UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 8-K

CURRENT REPORT

Pursuant to Section 13 or 15(d)
of the Securities Exchange Act of 1934

January 13, 2022
Date of Report (Date of earliest event reported)

Aprea Therapeutics, Inc.

(Exact name of registrant as specified in its charter)

Delaware	**001-39069**	**84-2246769**
(State or other jurisdiction of incorporation)	(Commission File Number)	(IRS Employer Identification No.)

535 Boylston Street **Boston, Massachusetts**	**02116**
(Address of principal executive offices)	(Zip Code)

Registrant's telephone number, including area code: **(617) 463-9385**

(Former name or former address, if changed since last report): Not applicable

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Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions:

☐ Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)

☐ Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)

☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))

☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	**Trading Symbol(s)**	**Name of each exchange on which registered**
Common stock, par value $0.001 per share	APRE	NASDAQ Global Select Market

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 (§230.405 of this chapter) or Rule 12b-2 of the Securities Exchange Act of 1934 (§240.12b-2 of this chapter).

Emerging growth company ☒

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☒

Item 2.02 Results of Operations and Financial Condition

As discussed below, in connection with participation in the 40th Annual J.P. Morgan Healthcare Conference, Aprea Therapeutics, Inc. (the 'Company") updated its corporate presentation to include disclosure that the Company expects cash and cash equivalents of $50.0 million to $55.0 million (unaudited) as of December 31, 2021.

Because the Company's consolidated financial statements for the year ended December 31, 2021 have not yet been finalized or audited, the preliminary statement of the Company's cash and cash equivalents as of December 31, 2021 in this Item 2.02 is subject to change, and the Company's actual cash and cash equivalents as of December 31, 2021 may differ materially from this preliminary estimate. Accordingly, you should not place undue reliance on this preliminary estimate.

Item 7.01 Regulation FD Disclosure

Beginning on January 13, 2022, the Company will participate in the 40th Annual J.P. Morgan Healthcare Conference. The Company has updated its corporate presentation that it intends to use in connection with its presentation on Thursday January 13, 2022 at 11:15 p.m. Eastern Time in meetings with investors.

A copy of the Company's corporate presentation is attached hereto as Exhibit 99.1 and is hereby incorporated by reference herein.

The information contained in Item 2.02 and Item 7.01 of this Current Report on Form 8-K, including Exhibit 99.1, is furnished pursuant to Item 2.02 and Item 7.01 of Form 8-K and shall not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, or otherwise subject to the liabilities of that section, nor shall it be deemed incorporated by reference in any filing under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, except as expressly stated by specific reference in such filing.

Item 9.01. Financial Statements and Exhibits.

(d) Exhibits.

Exhibit Number	Description
99.1	Aprea Therapeutics, Inc. Presentation
104	The cover page from this Current Report on Form 8-K, formatted as Inline XBRL

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned hereunto duly authorized.

Aprea Therapeutics, Inc.

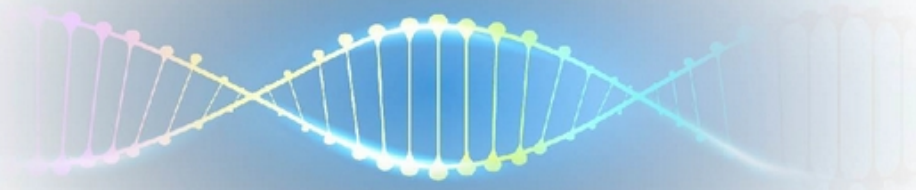
Dated:January 13, 2022

By: /s/ Christian S. Schade
Name: Christian S. Schade
Title: Chairman and Chief Executive Officer

