



VENTURA™
PRECISION MEDICINE

Clinical ID: ABC12345

Cellworks ID: 44444

Ref Physician: Dr.White

Biopsy Sequence: 1

Gender/Age: Male / 78

Date of Report: Jul 24, 2019

Indication: Myelodysplastic Syndrome(MDS)

1. Personalized Therapy Recommendation(s)

Drug Combination(s)
AZACITIDINE and CYTARABINE (PMID : 26568032, 30315234 NCT ID : NCT00569010, NCT03813147)
CYTARABINE and DECITABINE (PMID : 26838271, 26568032 NCT ID : NCT00416598, NCT00801489)
BORTEZOMIB and CYTARABINE (PMID : 22571447, 21740082 NCT ID : NCT01174888)

*For more details of actionable molecular target(s) and pathway(s), please check this [link](#).

2. Patient Disease Characteristics: Key Biomarker(s)

PARP1	AURKB
CHEK2	TP53
CHEK1	PPARG
CSNK2A1	
MYC	

*For more details on selected biomarker(s) and its impact on patient's disease profile, please check this [link](#).

3. Biomarker Impact Score

Therapies of Interest	Patient Biomarker Characteristics							
	PARP1	CHEK2	CHEK1	CSNK2A1	MYC	AURKB	TP53	PPARG
AZACITIDINE+CYTARABINE	✓	✓	✓	✓	✓	✓	✓	✓
CYTARABINE+DECITABINE	✓	✓	✓	✓	✓	✓	✓	✓
BORTEZOMIB+CYTARABINE	✓	✓	✓	✓	✓	✓	✓	✓

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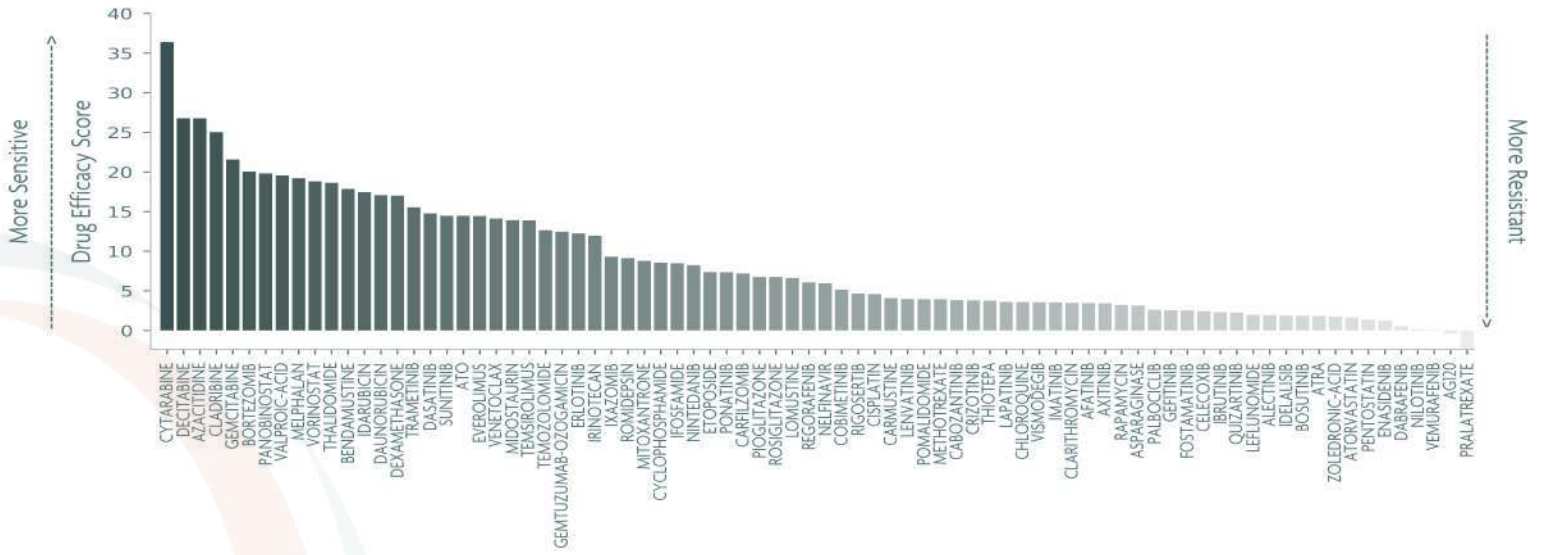
Gender/Age: Male / 78

