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

Date of Report (Date of earliest event reported): December 9, 2022

APTOSE BIOSCIENCES INC.
(Exact name of registrant as specified in its charter)

Canada	**001-32001**	**98-1136802**
(State or Other Jurisdiction of Incorporation)	(Commission File Number)	(I.R.S. Employer Identification No.)

251 Consumers Road, Suite 1105
Toronto, Ontario M2J 4R3
(Address of Principal Executive Offices) (Zip Code)

(647) 479-9828
(Registrant's telephone number, including area code)

(Former name or former address, if changed since last report)

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 Shares, no par value	APTO	NASDAQ Capital 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 8.01 Other Events.

Aptose Biosciences Inc. ("Aptose") has provided a clinical update of its lead oral myeloid kinome inhibitor, tuspetinib (formerly HM43239), as responses continue to emerge from a Phase 1/2 trial, and from its oral, dual lymphoid and myeloid kinase inhibitor, luxeptinib (formerly CG-806) in an ongoing Phase 1a/b trial.

Tuspetinib, a once daily oral agent designed to target FLT3, SYK, and JAK kinases but avoid targets that drive toxicities, safely delivered complete remissions (CR/CRh/CRi/CRp) as a monotherapy across four dose levels (40mg, 80mg, 120mg, and 160mg) in acute myeloid leukemia (AML) patients that previously had been failed by chemotherapy, Bcl-2 inhibitors, hypomethylating agents, competitor FLT3 inhibitors, and hematopoietic stem cell transplants. Data were presented at the 2022 American Society of Hematology (ASH) annual meeting by lead investigator Naval G. Daver, M.D., Associate Professor in the Department of Leukemia at MD Anderson Cancer Center, showing tuspetinib delivers single agent responses in very ill and heavily pretreated relapsed or refractory AML patients of mutationally-defined populations, including those with AML harboring wild-type FLT3, ITD or TKD mutated FLT3, or mutated forms of NPM1, MLL,TP53, NRAS, KRAS, DNMT3A, RUNX1, various slicing factors, and other genes.

As of October 6, 2022, 60 heavily pretreated relapsed/refractory AML patients were enrolled at multiple centers and treated at doses escalating from 20 mg to 200 mg, with further dose exploration at the 40 mg, 80 mg, 120 mg and 160 mg dose levels. Prior to Aptose licensing tuspetinib, Hanmi Pharmaceutical Company demonstrated complete remissions at the 80 mg dose level. As of January 1, 2022, Aptose assumed control of clinical trial activities and has demonstrated additional complete remissions at the 120 mg, 160 mg, and now the 40 mg dose levels. Many responders were bridged successfully to hematopoietic stem cell transplant (HSCT), while others not eligible for HSCT remained on tuspetinib with a durable response and no drug related myelosuppression even after months of continuous dosing.

The noteworthy safety and potency profile position tuspetinib, in both FLT3 mutated and unmutated AML patients, potentially to become the kinase inhibitor of choice to combine with venetoclax and hypomethylating agents to deliver high response rates without exacerbated myelosuppression or life-threatening toxicities and potentially to become the preferred agent for maintenance therapy to prevent relapse after HSCT or drug-induced complete remissions. Such roles can define the ultimate therapeutic success for patients and commercial success for tuspetinib.

"While the superior target and safety profile, and proven breadth of activity of tuspetinib compared to competitive compounds in development advocate for tuspetinib to participate in broader and more sizable commercial markets," said William G. Rice, Ph.D., Chairman, President, and Chief Executive Officer, "responses generated by tuspetinib in mutationally-defined populations of high unmet need may also provide accelerated approval opportunities."

Highlights of Updated Tuspetinib Data

- In addition to 5 CRc and 1 PR reported at ASH 2021, 4 new CRc and 3 new PR have been generated thus far during 2022.
- New responses from 2022 include three at the 160 mg dose, two at the 120 mg dose, one at the 80 mg dose, and one at the 40 mg dose level.
- Among FLT3+ mutant patients treated across dose levels, 8 of 21 (38.1%) achieved a response.
- Among FLT3+ patients with prior FLT3i, 3 of 11 (27.3%) of patients achieved responses.
- Among FLT3+/NPM1+ patients across dose levels, 4 of 6 (66.7%) achieved responses.
- Among FLT3+/NPM1+/DNMT3A+ patients across dose levels, 3 of 4 (75%) achieved responses.
- Among N/K-RAS+ patients across dose levels, 3 of 8 (37.5%) achieved responses.
- Among FLT3-WT/ TP53+ patients, 1 of 3 (33%) achieved a response.
- Among FLT3-WT patients across dose levels, 4 of 21 (19%) as of the data cut off achieved a clinical response, with one additional response (CRi) achieved since then.

