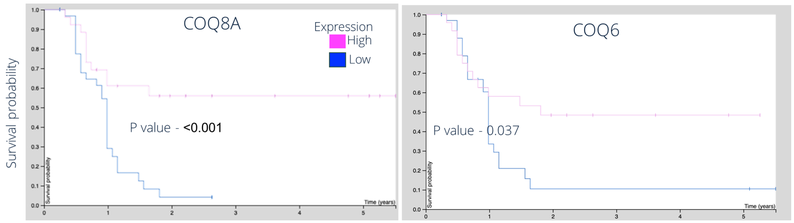
Trial in Progress: Update on a Phase 2 Study of BPM31510 (a lipid nanodispersion of oxidized CoQ10) with Vitamin K in combination with Standard of Care (SOC) RT and TMZ in Glioblastoma (GBM) patients without prior therapy

Seema Nagpal[1], Brian Stocksdale[1], Adam Cohen[2], Andrew Brenner[6],Chirag Patil[3], Brian Vaillant[4], Kevin Elmore[5], Rupa Juthani[7], David Reardon[8], Ryan Kendle[9], Alexander Spira[10], Jedrzej Wykretowicz[11], Valentina Zhukova-Harrill[12], Bing Nie[13], Megan Cox[13], Viatcheslav R. Akmaev[13], Niven R. Narain[13,14], Vijay Modur[13,] Brian Berman[13,14]

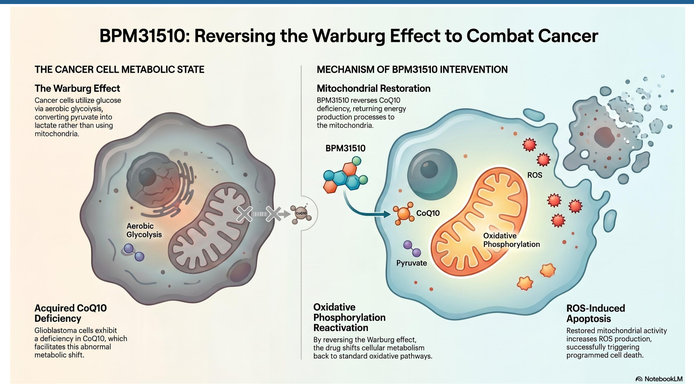
[1]Division of Neuro-Oncology, Department of Neurology and Neurological Sciences, Stanford University, Stanford, CA; [2]Inova Schar Cancer Institute, Fairfax, VA; [3]Cedars-Sinai Medical Center, Los Angeles, CA; [4]Texas Oncology-South Central, Austin, TX; [5]Icahn School of Medicine at Mt Sinai, New York, NY; [6]University of Texas Health Science Center at San Antonio, Mays Cancer Center at UT Health San Antonio MD Anderson, San Antonio, TX; [7]Valley Health Hospital, Ridgewood, NJ; [8]Dana Farber Cancer Institute, Boston, MA; [9]Sansum Clinic, Santa Barbara, CA; [10]Virginia Cancer Specialists, Fairfax, VA; [11]Virginia Oncology Associates, Norfolk, VA; [12]Aixial Group, Greensboro, NC; [13]BPGbio Inc., Waltham, MA; [14]Department of Molecular Biology and Department of Dermatology and Cutaneous Surgery, University of Miami Miller School of Medicine, Miami, FL

Decreased CoQ10 in GBM Correlates with Poor Survival

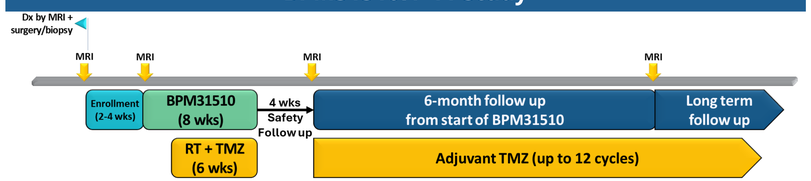


Human Proteome Atlas TCGA analysis COQ10 synthesis enzymes mRNA expression level and survival

BPM31510 Mechanism of Action



BPM31510IV-11 Study



<u>Study Design:</u>

- A single-arm, non-randomized, open-label phase 2 therapeutic study to assess the effects of adding BPM31510 onto a conventional treatment framework of RT and concurrent TMZ chemotherapy for subjects with newly diagnosed GB.
- The study will enroll approximate 50 subjects for ~90% power in rejecting the null hypothesis of PFS6 of ≤ 30%.

<u>Primary Endpoint:</u>

- Progression free survival at 6 and 12 months, defined as the proportion of subjects who have met Response Assessment in Neuro-Oncology criteria for complete response, partial response, or stable disease at 6 and 12 months following initiation of BPM31510.

<u>Secondary Endpoints:</u>

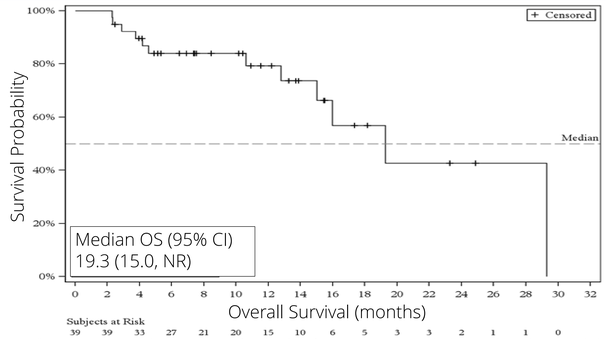
- Overall survival as determined by measuring from start date of BPM31510 to the date of death or date of last follow-up.
- To assess safety and tolerability of BPM31510 and Vitamin K1 administered concurrently with standard RT and TMZ in subjects with newly diagnosed GB.