Date of Report: Jul 24, 2019

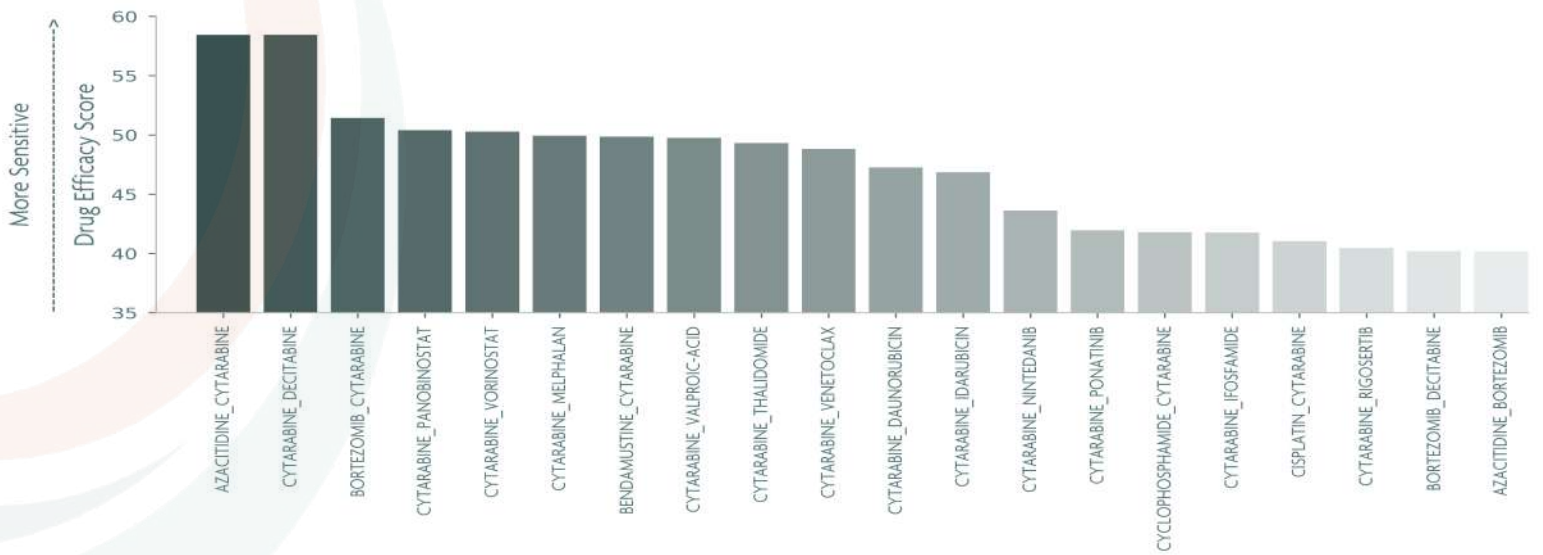
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4. Predicted Drug Sensitivity or Resistance

4.1 Single Drug Efficacy Prediction



4.2 Drug Combination Efficacy Prediction





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5. Summary of Patient Genomic Profile

Input Data Type	Mutations, CNV and Cytogenetics
Genetic Mutation(s)	5
Copy Number Variation(s)	373
Gene(s) Methylated	0

5.1 Detailed Information of Genomic Aberration(s) Modeled

5.1.1 Gene Mutation(s) with Gain of Function

NCOR1	PTPN11	TCF7L2
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5.1.2 Gene Mutation(s) with Loss of Function

KMT2C	MSH6
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5.1.3 Gene(s) with Increase in Copy Number Variation [CNV]

ABHD12	ABHD16A	ACSS1	ADRM1	AGER	ALG12	ANGPT1	ANGPT2
ARHGAP8	ASAHI	ASH2L	ATP6VIH	BAALC	BAG4	BIK	BLK
CCNE2	CDC25B	CEBPD	CERK	CHKB	CLU	CNOT7	COPS5
CSGALNACT1	CSNK2A1	CSNK2B	CTSB	CYP7A1	DDR1	DDX39B	DEPTOR
DERL1	DGATI	DHX16	DLC1	DPYS	E2F5	EGR3	EHMT2
EIF3E	EIF3H	EIF4EBP1	ELP3	EPHX2	ESRP1	EYA1	FABP5
FBXO32	FBXO43	FDFT1	FGFR1	FKBP1A	FKBPL	FNTA	FOXA2
GATA4	GFRA2	GFRA4	GGH	GPT	GSR	GTSE1	GZF1
HAS2	HDAC10	HEY1	HSF1	ID1	IDH3B	IDO1	IDO2
IKBKB	IL7	JAG1	KAT6A	LAMA5	LOXL2	LPL	LTA



