

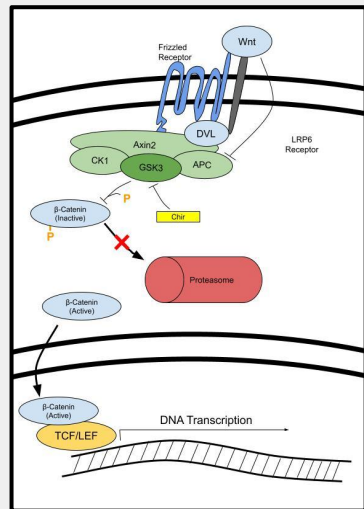
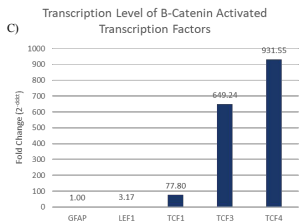
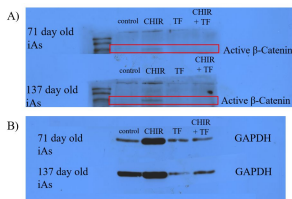
# Stem Cell Derived Astrocytes Robustly Express the Canonical Wnt/ $\beta$ -Catenin Pathway

Presented at International Society for Stem Cell Research: 2022 Boston International Symposium  
 Amogh Shetty<sup>1,2</sup>; Srinivas Narasipura<sup>2</sup>, PhD; Tanner Shull<sup>2</sup>; Janet Zayas<sup>2</sup>, PhD; Lena Al-Harhi<sup>2</sup>, PhD  
 Rush University Medical Center<sup>1</sup>, Illinois Mathematics and Science Academy<sup>2</sup>

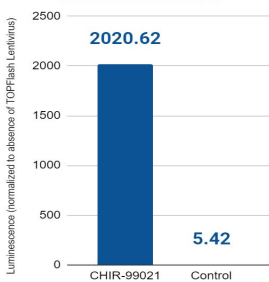


## Our Questions

- Is the Wnt/ $\beta$ -catenin pathway robustly expressed in hiPSC induced astrocytes (iAs)?
- How can we alter  $\beta$ -catenin presence to study the pathway in iAs?



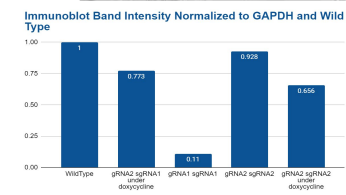
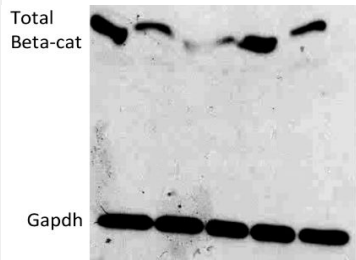
## TCF Reporter Assay CHIR vs CHIR-Absent



Presence of CHIR-99021 lead to increased luciferase activity in i-astrocytes infected with TOPflash lentiviral particles.

## Background

- Normal Human Astrocytes (NHAs) robustly express the Wnt/ $\beta$ -catenin pathway, an important pro-survival pathway that regulates several important CNS functions.
  - Glutamate uptake
  - Neuroimmune response
  - HIV transcription
- NHAs and other primary models are costly and difficult to access.
- Recently, a well established protocol was determined to differentiate hiPSCs into astrocytes (TCW, 2017) via neural progenitor cells (NPCs). However, the presence of Wnt/ $\beta$ -Catenin has not yet been studied in these induced-astrocytes (iAs).



## Conclusions

- Induced-Astrocytes express active Beta-Catenin at the protein level and TCFs/LEFs at the mRNA level. This hints that the pathway is robustly expressed in hiPSC differentiated astrocytes.
- The pathway can be activated by CHIR-99021 in iAs.
- Beta-Catenin may be knocked out with CRISPR-Cas9 via lentiviral approach.

## Future Directions

- Characterize iAs with CHIR-99021 presence.
- Repeat and confirm Beta-Catenin knockout from iAs.
- Characterize Beta-Catenin knocked out iAs to better determine the role of the Wnt/ $\beta$ -catenin pathway.
- Study the proliferation rate and metabolism of these cells to determine their usability as a research tool in the future.



## References

