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Subject to completion
Preliminary prospectus supplement dated January 14, 2019

The information in this preliminary prospectus supplement is not complete and may be changed. A registration statement relating to these securities has been filed with the Securities and Exchange Commission and is effective. This preliminary prospectus supplement and the accompanying prospectus are not an offer to sell these securities and we are not soliciting an offer to buy these securities in any state where the offer or sale is not permitted.

Prospectus supplement

(to Prospectus dated August 18, 2017)

6,600,000 Shares

Common stock

We are offering 6,600,000 shares of our common stock in this offering.

Our common stock is listed on The Nasdaq Capital Market under the symbol "STML." On January 11, 2019, the last reported sale price of our common stock on The Nasdaq Capital Market was $9.89 per share.

Investing in our common stock involves a high degree of risk. See "Risk Factors" beginning on page S-8 of this prospectus supplement and in the documents incorporated by reference into this prospectus supplement.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed upon the adequacy or accuracy of this prospectus supplement or the accompanying prospectus. Any representation to the contrary is a criminal offense.

	Per share	Total
Public offering price	$	$
Underwriting discounts and commissions	$	$
Proceeds to Stemline, before expenses	$	$

Delivery of the shares of common stock is expected to be made on or about , 2019. We have granted the underwriters an option for a period of 30 days to purchase an additional 990,000 shares of our common stock. If the underwriters exercise the option in full, the total underwriting discounts and commissions payable by us will be $, and the total proceeds to us, before expenses will be $.

J.P. Morgan

Prospectus Supplement dated , 2019

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You should rely only on the information contained in or incorporated by reference in this prospectus supplement, the accompanying prospectus and in any free writing prospectus that we have authorized for use in connection with this offering. We have not authorized any other person to provide any information other than that contained or incorporated by reference into this prospectus supplement, the accompanying prospectus or in any free writing prospectus prepared by or on behalf of us or to which we have referred you. We take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. You should not assume that the information contained in this prospectus supplement or the accompanying prospectus is accurate as of any date other than the date of this prospectus supplement or the accompanying prospectus, or that information contained in any document incorporated or deemed to be incorporated by reference is accurate as of any date other than the date of that document. Our business, financial condition, results of operations and prospects may have changed since that date. You should read this prospectus supplement, the accompanying prospectus, the documents incorporated by reference in this prospectus supplement and

the accompanying prospectus, and any free writing prospectus that we have authorized for use in connection with this offering, in their entirety before making an investment decision. You should also read and consider the information in the documents to which we have referred you in the sections of this prospectus supplement entitled "Where You Can Find More Information" and "Incorporation of Certain Information by Reference."

About this prospectus supplement

This document is in two parts. The first part is this prospectus supplement, which describes the specific terms of this offering of common stock and also adds to and updates information contained in the accompanying prospectus and the documents incorporated by reference in this prospectus supplement and the accompanying prospectus. The second part, the accompanying prospectus, dated August 18, 2017, provides more general information, some of which may not apply to this offering. Generally, when we refer to this prospectus supplement, we are referring to both parts of this document combined. To the extent there is a conflict between the information contained in this prospectus supplement and the information contained in the accompanying prospectus or any document incorporated by reference that was filed with the U.S. Securities and Exchange Commission, or SEC, before the date of this prospectus supplement, you should rely on the information in this prospectus supplement; provided that if any statement in one of these documents is inconsistent with a statement in another document having a later date—for example, a document incorporated by reference in the accompanying prospectus—the statement in the document having the later date modifies or supersedes the earlier statement.

We further note that the representations, warranties and covenants made by us in any agreement that is filed as an exhibit to any document that is incorporated by reference herein were made solely for the benefit of the parties to such agreement, including, in some cases, for the purpose of allocating risk among the parties to such agreements, and should not be deemed to be a representation, warranty or covenant to you. Moreover, such representations, warranties or covenants were accurate only as of the date when made. Accordingly, such representations, warranties and covenants should not be relied on as accurately representing the current state of our affairs.

We are offering to sell, and seeking offers to buy, shares of our common stock only in jurisdictions where offers and sales are permitted. The distribution of this prospectus supplement and the accompanying prospectus and the offering of the common stock in certain jurisdictions may be restricted by law. Persons outside the United States who come into possession of this prospectus supplement and the accompanying prospectus must inform themselves about, and observe any restrictions relating to, the offering of the common stock and the distribution of this prospectus supplement and the accompanying prospectus outside the United States. This prospectus supplement and the accompanying prospectus do not constitute, and may not be used in connection with, an offer to sell, or a solicitation of an offer to buy, any securities offered by this prospectus supplement and the accompanying prospectus by any person in any jurisdiction in which it is unlawful for such person to make such an offer or solicitation.

Unless otherwise stated, all references in this prospectus supplement to "we," "us," "our," "Stemline," the "Company" and similar designations refer to Stemline Therapeutics, Inc. This prospectus supplement contains trademarks and trade names of Stemline Therapeutics, Inc., including our name and logo. Other service marks, trademarks and trade names referred to in this document are the property of their respective owners.

Special cautionary notice regarding forward-looking statements

Certain matters discussed in this prospectus supplement and the accompanying prospectus, including matters discussed under the caption "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our Annual Report on Form 10-K and our Quarterly Reports on Form 10-Q, each as incorporated by reference herein, may constitute forward-looking statements for purposes of the Securities Act of 1933, as amended, or the Securities Act, and the Securities Exchange Act of 1934, as amended, or the Exchange Act, and involve known and unknown risks, uncertainties and other factors that may cause our actual results, performance or achievements to be materially different from the future results, performance or achievements expressed or implied by such forward-looking statements. The words "anticipate," "believe," "estimate," "may," "expect" and similar expressions are generally intended to identify forward-looking statements. Our actual results may differ materially from the results anticipated in these forward-looking statements due to a variety of factors, including, without limitation, those discussed under the captions "Risk factors," "Management's Discussion and Analysis of Financial Condition and Results of Operations" and elsewhere in this prospectus supplement and the documents incorporated by reference herein, as well as other factors which may be identified from time to time in our other filings with the SEC, or in the documents where such forward-looking statements appear. All written or oral forward-looking statements attributable to us are expressly qualified in their entirety by these cautionary statements.

Some of the factors that we believe could cause actual results to differ from those anticipated or predicted include:

- the success and timing of our MAA submission to the EMA CHMP;
- the success and timing of our clinical trials and preclinical studies for our product candidates, including site initiation, institutional review board approval, scientific review committee approval, patient accrual, safety, tolerability and efficacy data observed, and input from regulatory authorities, including the risk that the FDA, EMA, or other ex-U.S. national drug authority, ultimately does not agree with our data, find our data supportive of approval, or approve any of our product candidates;
- the possibility that results of clinical trials are not predictive of safety and efficacy results of our product candidates in broader patient populations or of our products if approved
- our ability to successfully file and obtain timely marketing approval from the U.S. Food and Drug Administration, or FDA, or comparable foreign regulatory agency for one or more Biologics License Applications, or BLAs, or New Drug Applications, NDAs or comparable foreign marketing authorization submissions;
- our ability to obtain and maintain marketing approval from regulatory agencies for our products in the U.S. and foreign countries;
- our ability to adhere to ongoing compliance requirements of all health authorities, in the U.S. and foreign countries;
- our ability to obtain and maintain adequate reimbursement for our products;
- our ability to obtain the desired labeling of our products under any regulatory approval we might receive;

