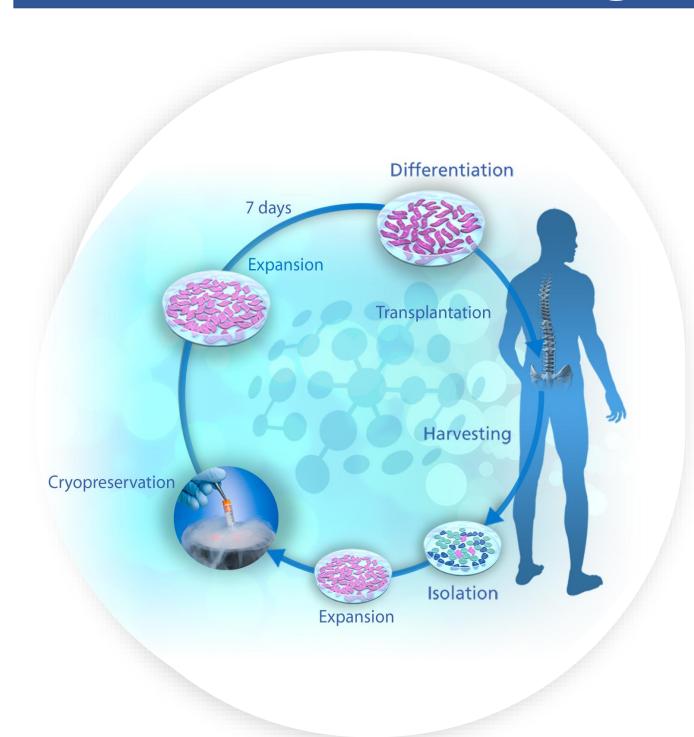
# Advancing NurOwn® for ALS: Phase 3 Clinical Trial Design



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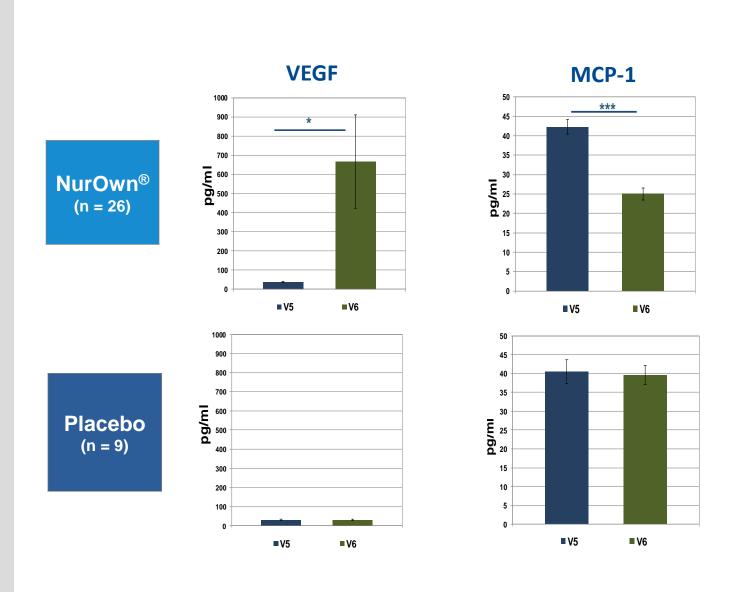
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## NurOwn Autologous Stem Cell Therapy<sup>1</sup>



# NurOwn treatment results in changes in CSF biomarker levels<sup>5</sup>

Single NurOwn treatment shows statistically significant changes in biomarkers and inflammatory markers measured in participant CSF as compared to placebo.

