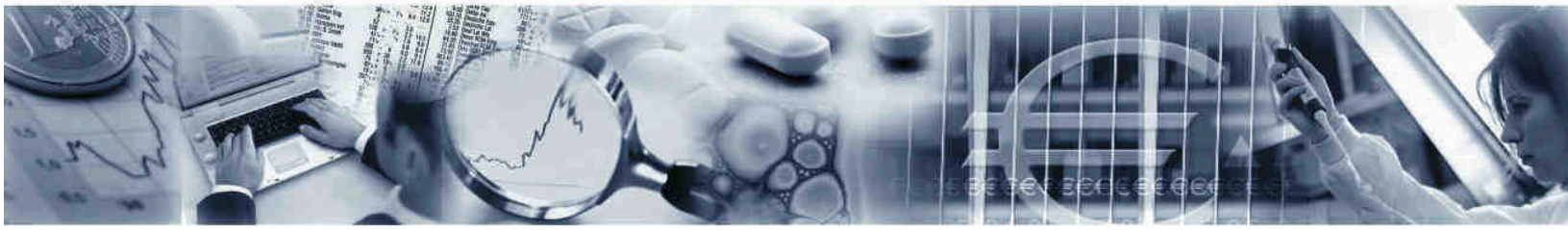

Research Note

Onconova Therapeutics Inc. (ONTX)

Next Step for Oral Rigosertib

Chief Research Analyst

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Date: 7 January 2019

Name:	**Onconova Therapeutics**
Country:	**USA**
Price:	**USD 2.53**
ISIN Code:	**US68232V3069**
Reuters Code:	**ONTX**
Market Cap (USD m):	**14.4**
EV (USD m):	**-8.0**
Cash & cash eq. (USD m):	**22.4**
Shares outstanding (m):	**5.7**
Volume:	**90,572**
Free float:	**95%**
52-week Range:	**1.69-40.05**

USD m	2016A	2017A	2018E
Total Revenues	5.546	0.787	1.500
Net (Loss)/Profit	(19.667)	(24.092)	(21.500)
Net loss per share (pence)	(4.44)	(2.68)	(3.51)
R&D costs	20.071	19.119	16.000
Cash increase/(decrease)	1.601	(16.400)	12.000
Cash and marketable sec.	21.400	4.000	16.000

Onconova Submits SPA to FDA for Phase III Oral Rigoserib Combo with Azacitidine

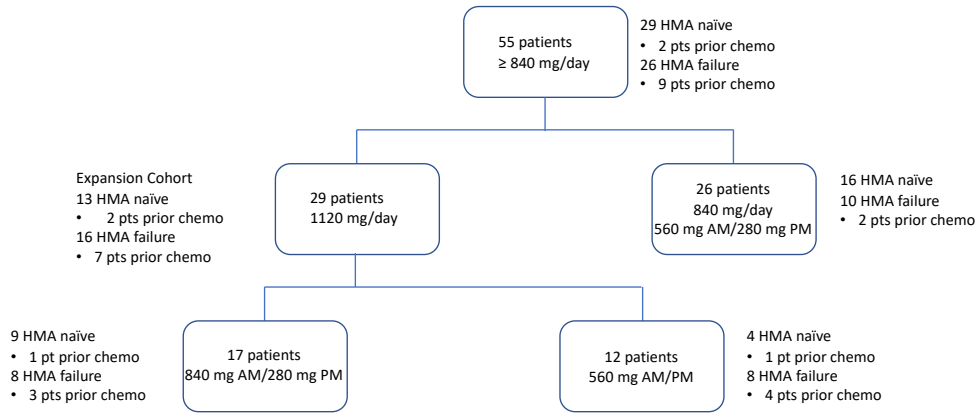
Last week, Onconova announced that it has submitted a Special Protocol Assessment (SPA) request for the FDA for its Phase III study of oral rigosertib combo with azacytidine (Vidaza) for the treatment of adults with treatment-naïve higher risk MDS. The request is part of the Company's ongoing interaction with the FDA, following an End-of-Phase II Meeting with FDA guidance for the proposed Phase III study and Scientific Advice from the EMA, consistent with the Company's strategy to study rigosertib in an earlier higher-risk MDS patient population with a more convenient mode of oral rigosertib administration. The End-of-Phase II Meeting also outlined that the primary endpoint of the proposed pivotal trial will be overall response rate (ORR), a composite of complete remission (CR), and partial remission (PR) based on the IWG Response Criteria. Onconova expects its dialogue with the FDA on this SPA submission to conclude in 2019H1.

