Positive Pompe Phase 1/2 Data at World Muscle Society

Conference Call & Webcast

October 4, 2017

Safe Harbor

This presentation contains "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995, including statements relating to encouraging preliminary data from a global Phase 1/2 study to investigate ATB200/AT2221 for the treatment of Pompe and the potential implications on these data for the future advancement and development of ATB200/AT2221. Words such as, but not limited to, "look forward to," "believe," "expect," "anticipate," "estimate," "intend," "confidence," "encouraged," "potential," "plan," "targets," "likely," "may," "will," "would," "should" and "could," and similar expressions or words identify forward-looking statements. The forward looking statements included in this presentation are based on management's current expectations and beliefs which are subject to a number of risks, uncertainties and factors, including that the preliminary data based on a small patient sample and reported before completion of the study will not be predictive of future results, that results of additional preliminary data or data from the completed study or any future study will not yield results that are consistent with the preliminary data presented, that the Company will not be able to demonstrate the safety and efficacy of ATB200/AT2221, that later study results will not support further development, or even if such later results are favorable, that the Company will not be able to successfully complete the development of, obtain regulatory approval for, or successfully commercialize ATB200/AT2221. In addition, all forward looking statements are subject to the other risks and uncertainties detailed in our Annual Report on Form 10-K for the year ended December 31, 2016 and Quarterly Report on 10-Q for the Quarter ended June 30, 2017. As a consequence, actual results may differ materially from those set forth in this press release. You are cautioned not to place undue reliance on these forward looking statements, which speak only of the date hereof. All forward looking statements are qualified in their entirety by this cautionary statement and we undertake no obligation to revise this press release to reflect events or circumstances after the date hereof.

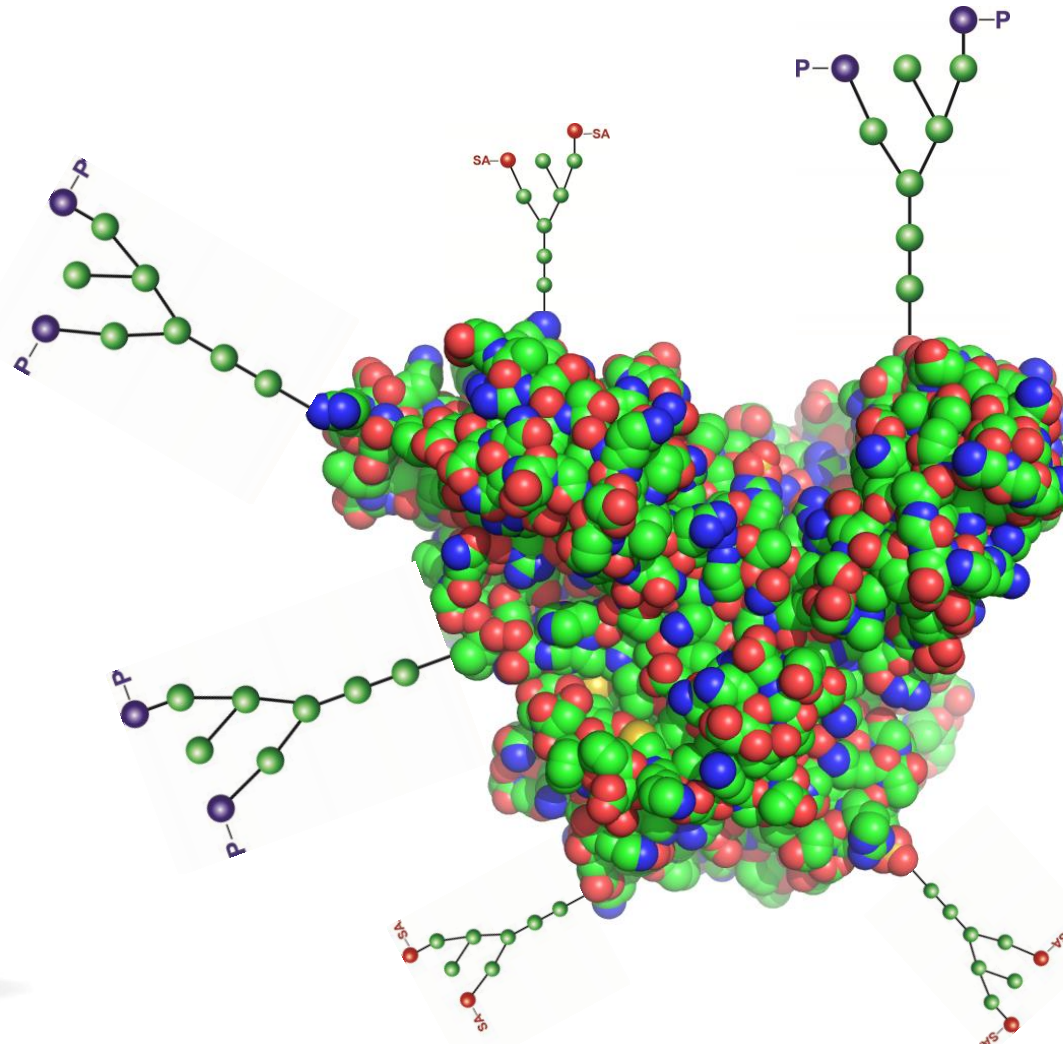# ATB200 + Chaperone: A Highly Differentiated Approach

