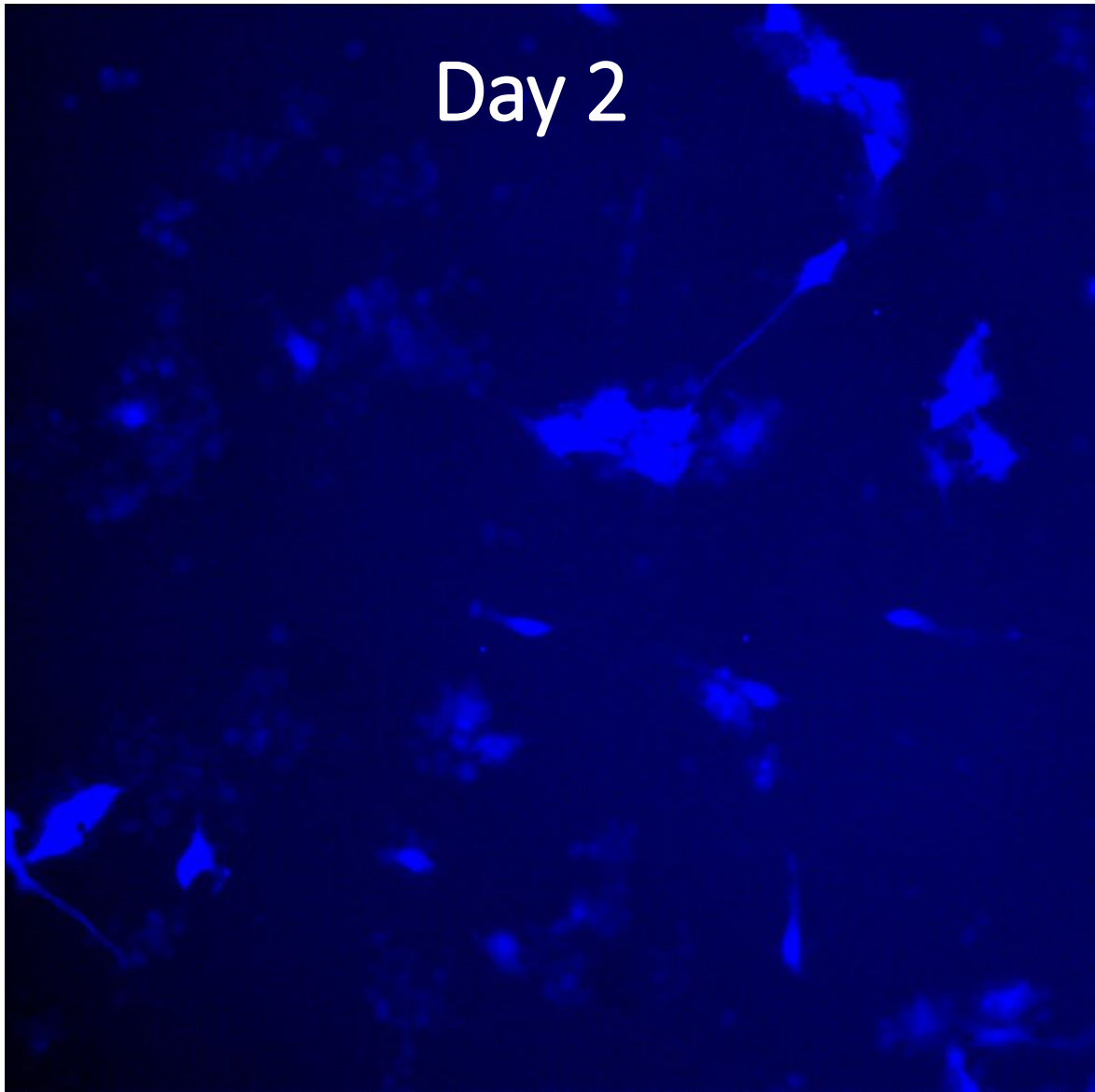
2nd day after differentiation (20x)



7th day after differentiation (20x)

