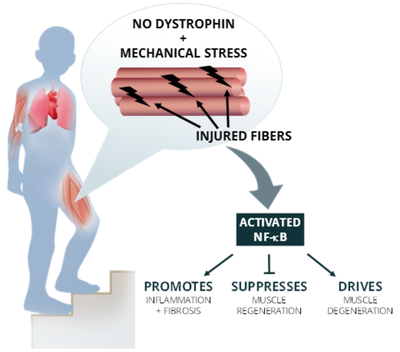
MoveDMD®: Positive Effects of Edasalonexent, an NF-κB Inhibitor, in 4 to 7-Year Old Patients with Duchenne Muscular Dystrophy in Phase 2 Study with an Open-Label Extension

Richard Finkel, MD [1], Krista Vandenborne, PT, PhD [2], H Lee Sweeney, PhD [2], Erika Finanger, MD [3], Gihan Tennekoon, MBBS, MRCS, LCRP [4], Perry Shieh, MD, PhD [5], Rebecca Willcocks, PhD [2], Sean C. Forbes PhD [2], William T. Triplett, BSc [2], Sabrina Yum, MD [4], Maria Mancini, MHP [6], Angelika Fretzen PhD [6], Pradeep Bista PhD[6], Andrew Nichols PhD[6], Joanne Donovan, MD, PhD[6]

[1] Nemours Children's Health System, Orlando, FL; [2] University of Florida Health, Gainesville, FL; [3] Oregon Health Sciences University, Portland, OR; [4] The Children's Hospital of Philadelphia, Philadelphia, PA; [5] University of California, Los Angeles, Los Angeles, CA; [6] Catabasis Pharmaceuticals, Cambridge, MA;

Background

NF-κB Is Activated in Duchenne Muscular Dystrophy following Mechanical Stress

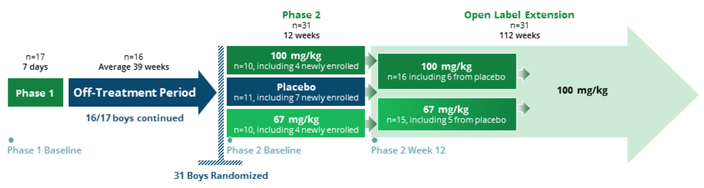


- The absence of dystrophin is necessary but not sufficient to drive the disease process in DMD
- The lack of dystrophin combined with mechanical stress activates NF-κB which then promotes muscle degeneration and suppresses muscle regeneration
- Edasalonexent is an oral NF-κB inhibitor in development for all patients with DMD regardless of mutation type

Kumar, et al. FASEB J 2003 17(3):17: 386-96.
Peterson, et al. Curr Top Dev Bio. 2011; 96: 85-119.

Study Design

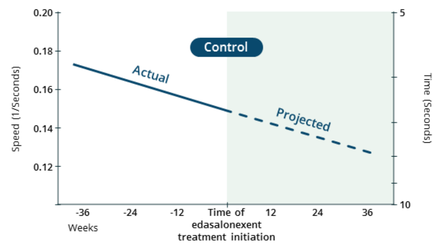
MoveDMD Phase 2 Trial Design



- Enrolled 31 boys ages 4 to 7 with confirmed DMD not on corticosteroids
- 12-week Phase 2 data analysis showed overall safety and trend toward greater improvement for 100 mg/kg dose, therefore patients on 67 mg/kg dose were transitioned to 100 mg/kg dose during the open-label extension
- At the time of the open-label extension data analysis, all 14 boys initially on 100 mg/kg continuing to participate had received 100 mg/kg for 24 weeks and 11 had completed 36 weeks of 100 mg/kg/day edasalonexent treatment

Analysis Approach to Open-Label Assessments of Muscle Function

- **Changes during the control period were measured prior to commencing edasalonexent, either prior to the initiation of Phase 2 or in the placebo group, for time periods averaging 39 weeks**
- **Comparison of control period to on-treatment period assumes that the rate of decline remains linear**
  - However, DMD natural history data indicates a more rapid decline as boys get older

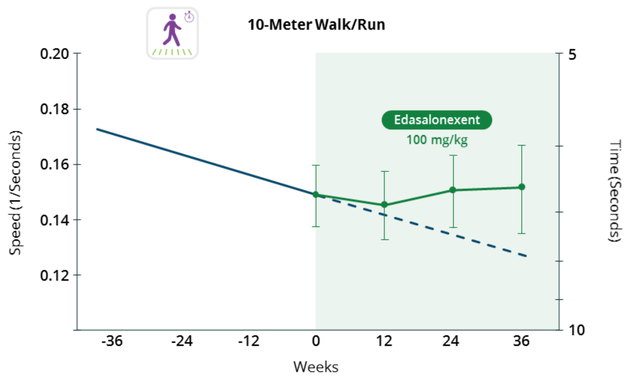


Solid line represents average of actual control period observations for boys in the 100 mg/kg treatment group (n=12)