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LTB	LY96	LYN	LYPLA1	MAPK11	MAPK12	MAVS	MCM4
MDC1	MICA	MICB	MMP16	MTDH	MYC	NBN	NCOA2
NDRG1	NEIL2	NOTCH4	NRG1	NSFL1C	NSMAF	NUDT18	OPLAH
PAG1	PBK	PCNA	PDLIM2	PDP1	PIM3	PLAT	PLCB1
PLXNB2	POLB	POU5F1	PPARA	PPP2R2A	PREX2	PRKDC	PRNP
PRR5	PSMA7	PTDSS1	PTK2	PTK2B	PTP4A3	RAB2A	RAD21
RALGAPA2	RASSF2	RB1CC1	RBCK1	RGS19	RIPK2	RRM2B	RUNX1T1
SCO2	SCRIB	SDC2	SFRP1	SFTPC	SGK3	SIRPA	SLC23A2
SLC25A32	SLC2A4RG	SNAI2	SNAP25	SPTLC3	SQLE	SRXN1	ST3GAL1
STK3	TASP1	TCEA1	TNF	TNFRSF10A	TNFRSF10B	TNFRSF10C	TNFRSF10D
TNFRSF11B	TRIB3	TRIM26	TYMP	UBR5	WNT7B	WRN	XKR4
XKR9	YWHAZ	ZDHHC2	ZFPM2	ZNF703			

5.1.4 Gene(s) with Decrease in Copy Number Variation [CNV]

ABCB1	ABCB5	ACSS2	ACTB	ADA	ADCY1	ADCYAP1R1	AHCY
AHR	AKAP9	AKR1B10	ARPC1A	ASB4	ASL	ASNS	ATG9B
AURKA	B4GALT5	BAZ1B	BCL7B	BHLHA15	BLVRA	BRAF	CAMK2B
CARD11	CASP2	CAV1	CCL26	CD36	CD40	CDK5	CDK6
CEBPB	CHN2	CLDN4	CNOT4	COL1A2	COPS6	CREB3L2	CUL1
CUX1	CYCS	CYP24A1	CYP51A1	DAGLB	DBF4	DDC	DGKB
DGKI	DMTF1	DNAJB6	DNAJB9	DNMT3B	DOCK4	DSN1	E2F1
EGFR	EIF2S2	EIF3B	ELMO1	ELMO2	EPB41L1	EPHA1	EPHB4
EPHB6	EPO	ETV1	EXOC4	EZH2	FSCN1	FZD1	FZD9
GGCT	GGT7	GLI3	GRB10	GSS	GSTK1	GTF2I	HBP1
HDAC9	HGF	HIPK2	HNF4A	HNRNPA2B1	HOXA1	HOXA10	HOXA11



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HOXA13	HOXA3	HOXA5	HOXA7	HOXA9	HSPB1	HTR5A	HUS1
IGFBP1	IGFBP3	IKZF1	IL6	IMPDH1	INSIG1	ITCH	ITGB8
L3MBTL1	LAMB1	LBP	LEP	LIMK1	MAD1L1	MAFB	MAFK
MAGI2	MCM7	MDH2	MET	MIOS	MIR182	MIR29A	MIR29B1
MLXIPL	MMP9	MNX1	MYBL2	NAMPT	NCF1	NCOA3	NCOA6
NDRG3	NFATC2	NOS3	NRF1	NUDT1	NUP205	OGDH	PAXIP1
PDGFA	PDIA4	PDK4	PHF20	PIK3CG	PLCG1	PMS2	PODXL
POLD2	POLM	PPP1R3A	PREX1	PRSS1	PSMA2	PSMC2	PSMG3
PSPH	PTGIS	PTN	PTPN1	PTPRZ1	RAC1	RALA	RASA4
RBL1	RHEB	RPA3	SAMHD1	SDC4	SEC61G	SEMA3E	SERPINE1
SFRP4	SH2B2	SHH	SLA2	SLC29A4	SMO	SMURF1	SNAI1
SNX13	SRC	SRPK2	STEAP1	STEAP4	STK4	STX1A	TBXAS1
TFPI2	TOP1	TRIM24	TWIST1	UBE3C	UPP1	USP42	VIPR2
WASL	WEE2	WIPI2	WISP2	XRCC2	ZC3HC1	ZDHHC4	ZNF217



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6. Therapy Rationale(s)

Rationales provided in this section highlight the pathways connected to drug sensitivity and resistance and include references to supporting published literature.

Species in **red** denote drug impact points. Species highlighted in **blue** are the key biomarkers.