Novel Pompe Treatment Paradigm with Three Key Differentiators

ATB200 (Novel ERT)

CHART™

CHAPERONE-ADVANCED REPLACEMENT THERAPY

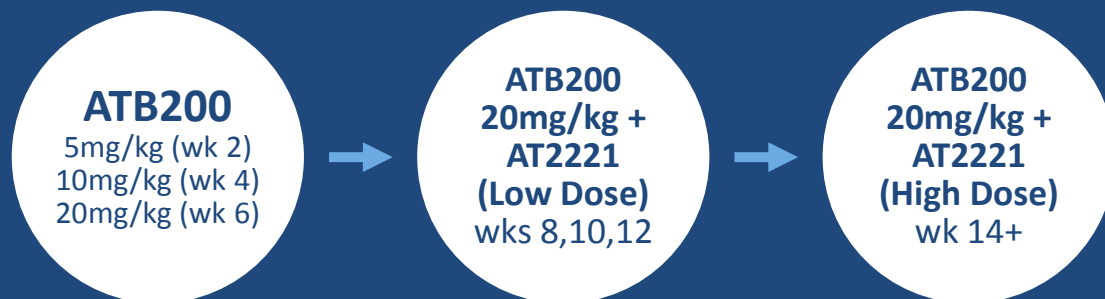**Chaperone addition**

Optimized mixture of glycans

High levels of M6P and bis M6P

*Artist rendering, not actual product image

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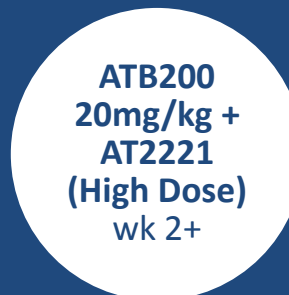
Phase 1/2 ATB200-02 Study Design

Phase 1/2 Clinical Study to Evaluate Safety, Tolerability, Pharmacokinetics (PK), and Pharmacodynamics (PD) of ATB200 + Chaperone (ATB200/AT2221) at 16 Sites in 5 Countries

18-Week Primary Treatment Period with Long-Term Extension (n=20)

Cohort 1 (Ambulatory ERT-Switch, n=11)

ATB200
5mg/kg (wk 2)
10mg/kg (wk 4)
20mg/kg (wk 6)

→

ATB200 20mg/kg + AT2221 (Low Dose) wks 8,10,12

→

ATB200 20mg/kg + AT2221 (High Dose) wk 14+

Cohort 2 (Non-Ambulatory ERT-Switch, n=4) & Cohort 3 (ERT-Naïve, n=5)

ATB200 20mg/kg + AT2221 (High Dose) wk 2+

Assessments:

- Safety/Tolerability
- Plasma PK
- Infusion-Associated Reactions
- Antibody & Cytokine Levels
- Pharmacodynamics
- Efficacy (Long-Term Extension)

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Baseline Characteristics of Patients in Phase 1/2 ATB200-02 Study (n=20)

Patients Across Three Cohorts Representative of Overall Late-Onset Pompe Population with Impairment at Baseline

Baseline Characteristics (N=20)	Cohort 1: Ambulatory ERT-Switch* (N=11)	Cohort 2: Non-Ambulatory ERT-Switch (N=4)	Cohort 3: ERT-Naïve (N=5)
Time on Standard of Care – mean years (SD)	4.77 (1.4)*	8.9 (3.8)	N/A
Age – mean years (range)	49.4 (28, 66)	36.0 (18, 56)	49.4 (24, 65)
Sex M:F	9:2	3:1	1:4
6MWT – mean meters (SD)	392.0 (93.4)	N/A	399.5 (83.5)
FVC Upright – mean % predicted (SD)	52.3 (13.2)	N/A	53.4 (20.3)

*Cohort 1 patients required to have been on ERT Standard of Care for 2-6 years at baseline