Dashed line represents extension of control period observations

Results

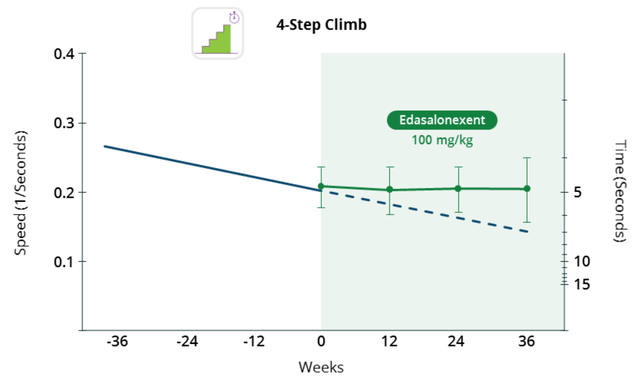
10-Meter Walk/Run Speed Stabilized with Edasalonexent Treatment



Disease progression on edasalonexent improved compared with rate of change during control

Means ± SEM shown

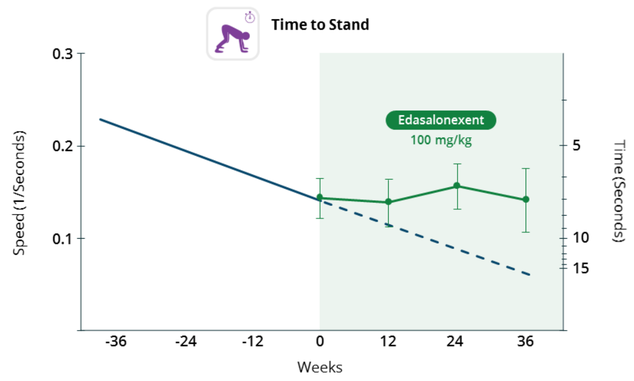
4-Stair Climb Speed Stabilized with Edasalonexent Treatment



Disease progression on edasalonexent improved compared with rate of change during control

Means ± SEM shown

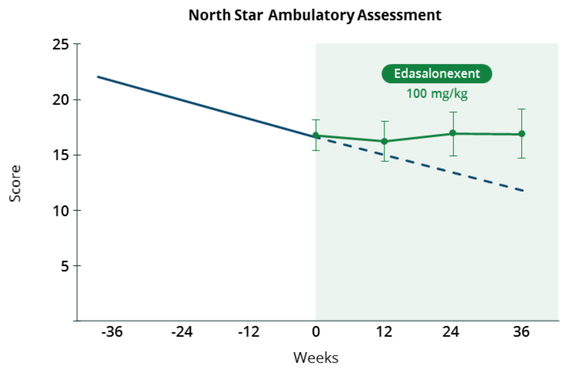
Time to Stand Speed Stabilized with Edasalonexent Treatment



Disease progression on edasalonexent improved compared with rate of change during control

Means ± SEM shown

North Star Ambulatory Assessment Score Stabilized with Edasalonexent Treatment



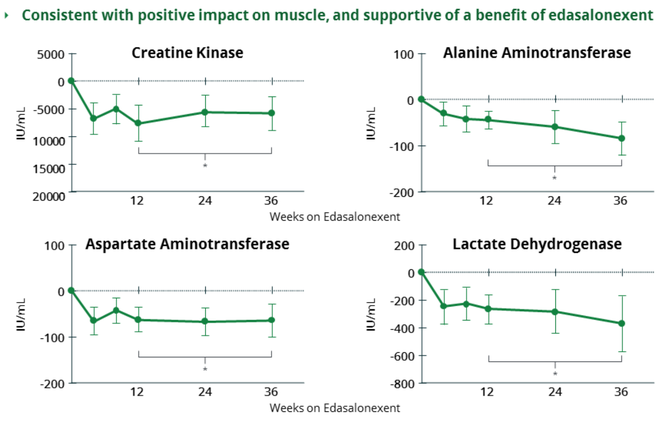
North Star is a composite endpoint evaluating physical function across 17 tests

Disease progression on edasalonexent improved compared with rate of change during control

Means ± SEM shown

Muscle Enzymes Significantly Decreased from Baseline on Edasalonexent

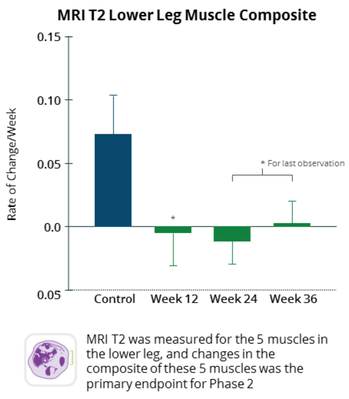
- **Consistent with positive impact on muscle, and supportive of a benefit of edasalonexent**



Means ± SEM shown; * p<0.05 for change from baseline after 12 weeks

Edasalonexent Significantly Improved Rate of Change of MRI T2 Lower Leg Composite of 5 Muscles Compared with Control Period

- MRI T2 increases over time in DMD, as shown for the control period
- 12-week Phase 2 MRI T2 exploratory primary endpoint not met, directional improvement
- Effects on treatment consistent with positive impact on muscle and a reduction in inflammation and supportive of a benefit of edasalonexent