STATUS: **GOF:** Gain of Function Mutations; **LOF:** Loss of Function Mutations; **SOF:** Switch of Function Mutations; **AMP:** CNV Over-expression; **DEL:** CNV Knock-down;

TYPE: **R:** Resistant Gene/Loop for the Drug; **S:** Sensitive Gene/Loop for the Drug

AZACITIDINE				
Gene	Status	Type	Gene Status Drug Action Pathway(s)	Supporting PMID(s)
EZH2	DEL	R	<p>AZACITIDINE — DNMT1 —> CPGMET</p> <p>EZH2 —> PRC2_COMPLEX —> CPGMET</p>	19194470 16357870



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AZACITIDINE				
Gene	Status	Type	Gene Status Drug Action Pathway(s)	Supporting PMID(s)
			AZACITIDINE — DNMT1 — CPGMET	
GGH	AMP	R	GGH — S ADENOSYL METHIONINE — CPGMET — TP53 —	19417127 12799639
			CANCER PROGRESSION	12579297 12154409
			GGH — S ADENOSYL METHIONINE — CPGMET — CDKN1A —	23647960 22617422
			CSNK2A1 — API — CTNNB1 — CANCER PROGRESSION	25502219 25886188
			GGH — S ADENOSYL METHIONINE — CPGMET — DUSP6 —	15867363 12689679
			MAPK1 — MYC — CANCER PROGRESSION	7626805 11255227
			GGH — S ADENOSYL METHIONINE — CPGMET — CDKN1A —	1516134 17146436
			CSNK2A1 — HDAC1 — RUNX3 — CANCER PROGRESSION	23612983 17935135
			GGH — S ADENOSYL METHIONINE — CPGMET — PPARG —	18850007 12383256
			NFKB1 — CANCER PROGRESSION	23671287 25224413
			GGH — S ADENOSYL METHIONINE — CPGMET — TP53 —	19142899 28928282
			PTK2 — CANCER PROGRESSION	21858223 15824892
			GGH — S-ADENOSYL METHIONINE — CPGMET — CDKN1A —	19363521
			CSNK2A1 — API — CTNNB1 — CANCER PROGRESSION	
			GGH — S-ADENOSYL METHIONINE — CPGMET — CDKN1A —	
			CSNK2A1 — HDAC1 — RUNX3 — CANCER PROGRESSION	
GGH — S-ADENOSYL METHIONINE — CPGMET — PPARG —				
NFKB1 — CANCER PROGRESSION				
GGH — SAM — CPGMET — PPARG — NFKB1 — CANCER PROGRESSION				



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KAT6A	AMP	S	AZACITIDINE — DNMT1 —> CPGMET	
			KAT6A —> EZH2 —> DNMT1 —> CPGMET — TP53 — CANCER PROGRESSION	12154409 25772242
			KAT6A —> EZH2 —> DNMT1 —> CPGMET — CDKN1A —	16357870 25886188
			CSNK2A1 —> API —> CTNNB1 —> CANCER PROGRESSION	23647960 12579297
			KAT6A —> EZH2 —> DNMT1 —> CPGMET — DUSP6 — MAPK1 —> MYC —> CANCER PROGRESSION	12799639 19417127
			KAT6A —> EZH2 —> DNMT1 —> CHEK1 —> AURKB —> SPI	15867363 12689679
			—> CANCER PROGRESSION	
			KAT6A —> EZH2 —> PRC2_COMPLEX —> CPGMET — CDKN1A — CSNK2A1 —> HDAC1 — RUNX3 — CANCER PROGRESSION	7626805 11255227
			1516134 17146436	
			KAT6A —> EZH2 —> PRC2_Complex —> CPGMET — PPARG — NFKB1 —> CANCER PROGRESSION	23612983 17935135
			18850007 22617422	
			KAT6A —> EZH2 —> PRC2_Complex —> CPGMET — CDKN1A — CSNK2A1 —> API —> CTNNB1 —> CANCER PROGRESSION	28599500 23671287
			KAT6A —> EZH2 —> PRC2_Complex —> CPGMET — CDKN1A — CSNK2A1 —> HDAC1 — RUNX3 — CANCER PROGRESSION	26498513 24647617
			9261115 29487290	
			KAT6A —> EZH2 —> PRC2_COMPLEX —> CPGMET — CDKN1A — CSNK2A1 —> API —> CTNNB1 —> CANCER PROGRESSION	16407820 26199136
			KAT6A —> EZH2 —> PRC2_COMPLEX —> CPGMET — PPARG — NFKB1 —> CANCER PROGRESSION	20097731 16850502
			22461507 20823107	
			KAT6A —> EZH2 —> PRC2_COMPLEX —> CPGMET — TP53 — CANCER PROGRESSION	19923321 8285455
			10400703 28536097	
			KAT6A —> EZH2 —> PRC2_COMPLEX —> CPGMET — CDKN1A — CSNK2A1 —> SNAI1 —> CANCER PROGRESSION	11304577 27703524
			KAT6A —> EZH2 —> PRC2_COMPLEX —> CPGMET — DUSP6 — MAPK1/3 —> MYC —> CANCER PROGRESSION	10676641 22569363
			14532106 19142899	
			KAT6A —> EZH2 —> PRC2_COMPLEX —> CPGMET — PTEN — PTK2 — TP53 — CANCER PROGRESSION	28928282 21858223
			KAT6A —> EZH2 —> PRC2_COMPLEX —> DNMT1 —> CPGMET — PPARG — NFKB1 —> CANCER PROGRESSION	17015478 15824892
			19363521 24688109	
			KAT6A —> EZH2 —> PRC2_COMPLEX —> DNMT1 —> CPGMET — CDKN1A — CSNK2A1 — API —> CTNNB1 —> CANCER PROGRESSION	22024163
			PROGRESSION	
			KAT6A —> EZH2 —> PRC2_COMPLEX —> DNMT1 —> CPGMET — CDKN1A — CSNK2A1 —> HDAC1 — RUNX3 — CANCER PROGRESSION	
			PROGRESSION	