- our plans to develop and commercialize our product candidates, including, but not limited to delays in arranging satisfactory manufacturing capabilities and establishing commercial infrastructure for ELZONRIS;
- product efficacy or safety concerns resulting in product recalls or regulatory action;
- the risk that estimates regarding the number of patients with the diseases that our products and product candidates may treat are inaccurate;
- our products not gaining acceptance among patients (and providers or third party payers) for certain indications (due to cost or otherwise);
- the risk that third party payors (including governmental agencies) will not reimburse for the use of ELZONRIS at acceptable rates or at all;
- the company's ability to maintain or increase sales of ELZONRIS;
- the company's ability to develop and commercialize ELZONRIS;
- the adequacy of our pharmacovigilance and drug safety reporting processes;
- the successful development and implementation of sales and marketing campaigns;
- the loss of key scientific or management personnel;
- the size and growth of the potential markets for our product candidates and our ability to serve those markets;
- our ability to successfully compete in the potential markets for our product candidates, if commercialized;
- regulatory developments in the United States and foreign countries;
- the rate and degree of market acceptance of any of our product candidates;
- new products, product candidates or new uses for existing products or technologies introduced or announced by our competitors and the timing of these introductions or announcements;
- market conditions in the pharmaceutical and biotechnology sectors;
- our available cash and investments;
- the accuracy of our estimates regarding expenses, future income, capital requirements and needs for additional financing;
- our ability to obtain additional funding;
- our ability to obtain and maintain intellectual property protection for our products and product candidates;
- delays, interruptions, or failures in the manufacture and supply of our products and product candidates;
- our ability to maintain the license agreements for our clinical drug candidates;
- the success and timing of our preclinical studies, including those intended to support an Investigational New Drug, or IND, application;

- the ability of our product candidates to successfully perform and advance in clinical trials;
- our ability to obtain and maintain authorization from regulatory authorities for use of our product candidates for the initiation and conduct of clinical trials;
- the ability of our third-party manufacturers to manufacture and supply our products, gain access to products we plan to use in combination studies and the performance of, and reliance on, our third-party manufacturers and suppliers;
- the performance of our clinical research organizations, clinical trial sponsors, and clinical trial investigators; and
- our ability to successfully implement our strategy.

The forward-looking statements contained in this prospectus supplement and the accompanying prospectus reflect our views and assumptions only as of the date of this prospectus supplement. Except as required by law, we assume no responsibility for updating any forward-looking statements.

We qualify all of our forward-looking statements by these cautionary statements. In addition, with respect to all of our forward-looking statements, we claim the protection of the safe harbor for forward-looking statements contained in the Private Securities Litigation Reform Act of 1995.

Prospectus supplement summary

This summary highlights information contained elsewhere or incorporated by reference in this prospectus supplement and the accompanying prospectus and in the documents we incorporate by reference. This summary does not contain all of the information that you should consider before deciding to invest in our common stock. You should read this entire prospectus supplement and the accompanying prospectus carefully, including the information referred to in the section entitled "Risk Factors" beginning on page S-8 of this prospectus supplement, as well as the other documents that we incorporate by reference into this prospectus supplement and the accompanying base prospectus, including our financial statements and the exhibits to the registration statement of which this prospectus supplement and the accompanying base prospectus is a part.

Overview

We are a commercial-stage biopharmaceutical company focused on discovering, acquiring, developing and commercializing innovative oncology therapeutics. In December 2018, the U.S. Food and Drug Administration, or FDA, approved our first product, ELZONRIS™ (tagraxofusp; SL-401), a targeted therapy directed to CD123, for the treatment of adult and pediatric patients, two years and older, with blastic plasmacytoid dendritic cell neoplasm, or BPDCN. We are currently in the process of launching ELZONRIS for patients with BPDCN in the U.S.

In November 2018, the European Medicines Agency, or EMA, granted accelerated assessment to the marketing authorization application, or MAA, of ELZONRIS for the treatment of patients with BPDCN. The MAA was submitted to the EMA in January 2019.

We are also seeking to broaden the commercial potential of ELZONRIS, globally, through ongoing clinical trials in additional indications including chronic myelomonocytic leukemia, or CMML, and myelofibrosis, or MF, acute myeloid leukemia, or AML, as well as planned trials in other CD123+ malignancies.

Our other clinical candidates include: SL-801, a novel oral small molecule reversible inhibitor of XPO1, which is currently in a Phase 1 trial of patients with advanced solid tumors and recent data were presented at the 2018 European Society of Medical Oncology, or ESMO, annual conference; SL-701, an immunotherapeutic, which has completed a Phase 2 trial in patients with second-line glioblastoma and recent data were presented at the 2018 Society for Neuro-Oncology, or SNO, annual conference; and SL-901, an oral, small molecule kinase inhibitor with a novel profile that could have potential in oncology and certain rare non-oncologic diseases.

ELZONRIS

ELZONRIS is a novel targeted therapy directed to the interleukin-3 receptor-α, or CD123, a target present on a wide range of malignancies as well as some autoimmune disorders. ELZONRIS has been approved by the FDA for the treatment of BPDCN in adult and pediatric patients two years and older, in both treatment-naïve and previously-treated populations. The ELZONRIS label contains a boxed warning for capillary leak syndrome, or CLS, which may be life-threatening or fatal, and can occur in patients receiving ELZONRIS. Physicians are advised to monitor for signs and symptoms of CLS and take actions as recommended in the full prescribing information. ELZONRIS is the first treatment approved for BPDCN and the first approved CD123-targeted therapy.

BPDCN is an aggressive, orphan hematologic malignancy with historically poor outcomes. BPDCN may present with features similar to, and can be mistaken for, certain diseases including acute myeloid leukemia, non-Hodgkin's lymphoma, acute lymphocytic leukemia, myelodysplastic syndromes, and chronic myelomonocytic leukemia, as well as other malignancies with skin manifestations. BPDCN typically presents in the bone marrow and/or skin, and may also involve lymph nodes and viscera. The diagnosis of BPDCN is based on the immunophenotypic diagnostic triad of CD123, CD4, and CD56.

CD123 is a key marker in identifying BPDCN and is a rapidly emerging target for therapeutic research in a variety of cancers. ELZONRIS is designed to specifically target CD123, and, within a triad of signature markers, enables proper diagnosis.

ELZONRIS was granted Breakthrough Therapy Designation, or BTD, in August 2016 and Orphan Drug Designation, or ODD, for BPDCN in June 2013. The ELZONRIS Biologics License Application, or BLA, was evaluated under Priority Review and approved by the FDA in December 2018.

ELZONRIS clinical trial design

The ELZONRIS BPDCN clinical trial, we believe, was the largest prospective trial ever conducted in this disease. This multicenter, multi-cohort, open-label, single-arm, clinical trial (STML-401-0114; NCT 02113982) enrolled 47 patients with BPDCN, including 32 treatment-naïve and 15 previously-treated patients, at seven sites in the U.S. Patients received ELZONRIS intravenously on days 1-5 of a 21-day cycle for multiple consecutive cycles. The trial consisted of three stages: Stage 1 (lead-in, dose escalation), Stage 2 (expansion) and Stage 3 (pivotal, confirmatory). Patients were also enrolled in an additional cohort (Stage 4) to enable uninterrupted access to ELZONRIS.

ELZONRIS clinical trial results

FDA approval was based on a multicenter, multicohort, open-label, single-arm clinical trial (STML-401-0114; NCT 02113982) in patients with treatment-naïve or previously-treated BPDCN. In the Stage 3 (pivotal) cohort, 13 patients with treatment-naïve BPDCN received ELZONRIS at the labeled dose and schedule. Efficacy was based on the rate of complete response or clinical complete response (CR/CRc), with CRc defined as complete response with residual skin abnormality not indicative of active disease. In this pivotal cohort, the CR/CRc rate was 53.8 percent (7/13) (95% CI: 25.1, 80.8). The median duration of CR/CRc was not reached (range: 3.9 to 12.2 months).