MRI T2 was measured for the 5 muscles in the lower leg, and changes in the composite of these 5 muscles was the primary endpoint for Phase 2

Means ± SEM shown; * ps0.05 for comparison with pre-treatment period

Safety

Safety

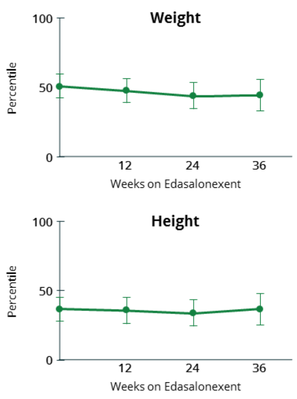
- **No safety signals**
  - 24 years of patient exposure
- **Well tolerated with majority of adverse events being mild in nature, mostly gastrointestinal**
  - Most common treatment-related adverse events were gastrointestinal and mild in severity
    - Diarrhea was transient, median duration 3 days
    - Vomiting was transient, median duration 1 day
  - No serious treatment-related adverse events or dose reductions
- **Vital Signs**
  - ECG heart rate decreased toward age-normative values
- **Growth: Weight, height and BMI changes age-appropriate**
- **No adverse trends in hematology, chemistry, renal or adrenal function, calcium and phosphate**

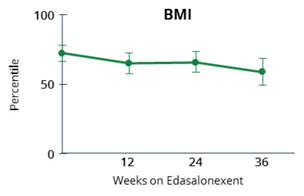
Adverse Events

Treatment Group	Edasalonexent 67 mg/kg/day	Edasalonexent 100 mg/kg/day
Adverse events in >10% of edasalonexent patients	(n =15)	(n =16)
Gastrointestinal disorders		
Diarrhea	6 (40.0)	8 (50.0)
Vomiting	5 (33.3)	7 (43.8)
Abdominal Pain Upper	2 (13.3)	2 (12.5)
Nausea	2 (13.3)	2 (12.5)
General disorders		
Pyrexia	4 (26.7)	6 (37.5)
Injury, poisoning		
Fall*	10 (66.7)	10 (62.5)
Contusion	3 (20.0)	4 (25.0)
Head Injury	2 (13.3)	2 (12.5)
Infections and infestations		
Nasopharyngitis	4 (26.7)	3 (18.8)
Ear infection	3 (20.0)	3 (18.8)
Gastroenteritis viral	1 (6.7)	5 (31.25)
Pharyngitis streptococcal	1 (6.7)	4 (25.0)
Respiratory disorders		
Cough	4 (26.7)	6 (37.5)
Rhinorrhoea	4 (26.7)	4 (25.0)
Metabolism and nutritional disorders		
Decreased appetite	1 (6.7)	4 (25.0)

*Falls were specifically recorded as an exploratory measure.

Age-Appropriate Growth Similar to Standard Growth Curves While on Edasalonexent



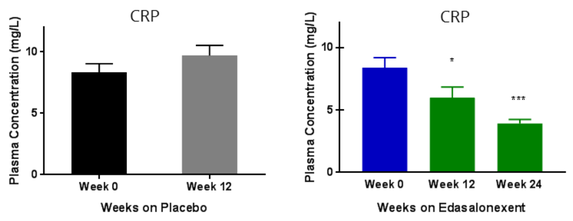


- **Boys treated with edasalonexent had age-appropriate increases in height and weight**

Biomarker

Edasalonexent Significantly Reduced Plasma C-Reactive Protein Compared with Pretreatment Baseline

- **CRP is a well-characterized blood test marker that provides a global assessment of inflammation**
- **CRP is elevated in DMD**
  - CRP approximately 3-fold higher in boys affected by DMD compared to unaffected boys†
- **In MoveDMD, CRP significantly decreased from baseline after 12 and 24 weeks of 100 mg/kg edasalonexent.**



Means ± SEM shown; * ps0.05, *** ps0.001 for comparison with pre-treatment baseline measurement

†Anderson et al, 2017, Pediatric Cardiology

Conclusions

Open-Label Extension Results: Edasalonexent Substantially Slowed DMD Disease Progression

- **Disease progression on edasalonexent improved compared to rate of change in control period**
  - North Star Ambulatory Assessment
  - Timed function tests 10-meter walk/run, 4-stair climb and time to stand
- **Additional measures provide further support for positive edasalonexent treatment effects**
  - Lower leg muscle MRI T2 rate of change significantly improved compared to control period progression
  - Muscle enzymes decreased compared to baseline at 12 weeks and later time points
  - Decreased CRP, a marker of systemic inflammation
- **Safety profile**
  - No safety signal and well tolerated
  - Height, weight and BMI growth patterns continued to be similar to unaffected boys
- **Functional endpoints evaluated are anticipated to be used in the Phase 3 clinical trial expected to initiate in H1 2018**

Acknowledgments

Acknowledgements

- Patients and families
- Patient groups
- ImagingDMD Staff
- Site Staff
- Catabasis team
- Thanks to PPMD and MDA for generous grant support for patient travel