Q3 Business Update - SER-287 Phase 1b Ulcerative Colitis study results

November 8, 2017

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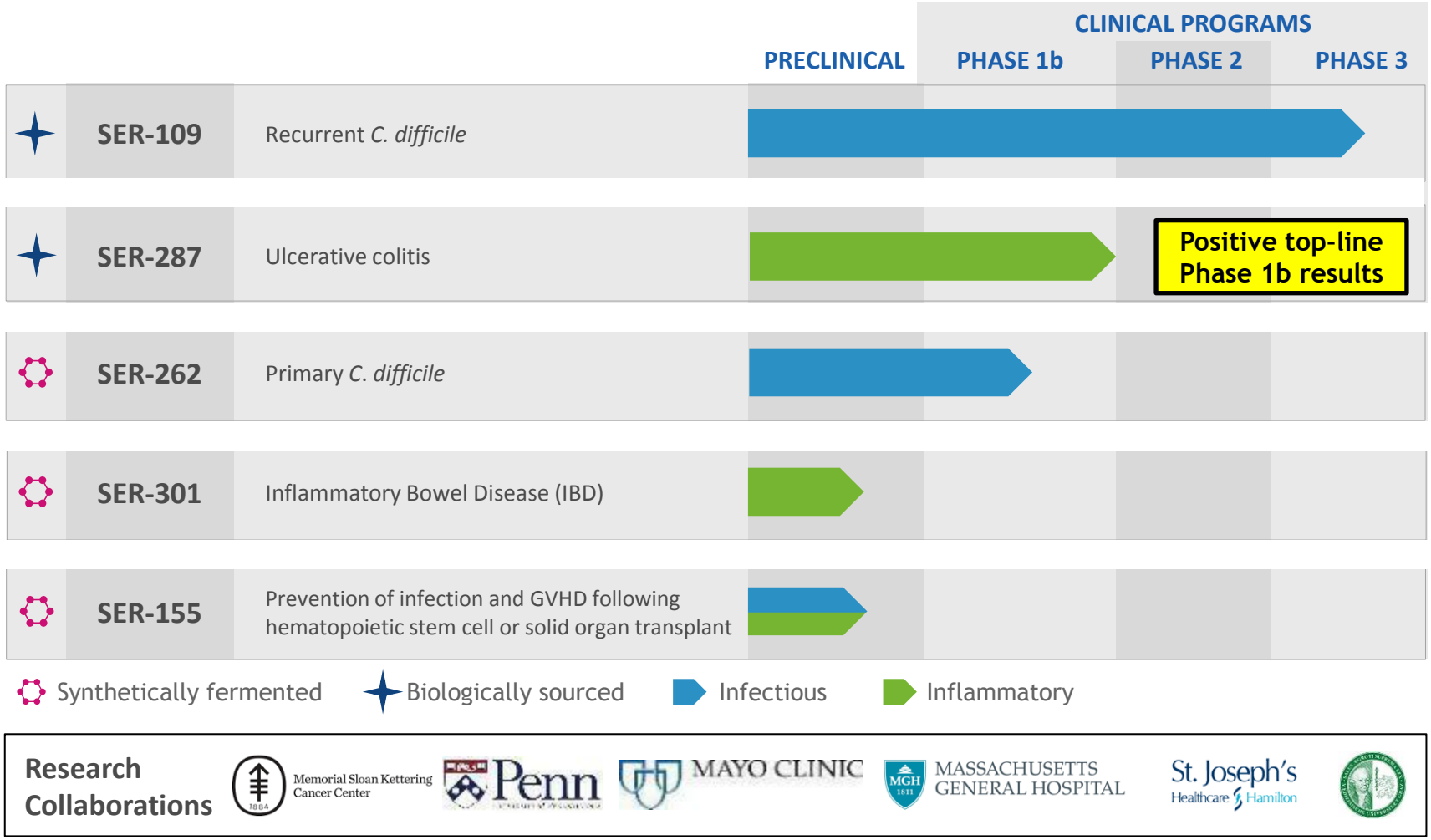
Leading the Microbiome Revolution

Forward looking statements

Some of the statements in this presentation constitute "forward looking statements" under the Private Securities Litigation Reform Act of 1995, including statements on the timing of additional data for the SER-287 Phase 1b study, the efficacy of SER-287, expected interactions with the FDA regarding SER-287, and the application of SER-287 to other diseases. Such statements are subject to important factors, risks and uncertainties (such as those discussed under the caption "Risk Factors" in the Company's Quarterly Report on Form 10-Q filed on August 3, 2017 and its other filings with the SEC) that may cause actual results to differ materially from those expressed or implied by such forward looking statements. Any forward looking statements included herein represent our views as of today only. We may update these statements, but we disclaim any obligation to do so.