Abbreviations: Dx = diagnosis; MRI = magnetic resonance imaging; RT = radiation therapy; TMZ = temozolomide; wks = weeks.

BPM31510IV-11 Demographics : ITT Population (N=51)

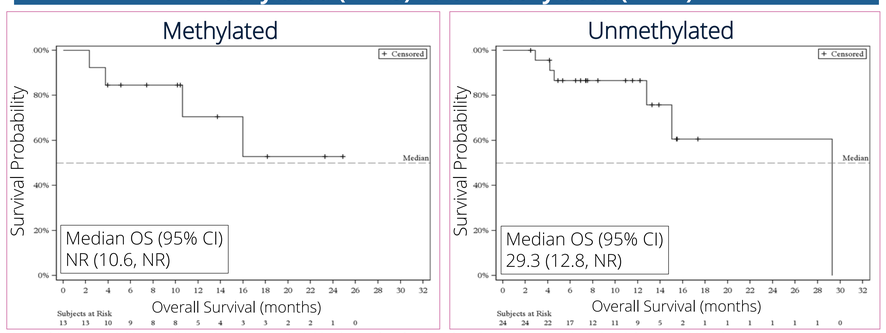
	MGMT: Methylated	MGMT: Unmethylated	MGMT: Unknown	Total
	N=16	N=33	N=2	N=51
Age				
Mean	62.2	47.5	66.9	59.3
Median	69.5	49	67	64
Gender				
Female	8	14	1	23
Male	8	19	1	28
Race				
White	13	27	2	42
American Indian or Alaska Native	1	0	0	1
Black or African American	0	0	0	0
Asian	0	3	0	3
Others	0	3	0	3
Not Reported	2	0	0	2

BPM31510IV-11 Early Efficacy: Overall Survival Per Protocol Population (N=39)



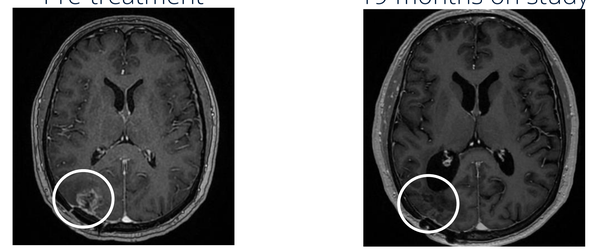
CI = Confidence Interval, OS = Overall Survival, NR = Not Reached; OS is the time from first date of BPM31510 exposure to death; 95% CI for median OS is calculated using the Brookmeyer and Crowley method; Probability estimates are based upon Kaplan-Meier estimates and 95% CI use the log-log transformation.

BPM31510IV-11 Early Efficacy: Overall Survival Methylated (N=13) vs Unmethylated (N=24)



CI = Confidence Interval, OS = Overall Survival, NR = Not Reached; OS is the time from first date of BPM31510 exposure to death; 95% CI for median OS is calculated using the Brookmeyer and Crowley method; Probability estimates are based upon Kaplan-Meier estimates and 95% CI use the log-log transformation.

BPM31510IV-11 Case Study



51-year-old man who presented with discoordination and a generalized seizure, found to have an MGMT unmethylated tumor. T1 post contrast MRI imaging pre-treatment and after 19 months on study.

BPM31510IV-11 Safety: ITT Population (N=51)

Number of patients with:	Overall; n (%)	Related to Study Treatment; n (%)
Any TEAE	49 (96.1)	36 (70.6)
Any serious TEAE	17 (33.3)	5 (9.8)
Any TEAE leading to treatment discontinuation	5 (9.8)	3 (5.9)
Any TEAE leading to death	3 (5.9)	1 (2.0)
Any TEAE with NCI-CTCAE grade 1	44 (86.3)	
Any TEAE with NCI-CTCAE grade 2	32 (62.7)	
Any TEAE with NCI-CTCAE grade 3	22 (43.1)	
Any TEAE with NCI-CTCAE grade 4	5 (9.8)	
Any TEAE with NCI-CTCAE grade 5	3 (5.9)	
Any AESIs	5 (9.8)	
Nervous system disorders	36 (70.6)	
Gastrointestinal disorders	32 (62.7)	
General disorders and administration site conditions	26 (51.0)	
Skin and subcutaneous tissue disorders	24 (47.1)	
Blood and lymphatic system disorders	8 (15.7)	

Note: TEAE = Treatment-Emergent Adverse Event, AESI = Adverse Event of Special Interest,

Present Findings

- BPM31510 is well-tolerated and does not exacerbate toxicity of chemoradiation with no new drug related SAEs encountered in treatment naïve patients in a front-line setting.
- Preliminary signal awaiting mature data shows a superior median OS of 29.3 months (12.8, NR) in the unmethylated patients. Table below represents a historical comparison.

	Unmethylated	
Study	N	Median OS (95% CI)
This Study	24	29.3 (12.8, NR)
Gilbert'13*	254	14.60 (13.20, 16.50)
Gilbert'14*	214	14.60 (13.60, 15.60)
Stupp'05*	60	12.70 (11.60, 14.40)
Stupp'17*	95	14.70 (12.80, 19.10)
Westphal'15*	32	15.50 (13.80, 24.00)

*Alnahhas, Iyad et al. *Neuro-oncology advances* vol. 2,1 vdaa082. 30 Oct. 2020, doi:10.1093/noajnl/vdaa082

- BPM31510IV-11 (NCT04752813) has completed recruiting.

Corresponding author email address Dr. Seema Nagpal, snagpal@stanford.edu

Dr. Nagpal and Dr. Stocksdale receive institutional research support from BPGBio

The safety and efficacy of BPM31510 has not been determined yet by the FDA.