Exhibit 99.1

aprea therapeutics

The p53 Reactivation Company



J.P. Morgan 40th Annual Healthcare Conference

January 2022

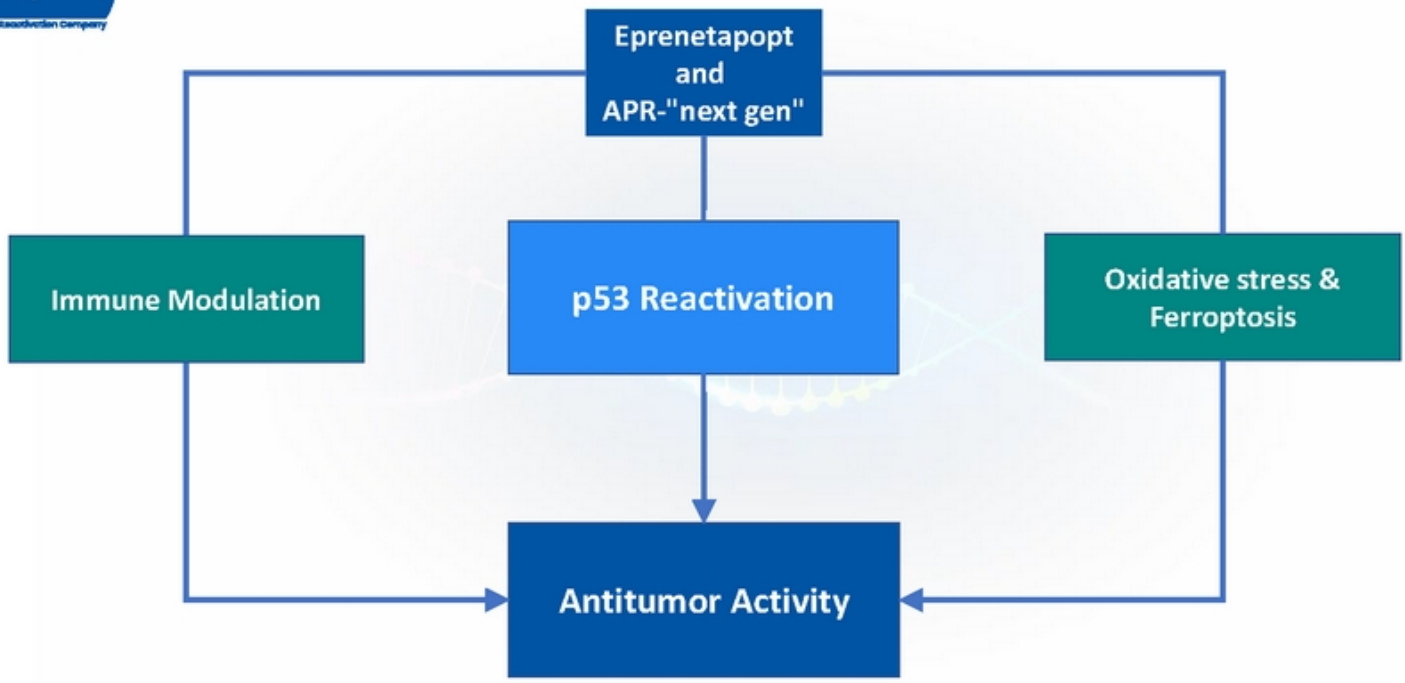
Forward-Looking Statements

Certain information contained in this presentation includes "forward-looking statements", within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, related to our clinical trials, regulatory submissions and strategic plans. We may, in some cases use terms such as "predicts," "believes," "potential," "continue," "anticipates," "estimates," "expects," "plans," "intends," "may," "could," "might," "likely," "will," "should" or other words that convey uncertainty of the future events or outcomes to identify these forward-looking statements. Our forward-looking statements are based on current beliefs and expectations of our management team that involve risks, potential changes in circumstances, assumptions, and uncertainties. Any or all of the forward-looking statements may turn out to be wrong or be affected by inaccurate assumptions we might make or by known or unknown risks and uncertainties. These forward-looking statements are subject to risks and uncertainties including risks related to the success and timing of our clinical trials or other studies and the other risks set forth in our filings with the U.S. Securities and Exchange Commission, including our Quarterly Report on Form 10-Q. For all these reasons, actual results and developments could be materially different from those expressed in or implied by our forward-looking statements. You are cautioned not to place undue reliance on these forward-looking statements, which are made only as of the date of this presentation. We undertake no obligation to publicly update such forward-looking statements to reflect subsequent events or circumstances.