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AZACITIDINE				
Gene	Status	Type	Gene Status Drug Action Pathway(s)	Supporting PMID(s)
L3MBTL1	DEL	S	AZACITIDINE — DNMT1 —> CPGMET	12154409 23671287
			AZACITIDINE — DNMT1	17540172 16357870
			L3MBTL1 — E2F1 —> EZH2 —> PRC2_COMPLEX —> CPGMET	23647960 19417127
			— CDKN1A — CSNK2A1 —> API —> CTNNB1 —> CANCER PROGRESSION	20097731 15824892
			L3MBTL1 — E2F1 —> EZH2 —> PRC2_COMPLEX —> CPGMET	22461507 28445985
			— DUSP6 — ERK —> MYC —> CANCER PROGRESSION	23979523 9261115
			L3MBTL1 — E2F1 —> EZH2 —> DNMT1 —> CPGMET —	16407820 25886188
			CDKN1A — CSNK2A1 —> API —> CTNNB1 —> CANCER PROGRESSION	12579297 12799639
			L3MBTL1 — E2F1 —> EZH2 —> DNMT1 —> CPGMET —	15867363 12689679
			CDKN1A — CSNK2A1 —> HDAC1 — RUNX3 — CANCER PROGRESSION	7626805 1516134
			L3MBTL1 — E2F1 —> EZH2 —> DNMT1 —> CPGMET — TP53	17146436 23612983
			— CANCER PROGRESSION	18850007 29656793
			L3MBTL1 — E2F1 —> EZH2 —> DNMT1 —> CPGMET — DUSP6	28054552 27621875
			— MAPK1 —> MYC —> CANCER PROGRESSION	21408221 26884725
			L3MBTL1 — E2F1 —> EZH2 —> DNMT1 —> CHEK1 —> AURKB	23319572 22251800
			—> SP1 —> CANCER PROGRESSION	10567568 23563505
			L3MBTL1 — E2F1 —> EZH2 —> PRC2_COMPLEX —> CPGMET	26498513 14532106
			— PPARG — NFKB1 —> CANCER PROGRESSION	23185017 19060929
			L3MBTL1 — E2F1 —> EZH2 —> PRC2_COMPLEX —> CPGMET	24434521 25501815
			— TP53 — CANCER PROGRESSION	9804796 27703524
L3MBTL1 — E2F1 —> EZH2 —> DNMT1 —> CPGMET — PPARG	10676641 17015478			
— NFKB1 —> CANCER PROGRESSION	28928282 22024163			
L3MBTL1 — E2F1 —> EZH2 —> DNMT1 —> CPGMET — DUSP6	19363521			
— MAPK1 —> MYC —> HK2 —> CANCER PROGRESSION				



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BORTEZOMIB				
Gene	Status	Type	Gene Status Drug Action Pathway(s)	Supporting PMID(s)
CDK5	DEL	S	<p>BORTEZOMIB — PROTEASOME — ER STRESS</p> <p>CDK5 → NFE2L2 → PSMB5 → PROTEASOME — ER STRESS</p>	21289309 21247388 27169614
MYC	AMP	S	<p>BORTEZOMIB — PROTEASOME — ER STRESS → ATF4</p> <p>→ DDIT4 — MTOR → MYC</p> <p>MYC → CANCER PROGRESSION</p>	22685320 23612979 26327694 21247388