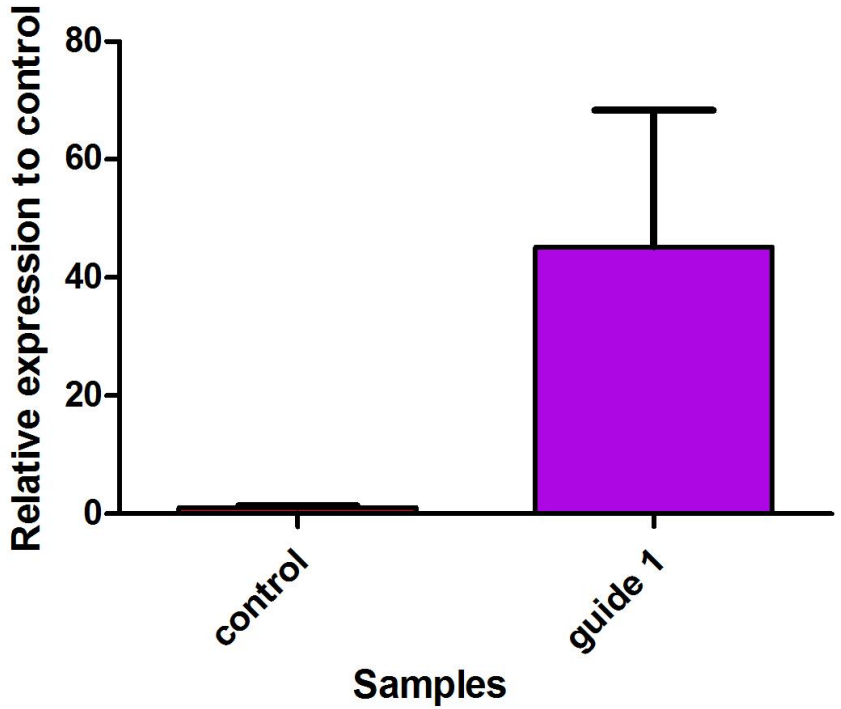
Confirming presence of guide RNA in H4 cells