The safety of ELZONRIS was assessed in 94 adults with treatment-naïve or previously-treated myeloid malignancies treated with ELZONRIS at the labeled dose and schedule. The most common adverse reactions (incidence >30%) were CLS, nausea, fatigue, peripheral edema, pyrexia, and weight increase. The most common laboratory abnormalities (incidence >50%) were decreases in albumin, platelets, hemoglobin, calcium, sodium, and increases in glucose, alanine aminotransferase (ALT) and aspartate aminotransferase (AST). CLS, defined as any event reported as CLS during treatment with ELZONRIS or the occurrence of at least 2 of the following CLS manifestations within 7 days of each other: hypoalbuminemia, edema, or hypotension, in clinical trials was 55% in patients receiving ELZONRIS, including grades 1 or 2 in 46% (43/94), grade 3 in 6% (6/94), grade 4 in 1% (1/94), and 2 fatal events (2/94, 2%).

In an additional 76 patients treated with ELZONRIS at 12 mcg/kg/day in all schedules, there were the following investigator-assessed CLS events: 3 grade 3 (4%), 1 grade 4 (1%) and 1 fatal event (1%). A myocardial infarction, grade 5, was reported in the grade 4 patient with CLS.

Clinical data from all stages (Stages 1, 2 and 3) of Study STML-401-0114 (NCT 02113982) were presented at the American Society of Hematology, or ASH, 2018 annual meeting. In 29 treatment-naïve patients who received ELZONRIS at 12 mcg/kg/day, the overall response rate (ORR) was 90 percent (26/29) (95% CI: 72.6, 97.8). In these patients, the CR/CRc rate was 72 percent (21/29) (95% CI: 52.8, 87.3) with a median duration of CR/CRc not reached (range: 1.3 to 32.2 months). Forty-five percent (13/29) of these patients were bridged to stem cell transplant, or SCT, following remission on ELZONRIS.

The median overall survival, or OS, among 29 treatment-naïve patients who received ELZONRIS at 12 mcg/kg/day was not reached (range: 0.2 to 42.0 months, with median follow-up of 23.0 months [range: 0.2 to 41+ months]).

ELZONRIS—additional clinical development

We are also conducting additional clinical development activities with ELZONRIS including in Phase 1/2 clinical trials of patients with CMML, MF, and other malignancies.

Chronic myelomonocytic leukemia (CMML)

At the 2018 ASH annual conference in December 2018, we reported Phase 1/2 data from 20 patients with relapsed/refractory CMML who received ELZONRIS in Stage 1 (lead-in, dose escalation stage) and Stage 2 (expansion stage). Stage 1 has completed enrollment, and Stage 2 is ongoing, with patient enrollment and follow-up continuing. In Stage 1, ELZONRIS at 12 mcg/kg/day for 3 days every 3-6 weeks was the highest tested dose for CMML, and a maximum tolerated dose, or MTD, was not reached. In Stage 2, patients are receiving ELZONRIS at 12 mcg/kg/day for 3 days every 3-6 weeks.

Median age was 69.5 years (range: 43-80); 80% were male. 50% (10/20) of patients had baseline splenomegaly by physical examination (measured in centimeters that spleen was palpable below the left costal margin). The most common treatment-related adverse events, or TRAEs, were hypoalbuminemia and thrombocytopenia (each 35%), vomiting and nausea (each 30%), fatigue and edema peripheral (each 20%). CLS was reported in 15% (3/20) of patients; all three cases were grade 2. The most common TRAEs, grade 3+, were thrombocytopenia (35%) and nausea (5%).

ELZONRIS monotherapy demonstrated improvements in splenomegaly and bone marrow complete responses, or CRs, in patients with relapsed/refractory CMML. 100% (10/10) of evaluable patients with baseline splenomegaly, by physical examination, had a spleen response: 80% (8/10) of these patients had splenomegaly reductions by at least 50%, and 67% (4/6) of these patients with baseline splenomegaly of 5 cm or more below the left costal margin had splenomegaly reductions of at least 50%. In addition, three patients had bone marrow CRs including one patient who was bridged to stem cell transplant, or SCT.

Based on results observed in this trial thus far, and the unmet medical need in relapsed/refractory CMML, we are finalizing a proposed design for a registrationally-directed trial (or cohort), which we expect to discuss with the FDA in the first half of 2019. We expect to provide further updates around these plans mid-2019, with the goal to initiate this trial or cohort in the second half of 2019. The current ongoing trial is continuing to enroll patients and we expect to provide periodic updates at upcoming conferences.

Myelofibrosis (MF)

At the 2018 ASH annual conference in December 2018, we reported Phase 1/2 data from 23 patients with relapsed/refractory MF who received ELZONRIS in Stage 1 (lead-in, dose escalation stage) and Stage 2 (expansion stage). Stage 1 has completed enrollment, and Stage 2 is ongoing, with patient enrollment and

follow up continuing. In Stage 1, ELZONRIS at 12 mcg/kg/day was the highest tested dose for MF, and a MTD was not reached. In Stage 2, patients are receiving ELZONRIS at 12 mcg/kg/day for 3 days every 3-6 weeks.

Median age was 69 years (range: 55-81); 61% were female. 70% (16/23) of patients had baseline splenomegaly by physical examination (measured by spleen that is palpable >5 cm below costal margin). In Stage 1, no dose limiting toxicities, or DLT, were identified and a maximum tolerated dose, or MTD, was not reached. The most common TRAEs were headache and hypoalbuminaemia (each 22%). The most common TRAEs, grade 3+, was thrombocytopenia (8%). There was also one case of CLS which was grade 3.

ELZONRIS monotherapy demonstrated improvements in splenomegaly in patients with relapsed/refractory MF. 56% (9/16) of evaluable patients with baseline spleen size >5 cm palpable by physical exam below the left costal margin experienced a reduction in splenomegaly: 44% (7/16) of patients had splenomegaly reduction by at least 29% and 25% (4/16) had splenomegaly reductions by at least 45%.

Based on results observed in the trial thus far, and the unmet medical need in relapsed/refractory MF, the next steps for the program are being evaluated. These steps could include single agent, combination, and registration-directed trials in patients with relapsed/refractory MF.

We expect to provide further updates around these plans later this year and into early next year in an effort to formulate a registration-directed strategy by the first half of 2020, if not earlier. The current ongoing trial is continuing to enroll patients and we expect to provide periodic updates at upcoming conferences.

ELZONRIS—outside of oncology

In addition to oncology opportunities, there may also be utility for CD123-targeted agents in various autoimmune diseases, such as scleroderma and cutaneous lupus, in which the CD123-expressing plasmacytoid dendritic cell, or pDC, the cell of origin of BPDCN, may play a role. With this in mind, we are currently conducting experiments in this area.

In June 2018, we presented preclinical data at the 2018 Annual European Congress of Rheumatology, or EULAR, in Amsterdam, Netherlands on ELZONRIS in the autoimmune disorder systemic sclerosis, or SSc. The data indicated that ELZONRIS is cytotoxic against CD123+ pDCs from SSc patients. Concurrent with pDC depletion, a reduction in secreted interferon-alpha and IL-6, two pro-inflammatory cytokines, was also observed in cell culture supernatant. These data suggest depletion of pDCs or attenuation of pDC function may represent a novel approach to treating patients with SSc and other autoimmune diseases. Additional research in this area is ongoing.

SL-801

SL-801 is a structurally novel, oral, small molecule, reversible inhibitor of Exportin-1, or XPO1, a nuclear transport protein implicated in a variety of malignancies. SL-801 has demonstrated preclinical in vitro and in vivo antitumor activity against a wide array of solid and hematologic cancers. SL-801's potential ability to reversibly bind XPO1 may offer the possibility to mitigate side effects and help optimize the therapeutic index. We are currently enrolling patients with advanced solid tumors in a Phase 1 dose escalation trial of single agent SL-801.