Phase II Data Combo Therapy Presented at ASH Last Month

To date, more than 400 patients have been treated with the oral formulation of rigosertib. Initial studies with single-agent oral rigosertib were conducted in hematological malignancies, lower-risk MDS, and solid tumors. Combination therapy of oral rigosertib with azacitidine, chemotherapy or radiotherapy has also been explored. Currently, oral rigosertib is being developed as a combination therapy together with azacitidine for patients with higher-risk MDS who require HMA therapy. The results of an expanded Phase II trial of oral rigosertib combination therapy with azacitidine were presented at the 2018 ASH Annual Meeting.

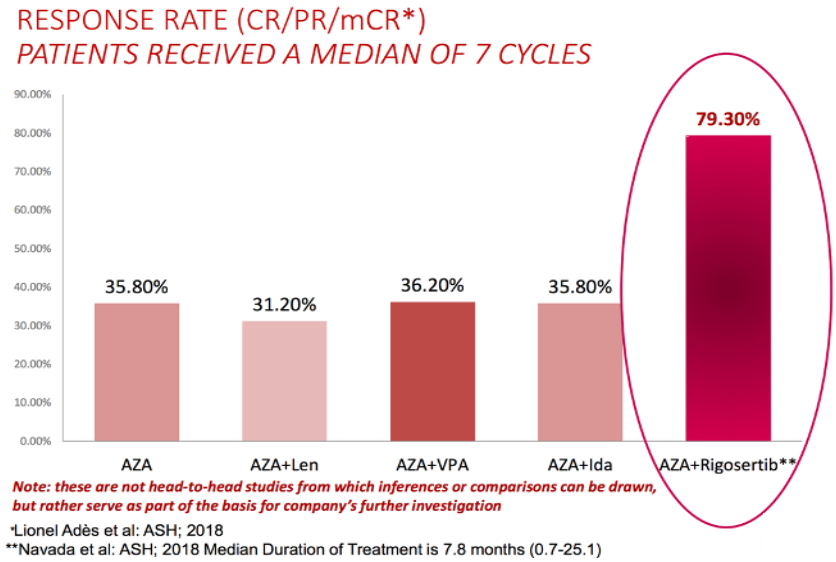
The most important data that were presented at ASH were:

- An overall response rate (ORR) of 90% reported in the Phase II trial in hypomethylating agent (**HMA**) therapy-naive patients, including complete remission (CR) rate of 34%
- Overall response rate (ORR) of 54% and CR/partial response (PR) of 8% in HMA-failed patients
- Median duration of response for the HMA-naive patients was 12.2 months
- Median duration of response for the HMA-failed patients was 10.8 months