Presentation Overview

- 2021 Year in Review
  - MDS Phase 3 study v. Phase 2
  - Undertreatment in experimental arm negatively impacted efficacy in the Phase 3 study
  - Phase 3 study design complicated results
  - FDA interaction
- FDA Clinical Holds
  - Lymphoid malignancies full clinical hold lifted
  - Myeloid clinical studies partial clinical hold
    - FDA interaction
- What's Next
  - Lymphoid & myeloid clinical studies
    - Introduce "oral" eprenetapopt
  - APR-548 & APR-3rd Generation
- 2022 Corporate Strategy
  - Explore New Opportunities
  - Cash Burn
  - 2022 Milestones

Multiple Pathways to Induce Antitumor Activity



Efficacy Results from Phase 3 vs Phase 2 Trials

Top-line Phase 3 data released December 2020

- Phase 3 trial failed to meet CR primary endpoint in ITT population at LPI + 6 data cutoff
  - ◊ 53% more patients achieved CR in eprenetapopt + AZA arm
  - ◊ Primary CR endpoint missed p-value < 0.05 by a total of ~4 patients
- ORR, duration of responses in ITT population favor eprenetapopt + AZA but not significantly different from AZA

Efficacy in MDS Patients	Phase 3 (LPI + 6 months)		Eprenetapopt + AZA Phase 2 Trials	
(ITT population)	Experimental Arm	Control Arm	U.S. Trial[1]	French Trial[2]
Response Rates, %				
CR	33.3 (P=0.13)	22.4	50	47
ORR	65.4	48.7	73	62
Duration of response, median, days				
CR	261	229	210	312
Overall	239	185	252	342

- Phase 3 trial LPI + 12 months data cut update
  - ◊ 34.6% CR rate in Experimental Arm vs 22.4% CR rate in Control Arm
  - ◊ 65.4% ORR in Experimental Arm vs 47.4% in Control Arm

[1]Sallman et al, J Clin Oncol, 2021; [2]Cluzeau et al, J Clin Oncol, 2021

Observations between Phase 3 vs Phase 2 Clinical Studies

- Study Demography: Phase 3 vs. Phase 2
  - Similar baseline disease characteristics (though higher proportion of higher risk patients in Phase 3 experimental arm)
  - Similar patient profile of *TP53* and non-*TP53* mutations
- Clinical Observations:
  - Adverse event type and frequency consistent with underlying disease
  - Phase 3 experimental arm patients received fewer treatment cycles than in control arm and in Phase 2 trials
  - Phase 3 experimental arm patients experienced higher rate of AZA dose modifications than control arm and in Phase 2 trials, leading to a loss of dose intensity/synergy
  - Phase 3 experimental arm had highest rate of patients with adverse prognosis compared to control arm and Phase 2 studies:
    - Therapy-related MDS
    - Higher *TP53* VAF and/or > 1 *TP53* mutation
    - Higher frequency of complex karyotype
  - Phase 3 open label study may have led to experimental arm treatment and selection bias

Conclusions and Next Steps

- Phase 3 Clinical Study Review
  - Response rate data encouraging despite topline miss
  - Study results impacted by study design and execution
    - Near miss on end-point: larger study?
    - Un-blinded study design may have resulted in treatment and selection bias
    - How much did COVID impact patient treatment?
- Commenced Phase 3 data review in Q3 2021 with FDA
  - Focus of FDA review centered on AE imbalance between experimental vs control arms
  - Justify or explore dose of eprenetapopt for optimal benefit-risk ratio
- FDA clinical holds announced in Q3 2021
  - Myeloid malignancy clinical trials: Partial Clinical Hold – August 4, 2021
    - Remaining patients in 3 fully-enrolled studies deriving clinical benefit permitted to continue therapy
  - Lymphoid malignancy program: Full Clinical Hold – August 11, 2021

Clinical Hold Update

Myeloid Malignancies

Phase 3 Frontline MDS, Phase 2 AML, Phase 2 Post-Transplant MDS/AML

- FDA Partial Clinical Hold – Summary information requests
  - Review and analyze safety database for infections, by dose levels
  - Provide SAE listings and patient narratives, by dose levels
  - Develop strategy for optimal dosing regimen of eprenetapopt with AZA
- All studies previously completed enrollment – 7 patients remain across 3 studies
- FDA interaction – 12/2021
  - Submission included extensive data and analyses to include:
    - Per patient clinical narratives
    - Listings and analyses of infections across eprenetapopt monotherapy and AZA combination studies
  - Discussed and reached preliminary agreement on proposals for new clinical studies
    - New studies to begin with dose optimization followed by controlled Phase 2 studies
- Anticipate FDA agreement to proceed with myeloid clinical development Q1 2022
  - Agreement on new dose optimization studies under current IND
  - Future updates on progress of new clinical studies