In October 2018, we presented an update on the ongoing SL-801 Phase 1 trial at the European Society of Medical Oncology, or ESMO, annual meeting in Munich, Germany. Forty-two patients with advanced solid

tumors received SL-801 at escalating doses. Median age was 64 years (range: 39-83); 52% were female. The trial has largely enrolled a heavily pretreated patient population (72% of patients were third-line or greater), with a wide spectrum of tumor types, including gastrointestinal, breast, lung, neuroendocrine, ovarian, and others. No MTD has yet been identified. The most common TRAEs, through ten cohorts, included nausea (64%), vomiting (48%), fatigue (38%), diarrhea (24%), and decreased appetite (24%). The most common TRAEs, grade 3, were nausea (7%), diarrhea (5%), fatigue (5%), and vomiting (2%). There was also one grade 3 TRAE of hypophosphatemia and one grade 3 TRAE of neutropenia.

Through ten cohorts, stable disease was achieved in 29% (12/42) of patients. One patient with a heavily pretreated neuroendocrine tumor had a 20% tumor shrinkage. Preliminary pharmacokinetic analyses suggest that increases in exposure may be dose-dependent.

The dosing regimen for SL-801 is currently being revised in light of the occurrence of non-dose limiting gastrointestinal effects. Our plan is to resume dosing at 65 mg/day for days 1-2 of a seven-day cycle, and we expect to provide further data updates throughout 2019.

SL-701

SL-701 is an immunotherapy designed to direct the immune system to attack targets present on brain cancer and other malignancies. SL-701 is comprised of several short synthetic peptides that correspond to epitopes of targets including IL-13Rα2, EphA2, and survivin; two of these synthetic peptides (IL-13Rα2 and survivin) are mutant and believed to enhance immune activity.

We completed a Phase 2 trial of SL-701 in adult patients with second-line glioblastoma, or GBM. Phase 2 data suggest SL-701 is generating a target specific CD8+ T-cell response, which may be translating into improved clinical outcomes, including improved OS, in a subset of patients.

In October 2018, data from the trial were selected for oral presentation at the ESMO annual meeting in Munich, Germany. The trial consisted of 2 stages: Stage 1 and Stage 2. Stage 1 enrolled 46 patients and administered SL-701 as a single agent, with the immunostimulants GM-CSF and Imiquimod. Stage 2 enrolled 28 patients and administered SL-701 in combination with bevacizumab, and the immunostimulant poly-ICLC. SL-701 was generally well-tolerated. The most common TRAEs were fatigue (22%) and injection site reaction (18%). The only grade 3+ TRAE was fatigue (3%).

In Stage 1, one patient had a partial response, or PR, of 18+ month duration (ongoing), and there were 15 SDs, 6 of which were at least 5 months duration (range: 5 to 28+ months, ongoing). In Stage 2, two patients achieved CR and 2 patients had PRs, for an ORR of 14% (6/28).

In Stage 2, the median overall survival, or OS, was 11.7 months with a 50% 12-month OS rate including some long-term (>12 month) survivors. Long-term survivors in Stage 2 were comprised largely of patients who generated target-specific CD8+ T-cell responses, as determined by *ex vivo* assay of blood samples, suggesting that immunocompetent patients, in particular, may benefit from this treatment.

Given the safety and efficacy data generated to date with SL-701 and bevacizumab in second-line GBM, an indication of unmet need, we are considering next steps including leveraging these results and the potential immune-related data in registration-directed trial designs. These next steps may involve conducting trials with enrichment strategies, larger studies, including randomized studies, single arm studies, further combination studies with novel agents (e.g., checkpoint inhibitors), that could be conducted alone or via partnerships, or cessation of the program. If additional studies are conducted, this may entail

significant manufacturing campaigns and commitments around SL-701 and certain immunostimulants depending upon the choice and availability of immunostimulants.

SL-701 was awarded ODD from the FDA for the treatment of glioma in January 2015.

We expect to provide further updates relating to this program later this year.

SL-901

SL-901 is an oral, small molecule kinase inhibitor. In December 2017, we in-licensed this drug candidate from UCB Biopharma Sprl, or UCB. Prior to in-licensing, the agent had demonstrated preclinical activity in several tumor types, and was evaluated in an abbreviated Phase 1 clinical trial in Europe. A PR in one patient with advanced lung cancer was reported. Neither a DLT nor MTD was reached in the trial and we believe further dose escalation is possible and warranted. We also believe that this approach may have utility in a non-oncologic rare disease and preclinical work in this area is ongoing. Additionally, we are currently evaluating plans to enable a new regulatory filing, including certain IND-enabling work, to continue clinical dose escalation.

General

We have devoted substantially all of our resources to develop our product candidates, manufacture our product candidates, prepare for commercialization, build our intellectual property portfolio, execute our business plan, raise capital, and provide general and administrative support for these operations. We have generated minimal revenues to date, have not generated any revenue from product sales, and have funded our operations primarily through public and private sales of common stock and private sales of convertible preferred stock to our investors.

Company information

We were incorporated under the laws of the State of Delaware in August 2003. Our principal executive office is located at 750 Lexington Avenue, Eleventh Floor, New York, New York 10022 and our telephone number is (646) 502-2311.

Our website address is www.stemline.com. We are not including the information on our website as a part of, nor incorporating it by reference into, this prospectus supplement.

The offering

Common stock offered by us	6,600,000 Shares
Common stock to be outstanding after the offering	38,271,552 Shares
Option to purchase additional shares	We have granted the underwriters an option to purchase 990,000 additional shares of our common stock. This option is exercisable, in whole or in part, for a period of 30 days from the date of this prospectus supplement.
Use of proceeds	We intend to use the net proceeds from this offering for (i) commercial activities of ELZONRIS (tagraxofusp; SL-401) including clinical trials for additional indications including CMML, MF and other diseases; (ii) clinical development of SL-801, SL-701 and potentially SL-901; (iii) research and development activities; (iv) potential acquisitions and in-licensing; and (v) other general corporate purposes. See "Use of Proceeds" on page S-15 of this prospectus supplement.
Risk factors	See "Risk Factors" beginning on page S-8 and our "Risk Factors" beginning on page 40 of our Quarterly Report on Form 10-Q for the quarter ended September 30, 2018, which is incorporated by reference herein, for a discussion of factors that you should consider before investing in our common stock.
Nasdaq Capital Market symbol	STML

The number of shares of our common stock outstanding after this offering is based on 31,671,552 actual shares of our common stock outstanding as of September 30, 2018, and excludes, as of such date:

- 3,191,018 shares of our common stock issuable upon the exercise of stock options outstanding as of September 30, 2018, at a weighted-average exercise price of $9.13 per share, of which 2,216,605 shares were vested as of such date; and
- 2,358,480 shares of our common stock available for future issuance under our 2016 Equity Incentive Plan, or the 2016 Equity Plan, as of September 30, 2018.

Unless otherwise indicated, all information in this prospectus supplement assumes:

- no exercise of the outstanding options; and
- no exercise by the underwriters of the option to purchase up to 990,000 additional shares of our common stock.

Risk factors

An investment in our common stock involves a high degree of risk. Before deciding whether to invest in our common stock, you should consider carefully the risks discussed below, together with other information in this prospectus supplement, the accompanying prospectus, the information and documents incorporated by reference including the section "Risk Factors" beginning on page 40 of our Quarterly Report on Form 10-Q for the quarter ended September 30, 2018, which is incorporated by reference herein, and in any free writing prospectus that we have authorized for use in connection with this offering. The risks described below may not be the only ones relating to our company. Additional risks that we currently believe are immaterial or risks not currently known to us may also impair our business and operations. Our business, results of operation, financial condition, cash flow and prospects and the trading price of our common stock could be harmed as a result of any of these risks, and investors may lose all or part of their investment.