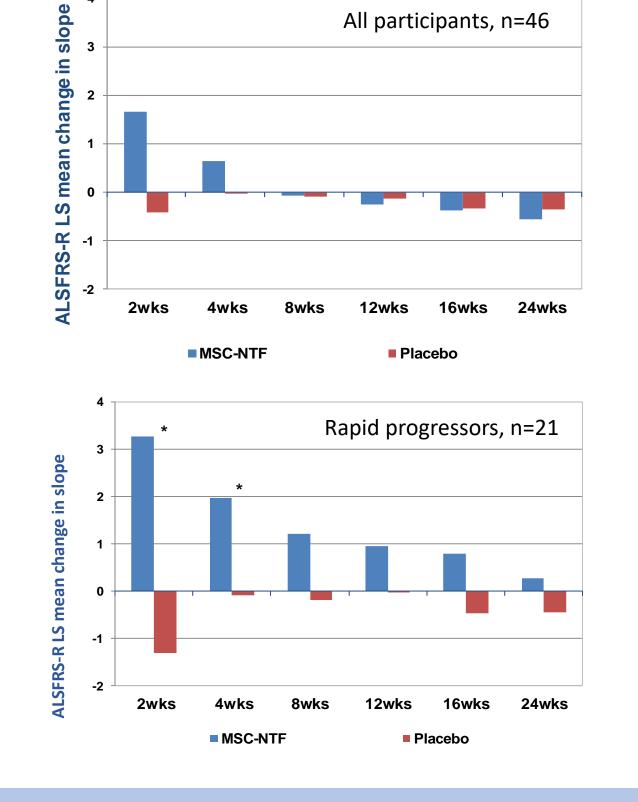


### Single bone marrow harvest creates several years of therapy with patient's own cells

- No animal proteins, antibiotics, genetic modifications, viral vectors used in manufacturing process
- Reproducible functional effects observed in vitro and in vivo<sup>2-4</sup>

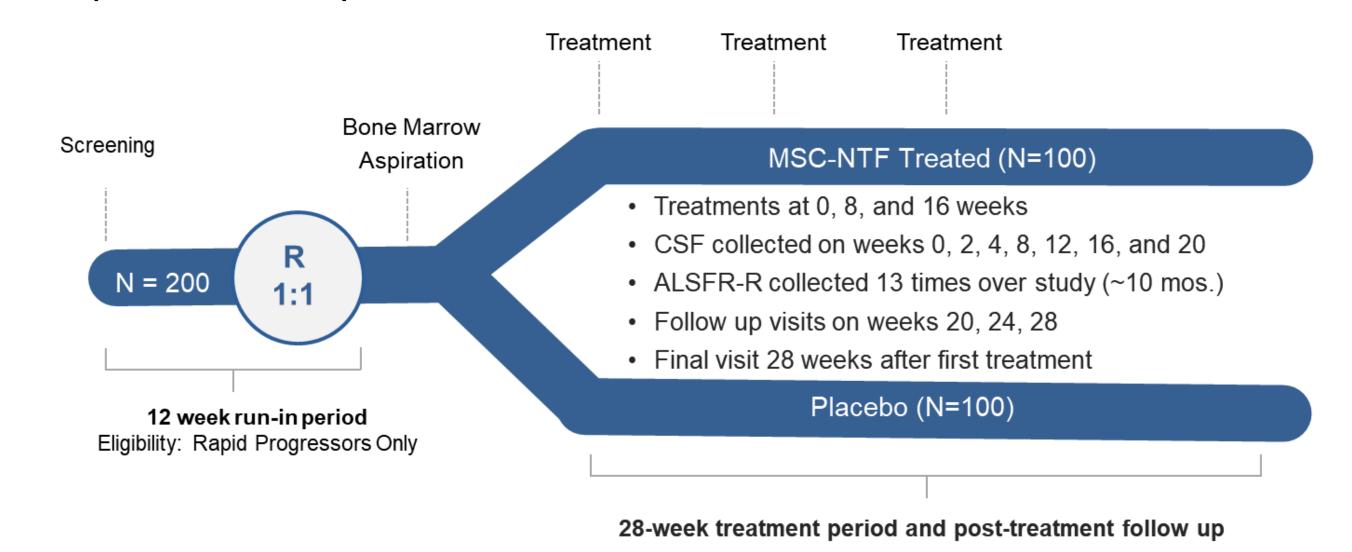
# NurOwn treatment shows preliminary signs of clinical efficacy<sup>5</sup>

Single NurOwn treatment slowed the rate of disease progression by improving the ALSFRS-R LS mean change in slope compared to placebo.



## NurOwn ALS Phase 3 Trial Design

- Placebo-controlled, randomized, double-blind Phase 3 trial
- Trial fully enrolled, dosing complete
- Topline data expected 4Q 2020



# **Primary Endpoint**

Responder analysis change in the rate of decline in ALSFRS-R over 28 wks

- Allows for longitudinal view into disease progression, applies a threshold to define clinically meaningful changes, statistical model takes into account important covariates known to influence progression

## **Secondary Endpoints**

- Safety
- Percentage of participants with disease progression halted or improved
- ALSFRS-R change from baseline
- Combined analysis of Function and Survival
- Slow vital capacity
- Tracheostomy-free and overall survival
- CSF/Biomarkers