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Summary of Available Data

	Cohort 1 (ERT-Switch, n=11)	Cohort 2 (Non-ambulatory ERT-Switch, n=4)	Cohort 3 (ERT-Naive, n=5)
Safety and tolerability	n=11	n=4	n=5
Biomarkers	n=11	n=4	n=5
Functional assessments at month	Month 6 (n=9)* Month 9 (n=8)	Month 6 (n=4)	Month 6 (n=5) Month 9 (n=2)
Functional assessments	6MWT Other motor function tests Pulmonary function (FVC, MIP/MEP)	Muscle Strength Tests	6MWT Other motor function tests Pulmonary function (FVC, MIP/MEP)

*One patient discontinued after completing Stage 1 (week 18) due to travel burden/family considerations and one patient's month 6 assessments pending due to an incomplete visit

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Safety Summary (n=20)*

AEs Generally Mild and Transient with Very Low (<1%) Rate of Infusion-Associated Reactions After 400+ Total Infusions of ATB200/AT2221 Across All Cohorts
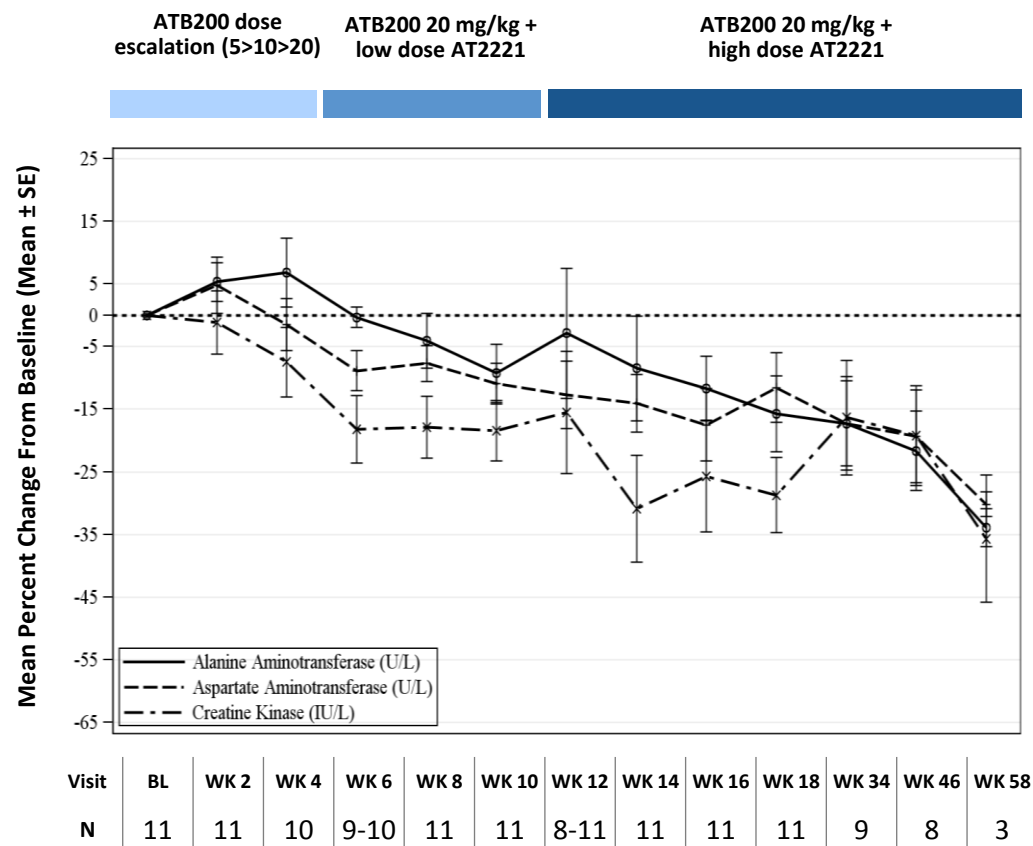
- AEs were generally mild and transient
- Very low number (<1%) of infusion-associated reactions (IARs) after 400+ total infusions
  - One IAR event in one ERT-switch patient (skin discoloration)
  - Two IAR events in one ERT-naïve patient (localized pruritus, erythema and burning sensation)
- Longest duration of treatment is 72 weeks