Risks related to our financial position and capital requirements

We have incurred net operating losses since our inception and anticipate that we will continue to incur substantial operating losses for the foreseeable future. We may never achieve or sustain profitability, which would depress the market price of our common stock, and could cause you to lose all or a part of your investment.

We have incurred net losses from operations from our inception through September 30, 2018 of approximately $274.1 million. We do not know whether or when we will become profitable. To date, we have not commercialized any products or generated any income from product sales. Our losses have resulted principally from costs incurred in development and discovery activities. We anticipate that our operating losses will substantially increase over the next several years as we execute our plan to expand our discovery, research, development and potential commercialization activities. We believe that our existing cash, cash equivalents, short-term investments and long-term investments including the cash proceeds received from our follow-on public offering during the first quarter of 2018, will be sufficient to fund our operations and our capital expenditures for at least the next two years. If our cash is insufficient to meet future operating requirements, we will have to raise additional funds. If we are unable to obtain additional funds on terms favorable to us or at all, we may be required to cease or reduce our operating activities or sell or license to third-parties some or all of our intellectual property. If we raise additional funds by selling additional shares of our capital stock, the ownership interests of our stockholders will be diluted. If we need to raise additional funds through the sale or license of our intellectual property, we may be unable to do so on terms favorable to us, if at all. In addition, if we do not continue to meet our diligence obligations under our license agreements for our clinical drug candidates that we have in-licensed, we will lose our rights to develop and commercialize those clinical drug candidates.

If we do not successfully develop and obtain regulatory approval for our existing and future product candidates and effectively manufacture, market and sell any product candidates that are approved, we may never generate product sales, and even if we do generate product sales, we may never achieve or sustain profitability on a quarterly or annual basis. Our failure to become and remain profitable would depress the market price of our common stock and could impair our ability to raise capital, expand our business, diversify our product offerings or continue our operations. A decline in the market price of our common stock also could cause you to lose all or a part of your investment.

We will require additional financing to achieve our goals, and a failure to obtain this capital when needed could force us to delay, limit, reduce or terminate our product development or commercialization efforts.

Since our inception, most of our resources have been dedicated to the discovery, acquisition and preclinical and clinical development of our product candidates. We have expended and believe that we will continue to expend substantial resources for the development of our clinical drug candidates and may expend additional resources on other product candidates and drug discovery and acquisition efforts. These expenditures will include costs associated with general administration, facilities, research and development, acquiring new technologies, manufacturing product candidates, conducting preclinical experiments and clinical trials, applying for regulatory approvals, commercializing any products that might receive approval for sale, and costs associated with operating as a public company.

We have no significant current source of income to sustain our present activities, and we do not expect to generate income until, and unless, we obtain approval from the FDA or other regulatory authorities, and we successfully commercialize one or more of our compounds. As the outcome of our ongoing and future clinical trials is highly uncertain, our estimates of clinical trial costs necessary to successfully complete the development and commercialization of our product candidates may differ significantly from our actual costs. In addition, other unanticipated costs may arise.

As a result of these and other factors currently unknown to us, we may need to seek additional funds sooner than planned, through public or private equity, debt financings or other sources, such as strategic partnerships and alliances and licensing arrangements. In addition, we may seek additional capital due to favorable market conditions or strategic considerations even if we believe we have sufficient funds for our current or future operating plans.

Our future capital requirements depend on many factors, including:

- the number and characteristics of the product candidates we pursue;
- the scope, progress, results and costs of researching and developing our product candidates, and conducting preclinical and clinical trials;
- the ability of our product candidates to progress through clinical development successfully;
- the timing of, and the costs involved in, seeking regulatory approvals for our product candidates;
- the cost of commercialization activities if any of our product candidates are approved for sale, including marketing, sales and distribution costs;
- the cost associated with securing and establishing commercialization and manufacturing capabilities for our product candidates and any products for which we might receive regulatory approval;
- our ability to establish and maintain strategic partnerships, licensing or other arrangements and the economic and other terms of such agreements;
- the costs involved in preparing, filing, prosecuting, maintaining, defending and enforcing patent claims, including litigation costs and the outcome of such litigation;
- the timing, receipt and amount of sales of, or royalties on, our future products, if any;

- our need and ability to hire additional management and scientific, medical, and sales and marketing personnel;
- the effect of competing technological and market developments; and
- our need to implement additional internal systems and infrastructure, including financial and reporting systems.

Additional funds may not be available when we need them, on terms that are acceptable to us, or at all. If adequate funds are not available to us on a timely basis, we may be required to:

- delay, limit, reduce or terminate preclinical studies, clinical trials or other research and development activities for one or more of our product candidates;
- delay, limit, reduce or terminate manufacturing of our product candidates; or
- delay, limit, reduce or terminate our establishment of sales and marketing capabilities or other activities that may be necessary to commercialize our product candidates and ensure their acceptance by third-party payors and the market.

If you purchase shares of common stock in this offering, you may suffer immediate dilution of your investment.

If you purchase common stock in this offering, you will incur immediate and substantial dilution of $ per share, representing the difference between the public offering price of $ per share, and our as adjusted net tangible book value per share after giving effect to this offering at the public offering price. Moreover, as of September 30, 2018, there were 3,191,018 shares subject to outstanding options at a weighted-average exercise price of $9.13 per share. To the extent that these outstanding options are ultimately exercised or the underwriter exercises its option to purchase additional shares, you may incur further dilution. For a further description of the dilution you may experience immediately after this offering, see "Dilution."

Raising additional capital may cause dilution to our existing stockholders, restrict our operations or require us to relinquish rights to our technologies or product candidates.

We will likely seek to raise additional capital through a combination of private and public equity offerings, debt financings, strategic partnerships and alliances and licensing arrangements. To the extent that we raise additional capital through the sale of equity or convertible debt securities, the ownership interests of existing stockholders will be diluted, and the terms may include liquidation or other preferences that adversely affect stockholder rights. Debt financing, if available, may involve agreements that include covenants limiting or restricting our ability to take certain actions, such as incurring debt, making capital expenditures or declaring dividends. If we raise additional funds through strategic partnerships and alliances and licensing arrangements with third-parties, we may have to relinquish valuable rights to our technologies or product candidates, or grant licenses on terms that are not favorable to us. If we are unable to raise additional funds through equity or debt financing when needed, we may be required to delay, limit, reduce or terminate our product development or commercialization efforts or grant rights to develop and market product candidates that we would otherwise prefer to develop and market ourselves.

Unstable market and economic conditions may have serious adverse consequences on our business, financial condition and stock price.

There can be no assurance that deterioration in credit and financial markets and confidence in economic conditions will not occur. Our general business strategy may be adversely affected by an economic downturn, a volatile business environment or an unpredictable and unstable market. If equity and credit markets deteriorate, it may make any necessary equity, debt, or other financing more difficult to secure, more costly, more dilutive, and less favorable to existing shareholders. Failure to secure any necessary financing in a timely manner and on favorable terms could have a material adverse effect on our growth strategy, financial performance and stock price and could require us to delay or abandon our business and clinical development plans. In addition, there is a risk that one or more of our current service providers, manufacturers and other partners may not survive these difficult economic times, which could directly affect our ability to attain our operating goals on schedule and on budget. There is a possibility that our stock price may decline, due in part to the volatility of the stock market and the general economic downturn.

We have broad discretion over the use of our cash, cash equivalents and marketable securities, including the net proceeds we receive in this offering, and may not use them effectively.