- Significant bone marrow leukemic blast reductions were observed broadly in FLT3+ and FLT3 wildtype patients across multiple dose levels, comparable to reported gilteritinib data, but in more heavily pre-treated relapsed and refractory AML patients (waterfall chart available on Aptose website).
- Vignettes of patient experience highlight the potency of tuspetinib to deliver complete remission among distinct mutationally-defined populations with a diversity or adverse mutations.
- Tuspetinib continued to show a favorable safety profile with only mild AEs and no DLTs up to 160 mg per day, and no drug discontinuations from drug related toxicity.
    - No drug related SAE, drug related deaths, differentiation syndrome
    - No drug related AE of QT prolongation
    - No DLT through 160 mg level – one DLT of muscle weakness at 200 mg (not rhabdomyolysis)
    - No observed muscle destruction – no AE of elevated creatinine phosphokinase (CPK)
    - Avoids many of the typical toxicities observed with other tyrosine kinase inhibitors
- Aptose has identified a safe therapeutic range with a broad therapeutic window, spanning the dose levels of 40, 80, 120 and 160 milligrams.
- For the APTIVATE expansion trial that has initiated patient enrollment, Aptose has selected 120 milligrams as the initiating single agent expansion dose and 80mg as the initiating dose selected for combination with venetoclax. The trial is designed to confirm activity through patient enrichment of specific mutationally defined AML populations, including FLT3-mutant patients who have been failed by a prior FLT3 inhibitor, as supported by fast-track designation and significant response rate to date.

Aptose also provided an update of the luxeptinib clinical program:

Luxeptinib Key Highlights

Luxeptinib is an oral, first-in-class FLT3 and BTK kinase inhibitor in Phase 1 a/b clinical studies for the treatment of myeloid hematologic malignancies. This small molecule demonstrates potent inhibition of wild type and all mutant forms of FLT3 (including internal tandem duplication, or ITD, and mutations of the receptor tyrosine kinase domain and gatekeeper region) and cures animals of AML in the absence of toxicity in murine leukemia models. The original G1 formulation of luxeptinib was hampered by poor absorption resulting in inadequate exposure levels.

- The "G3" formulation was designed and developed for more rapid absorption (early Tmax), more efficient absorption (use lower doses), longer retention (longer $t_{1/2}$), and greater accumulation (higher steady state levels).
- Aptose recently announced the dosing of the first patient to receive a continuous dosing regimen of the G3 formulation of luxeptinib in the ongoing Phase 1a/b clinical trial in patients with relapsed or refractory AML. As of this date, a second patient has begun continuous dosing with G3.
- The new G3 formulation this year was tested as a single dose in 20 patients from a Phase 1 clinical program of luxeptinib. Modeling of the pharmacokinetic (PK) properties of G3 predicts steady-state plasma exposure from continuous dosing with 50 mg of G3 (every 12 hours, Q12h) should be comparable to that of 900 mg of the original G1 formulation Q12h, representing up to an 18-fold improvement in bioavailability with G3. Patients now are receiving continuous dosing with the 50mg G3 Q12h dose, with the protocol allowing for further dose escalation of G3 in subsequent cohorts.
- Prior, one patient administered the original G1 formulation achieved exposures that enabled a complete remission (CR) in an R/R AML patient.
- During studies with the original G1 formulation, tumor shrinkage also was demonstrated among B-cell cancer patients, including a very recent report of a complete response (CR) in a DLBCL patient that was determined via biopsy analysis at the end of Cycle 22 with 900mg BID dosing of the original G1 formulation
- The G3 formulation may result in greater exposures of luxeptinib and additional responses in this difficult-to-treat patient population.
- Aptose expects that 9-15 patients will determine if G3 is safe and achieves desired exposures to deliver clinical responses.

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.

Date: December 9, 2022

APTOSE BIOSCIENCES INC.

By: /s/ Fletcher Payne
Name: Fletcher Payne
Title: Senior Vice President & Chief Financial Officer