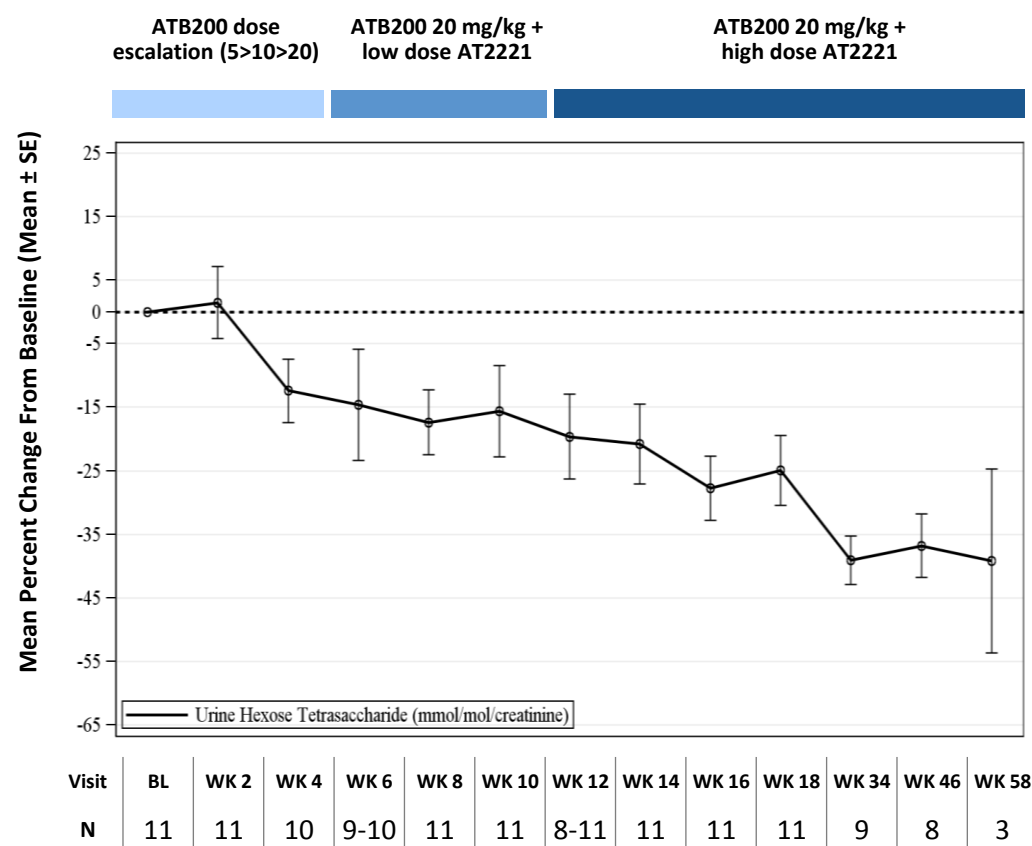*Reported through interim data analysis (maximum 72 weeks)

Cohort 1 (ERT-Switch): Biomarkers up to Week 58 (N=11)*

Persistent and Durable Improvement in Biomarkers of Muscle Damage (CK, ALT, AST) and Disease Substrate (Hex4) for up to 58 Weeks on ATB200/AT2221

**Muscle Damage Biomarkers
(% Change from Baseline for CK, ALT, and AST)**

**Disease Substrate Biomarker
(% Change from Baseline for Hex 4)**

Visit	BL	WK 2	WK 4	WK 6	WK 8	WK 10	WK 12	WK 14	WK 16	WK 18	WK 34	WK 46	WK 58
N	11	11	10	9-10	11	11	8-11	11	11	11	9	8	3

Visit	BL	WK 2	WK 4	WK 6	WK 8	WK 10	WK 12	WK 14	WK 16	WK 18	WK 34	WK 46	WK 58
N	11	11	10	9-10	11	11	8-11	11	11	11	9	8	3

Cohort 2 (Non-Ambulatory ERT-Switch): Biomarkers up to Week 24 (N=4)*

Improvement in Biomarkers of Muscle Damage (CK) and Disease Substrate for up to 24 Weeks on ATB200/AT2221