Our management has broad discretion to use our cash, cash equivalents and marketable securities, including the net proceeds we receive in this offering, to fund our operations and could spend these funds in ways that do not improve our results of operations or enhance the value of our common stock. The failure by our management to apply these funds effectively could result in financial losses that could have a material adverse effect on our business, cause the price of our common stock to decline and delay the development of our product candidates. Pending their use to fund operations, we may invest our cash, cash equivalents and marketable securities in a manner that does not produce income or that loses value.

Risks related to our common stock

The market price of our common stock may be highly volatile and our stockholders could incur substantial losses.

The market price of our common stock may be highly volatile, and could be subject to wide fluctuations in response to various factors, some of which are beyond our control. Since our initial public offering which occurred in January 2013, the price of our common stock has ranged from $3.88 per share to $47.25 per share. The stock market in general and the market for biopharmaceutical companies, in particular, have experienced extreme volatility that has often been unrelated to the operating performance of particular companies. The market price for our common stock may be influenced by many factors, including:

- results from or delays of clinical trials of our product candidates, as well as results of regulatory reviews relating to the approval of our product candidates;
- our decision to initiate a clinical trial, not to initiate a clinical trial or to terminate an existing clinical trial;
- our dependence on third-parties, including clinical research organizations and contract manufacturing organizations, trial sites, clinical trial sponsors and clinical investigators;
- our ability to commercialize our product candidates, if approved;

- the results of our efforts to discover, develop, acquire or in-license additional product candidates or products;
- new products, product candidates or new uses for existing products or technologies introduced or announced by our competitors and the timing of these introductions or announcements;
- regulatory or legal developments in the United States and other countries;
- our ability to maintain the license agreements for our product candidates;
- developments or disputes concerning patent applications, issued patents or other proprietary rights;
- the recruitment or departure of key scientific or management personnel;
- the level of expenses related to any of our product candidates or clinical development programs;
- actual or anticipated changes in estimates as to financial results, development timelines or recommendations by securities analysts;
- variations in our financial results or those of companies that are perceived to be similar to us;
- sales of common stock by us or our stockholders in the future, as well as the overall trading volume of our common stock;
- changes in the structure of healthcare payment systems and product pricing restrictions;
- market conditions in the pharmaceutical and biotechnology sectors;
- general economic, industry and market conditions and other factors that may be unrelated to our operating performance or the operating performance of our competitors, including changes in market valuations of similar companies; and
- the other factors described in this "Risk Factors" section.

Our executive officers, directors, and principal stockholders maintain the ability to exert substantial influence over all matters submitted to stockholders for approval.

Our executive officers, directors, and principal stockholders beneficially own shares representing approximately 33.0% of our outstanding capital stock. As a result, if these stockholders were to choose to act together, they would be able to exert substantial influence over all matters submitted to our stockholders for approval, as well as our management and affairs. For example, these persons, if they choose to act together, would exert substantial influence over the election of directors and approval of any merger, consolidation or sale of all or substantially all of our assets. This concentration of voting power could delay or prevent an acquisition of our company on terms that other stockholders may desire.

Provisions in our corporate charter documents and under Delaware law could make an acquisition of us, which may be beneficial to our stockholders, more difficult and may prevent attempts by our stockholders to replace or remove our current management.

Provisions in our corporate charter and our bylaws may discourage, delay or prevent a merger, acquisition or other change in control of us that stockholders may consider favorable, including transactions in which they might otherwise receive a premium for their shares. These provisions could also limit the price that

investors might be willing to pay in the future for shares of our common stock, thereby depressing the market price of our common stock. Among other things, these provisions:

- establish a classified board of directors such that not all members of the board are elected at one time;
- allow the authorized number of our directors to be changed only by resolution of our board of directors;
- limit the manner in which stockholders can remove directors from the board;
- establish advance notice requirements for stockholder proposals that can be acted on at stockholder meetings and nominations to our board of directors;
- require that stockholder actions must be effected at a duly called stockholder meeting and prohibit actions by our stockholders by written consent;
- limit who may call special stockholder meetings and the matters transacted at such meetings;
- authorize our board of directors to issue preferred stock without stockholder approval, which could be used to institute a "poison pill" that would work to dilute the stock ownership of a potential hostile acquirer, effectively preventing acquisitions that have not been approved by our board of directors; and
- require the approval of the holders of at least 75% of the votes that all our stockholders would be entitled to cast to amend or repeal certain provisions of our charter or bylaws.

Moreover, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, which prohibits a person who owns in excess of 15% of our outstanding voting stock from merging or combining with us for a period of three years after the date of the transaction in which the person acquired in excess of 15% of our outstanding voting stock, unless the merger or combination is approved in a prescribed manner. Any provision in our corporate charter or our bylaws or Delaware law that has the effect of delaying or deterring a change in control could limit the opportunity for our stockholders to receive a premium for their shares of our common stock, and could also affect the price that some investors are willing to pay for our common stock.

We incur significant costs as a result of operating as a public company, and our management is required to devote substantial time to compliance initiatives.

As a public company, we incur and will continue to incur significant legal, accounting and other expenses. We are subject to the reporting and other requirements of the Securities Exchange Act of 1934, as amended, or the Exchange Act, the Sarbanes Oxley Act of 2002, or the Sarbanes Oxley Act, and the Dodd-Frank Wall Street Reform and Protection Act, as well as rules subsequently adopted by the SEC and the Nasdaq Stock Market, or Nasdaq. These rules and regulations require, among other things, that we file annual, quarterly and current reports with respect to our business and financial condition and establish and maintain effective disclosure and financial controls and corporate governance practices. Changes in these rules and regulations can create uncertainty for public companies, increasing legal and financial compliance costs and making some activities more time-consuming. Our management and other personnel devote a substantial amount of time to these compliance initiatives.

If we fail to maintain an effective system of internal control over financial reporting, we may not be able to accurately report our financial results or prevent fraud. As a result, stockholders could lose confidence in our financial and other public reporting, which would harm our business and the trading price of our common stock.

Effective internal controls over financial reporting are necessary for us to provide reliable financial reports and, together with adequate disclosure controls and procedures, are designed to prevent fraud. Any failure to implement required new or improved controls, or difficulties encountered in their implementation, could cause us to fail to meet our reporting obligations. In addition, any testing by us conducted in connection with Section 404 of the Sarbanes-Oxley Act, or the subsequent testing by our independent registered public accounting firm, may reveal deficiencies in our internal controls over financial reporting that are deemed to be material weaknesses or that may require prospective or retroactive changes to our financial statements or identify other areas for further attention or improvement. Inferior internal controls could also cause investors to lose confidence in our reported financial information, which could have a negative effect on the trading price of our common stock.

We are required to disclose changes made in our internal controls and procedures on a quarterly basis and our management is required to assess the effectiveness of these controls annually. An independent assessment of the effectiveness of our internal controls could detect problems that our management's assessment might not. Undetected material weaknesses in our internal controls could lead to financial statement restatements and require us to incur the expense of remediation.

We do not expect to pay dividends on our capital stock in the foreseeable future.

We have never declared or paid cash dividends on our capital stock. We currently intend to retain all of our future earnings, if any, to finance the growth and development of our business, and we do not anticipate paying any cash dividends on our capital stock in the foreseeable future. In addition, the terms of any future debt agreements may preclude us from paying dividends. As a result, capital appreciation, if any, of our common stock, will be your sole source of gain for the foreseeable future.

If securities or industry analysts do not publish research or publish inaccurate or unfavorable research about our business, our stock price and trading volume could decline.

The trading market for our common stock will depend in part on the research and reports that securities or industry analysts publish about us or our business. If one or more of the analysts who cover us downgrade our stock or publish inaccurate or unfavorable research about our business, our stock price would likely decline. If one or more of these analysts cease coverage of our company or fail to publish reports on us regularly, demand for our stock could decrease, which might cause our stock price and trading volume to decline.