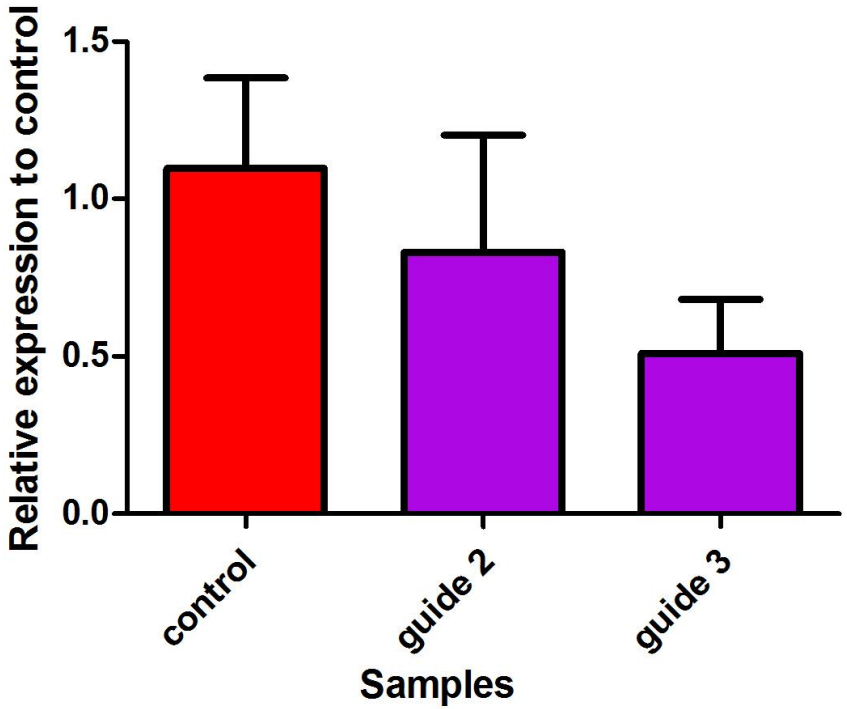




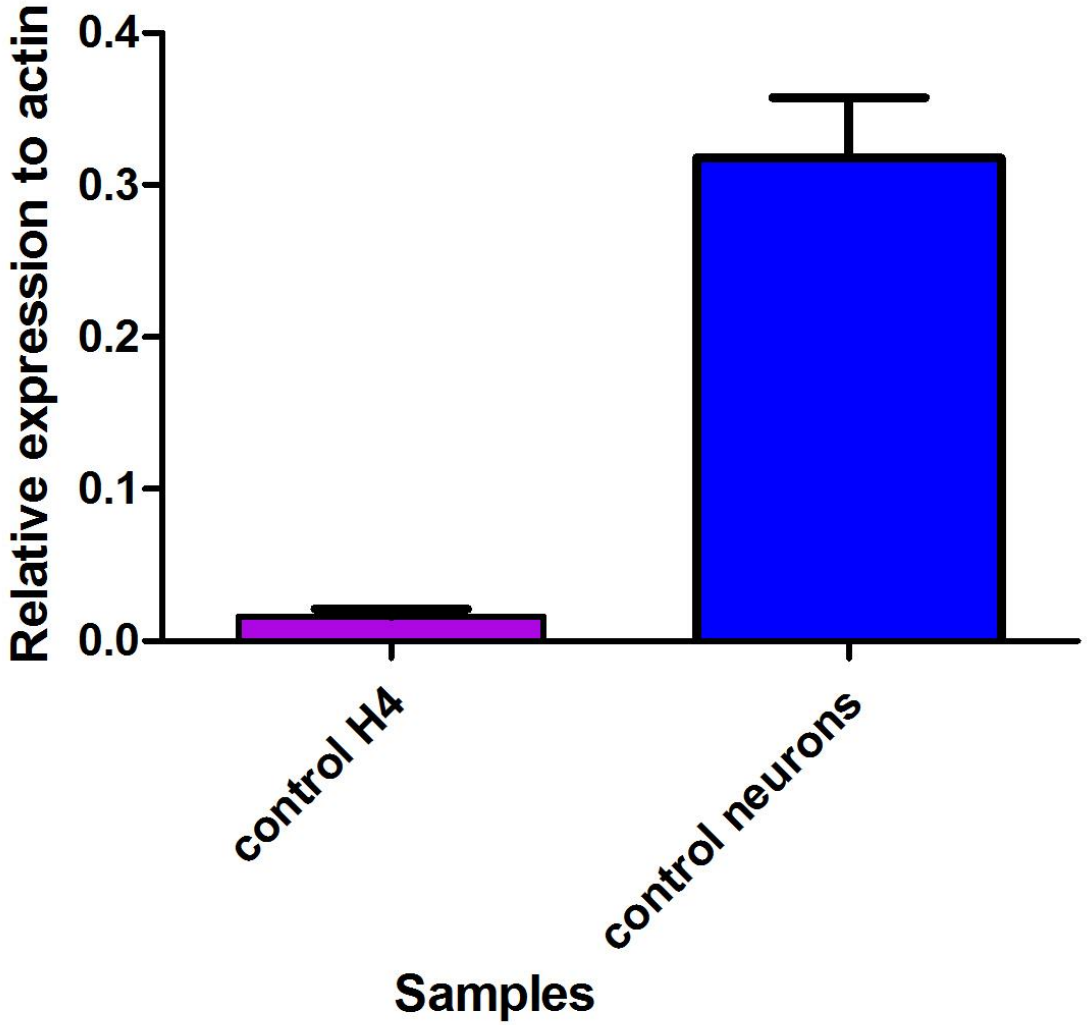
δ-catenin knockdown in H4 cells inconclusive

