Trial in Progress: 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 Multiforme (GBM) patients without prior therapy

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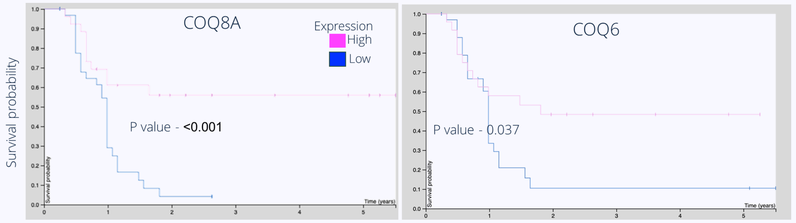
Background

CoQ10 deficiency is a common feature of glioblastoma (Biomolecules. 2022 Feb; 12(2): 336). BPM31510 is a novel drug-lipid conjugate nanodispersion that achieves supraphysiological levels of oxidized CoQ10. In preclinical studies, supraphysiological concentrations of oxidized CoQ10 induce a metabolic shift accompanied by Reactive Oxygen Species (ROS) generation leading to apoptosis in cancer cells. Main AEs in phase 1 were hepatotoxicity and coagulopathy. Dose limiting toxicity (DLT) was not achieved even at the highest dose level (342 mg/kg). Coagulopathy (prolonged PT/INR, PTT/aPTT) was alleviated by prophylactic administration of Vitamin K. Starting at phase 1, RP2D dose has remained at 110 mg/kg/week.

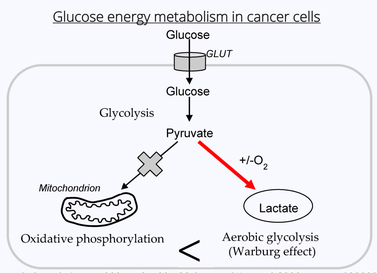
BPM31510IV-11 (NCT04752813) is a single-arm, non-randomized, open-label, phase 2 study of BPM31510 + Vitamin K1 with standard radiotherapy (RT) and temozolomide (TMZ) in newly diagnosed GBM patients. The study is currently recruiting patients in the US.

Decreased CoQ10 in GBM Correlates with Poor Survival



Human Proteome Atlas TCGA analysis COQ10 synthetic enzymes mRNA expression and survival

BPM31510 Mechanism of Action



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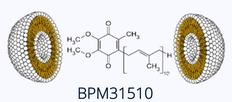


BPM31510

BPM31510 reverses the acquired CoQ10 deficiency in GBM returning energy production to the mitochondria reversing the Warburg effect. This results in an increase in ROS production leading to apoptosis.

Phase 1 Overview and Results

Study Overview	A phase 1 study of BPM31510-IV plus vitamin K in subjects with glioblastoma that has recurred on a bevacizumab-containing regimen
Clinical Investigators & Sites	USA: Stanford - Dr. Lawrence Recht, Dr. Seema Nagpal, Dr. Reena Thomas
Study Demographics	This is a mTPI adaptive clinical trial design to determine maximum-tolerated dose (MTD) up to maximum 10 subjects
Patient Recruitment	12 patients enrolled (220 mg/kg, n=6; 276 mg/kg, n=1; 342 mg/kg, n=5 weekly dosing).
Clinical Summary	Dose limiting toxicity was ≥342 mg/kg/week and drug is well tolerated

Phase 2 BPM31510IV-11 Study Design, Endpoints, and Treatment

Study Design:

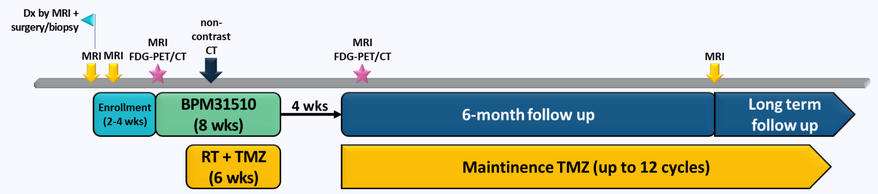
- A single-arm, non-randomized, open-label phase 2 therapeutic study to assess the effects of adding BPM31510 onto a conventional treatment framework of RT and concurrent TMZ chemotherapy for subjects with newly diagnosed GB.
- Study initiated with a dose-confirmation phase establishing safety of BPM31510 in combination with RT and TMZ. Following a standard 3+3 dose design, with 1 potential dose de-escalation in the event of a DLT.
- The efficacy phase of the study will begin after the recommended Phase 2 dose (RP2D) being confirmed.
- The study will enroll approximate 50 subjects for ~90% power in rejecting the null hypothesis of PFS6 of ≤ 30%.

Primary Endpoint:

- Progression free survival at 6 month, 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 month following initiation of BPM31510.

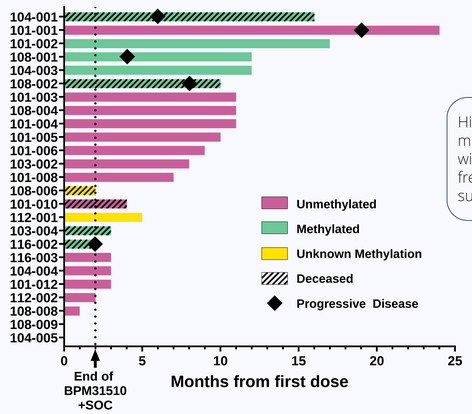
Secondary Endpoints:

- 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 neo-adjuvantly and concurrently with standard RT and TMZ in subjects with newly diagnosed GB.



Abbreviations: CT = computerized tomography; Dx = diagnosis; FDG-PET = fluorodeoxyglucose-positron emission tomography; MRI = magnetic resonance imaging; RT = radiation therapy; TMZ = temozolomide; wks = weeks.

GBM Phase 2 Patient Study Status (as of March 10th, 2025)



High MGMT promoter methylation rate is associated with improved progression-free survival (PFS) and overall survival (OS)

GBM Phase 2 Study Sites

Active Study Site	Investigator
Stanford University Cancer Center	Seema Nagpal, MD
Cedars-Sinai Medical Center	Chirag Patil, MD, MS
Icahn School of Medicine at Mount Sinai	Kevin Elmore, MD
Inova Schar Cancer Institute	Adam Cohen, MD
Valley Health Hospital	Rupa Juthani, MD
Sansum Clinic, Santa Barbara	Ryan Kendle, MD
Virginia Cancer Specialists	Alexander Spira, MD, PhD, FACP
Virginia Oncology Associates	Shaker George Shaman, MD
Texas Oncology, Austin	Brian Vaillant, MD
Dana Farber Cancer Institute	David Reardon, MD
University of Texas Health Science Center at San Antonio	Andrew Brenner, MD, PhD
Study Site in Start-up	**Investigator**
University of Alabama at Birmingham	Rebecca M Brown, MD, PhD

Conclusions and Next Steps

- 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.
- Prophylactic Vit K has greatly reduced any grade 1 increases in PTT/INR and has improved safety profile vis-à-vis bleeding risk.
- BPM31510IV-11 (NCT04752813) is actively recruiting.
- A contemporaneous control arm is being built with HER data and discussions are ongoing with several sites to develop a case-control comparison

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