Use of proceeds

We estimate that the net proceeds from our issuance and sale of 6,600,000 shares of our common stock in this offering will be approximately $ million, after deducting underwriting discounts and commissions and estimated offering expenses payable by us. If the underwriters exercise the option to purchase an additional 990,000 shares of our common stock in full, we estimate that the net proceeds from this offering will be approximately $ million, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

We intend to use the net proceeds from this offering for (i) commercial activities of ELZONRIS (tagraxofusp; SL-401) including clinical trials for additional indications including CMML, MF and other diseases; (ii) clinical development of SL-801, SL-701 and potentially SL-901; (iii) research and development activities; (iv) potential acquisitions and in-licensing; and (v) other general corporate purposes.

ELZONRIS. The FDA has granted approval of ELZONRIS for the treatment of BPDCN in adult and pediatric patients two years and older, in both treatment-naïve and previously-treated populations. We currently plan to commercialize ELZONRIS in the United States and we are evaluating options to bring ELZONRIS to patients with BPDCN in the EU and potentially globally. We are also assessing ELZONRIS in other indications including CMML, MF, and AML, as a single agent and, potentially, in combination. We also plan to initiate additional clinical trials with ELZONRIS as a single agent and/or in combination in other cancers and potentially autoimmune diseases in the future.

SL-801. We are conducting a Phase 1 trial in patients with advanced solid tumors. The dosing regimen for SL-801 is currently being revised in light of the occurrence of non-dose limiting gastrointestinal effects. Our plan is to resume dosing at 65 mg/day for days 1-2 of a seven-day cycle, and we expect to provide further data updates throughout 2019. We are also considering a Phase 1 trial in patients with advanced hematological cancers, as well as combination strategies with SL-801 and other agents, at some point in the future.

SL-701. We have completed a Phase 2 trial of SL-701 in second-line GBM and are following patients for outcomes including survival. We are considering next steps for the program, including conducting addition studies, including larger studies, either as a single agent or in combination studies with other agents, that could be conducted alone or via partnerships.

We will continue to be opportunistic and evaluate assets in an effort to expand our clinical and preclinical pipeline via strategic acquisitions and licensing.

Any remaining proceeds will be used for general corporate purposes.

This expected use of the net proceeds from this offering represents our intentions based upon our current plans and business conditions. The amounts and timing of our actual expenditures may vary significantly depending on numerous factors, including the progress of our development efforts, the status of and results from clinical trials, as well as any collaborations that we may enter into with third parties for our product candidates, and any unforeseen cash needs. As a result, our management will retain broad discretion over the allocation of the net proceeds from this offering.

While we do not expect that the net proceeds from this offering and our existing cash, cash equivalents and marketable securities will be sufficient to enable us to fund the completion of development of any product candidates we may develop, we do believe that our existing cash, cash equivalents, short-term investments and long-term investments, after this offering, will be sufficient to cover our cash flow

requirements for at least the next two years. We have based this estimate on assumptions that may prove to be wrong, and we could use our available capital resources sooner than we currently expect.

Pending our use of the net proceeds from this offering as described above, we intend to invest the net proceeds in a variety of capital preservation investments, including short-term, investment grade, interest bearing instruments and U.S. government securities.

Price range of common stock

Our common stock is listed on The Nasdaq Capital Market under the symbol "STML" and has been publicly traded since December 29, 2013. Prior to that time, there was no public market for our common stock. As a result, we have not set forth quarterly information with respect to the high and low sales prices for our common stock for such period.

As of January 11, 2019, the last sale price of our common stock was $9.89, as reported by The Nasdaq Capital Market. There were approximately 140 holders of record of our common stock as of that date. The actual number of stockholders is greater than this number of record holders and includes stockholders who are beneficial owners but whose shares are held in street name by brokers and other nominees. This number of holders of record also does not include stockholders whose shares may be held in trust by other entities.

The following table sets forth the ranges of high and low sales price per share of our common stock as reported on The Nasdaq Capital Market for the period indicated.

	High	Low
2017		
First Quarter	14.25	5.50
Second Quarter	9.65	7.30
Third Quarter	11.70	7.30
Fourth Quarter	16.00	10.20
2018		
First Quarter	18.75	13.05
Second Quarter	20.55	14.15
Third Quarter	17.85	13.90
Fourth Quarter	17.38	7.82
2019		
First Quarter (through January 11, 2019)	10.75	9.20

Dividend policy

We have never declared or paid any cash dividends on our common stock and do not anticipate paying any cash dividends in the foreseeable future. Any future determination to pay dividends will be at the discretion of our board of directors.

Capitalization

The following table sets forth our capitalization as of September 30, 2018:

- on an actual basis; and
- on an as adjusted basis to reflect the sale of the 6,600,000 shares of common stock offered by us in this offering (assuming no exercise of the underwriters' option to purchase additional shares) after deducting underwriting discounts and commissions and estimated offering expenses payable by us.

You should read this table together with our financial statements and related notes and the "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our Annual Report on Form 10-K for the year ended December 31, 2017 and our Quarterly Report on Form 10-Q for the quarter ended September 30, 2018.

	September 30, 2018 (unaudited)	
(in thousands, except share data)	**Actual**	**As adjusted**
Cash, cash equivalents, short-term investments and long-term investments	$ 78,534,240	
Stockholders' equity:		
Preferred stock, $0.0001 par value per share, 5,000,000 shares authorized; none issued and outstanding, actual and as adjusted	—	—
Common stock, $0.0001 par value per share, 53,750,000 shares authorized; 31,671,552 shares actual and 38,271,552 shares as adjusted, issued and outstanding	3,167	
Additional paid-in capital	326,084,695	
Accumulated other comprehensive loss	(96,546)	
Accumulated deficit	(262,453,150)	
Total stockholders' equity	63,538,166	
Total capitalization	$ 80,964,600	

The table above excludes the following shares as of September 30, 2018:

- 3,191,018 shares of our common stock issuable upon the exercise of stock options outstanding as of September 30, 2018, at a weighted-average exercise price of $9.13 per share, of which 2,216,605 shares were vested as of such date; and
- 2,358,480 shares of our common stock available for future issuance under our 2016 Equity Plan, as of September 30, 2018.

Dilution

If you invest in our common stock in this offering, your ownership interest will be diluted immediately to the extent of the difference between the offering price per share of our common stock and the as adjusted net tangible book value per share of our common stock after the offering.

Our historical net tangible book value as of September 30, 2018 was $63.5 million, or $2.01 per share of our common stock. Historical net tangible book value per share represents the amount of our total tangible assets less total liabilities, divided by the number of shares of our common stock outstanding.

After giving effect to the sale of 6,600,000 shares of common stock by us, at a public offering price of $ per share, less the underwriting discounts and commissions and estimated offering expenses payable by us, our as adjusted net tangible book value as of September 30, 2018 would have been $ million, or $ per share. This represents an immediate increase in net tangible book value per share of $ to existing stockholders and immediate dilution of $ in as adjusted net tangible book value per share to new investors purchasing common stock in this offering.

Dilution per share to new investors is determined by subtracting as adjusted net tangible book value per share after this offering from the offering price per share paid by new investors. The following table illustrates this dilution on a per share basis.

Assumed Offering Price Per Share		$
Historical Net Tangible Book Value Per Share as of September 30, 2018	$ 2.01	
Increase in Net Tangible Book Value Per Share Attributable to New Investors		
As Adjusted Net Tangible Book Value Per Share After the Offering		
Dilution Per Share to New Investors		$

If the underwriters exercise their option to purchase 990,000 additional shares in this offering in full, the as adjusted net tangible book value after the offering would be $ per share, the increase in as adjusted net tangible book value per share to existing stockholders would be $ and the dilution per share to new investors would be $ per share, in each case after deducting underwriting discounts and estimated offering expenses payable by us. If any shares are issued upon exercise of outstanding options at exercise prices below the public offering price in this offering, you will experience further dilution.