## **ALS Functional Scale Analyses**

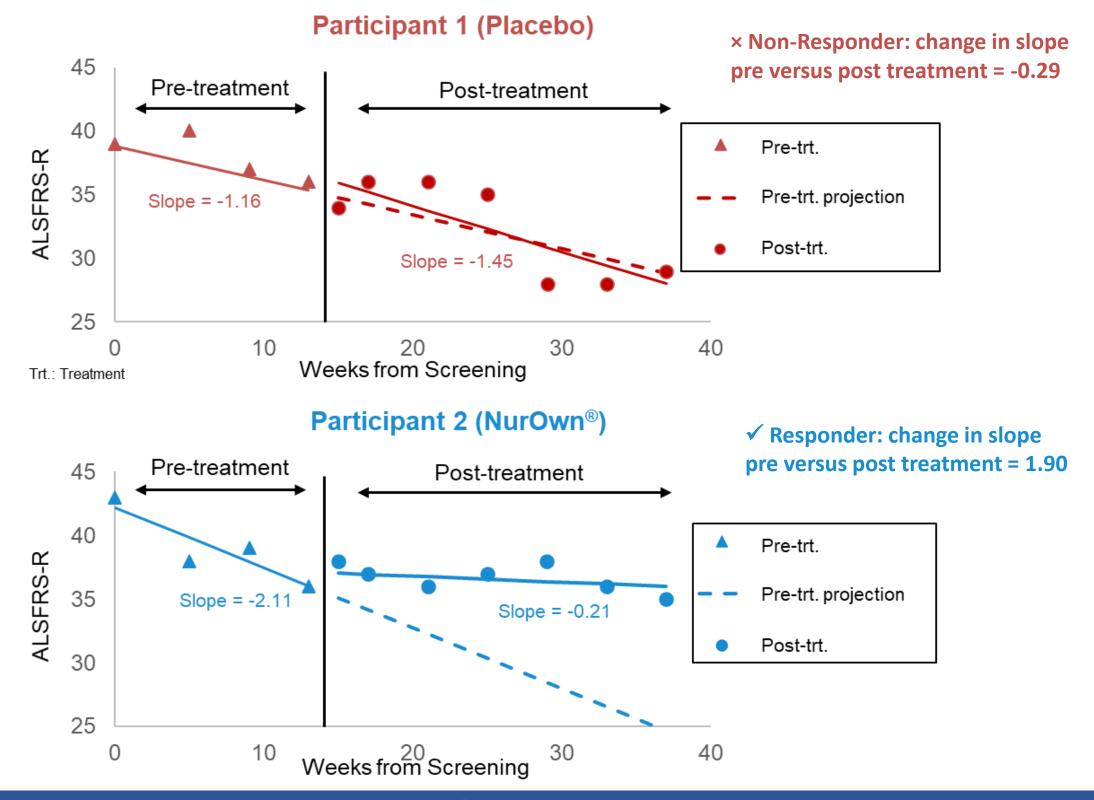
Analyses of slopes:

- Each participant's ALSFRS-R data fit with linear regression model, providing estimate of disease progression over time
- Responder = participant with a ≥1.25 points/month improvement in ALSFRS-R post-treatment slope compared to pre-treatment slope

Analyses of change in ALSFRS-R scores over time:

- Individual change scores over time calculated over treatment period and combined to form average treatment change over time
- Average treatment change scores analyzed using a longitudinal model, allowing comparison of magnitude of change between treatments

#### Illustration of Responder Analysis



## Conclusions

NurOwn Phase 3 trial is rigorous, adequately powered, and designed to detect clinically meaningful treatment effect of autologous stem cell therapy in ALS patients. Primary and secondary endpoints will generate relevant evidence to assess the safety and efficacy of NurOwn in ALS.

#### Contact

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#### References

- 1. Petrou P, Gothelf Y, Argov Z, et al. Safety and clinical effects of mesenchymal stem cells secreting neurotrophic factor transplantation in patients with amyotrophic lateral sclerosis. JAMA Neurology 2016;73:337–344.
- 2. Sadan O, Shemesh N, Barzilay R, et al. Mesenchymal stem cells induced to secrete neurotrophic factors attenuate quinolinic acid toxicity: A potential therapy for Huntington's disease. Experimental Neurolog 2012:234(2):417-427. doi:10.1016/i.expneurol.2011.12.045
- 2012;234(2):417-427. doi:10.1016/j.expneurol.2011.12.045
  3. Sadan O, Bahat-Stromza M, Barhum Y, et al. Protective effects of neurotrophic factor-secreting cells in a 6-OHDA rat model of Parkinson disease. Stem Cells and Development. 2009;18(8):1179-1190.
- 4. Dadon-Nachum M, Sadan O, Srugo I, Melamed E, Offen D. Differentiated Mesenchymal Stem Cells for Sciatic Nerve Injury. Stem Cell Reviews and Reports. 2011;7(3):664-671.