One-way ANOVA test shows no significant differences



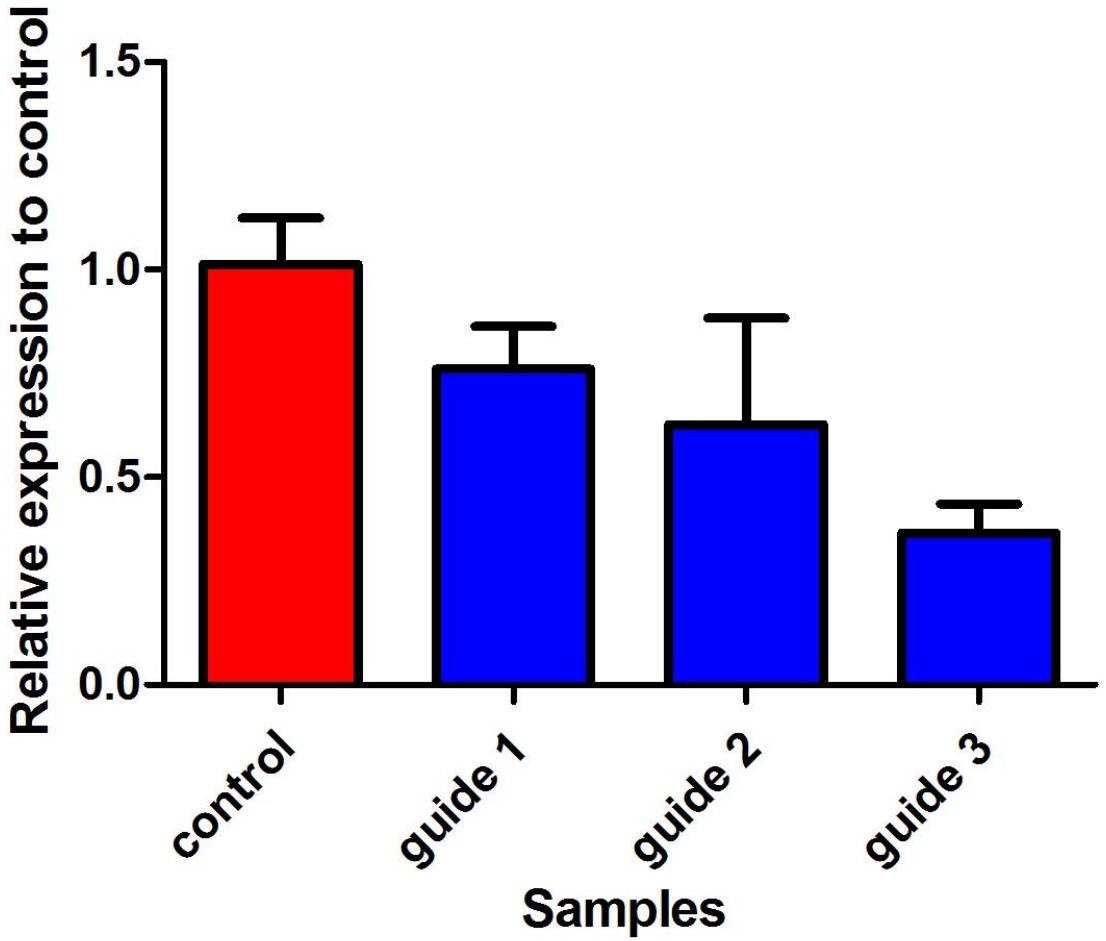


δ-catenin more highly expressed in neurons



Knockdown of δ-catenin confirmed in neurons