**Muscle Damage Biomarkers
(% Change from Baseline for CK, ALT, and AST)**

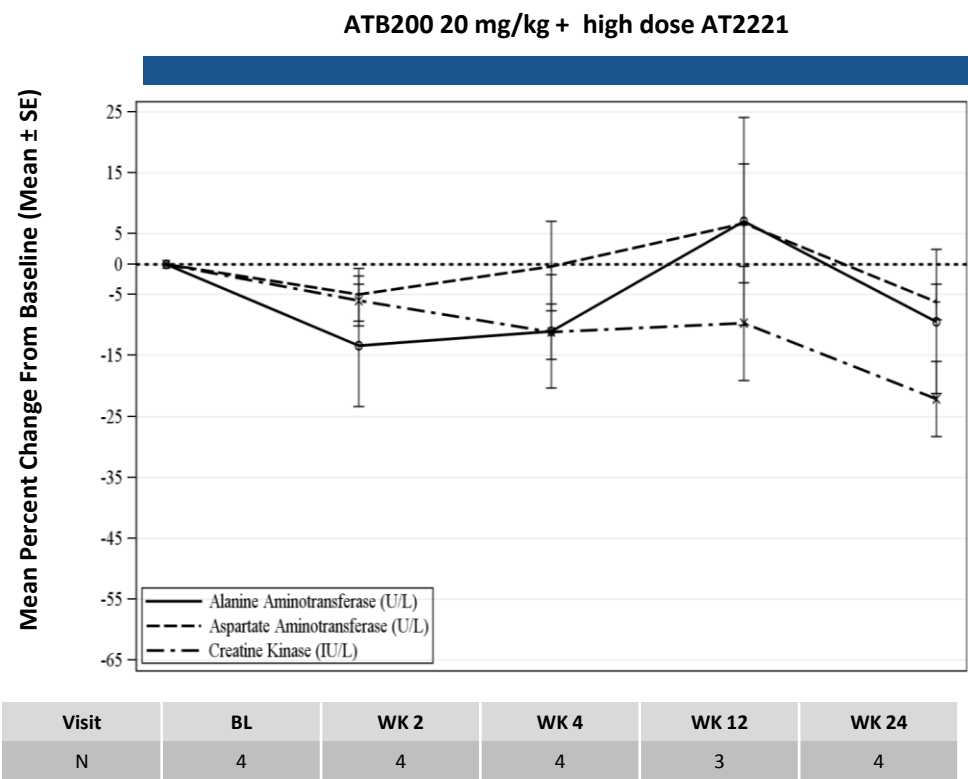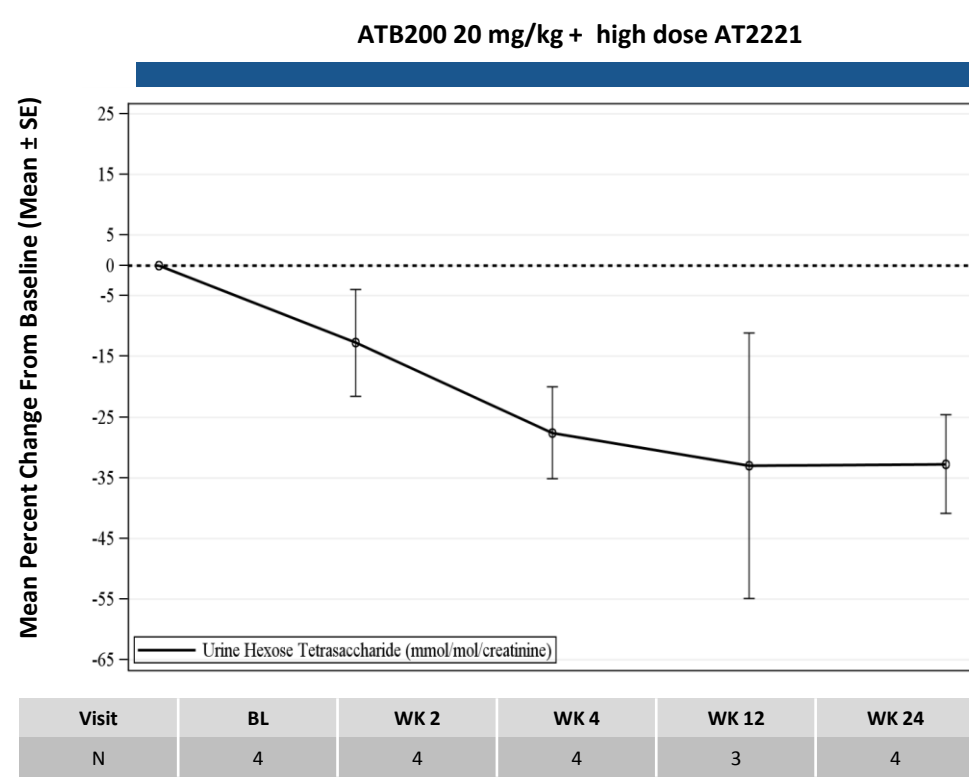**Disease Substrate Biomarker
(% Change from Baseline for Hex 4)**

ATB200 20 mg/kg + high dose AT2221

Visit	BL	WK 2	WK 4	WK 12	WK 24
N	4	4	4	3	4

ATB200 20 mg/kg + high dose AT2221

Visit	BL	WK 2	WK 4	WK 12	WK 24
N	4	4	4	3	4

*Reported through interim data analysis (maximum 24 weeks); Missing values either unable to be analyzed or not yet analyzed

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Cohort 3 (ERT-Naïve): Biomarkers up to Week 36 (N=6)*

Improvement in Biomarkers of Muscle Damage and Disease Substrate for up to 36 Weeks on ATB200/AT2221

Muscle Damage Biomarkers
(% Change from Baseline for CK, ALT, and AST)

Disease Substrate Biomarker
(% Change from Baseline for Hex 4)

ATB200 20 mg/kg + high dose AT2221

Legend: Alanine Aminotransferase (U/L); Aspartate Aminotransferase (U/L); Creatine Kinase (IU/L)