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CYTARABINE				
Gene	Status	Type	Gene Status Drug Action Pathway(s)	Supporting PMID(s)
HUS1	DEL	S	<p>CYTARABINE → DNA DAMAGE</p> <p>HUS1 → DNA REPAIR (MMR) — DNA DAMAGE</p>	20188637 23361057 15314187 2311169
KMT2C	LOF	S	<p>CYTARABINE → AraCTP → DNA DAMAGE</p> <p>KMT2C → H3K4 METHYLATION → MLH1 → DNA REPAIR (MMR) — DNA DAMAGE</p>	25043185 25135975 23361057 24403070 15475387 2311169
L3MBTL1	DEL	S	<p>CYTARABINE → DNA DAMAGE</p> <p>L3MBTL1 — E2F1 → EZH2 → PRC2_COMPLEX → DNA DAMAGE</p> <p>CPGMET — MLH1 → DNA REPAIR(MMR) — DNA DAMAGE</p>	25043185 24403070 15475387 10072435 25886910 22395470 2311169
MSH6	LOF	S	<p>CYTARABINE → DNA DAMAGE</p> <p>MSH2 → DNA REPAIR (MMR) — DNA DAMAGE</p> <p>MSH6 → DNA REPAIR (MMR) — DNA DAMAGE</p> <p>MSH6 → DNA REPAIR (MMR) — DNA DAMAGE</p> <p>MSH6 → DNA_REPAIR — DNA DAMAGE — CANCER PROGRESSION</p> <p>MSH6 → DNA_REPAIR — DNA DAMAGE</p>	20823149 23361057 2311169 27869523



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CYTARABINE				
Gene	Status	Type	Gene Status Drug Action Pathway(s)	Supporting PMID(s)
MYC	AMP	R	<p>CYTARABINE → DNA DAMAGE</p> <p>MYC → DHODH → dCTP — CYTARABINE → DNA DAMAGE</p> <p>MYC → CTPS → dCTP — CYTARABINE → DNA DAMAGE</p> <p>MYC → DHODH → dCTP — CYTARABINE → DNA DAMAGE</p> <p>MYC → CTPS → dCTP — CYTARABINE → DNA DAMAGE</p> <p>MYC → DHODH → dCTP — CYTARABINE</p> <p>MYC → CTPS → dCTP — CYTARABINE</p> <p>MYC → MYC_MAX → DHODH → dCTP — </p> <p>CYTARABINE → DNA DAMAGE</p> <p>MYC → MYC_MAX → CTPS → dCTP — </p> <p>CYTARABINE → DNA DAMAGE</p> <p>MYC → MYC_MAX → MLH1 → DNA REPAIR (MMR) — DNA DAMAGE</p>	2311169 23361057 18628958 27641501 17275176 25127121
PMS2	DEL	S	<p>CYTARABINE → AraCTP → DNA DAMAGE</p> <p>PMS2 → DNA REPAIR (MMR) — DNA DAMAGE</p>	19793570 23361057 11292842 2311169
EZH2	DEL	R	<p>CYTARABINE → DNA DAMAGE</p> <p>EZH2 → PRC2 COMPLEX → H3K27 TRIMETHYLATION — </p> <p>HOXA5 → MLH1 → DNA REPAIR (MMR) — DNA DAMAGE</p>	24987060 25043185 16756717 26472914 15475387 10072435 2311169



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CYTARABINE				
Gene	Status	Type	Gene Status Drug Action Pathway(s)	Supporting PMID(s)
PTPN11	GOF	R	CYTARABINE → DNA DAMAGE PTPN11 → CHEK1 → BRCA2 → DNA REPAIR (HR) — DNA DAMAGE PTPN11 → RAS → RAF → MAP2K1/2 → MAPK1/3 → MYC → MLH1 (MMR) — DNA DAMAGE	9520401 26617336 20432758 18317453 18566216 16260787 15814658 23189174 2311169
			CYTARABINE → DNA DAMAGE RRM2B → dCTP — CYTARABINE → DNA DAMAGE	19842938 2311169
SNAI2	AMP	S	CYTARABINE → DNA DAMAGE SNAI2 — BRCA1/2 → DNA REPAIR (HR) — DNA DAMAGE	23011797 15734731 15546503 2311169