Lymphoid Malignancies
Phase 1 Relapsed/Refractory CLL/MCL

- FDA Clinical Hold – Summary information requests
  - Explore optimal dose in dose-escalation design
- Phase 1 study had enrolled 1 patient
  - Patient achieved CR
- FDA interaction October 2021
  - Submission included proposed amendments for clinical studies to proceed
    - New studies to include dose optimization in later-line NHL population
- FDA Clinical Hold lifted December 2021


2022 Development Strategy
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ASH 2021 Oral Presentation

Phase II Trial of Eprenetapopt (APR-246) in Combination with Azacitidine (AZA) As Maintenance Therapy for *TP53* Mutated AML or MDS Following Allogeneic Hematopoietic Stem Cell Transplantation (HCT)

Asmita Mishra, MD,[1] Roni Tamari, MD,[2] Amy E. DeZern, MD,[3] Michael T. Byrne, DO,[4] Mahasweta Gooptu, MD[5], Yi-Bin Chen, MD[6], H. Joachim Deeg, MD[7], Phillip Gallacher[8], Anders Wennborg, MD, PhD[8], Denice Kaylor Hickman, BSN, RN[8], Eyal C. Attar, MD[8] and Hugo F. Fernandez, MD[9]

[1]Department of Blood and Marrow Transplant and Cellular Immunotherapy, H. Lee Moffitt Cancer Center and Research Institute, Tampa, FL; [2]Adult Bone Marrow Transplant Service, Memorial Sloan Kettering Cancer Center, New York, NY; [3]Sidney Kimmel Comprehensive Cancer Center, Johns Hopkins University, Baltimore, MD; [4]Department of Medicine, Division of Hematology and Oncology, Vanderbilt University Medical Center, Nashville, TN; [5]Dana-Farber Cancer Institute, Division of Hematologic Malignancies, Harvard Medical School, Boston, MA; [6]Blood and Marrow Transplant Program, Massachusetts General Hospital, Boston, MA; [7]Clinical Research Division, Fred Hutchinson Cancer Research Center, Seattle, WA; [8]Aprea Therapeutics, Boston, MA; [9]Moffitt Cancer Center, Pembroke Pines, FL

Outcomes from Post-HCT Maintenance Study of Eprenetapopt with Aza Compare Favorably to Historical Data

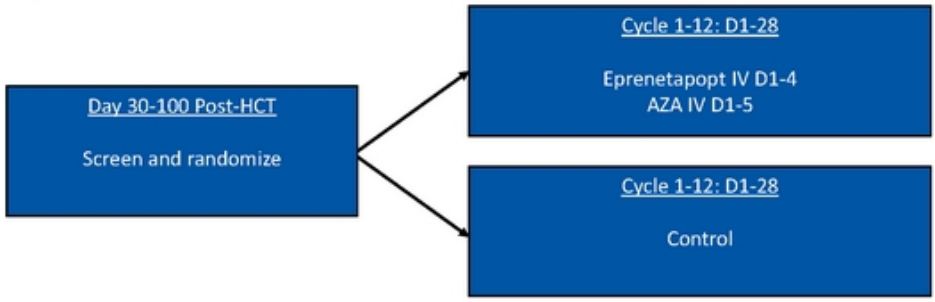
	TP53 Mutant MDS/AML Eprenetapopt + AZA* (N=33)	CIBMTR Retrospective Analysis**	
		AML *TP53* mutant and complex cytogenetics (N=153)	MDS *TP53* mutant and/or complex cytogenetics (N=314)
Relapse-free survival n, (95% CI)			
Median, months	**12.5 (9.6-NR)**	5.0 (0.3-30.6)	4.4 (0.3-34.7)
1-year , %	**60 (41.0-74.4)**	36 (28-44)	35 (29-41)
2-year, %	Not available	28 (21-36)	23 (17-29)
Overall survival			
Median, months	**20.6 (14.2-NR)**	7.0 (0.3-36.4)	6.9 (0.3-36.3)
1-year, %	**79 (60.6-89.3)**	56 (48-64)	51 (45-56)
2-year, %	Not available	38 (30-47)	36 (30-42)

- Data suggest Post-HCT maintenance therapy with eprenetapopt and AZA was safe and tolerable
  - Majority of AEs comprised known complications in the post-HCT period
  - 13 participants (42%) completed 12 cycles
- Study met primary hypothesis of 1-year RFS > 50% based on historical data of 1-year RFS 30%.