Visit	BL	WK 2	WK 4	WK 12	WK 24	WK 36
N	5	5	4-5	5	5	2

ATB200 20 mg/kg + high dose AT2221

Legend: Urine Hexose Tetrasaccharide (mmol/mol/creatinine)

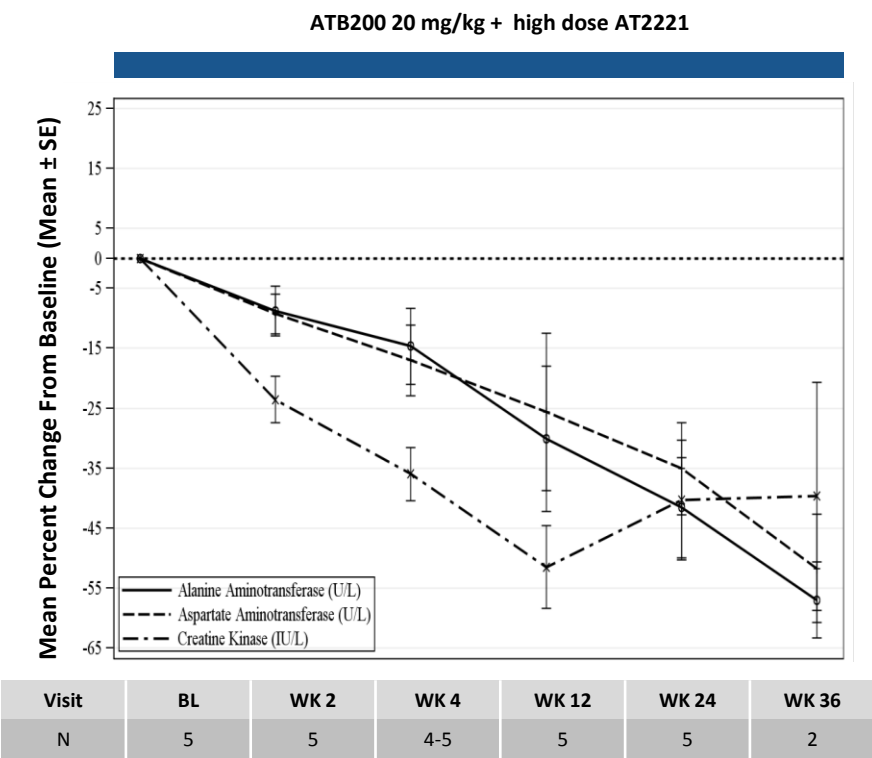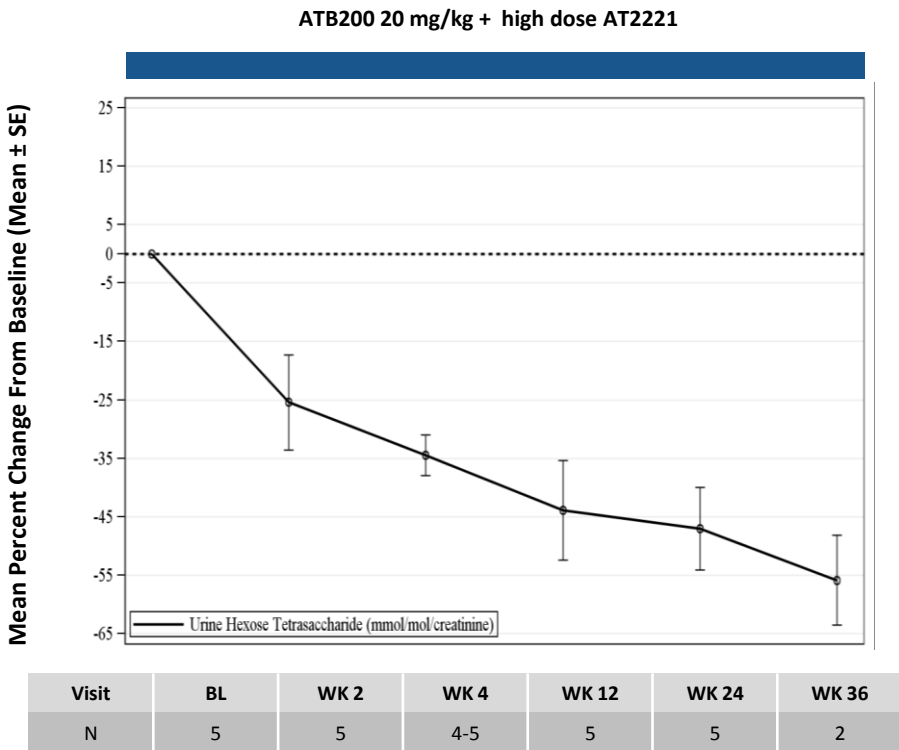| Visit	BL	WK 2	WK 4	WK 12	WK 24	WK 36
N	5	5	4-5	5	5	2