Robust microbiome therapeutics pipeline



Research Collaborations

Memorial Sloan Kettering Cancer Center · Penn · MAYO CLINIC · MASSACHUSETTS GENERAL HOSPITAL · St. Joseph's Healthcare Hamilton

Top line SER-287 Phase 1b data disclosed in October 2, 2017 press release;

Collaboration with Nestlé Health Science regarding *C. difficile* and IBD programs for markets only outside of North America

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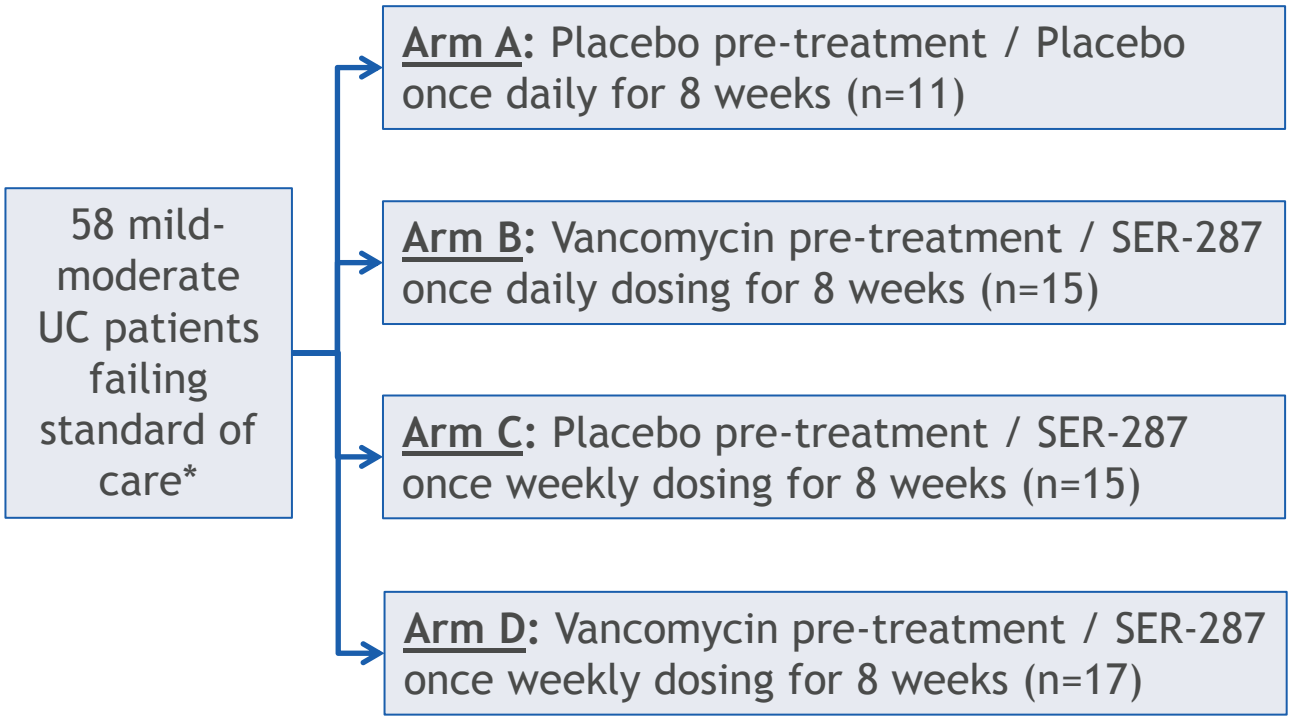
SER-287 Phase 1b Ulcerative Colitis study



* Study designed to enroll 55 patients, with 15 in SER-287 treatment arms and 10 in the placebo / placebo arm

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SER-287 Phase 1b study endpoints

Primary Objectives

- **Safety and tolerability**
- Change in composition of intestinal microbiome at 8 weeks *

Secondary Objectives

- **Clinical remission, endoscopic improvement, and response through measure of the total modified Mayo Score**
- Change in serum and fecal biomarkers *
- Complement of microbiome metabolic pathways from stool, urine and blood *
- Immunological and pathologic changes in mucosal biopsies *

* Microbiome data and other biomarker data are expected in the coming months

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SER-287 Phase 1b efficacy analyses

Two prespecified Intent-to-Treat (ITT) statistical methods were used to analyze SER-287 Phase 1b efficacy outcomes:

Intent-to-Treat statistical analyses	Patients analyzed
Limited to observed data • All patients with post-treatment endoscopy results were included in the efficacy analysis if they remained in the trial until Day 48 • Typically used in earlier stage clinical studies	53 / 58 subjects
All subjects, missing data counted as failure • Patients who discontinued without post-treatment endoscopy or with protocol violations were considered treatment failures in the efficacy analysis • Typically used in registrational clinical studies	58 / 58 subjects

Initial top-line reported results

Note: A patient in the placebo study arm experienced a disease flare and was treated with corticosteroids (a protocol violation) prior to the end of treatment endoscopy. Endoscopy showed improvement and the patient was assessed as having achieved clinical remission per the observed data statistical approach however in the all subjects, missing data approach they were considered a failure due to the protocol violation.

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Initial top-line reported results

Efficacy analysis: Limited to observed data

Endpoint	Intent-to-Treat Population: Limited to Observed Data			
	Placebo / Placebo (N = 10) (%)	Vancomycin / SER-287 daily (N = 15) (%)	Placebo / SER-287 weekly (N = 14) (%)	Vancomycin / SER-287 weekly (N = 14) (%)
Clinical Remission:				
	1/10 (10%)	**6/15 (40%)**	2/14 (14.3%)	3/14 (21.4%)
Difference from placebo (SER-287 minus placebo)		**30.0%**	4.3%	11.4%
p-value		0.1794	0.9999	0.6146
Endoscopic Improvement:				
	1/10 (10%)	**6/15 (40%)**	5/14 (35.7%)	4/14 (28.6%)
Difference from placebo (SER-287 minus placebo)		**30.0%**	25.7%	18.6%
p-value		0.1794	0.3408	0.3577
Clinical Response:				
	6/10 (60%)	9/15 (60%)	6/14 (42.9%)	4/14 (28.6%)
Difference from placebo (SER-287 minus placebo)		0.0%	-17.1%	-31.4%
p-value		0.9999	0.6802	0.2112

Top line SER-287 Phase 1b data disclosed in October 2, 2017 press release

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Efficacy analysis: All subjects, missing data counted as failure

Endpoint	Intent-to-Treat Population: All Subjects, Missing Data Counted as Failure			
	Placebo / Placebo (N = 11) (%)	Vancomycin / SER-287 daily (N = 15) (%)	Placebo / SER-287 weekly (N = 15) (%)	Vancomycin / SER-287 weekly (N = 17) (%)
Clinical Remission:				
	0/11 (0%)	**6/15 (40%)**	2/15 (13.3%)	3/17 (17.7%)
Difference from placebo (SER-287 minus placebo)		**40.0%**	13.3%	17.7%
p-value		**0.0237**	0.4923	0.2579
Endoscopic Improvement:				
	1/11 (9.1%)	**6/15 (40%)**	5/15 (33.3%)	4/17 (23.5%)
Difference from placebo (SER-287 minus placebo)		**30.9%**	24.2%	14.4%
p-value		0.1783	0.1973	0.6195
Clinical Response:				
	5/11 (45.5%)	9/15 (60%)	6/15 (40%)	4/17 (23.5%)
Difference from placebo (SER-287 minus placebo)		14.5%	-5.5%	-22.0%
p-value		0.6922	0.9999	0.4087

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Definitions of clinical efficacy endpoints

Endpoint	Protocol Definition	New FDA Definition (2016)*
Clinical Remission	Total Modified Mayo Score <=2 and an endoscopic subscore of 0 or 1	Stool Frequency subscore =0, Rectal Bleeding subscore=0 and Endoscopic subscore = 0 or 1 (modified) on Mayo Score
Endoscopic Improvement	Decrease in endoscopic subscore of >=1	Endoscopic subscore = 0 or 1*, but no histological assessment of the mucosa
Clinical Response	Decrease of >=3 points in Total Modified Mayo Score from baseline, along with either a decrease of >=1 point in rectal bleeding subscore or absolute rectal bleeding subscore of 0 or 1	**Not recommended in FDA Guidance**

*FDA Ulcerative colitis: Clinical Trial Endpoints – Guidance for Industry; August 2016

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Efficacy analysis: Limited to observed data (Per FDA definition from 2016 guidance)