* Mishra A., et al., ASH, 2021,**Retrospective CIBMTR Analysis, 2021 (unpublished), NR=not estimable

Eprenetapopt + AZA vs Control in *TP53* Mutant MDS/AML Post-HCT Maintenance

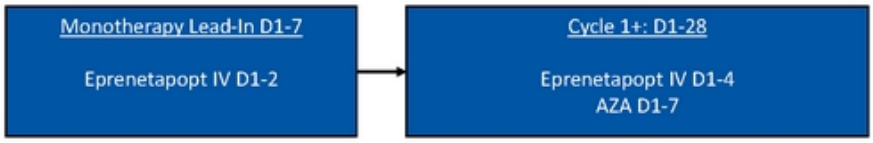
- Encouraging 1-yr RFS, 1-yr OS, median RFS, and median OS observed in patients with *TP53* mutant MDS/AML who received post-HCT maintenance with eprenetapopt + AZA compared to historical data
- Overview of proposed registrational randomized controlled trial of eprenetapopt + AZA vs. control arm in *TP53* mutant MDS/AML post-HCT maintenance



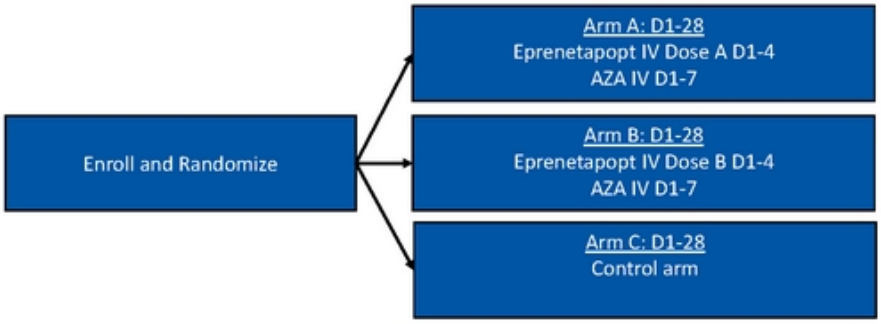
- Status
  - Discussion with national transplant cooperative group and registrational trial design 1H 2022
  - Plan for initiation of enrollment in 2023 following FDA agreement

Clinical Development Plan in *TP53* Mutant Myeloid Malignancies Pending Final FDA approval

- Overview of Phase 1 Trial in R/R *TP53* mutant MDS/AML to assess 3 dose levels to determine optimal dose of eprenetapopt (N=up to 30)

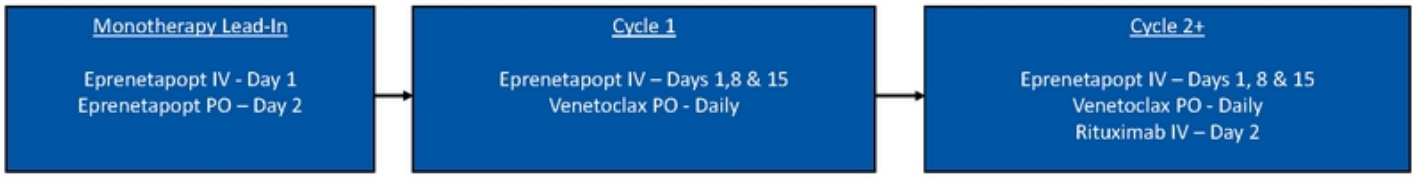


- Status
  - ◊ Plan first patient enrolled Q2 2022
  - ◊ Preliminary tolerability and efficacy data anticipated 2H 2022
- Overview of subsequent Phase 2 Trial in *TP53* mutant MDS (N=up to 30 per arm)



Phase 1 Trial of Eprenetapopt Combination Therapy in R/R *TP53* Mutant Richter's Transformed NHL

- In large cancer cell databases, lymphoid cancer cell lines appear to be among the most sensitive to eprenetapopt[1].
- Overview of Phase 1 Trial in R/R Richter's Transformed NHL (N=up to 30)
- Introduce oral administration of eprenetapopt (PK data to inform clinical opportunities)