T-test shows significant difference between guide 3 and control

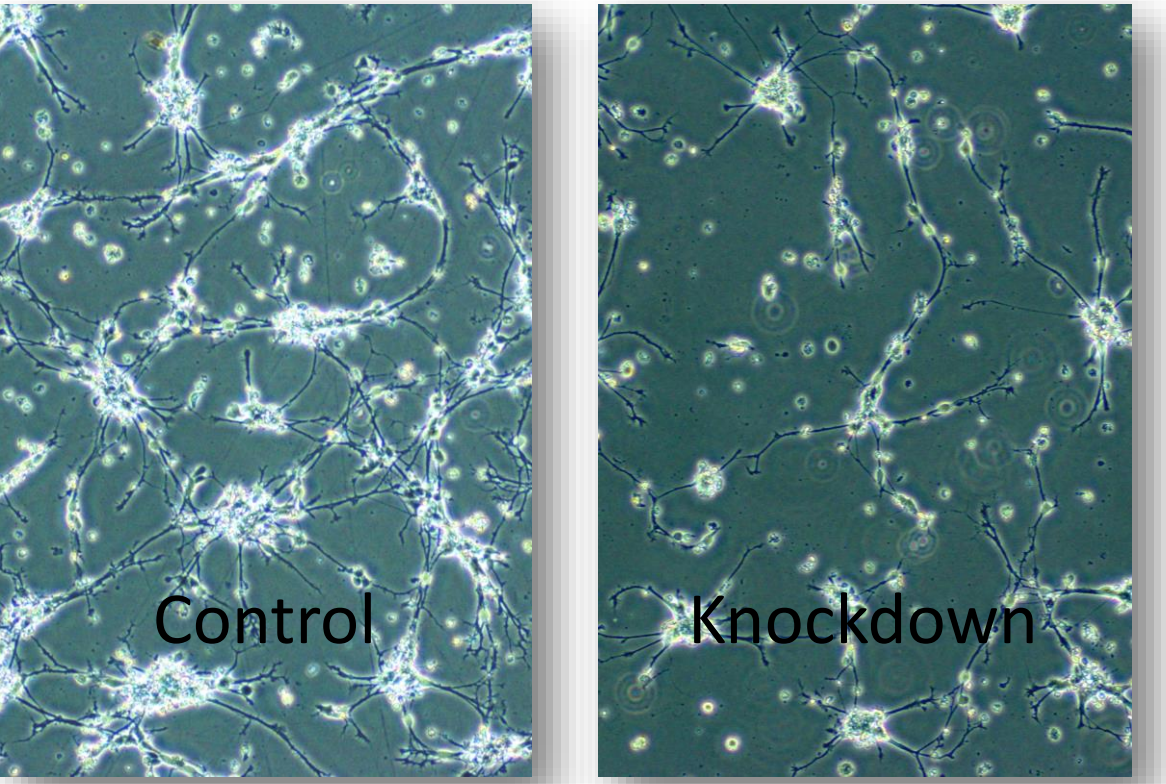


Guide RNA 3 most effective at repression

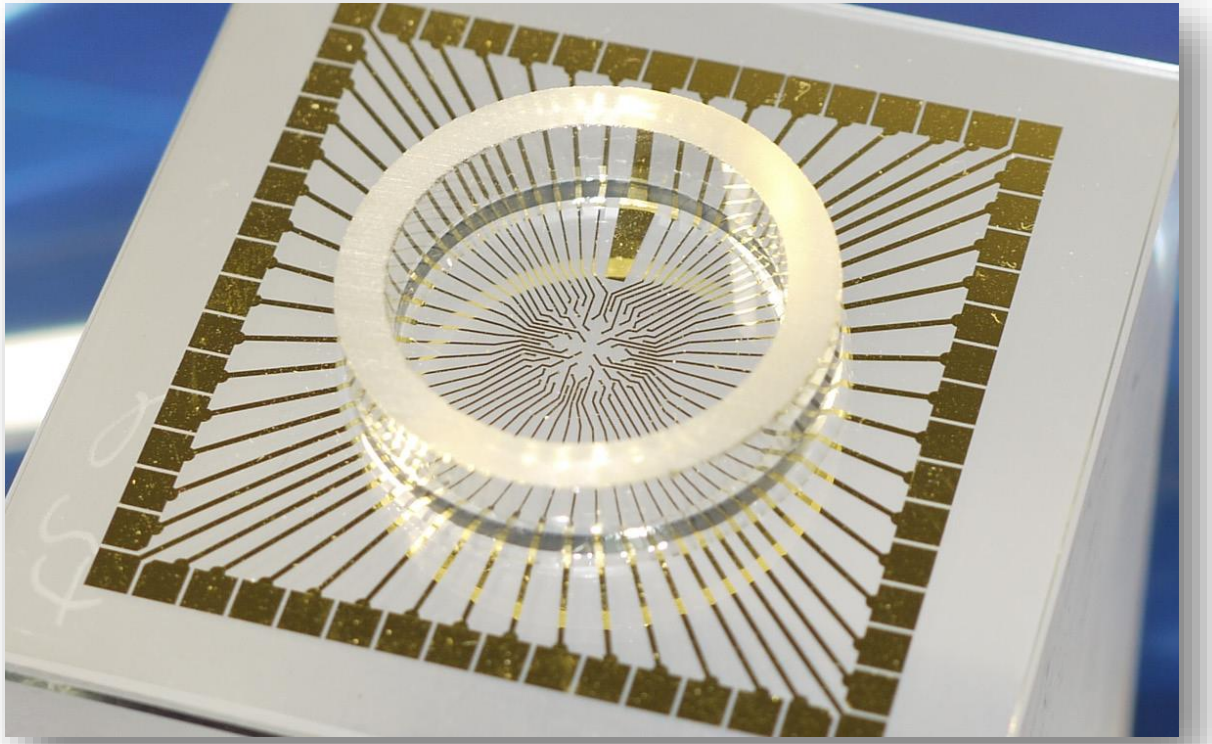
- Confirmation of most effective δ–catenin knockdown