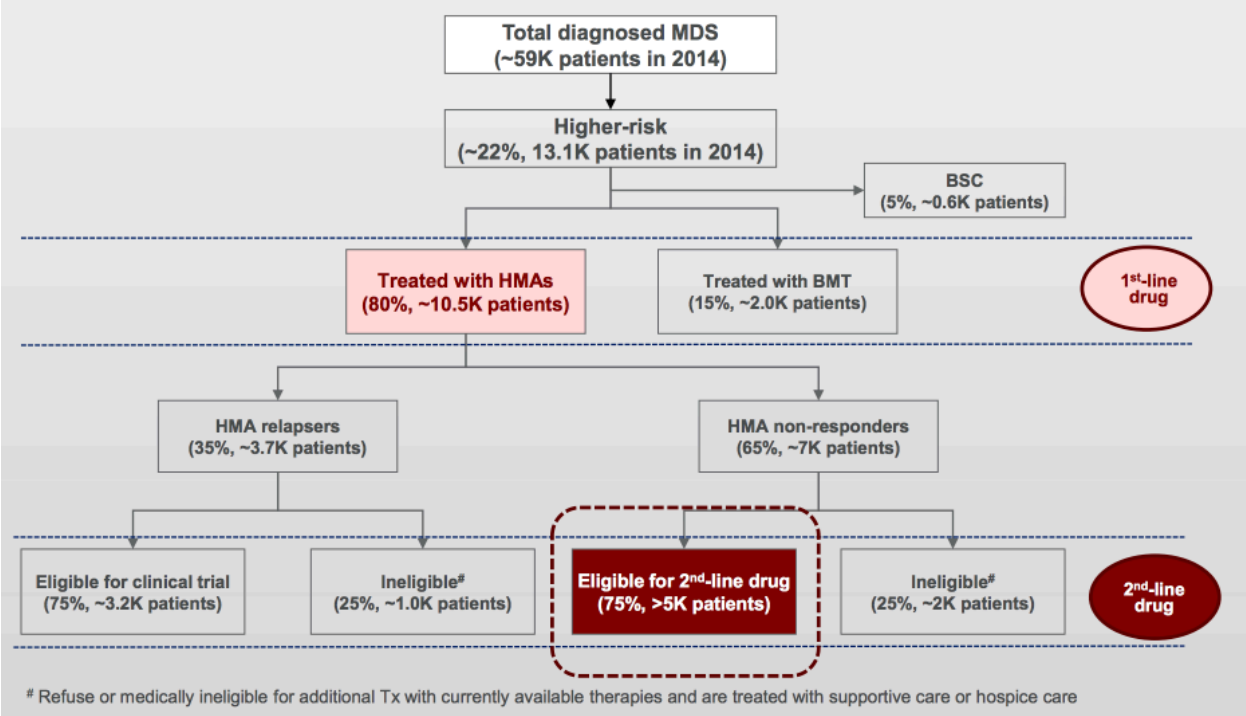
Source: Onconova

Patients were administered two different dosage strengths (840mg and 1120mg) of rigosertib, which included both HMA-naive and HMA-failed patients. HMA-naive patients received none of the two approved HMAs, azacitidine and decitabine. HMA-failed received one of the HMAs, but either relapsed or did not respond to HMA treatment. Both dosage groups - which included both HMA-naive and HMA-failed patients - were then given azacitidine, the current standard of care for HR-MDS patients.



Valuation

We have maintained our valuation on Onconova at USD 355 million. In our last update report (September 2018) we increased the potential pricing for rigosertib. Last year, US biotech company Agios received approval of its AML drug Tibsovo which will be priced at USD 26,115 per month. The new leukemia drug Vyxeaos from Jazz Pharmaceuticals is priced annually at around USD 150,000. Therefore, we have increased the pricing for rigosertib to USD 100,000 from USD 80,000. At that time, we also increased the LOA for Onconova's lead product rigosertib. At this moment we do not address value to other programs in Onconova's pipeline. This is a potential upside for the company. The value per share boils down to USD 62.50 per share.



Source: Onconova

Valuation rigosertib HR-MDS IV US Market

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	
No of patients US (yoy growth 3.5% as of 2015)	72.520	75.058	77.685	80.404	83.218	86.131	89.145	92.266	95.495	98.837	
No of patients eligible (15%)	9.790	10.133	10.487	10.855	11.234	11.628	12.035	12.456	12.892	13.343	
Penetration	0.8%	1.5%	3.0%	4.5%	6.8%	9.0%	11.3%	12.8%	14.3%	15.0%	
Total Revenues (USD m)	7.6	16.0	33.4	52.4	82.1	114.5	149.6	177.2	207.0	227.8	
Margin 50%	3.8	8.0	16.7	26.2	41.1	57.2	74.8	88.6	103.5	113.9	
WACC 12%	0.70	0.62	0.55	0.49	0.44	0.39	0.35	0.31	0.27	0.24	
NPV (million)	2.7	5.0	9.3	12.9	18.0	22.3	25.9	27.3	28.3	27.7	
Total NPV (million)											**179.4**
LOA 75%											**125.6**

Valuation rigosertib HR-MDS IV EU Market

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
No of patients EU (yoy growth 3.5% as of 2015)	131.681	136.290	141.060	145.997	151.107	156.396	161.869	167.535	173.399	179.468	
No of patients eligible (9%)	17.777	18.399	19.043	19.710	20.399	21.113	21.852	22.617	23.409	24.228	
Penetration	0,8%	1,5%	3,0%	4,5%	6,8%	9,0%	11,3%	12,8%	14,3%	15,0%	
Total Revenues (USD m)	**8,4**	**17,6**	**36,8**	**57,6**	**90,4**	**125,9**	**164,6**	**195,0**	**227,8**	**250,6**	
Margin 50%	4,2	8,8	18,4	28,8	45,2	63,0	82,3	97,5	113,9	125,3	
WACC 12%	0,62	0,55	0,49	0,44	0,39	0,35	0,31	0,27	0,24	0,22	
NPV (million)	2,6	4,9	9,1	12,6	17,6	21,8	25,3	26,7	27,7	27,1	
Total NPV (million)											**175.5**
LOA 75%											**122.8**