Endpoint	Intent-to-Treat Population: Limited to Observed Data			
	Placebo / Placebo (N = 10) (%)	Vancomycin / SER-287 daily (N = 15) (%)	Placebo / SER-287 weekly (N = 14) (%)	Vancomycin / SER-287 weekly (N = 14) (%)
Clinical Remission:				
	1/10 (10%)	**6/15 (40%)**	1/14 (7.1%)	3/14 (21.4%)
Difference from placebo (SER-287 minus placebo)		**30.0%**	-2.9%	11.4%
p-value		0.1794	0.9999	0.6146
Endoscopic Improvement:				
	1/10 (10%)	**8/15 (53.3%)**	4/14 (28.6%)	5/14 (35.7%)
Difference from placebo (SER-287 minus placebo)		**43.3%**	18.6%	25.7%
p-value		**0.0405**	0.3577	0.3408
Clinical Response:				
	Not defined or recommended in FDA Guidance			
Difference from placebo (SER-287 minus placebo)				
p-value				

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Efficacy analysis: All subjects, missing data counted as failure (Per FDA definition from 2016 guidance)

Endpoint	Intent-to-Treat Population: All Subjects, Missing Data Counted as Failure			
	Placebo / Placebo (N = 11) (%)	Vancomycin / SER-287 daily (N = 15) (%)	Placebo / SER-287 weekly (N = 15) (%)	Vancomycin / SER-287 weekly (N = 17) (%)
Clinical Remission:				
	0/11 (0%)	**6/15 (40%)**	1/15 (6.7%)	3/17 (17.6%)
Difference from placebo (SER-287 minus placebo)		**40.0%**	6.7%	17.6%
p-value		**0.0237**	0.9999	0.2579
Endoscopic Improvement:				
	0/11 (0%)	**8/15 (53.3%)**	4/15 (26.7%)	5/17 (29.4%)
Difference from placebo (SER-287 minus placebo)		**53.3%**	26.7%	29.4%
p-value		**0.0074**	0.1134	0.1247
Clinical Response:				
	Not defined or recommended in FDA Guidance			
Difference from placebo (SER-287 minus placebo)				
p-value				

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SER-287 safety and tolerability profile very favorable

- No drug related serious adverse events associated with SER-287
- Lower rate of GI related adverse events in SER-287 daily arm provides supportive evidence of SER-287 benefit on symptoms seen in Ulcerative Colitis

System Organ Class	Safety Population				
	(Placebo / placebo) (N = 11) n (%)	(Vancomycin / SER-287 daily) (N = 15) n (%)	(Placebo / SER-287 weekly) (N = 15) n (%)	(Vancomycin / SER-287 weekly) (N = 17) n (%)	SER-287 (N = 47) n (%)
Gastrointestinal disorders	**5 (45.5)**	**2 (13.3)**	7 (46.7)	8 (47.1)	17 (36.2)
General disorders and administration site conditions	1 (9.1)	1 (6.7)	0	3 (17.6)	4 (8.5)
Immune system disorders	0	0	0	1 (5.9)	1 (2.1)
Infections and infestations	3 (27.3)	4 (26.7)	1 (6.7)	6 (35.3)	11 (23.4)
Injury, poisoning and procedural complications	2 (18.2)	0	0	0	0
Investigations	0	0	0	1 (5.9)	1 (2.1)
Metabolism and nutrition disorders	0	1 (6.7)	0	1 (5.9)	2 (4.3)
Musculoskeletal and connective tissue disorders	0	2 (13.3)	3 (20.0)	1 (5.9)	6 (12.8)
Nervous system disorders	0	3 (20.0)	0	1 (5.9)	4 (8.5)
Psychiatric disorders	1 (9.1)	1 (6.7)	0	0	1 (2.1)
Reproductive system and breast disorders	0	0	0	1 (5.9)	1 (2.1)
Respiratory, thoracic and mediastinal disorders	0	1 (6.7)	1 (6.7)	2 (11.8)	4 (8.5)
Skin and subcutaneous tissue disorders	0	3 (20.0)	0	1 (5.9)	4 (8.5)

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Microbiome results expected in coming months

Microbiome analyses to include:

- Increase in the total bacterial diversity
- Prevalence of SER-287 spore-former species
- Identification of bacteria that correlate with efficacy

Pending microbiome results to inform:

- Future SER-287 clinical development plans
- Additional support for SER-287 mechanism of action
- Composition of SER-301, a rationally designed, preclinical candidate for Inflammatory Bowel Disease

Advancing SER-287 clinical development

- Company expects to meet with the FDA to determine the most accelerated path to advance SER-287 development in Ulcerative Colitis, both as an induction and a maintenance therapy
- Company also intends to assess future development in Crohn's disease and pediatric forms of Inflammatory Bowel Disease (Orphan Indication)