*Reported through interim data analysis (maximum 36 weeks); Missing values either unable to be analyzed or not yet analyzed

Cohort 1 and 3: 6-Minute Walk Test (6MWT) (n=14)

Mean 6MWT Distance Improved for Both ERT-Naïve Patients (+41.8 Meters)

and ERT-Switch Patients (+35.3 Meters) at Month 6 with Continued Benefit Out to Month 9

6-Minute Walk Test (m): Month 6 and 9

Cohort	Baseline (n=10) Mean (SD)	Change at Month 6 (n=9) Mean (SD)	Change at Month 9 (n=8) Mean (SD)
Cohort 1 ERT-Switch	397.2 (96.8)	+35.3 (40.1)	+37.2 (33.8)
Cohort	**Baseline (n=5) Mean (SD)**	**Change at Month 6 (n=5) Mean (SD)**	**Change at Month 9 (n=2) Mean (SD)**
Cohort 3 ERT-Naïve	399.5 (83.5)	+41.8 (29.4)	+74.9 (4.0)

6MWT distance increased in 7/9 and 8/8 ERT-switch patients at Month 6 and 9, respectively

- Two patients stable at Month 6, one of these patients reached Month 9 and had increased walking distance

6MWT Increased in 5/5 and 2/2 ERT-Naïve Patients at Month 6 and Month 9, Respectively

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Cohort 1 and 3: Other Motor Function Tests (n=14)

Improvement in Nearly All Motor Function Tests with 6MWT Consistent with Overall Improvement in Motor Performance for Both ERT-Switch and ERT-Naïve Patients at Month 6 and 9

Other Motor Function Tests: Month 6 and 9

Cohort	Assessment (sec)	Baseline (n=10) Mean (SD)	Change at Month 6 (n=9) Mean (SD)	Change at Month 9 (n=8) Mean (SD)
Cohort 1: ERT-Switch	**Timed up and Go**	10.5 (6.6)	-2.2 (3.4)	-0.6 (2.5)
	4 Stair Climb	4.1 (2.7)	-1.0 (1.2)	-0.9 (1.3)
	10M walk	7.4 (3.0)	-0.3 (1.6)	0.1 (1.3)
	Gowers#	7.9 (2.8)	-2.2 (2.0)	-2.1 (1.3)
	GSGC Score	12.6 (4.8)	-0.8 (3.0)	-0.9 (3.5)
Cohort	Assessment (sec)	Baseline (n=5) Mean (SD)	Change at Month 6 (n=5) Mean (SD)	Change at Month 9 (n=2) Mean (SD)
Cohort 3: ERT-Naïve	**Timed up and Go**	9.4 (2.9)	-1.0 (1.1)	-1.6 (1.0)
	4 Stair Climb	4.2 (1.5)	-0.6 (0.3)	-0.8 (0.3)
	10M walk	7.9 (3.0)	-0.7 (1.1)	-1.0 (0.1)
	Gowers	13.9 (11.0)	7.9* (21.0)	-1.3 (0.0)
	GSGC Score	12.2 (3.6)	-1.8 (3.8)	-4.0 (1.4)

Notes: * Median change from baseline was -0.8 and 4/5 had decrease; # N=9 Missing values not obtained due to patient refusal to perform test

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Cohort 2: Muscle Strength Testing at Month 6 (n=4)

Substantial and Consistent Improvement in Upper Extremity Strength in Non-Ambulatory ERT-Switch Patients in Nearly All Quantitative and Qualitative Measures at Month 6

Assessment	Muscle Group Tested	Baseline		Change to Month 6	
		Left Mean (SD)	**Right Mean (SD)**	**Left Mean (SD)**	**Right Mean (SD)**
QMT- Quantitative Muscle Testing - Dynamometer (pounds force)	Shoulder Adduction*	4.2 (6.8)	1.5 (1.9)	+2.3 (4.4)	+5.8 (8.4)
	Shoulder Abduction	9.8 (10.9)	6.9 (7.6)	+0.3 (5.1)	+0.8 (1.5)
	Elbow Flex	7.8 (8.7)	4.9 (5.1)	-0.1 (10.0)	+2.4 (6.1)
	Elbow Extension	7.3 (8.1)	5.0 (5.9)	+1.5 (3.4)	+4.1 (2.1)
MMT - Manual Muscle Testing (manual score)	Shoulder Adduction*	1.3 (1.2)	1.0 (1.0)	+0.7 (1.2)	+0.7 (1.2)
	Shoulder Abduction**	1.3 (1.2)	1.3 (1.2)	+0.5 (0.7)	0.0 (0.0)
	Elbow Flex	2.3 (2.5)	2.0 (2.0)	+0.7 (0.6)	+1.0 (1.0)
	Elbow Extension	2.0 (2.0)	2.0 (2.0)	+0.7 (0.6)	+1.0 (1.0)