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DECITABINE				
Gene	Status	Type	Gene Status Drug Action Pathway(s)	Supporting PMID(s)
KAT6A	AMP	S	DECITABINE — DNMT1 — CPGMET	
			KAT6A — EZH2 — PRC2_COMPLEX — CPGMET —	12154409 25772242
			CDKN1A — CSNK2A1 — HDAC1 — RUNX3 — CANCER PROGRESSION	16357870 25886188
			KAT6A — EZH2 — DNMT1 — CPGMET — TP53 —	23647960 12579297
			KAT6A — EZH2 — DNMT1 — CPGMET — CDKN1A —	12799639 19417127
			— CSNK2A1 — API — CTNNB1 — CANCER PROGRESSION	15867363 12689679
			KAT6A — EZH2 — DNMT1 — CPGMET — DUSP6 —	7626805 11255227
			— MAPK1 — MYC — CANCER PROGRESSION	1516134 17146436
			KAT6A — EZH2 — DNMT1 — CHEKI — AURKB —	23612983 17935135
			SP1 — CANCER PROGRESSION	18850007 22893792
			KAT6A — EZH2 — PRC2_COMPLEX — CPGMET —	22617422 28599500
			PPARG — NFKB1 — CANCER PROGRESSION	23671287 20823107
			KAT6A — EZH2 — PRC2_COMPLEX — CPGMET —	19923321 16850502
			CDKN1A — CSNK2A1 — API — CTNNB1 — CANCER PROGRESSION	21248841 28869966
			KAT6A — EZH2 — PRC2_Complex — CPGMET —	11668500 27073531
			PPARG — NFKB1 — CANCER PROGRESSION	18311148 17325427
			KAT6A — EZH2 — PRC2_Complex — CPGMET —	11327722 19142899
			CDKN1A — CSNK2A1 — API — CTNNB1 — CANCER PROGRESSION	22461507 28928282
			KAT6A — EZH2 — PRC2_Complex — CPGMET —	11602581 16861352
			CDKN1A — CSNK2A1 — HDAC1 — RUNX3 — CANCER PROGRESSION	21858223 17015478
			KAT6A — EZH2 — PRC2_COMPLEX — CPGMET —	26516376 15824892
			CDKN1A — CSNK2A1 — SNAI1 — CANCER PROGRESSION	26791049 22343522
			KAT6A — EZH2 — PRC2_COMPLEX — DNMT1 —	21709715 7556187
			CPGMET — PPARG — NFKB1 — CANCER PROGRESSION	24389641 10801130
			KAT6A — EZH2 — PRC2_COMPLEX — DNMT1 —	19363521 24688109
			CPGMET — CDKN1A — CSNK2A1 — API — CTNNB1 —	28261562 24058769
			— CANCER PROGRESSION	22024163
			KAT6A — EZH2 — PRC2_COMPLEX — DNMT1 —	
			CPGMET — CDKN1A — CSNK2A1 — HDAC1 — RUNX3 —	
			— CANCER PROGRESSION	



VENTURA™
PRECISION MEDICINE

Clinical ID: ABC12345

Cellworks ID: 44444

Ref Physician: Dr.White

Biopsy Sequence: 1

Gender/Age: Male / 78

Date of Report: Jul 24, 2019

Indication: Myelodysplastic Syndrome(MDS)

DECITABINE				
Gene	Status	Type	Gene Status Drug Action Pathway(s)	Supporting PMID(s)
L3MBTL1	DEL	S	DECITABINE — DNMT1	20097731 17540172
			DECITABINE — DNMT1 → CPGMET	15824892 16407820
				19471727 23647960
				17015478 9261115
			L3MBTL1 — E2F1 → EZH2 → DNMT1 → CPGMET —	16357870 12154409
			CDKN1A — CSNK2A1 → API → CTNNB1 → CANCER	24389641 22461507
			PROGRESSION	28445985 14532106
			L3MBTL1 — E2F1 → EZH2 → DNMT1 → CPGMET —	28928282 23671287
			CDKN1A — CSNK2A1 → HDAC1 — RUNX3 — CANCER	22024163 25886188
			PROGRESSION	23979523 19363521
			L3MBTL1 — E2F1 → EZH2 → DNMT1 → CPGMET —	12579297 12799639
			PPARG — NFKB1 → CANCER PROGRESSION	15867363 12689679
			L3MBTL1 — E2F1 → EZH2 → DNMT1 → CPGMET —	7626805 1516134
			DUSP6 — ERK → MYC → CANCER PROGRESSION	17146436 23612983
			L3MBTL1 — E2F1 → EZH2 → DNMT1 → CPGMET —	18850007 29656793
			PPARG — NFKB1 → SNAI1 → CANCER PROGRESSION	28054552 27621875
			L3MBTL1 — E2F1 → EZH2 → DNMT1 → CPGMET —	21408221 26884725
			DUSP6 — MAPK1 → MYC → CANCER PROGRESSION	23319572 22251800
			L3MBTL1 — E2F1 → EZH2 → DNMT1 → CPGMET —	10567568 23563505
			DUSP6 — MAPK1 → MYC → CANCER PROGRESSION	26498513 23185017
L3MBTL1 — E2F1 → EZH2 → DNMT1 → CHEK1 →	19060929 24434521			
AURKB → SP1 → CANCER PROGRESSION	25501815 9804796			