Valuation rigosertib HR-MDS IV Japanese Market

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
No of patients Japan (yoy growth 3.5% as of 2015)	13,140	13,600	14,076	14,568	15,078	15,606	16,152	16,717	17,303	17,908	
No of patients eligible (9%)	1,064	1,102	1,140	1,180	1,221	1,264	1,308	1,354	1,402	1,451	
Penetration	1.8%	3.6%	5.4%	8.1%	10.8%	12.6%	14.4%	16.2%	17.1%	18.0%	
Total Revenues (USD m)	1.3	2.7	4.2	6.6	9.2	11.3	13.4	15.8	17.5	19.2	
Royalty Symbio 20%	0.0	0.3	0.9	1.3	1.8	2.2	2.7	3.2	3.5	3.8	
Milestone payment SymBio	8.0	5.0									
WACC 11%	0.57	0.51	0.45	0.40	0.36	0.32	0.29	0.26	0.23	0.20	
NPV (million)	5.3	3.1	0.3	0.4	0.6	0.7	0.8	0.9	0.9	0.9	
Total NPV (million)											**14.7**

Valuation rigosertib HR-MDS first line oral US Market

Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	
No of patients US (yoy growth 3.5% as of 2015)	13,140	13,600	14,076	14,568	15,078	15,606	16,152	16,717	17,303	17,908	
No of patients eligible (18%)	14,222	14,719	15,234	15,768	16,320	16,891	17,482	18,094	18,727	19,382	
Penetration	0,8%	1,5%	3,0%	4,5%	6,8%	9,0%	11,3%	12,8%	14,3%	15,0%	
Total Revenues (USD m)	6,7	14,0	29,2	45,8	71,8	100,1	130,7	154,9	181,0	199,1	
Margin 50%	3,3	7,0	14,6	22,9	35,9	50,0	65,4	77,4	90,5	99,6	
WACC 12%	0,55	0,49	0,44	0,39	0,35	0,31	0,27	0,24	0,22	0,19	
NPV (million)	1,9	3,4	6,4	8,9	12,4	15,4	17,9	18,8	19,6	19,1	
Total NPV (million)											**104.8**
LOA 40%											**41.9**

Valuation rigosertib HR-MDS first line oral EU Market

Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	
No of patients EU (yoy growth 3.5% as of 2015)	143,104	148,113	153,297	158,662	164,215	169,963	175,912	182,069	188,441	195,036	
No of patients eligible (18%)	25,759	26,660	27,593	28,559	29,559	30,593	31,664	32,772	33,919	35,107	
Penetration	0,8%	1,5%	3,0%	4,5%	6,8%	9,0%	11,3%	12,8%	14,3%	15,0%	
Total Revenues (USD m)	8,6	17,9	37,5	58,8	92,2	128,4	167,8	198,8	232,3	255,6	
Margin 50%	4,3	9,0	18,7	29,4	46,1	64,2	83,9	99,4	116,2	127,8	
WACC 12%	0,49	0,44	0,39	0,35	0,31	0,27	0,24	0,22	0,19	0,17	
NPV (million)	2,1	3,9	7,3	10,2	14,2	17,6	20,4	21,5	22,3	21,8	
Total NPV (million)											**119.6**
LOA 40%											**41.8**

Analyst: Marcel Wijma MSc
Marcel Wijma, Chief Research Officer and managing partner, has a longstanding history in financial biotech research. After selling Van Leeuwenhoeck Research (VLR) to SNS Securities in 2006, he established an award winning analyst team in biotech/life sciences at SNS Securities. In 2009, Marcel was awarded by Financial Times/Starmine as being one of the Top-3 biotech analysts in Europe. Later that year, Marcel purchased VLR from SNS Securities after which the company was reconstituted. At VLR, he leads the professional VLR research organisation, which is augmented by selected external financial researchers with a specialisation in Life Sciences. Mr. Wijma has a Masters degree in Financial Economics from Erasmus University in Rotterdam.