

# Investigating Relationships of Circulating Brain Derived Neurotrophic Factor with Alcohol Intake and Clinical Measurements among People Living with HIV

Eden M. Gallegos<sup>1</sup>, Stefany Primeaux<sup>1</sup>, Liz Simon Peter<sup>1</sup>, Tekeda Ferguson, Patricia Molina<sup>1</sup>.

<sup>1</sup>Department of Physiology, Louisiana State University Health Sciences Center, New Orleans, LA, USA.

## Introduction

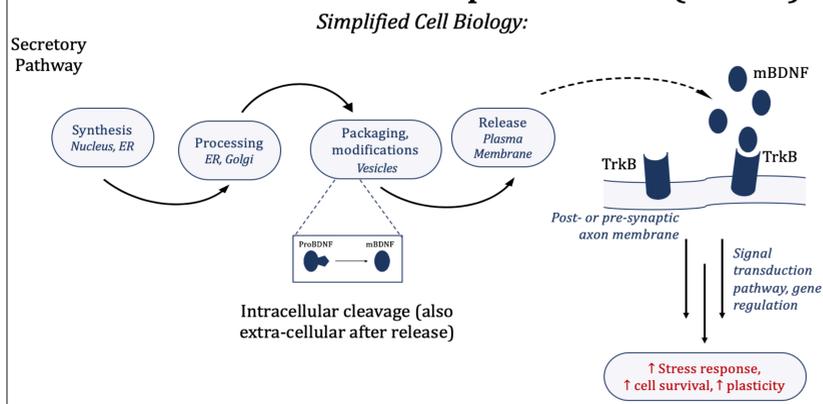
### Brain Derived Neurotrophic Factor (BDNF)

- A neurotrophin produced in the brain, muscles, & other locations; associates with tropomyosin receptor kinase B (TrkB) to cause patterns of gene regulation
- Plays a role in neuronal growth and maintenance
- Factors Potentially Influencing Circulating BDNF Levels**
- Exercise is associated with enhanced cognitive function, brain plasticity, and lower risk of neurological diseases (Walsh et al., 2018; Marosi et al., 2014).
- Studies monitoring physical activity and circulating BDNF suggest a correlation between the two factors (Walsh et al., 2018).
- Studying baseline values of BDNF in relation to various lifestyle factors lays a framework for investigating the physiological role of BDNF.

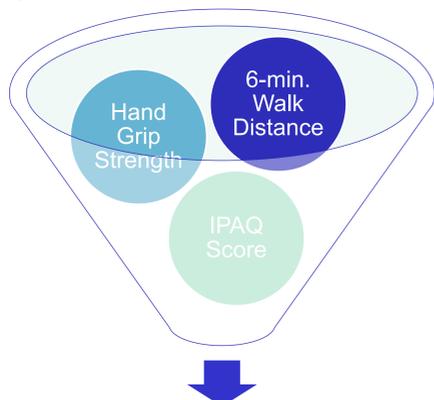
### Hypothesis

Higher circulating mBDNF levels will be associated with increased physical activity and strength. Lower circulating mBDNF levels will be associated with increased alcohol consumption and a sedentary lifestyle.

## Brain Derived Neurotrophic Factor (BDNF)



**Figure 1.** Overview of BDNF synthesis and action. TrkB, tropomyosin kinase B; mBDNF, mature BDNF.



### Physical Activity Level & Strength

**Figure 2.** Variables chosen to correlate with baseline circulating BDNF. IPAQ, International Physical Activity Questionnaire.

## Methods & Participant Data

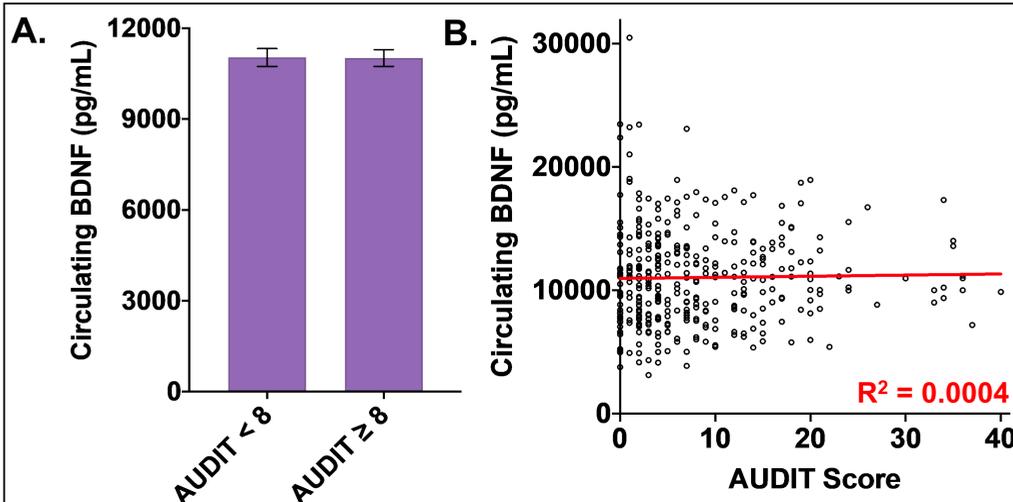
### Measuring Baseline Serum mBDNF:

- Biossensis Mature BDNF Rapid™ enzyme-linked immunosorbent assay (ELISA) kit

**Table 1. Demographic Information Stratified by AUDIT Score (Welsh et al., 2019).**

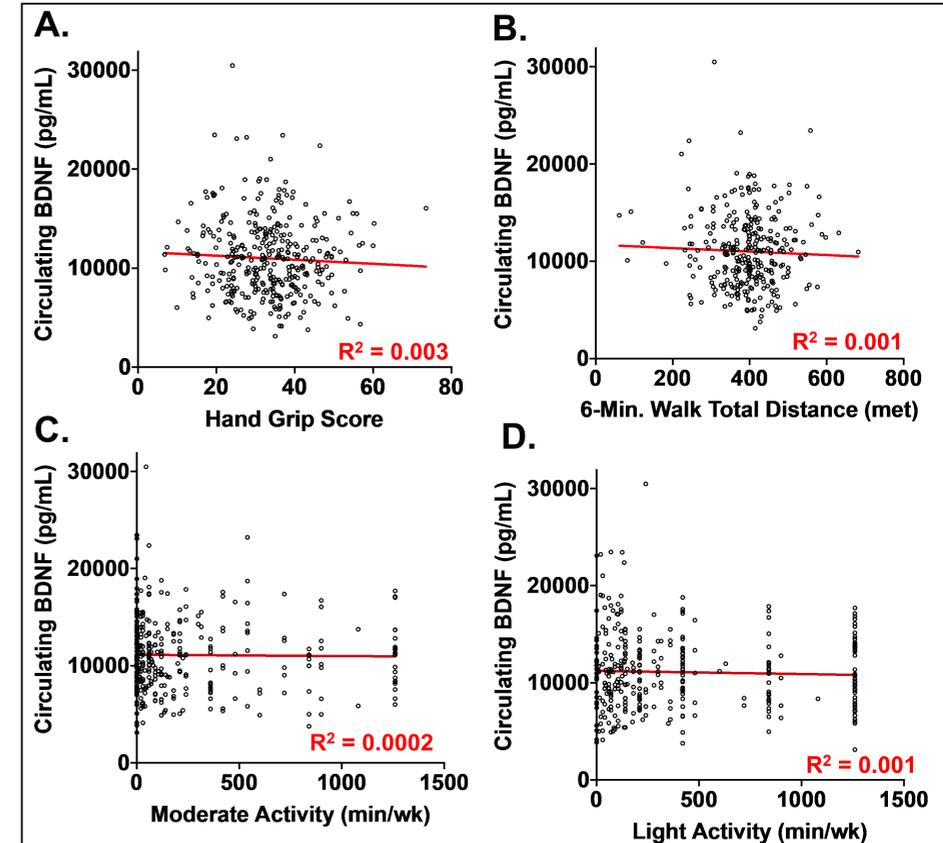
	AUDIT		
	All (%)	<8 (%)	≥8 (%)
Sex			
Female	31.0	36.7	23.1
Male	69.0	63.3	76.9
Age			
20-49	45.7	44.5	47.6
50-60+	54.2	55.6	52.4
Race			
African American	83.6	82.6	85
White	15.6	16.1	15.0
Other	0.8	1.4	0
Education			
<High School	40.8	35.8	48.3
High School Graduate	31.2	33.5	27.9
Some College	22.2	24.8	18.4
4-Yr College Graduate or graduate school	5.7	6.0	5.5
BMI			
<18.5	4.4	4.2	4.8
18.5 to 24.9	38.4	35.2	43.8
25 to 29.9	29.0	29.6	28.8
30 to 34.9	17.0	20.4	12.3
35+	10.4	10.6	10.3

## AUDIT Score & BDNF



**Figure 3.** Circulating BDNF and Alcohol Intake measured by AUDIT. Circulating BDNF was both **A.** sorted by high or low AUDIT (mean ± SEM) and **B.** correlated with AUDIT Score.

## Physical Activity, Strength & BDNF



**Figure 4.** Circulating BDNF and clinical measures of physical activity and strength. Circulating BDNF was correlated to **A.** hand-grip strength, **B.** 6-min. walk total distance, **C.** IPAQ moderate activity, and **D.** IPAQ light activity.

## Conclusions

- No significant differences or correlations were found when comparing AUDIT scores or various measures of physical activity and strength to circulating BDNF.
- Though baseline measures of circulating BDNF in HIV+ individuals were not correlated with activity measures or AUDIT score, we would predict that an exercise intervention would increase BDNF levels and have potential to improve overall strength and cognitive function.

## References & Acknowledgements

Welsh DA, Ferguson T, Theall KP, Simon L, Amedee A, Siggins RW, Nelson S, Brashear M, Mercante D, Molina PE (2010) The New Orleans Alcohol Use in HIV Study: Launching a Translational Investigation of the Interaction of Alcohol Use with Biological and Socioenvironmental Risk Factors for Multimorbidity in People Living with HIV. *Alcohol Clin Exp Res.* 43:704-709.

Walsh JJ, Tschakovsky ME (2018) Exercise and circulating BDNF: Mechanisms of release and implications for the design of exercise interventions. *Appl Physiol Nutr Metab.* 43:1095-1104.

Marosi K, Mattson MP (2014) BDNF mediates adaptive brain and body responses to energetic challenges. *Trends in Endo and Metab.* 25:89-95.

This work was funded by the NIH under the 5T35AA021097-08 (MPI) award.