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DECITABINE				
Gene	Status	Type	Gene Status Drug Action Pathway(s)	Supporting PMID(s)
EZH2	DEL	R	DECITABINE — DNMT1 —> CPGMET	15824892 19417127
			EZH2 —> DNMT1 —> CPGMET — PPARG — NFKB1 —> CANCER PROGRESSION	23647960 17015478
			EZH2 —> DNMT1 —> CPGMET — CDKN1A — CSNK2A1 —> API —> CTNNB1 —> CANCER PROGRESSION	12799639 24688109
			EZH2 —> DNMT1 —> CPGMET — CDKN1A — CSNK2A1 —> HDAC1 — RUNX3 — CANCER PROGRESSION	22569363 16357870
			EZH2 —> DNMT1 —> CPGMET — TP53 — CANCER PROGRESSION	12154409 12579297
			EZH2 —> DNMT1 —> CPGMET — DUSP6 — MAPK1 —> MYC —> CANCER PROGRESSION	24389641 18425818
			EZH2 —> DNMT1 —> CHEKI —> AURKB —> SPI —> CANCER PROGRESSION	25886188 15867363
				28928282 23671287
				19553068 22024163
				19363521 7626805



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Indication: Myelodysplastic Syndrome(MDS)

DECITABINE				
Gene	Status	Type	Gene Status Drug Action Pathway(s)	Supporting PMID(s)
			DECITABINE — DNMT1 —> CPGMET	
GGH	AMP	R	GGH — S ADENOSYL METHIONINE —> CPGMET — CDKN1A — CSNK2A1 —> API —> CTNNB1 —> CANCER PROGRESSION	19417127 12799639
			GGH — S ADENOSYL METHIONINE —> CPGMET — CDKN1A — CSNK2A1 —> HDAC1 — RUNX3 — CANCER PROGRESSION	12579297 22893792 23647960 22617422
			GGH — S ADENOSYL METHIONINE —> CPGMET — PPARG — NFKB1 —> CANCER PROGRESSION	25502219 12154409 25886188 15867363
			GGH — S ADENOSYL METHIONINE —> CPGMET — TP53 — CANCER PROGRESSION	12689679 7626805 11255227 1516134
			GGH — S ADENOSYL METHIONINE —> CPGMET — DUSP6 — MAPK1 —> MYC —> CANCER PROGRESSION	17146436 23612983
			GGH — S-ADENOSYL METHIONINE —> CPGMET — CDKN1A — CSNK2A1 —> API —> CTNNB1 —> CANCER PROGRESSION	17935135 18850007 19142899 28928282
			GGH — S-ADENOSYL METHIONINE —> CPGMET — CDKN1A — CSNK2A1 —> HDAC1 — RUNX3 — CANCER PROGRESSION	21858223 25224413 15824892 23671287
			GGH — S-ADENOSYL METHIONINE —> CPGMET — PPARG — NFKB1 —> CANCER PROGRESSION	19363521 12383256
			GGH — SAM —> CPGMET — PPARG — NFKB1 —> CANCER PROGRESSION	



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7. Genomic Aberration to Key Biomarker Pathway(s)

This section provides a snapshot of paths connecting the most significant gene aberrations with patient biomarkers and references to published research supporting these pathways.

RED: Gain of Function/Switch of Function Mutation(s) or Amplified Gene(s)

BLUE: Loss of Function Mutation(s) or Deleted Gene(s)

TRANSCRIPTION FACTORS:

Key Biomarker(s)	Molecular Pathway Rationale for Biomarker(s)	Reference PMID(s)
TP53	CUX1 → ATM → BRCA1 → TP53	10373534 10550055 10783165 10866324 14701743 19377469 22319212 9582019
	KMT2C → TP53	19433796 22034226
PPARG	CUX1 → ATM → BRCA1 → CDKN1A → CSNK2A1 HDAC3 → PPARG	10373534 10550055 10783165 10866324 11255227 12479814 14701743 15832170 16127449 22319212 22850745 25101980
	KMT2C → PPARG	16029943
MYC	CUX1 → ATM → BRCA1 → CDKN1A → CSNK2A1 MYC	10373534 10550055 10783165 10866324 11255227 12149649 14701743 18438430 22319212 22850745 25101980 2663470
	L3MBTL1 → MYC	17540172
	RAD21 → MYC	28729862



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KINASE**:

Key Biomarker(s)	Molecular Pathway Rationale for Biomarker(s)	Reference PMID(s)
CSNK2A1	CUX1 → ATM → BRCA1 → CDKN1A — CSNK2A1	10373534 10550055 10783165 10866324 11255227 14701743 22319212 22850745 25101980
AURKB	CUX1 → ATM → BRCA1 → CDKN1A — CSNK2A1 → HDAC3 → AURKB	10373534 10550055 10783165 10866324 11255227 14701743 19287963 22319212 22751009 22850745 25101980

** Assayable key kinase biomarkers identified for this patient.



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