Note: MMT Scoring: 1) Visible muscle movement, but no movement at the joint, 2) Movement at the joint, but not against gravity, 3) Movement against gravity, but not against added resistance, 4) Movement against resistance, but less than normal, 5) Normal strength
*N=3 or **N=2 due to assessment not being performed at some visits for some patients

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Forced Vital Capacity (FVC) Summary (n=13)*

FVC Increased in ERT-Naïve Patients and was Generally Stable in ERT-Switch Patients

FVC (% Predicted): Month 6 and 9

Cohort	Baseline (n=9) Mean (SD)	Change at Month 6 (n=8) Mean (SD)	Change at Month 9 (n=7) Mean (SD)
Cohort 1 ERT-Switch Ambulatory*	52.6 (14.7)	-1.0 (4.2)	-2.0 (3.6)
Cohort	**Baseline (n=5) Mean (SD)**	**Change at Month 6 (n=5) Mean (SD)**	**Change at Month 9 (n=2) Mean (SD)**
Cohort 3 ERT-Naïve	53.4 (20.3)	+4.2 (5.6)	+5.0 (1.4)

FVC stable or increased in 5/8 and 5/7 ERT-switch patients at Month 6 and Month 9 respectively

FVC increased in 4/5 and 2/2 ERT-naïve patients at Month 6 and Month 9 respectively

*FVC results not available for 1 subject at Month 6 and 9

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Other Pulmonary Function Tests at Month 6 (n=14)

MIP and MEP Generally Stable or Increased in Both ERT-Naïve and ERT-Switch Patients

Other Pulmonary Function Tests: MIP and MEP

Patients	Assessment	Baseline (n=10) Mean (SD)	Change at Month 6 (n=9) Mean (SD)	Change at Month 9 (n=8) Mean (SD)
Cohort 1: ERT-Switch	MIP	35.7 (11.0)	+0.9 (4.5)	-1.4 (2.7)
	MEP	72.6 (32.6)	+20.3 (42.4)	+31.1 (39.3)
Patients	Assessment	Baseline (n=5) Mean (SD)	Change at Month 6 (n=5) Mean (SD)	Change at Month 9 (n=2) Mean (SD)
Cohort 3: ERT-Naive	MIP	32.6 (18.5)	+11.0 (5.0)	+1.5 (0.7)
	MEP	60.6 (8.3)	-0.4 (12.4)	-1.0 (19.8)

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Study ATB200-02 Data Summary

Consistent and Durable Improvement in Key Biomarkers and Muscle Function as well as Stabilization or Improvement in Respiratory Function

Muscle Function (All Cohorts)

- Muscle function improved in 16/18 and 10/10 patients at Month 6 and 9, respectively
- 6MWT distance increased to Month 9
  - ERT-naïve: mean increases of +42m (Month 6) and +75m (Month 9)
  - ERT-switch: mean increases of +35m (Month 6), +37m (Month 9)
- Improvement in other motor function tests consistent with 6MWT for both ERT-naïve and ERT-switch patients
- 4/4 non-ambulatory ERT-switch patients showed significant increase in muscle strength tests at Month 6

Pulmonary Function (Cohorts 1 and 3)

- FVC generally stable in ERT-switch patients
- FVC increased in a majority of ERT-naïve patients
- MIP and MEP generally stable or improved in both ERT-switch and ERT-naïve patients

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Pompe Phase 1/2 Study ATB200-02 Data Cascade

Continuing Collaborative Discussions with Regulators in the U.S. and EU

Update Anticipated in the First Half of 2018

Pompe Milestones in 2017

Preliminary 18-Week Data at WORLD*Symposium*

Additional 18-Week & Initial Extension Data

18-Week & Extension Data Presentation at World Muscle Society

Discussions with U.S. and EU regulators

18-WEEK DATA
- Safety / tolerability
- Pharmacokinetics (PK)
- Biomarkers
- Immunogenicity

EXTENSION DATA
- Motor/pulmonary function

Thank you

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Appendix

Pompe Disease Overview

Pompe Disease is Heterogeneous Across a Broad Spectrum of Patients

Deficiency of GAA leading to glycogen accumulation

Respiratory and cardiac failure are leading causes of morbidity and mortality

Age of onset ranges from infancy to adulthood

5,000 – 10,000 patients diagnosed WW[1]

Symptoms include muscle weakness, respiratory failure, and cardiomyopathy

~$800M+ Global Pompe ERT sales in FY15[2]

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