Future plans:

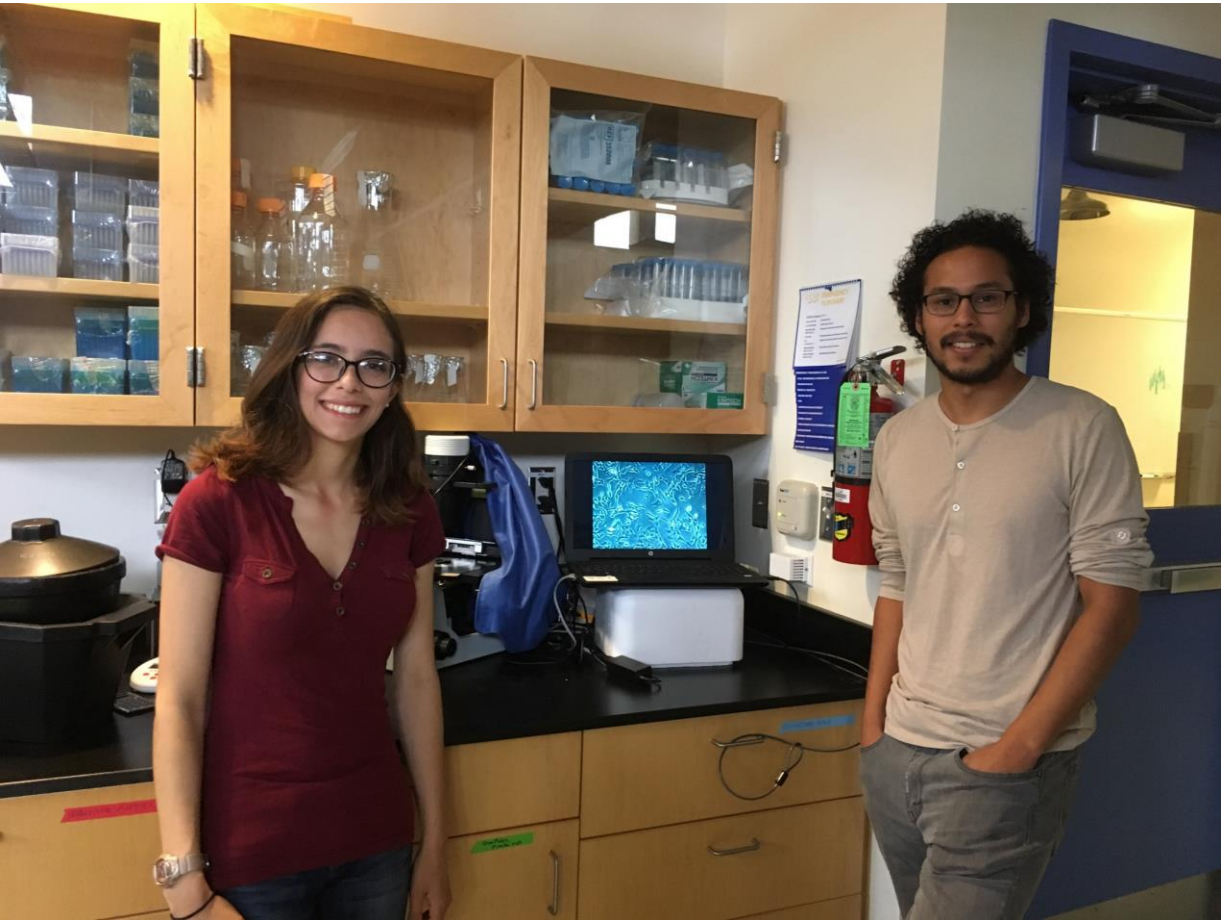
Morphology



Electrophysiological properties



Acknowledgements



- Elmer Guzman, Mentor
- Dr. Ken Kosik, Principal Investigator
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- Samantha Davis, EUREKA Coordinator
- My program peers

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