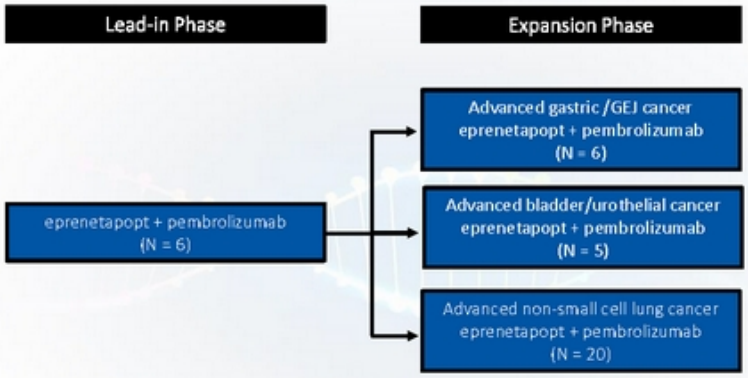


- Status
  - Plan first patient enrolled Q2 2022
  - Preliminary tolerability and efficacy data anticipated 2H 2022

[1] Aprea analysis of Broad Institute DepMap portal (www.depmap.org); Picco et al, *Nat Commun*, 2019.

Phase 1/2 Trial of Eprenetapopt + Pembrolizumab Combination in Advanced Solid Tumors

- Overview of Phase 1/2 Solid Tumor Trial



- Program update
  - No dose limiting toxicities in lead-in phase (N=6)
  - Enrollment completed, with 6 patients enrolled to gastric, 5 to bladder arm and 20 to NSCLC
  - Presented at ESMO, Paris, France, September 2021, by Park H., et al.
  - 2 patients with squamous NSCLC with prior PD1/PDL1 exposure had reductions in tumor size at 1st disease assessment.
    - Subsequently, 1 patient has achieved at PR (~30% reduction in tumor volume)
  - 1 Bladder cancer patient having relapsed after prior chemotherapy achieved CR, and 1 patient without prior therapy has achieved PR
  - Planning future study of oral eprenetapopt with IO therapy

New Generation APR molecules
APR-548 & APR-3rd generation

- Overview of APR-548 FIH Trial

- APR-548: Status
  - 3 patients enrolled
  - Expect to stop enrollment up to ~10 patients
  - Provides opportunity to collect blood and bone marrow samples to study pharmacodynamics

- APR – 3rd Generation
  - New molecules suitable for oral administration approaching CMC scale up and toxicology
  - Goal is to file IND in Q4 2022
  - Expect new CoM IP


2022 Corporate Strategy
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Identify New Assets & Opportunities

- Capitalize on Scientific and Development Expertise
  - Knowledge of disease processes and therapeutic targets/pathways, including
    - DNA damage
    - Cell cycle control
    - Oxidative stress
    - Apoptosis and Ferroptosis
  - Clinical Development
    - Clinical operations
    - Clinical trial design and execution in solid tumor and hematologic malignancy indications
- Active search for platforms/programs
  - Complement current oncology development skills
  - Diversify pipeline opportunities away from single product focus
  - Create potential new business development opportunities

2022 Financial and Planned Clinical Milestones

- Financial
  - $50 - 55 million of cash and cash equivalents (unaudited) expected at December 31, 2021
  - Anticipated cash burn for 2022: $25 – 30 million
  - Existing cash should fund operations into 2023
  - Exploring new assets and opportunities

- 2022 Planned Clinical Development Milestones
  - **Phase 1/2 MDS/AML Trial: Dose optimization data Q4**
  - Phase 1 NHL Trial: **Dose optimization data Q4**
    - **Oral administration data**
  - **APR-548: Complete patient enrollment 1H**
  - **APR-3rd : Generation: Submit IND Q4**

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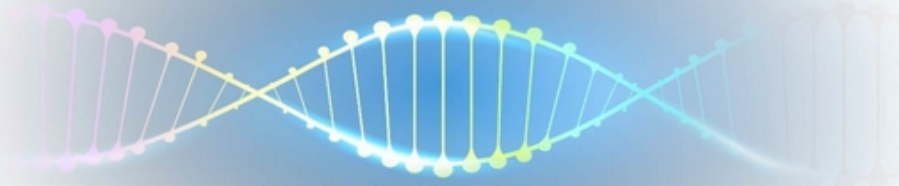
The p53 Reactivation Company



J.P. Morgan 40th Annual Healthcare Conference

January 2022