The table above excludes the following shares as of September 30, 2018:

- 3,191,018 shares of our common stock issuable upon the exercise of stock options outstanding as of September 30, 2018, at a weighted-average exercise price of $9.13 per share, of which 2,216,605 shares were vested as of such date; and
- 2,358,480 shares of our common stock available for future issuance under our 2016 Equity Plan, as of September 30, 2018.

Material U.S. federal income tax consequences to non-U.S. holders

The following is a summary of the material United States federal income tax consequences relating to the acquisition, ownership and disposition of our common stock as of the date hereof. Except where noted, this summary deals only with our common stock that is held as a capital asset (within the meaning of Section 1221 of the Internal Revenue Code of 1986, as amended (the "Code") by a "non-U.S. holder" (as defined below).

For purposes of this summary, a "non-U.S. holder" means a beneficial owner of our common stock (other than a partnership or any other entity treated as a partnership for United States federal income tax purposes) that is not for United States federal income tax purposes any of the following:

- an individual citizen or resident of the United States;
- a corporation (or any other entity treated as a corporation for United States federal income tax purposes) created or organized in or under the laws of the United States, any state thereof or the District of Columbia;
- an estate the income of which is subject to United States federal income taxation regardless of its source; or
- a trust if it (1) is subject to the primary supervision of a court within the United States and one or more United States persons have the authority to control all substantial decisions of the trust or (2) has a valid election in effect under applicable United States Treasury regulations ("Treasury Regulations") to be treated as a United States person.

This summary is based upon provisions of the Code and Treasury Regulations, administrative rulings and judicial decisions currently in effect, all as of the date hereof and all subject to change at any time, possibly with retroactive effect, or to different interpretation by the Internal Revenue Service ("IRS"). This summary does not address all aspects of United States federal taxes and does not address any foreign, state, local or other tax considerations that may be relevant to non-U.S. holders in light of their personal circumstances. In addition, this summary does not represent a detailed description of the United States federal income tax consequences applicable to non-U.S. holders that are subject to special treatment under the United States federal income tax laws (including a non-U.S. holder that is a United States expatriate, "controlled foreign corporation," "passive foreign investment company," "real estate investment trust," "regulated investment company," dealer in securities or currencies, financial institution, tax-exempt entity, insurance company, person holding our common stock as part of a hedging, integrated, conversion or constructive sale transaction or a straddle, trader in securities that elects to use a mark-to-market method of accounting, person liable for the alternative minimum tax, person who acquired our common stock as compensation for services, or a partnership or other pass-through entity, or partner in a partnership or beneficial owner of a pass-through entity that holds our common stock for United States federal income tax purposes). We cannot provide assurance that a change in law will not alter significantly the tax considerations that we describe in this summary.

If a partnership (or other entity treated as a partnership for U.S. federal income tax purposes) holds our common stock, the tax treatment of a partner will generally depend upon the status of the partner and the activities of the partnership. Non-U.S. holders that are partners of a partnership holding our common stock should consult their tax advisors.

Non-U.S. holders considering the purchase of our common stock should consult their own tax advisors concerning the particular United States federal income and estate tax consequences of the ownership of our common stock, as well as the consequences arising under the laws of any other taxing jurisdiction.

Distribution on our common stock

Distributions paid on our common stock will be taxable as dividends to the extent paid out of current or accumulated earnings and profits, as determined under United States federal income tax principles. Dividends paid to a non-U.S. holder of our common stock generally will be subject to United States federal withholding tax at a 30% rate or such lower rate as may be specified by an applicable income tax treaty. However, dividends that are effectively connected with the conduct of a trade or business by the non-U.S. holder within the United States (and, if required by an applicable income tax treaty, are attributable to a United States permanent establishment) are not subject to United States federal withholding tax, provided certain certification and disclosure requirements are satisfied. Instead, such dividends are subject to United States federal income tax on a net-income basis in the same manner as if the non-U.S. holder were a "United States person" as defined in the Code. Any such effectively connected dividends received by a foreign corporation may, under certain circumstances, be subject to an additional "branch profits tax" at a 30% rate or such lower rate as may be specified by an applicable income tax treaty.

A non-U.S. holder who wishes to claim the benefit of an applicable treaty rate and avoid backup withholding, as discussed below, for dividends will be required (a) to complete IRS Form W-8BEN or W-8BEN-E(or other applicable form) and certify under penalty of perjury that it is not a "United States person" as defined under the Code and is eligible for treaty benefits or (b) if the common stock is held through certain foreign intermediaries, to satisfy the relevant certification requirements of applicable Treasury Regulations. Special certification and other requirements apply to certain non-U.S. holders that are pass-through entities rather than corporations or individuals.

A non-U.S. holder of eligible for a reduced rate of United States withholding tax pursuant to an income tax treaty may obtain a refund of any excess amounts withheld by filing an appropriate claim for refund with the IRS.

Gain on disposition of our common stock

Any gain realized on the disposition of our common stock by a non-U.S. holder generally will not be subject to United States federal income tax unless:

- the gain is effectively connected with a trade or business of the non-U.S. holder in the United States (and, if required by an applicable income tax treaty, is attributable to a United States permanent establishment of the non-U.S. holder);
- the non-U.S. holder is an individual who is present in the United States for 183 days or more in the taxable year of that disposition, and certain other conditions are met; or
- we are or have been a "United States real property holding corporation" for United States federal income tax purposes at any time during the shorter of the five-year period ending on the date of the disposition or such non-U.S. holder's holding period for our common stock and such non-U.S. holder held (at any time during the shorter of the five-year period ending on the date of the disposition or such non-U.S. holder's holding period) more than 5% of our common stock.

An individual non-U.S. holder described in the first bullet point immediately above will be subject to tax on the net gain derived from the sale under regular graduated United States federal income tax rates. If a non-U.S. holder that is a foreign corporation falls under the first bullet point immediately above, it will be subject to tax on its net gain in the same manner as if it were a "United States person" as defined in the Code and, in addition, may under certain circumstances be subject to a branch profits tax equal to 30% of its effectively connected earnings and profits or at such lower rate as may be specified by an applicable income tax treaty.

We believe we have not been and are not currently a "United States real property holding corporation" for United States federal income tax purposes; however, no assurance can be given that we are not or will not become one in the future. If, however, we are or become a "United States real property holding corporation," so long as our common stock continues to be regularly traded on an established securities market, only a non-U.S. holder who holds, or held (at any time during the shorter of the five-year period ending on the date of disposition or the non-U.S. holder's holding period) more than 5% of our common stock will be subject to United States federal income tax on the disposition of the common stock. Non-U.S. holders should consult their own tax advisors about the consequences that could result if we are, or become, a "United States real property holding corporation."

Information reporting and backup withholding

Information returns are required to be filed with the IRS reporting the amount of dividends paid to each non-U.S. holder tax withheld with respect to such dividends, regardless of whether withholding was required. Copies of the information returns reporting such dividends and withholding may also be made available to the tax authorities in the country in which the non-U.S. holder resides under the provisions of an applicable income tax treaty.

A non-U.S. holder will be subject to backup withholding with respect to dividends paid to it unless it certifies under penalty of perjury that it is a non-U.S. holder (and the payor does not have actual knowledge or reason to know that it is a "United States person" as defined in the Code), or it otherwise establishes an exemption.

Information reporting and, depending on the circumstances, backup withholding will apply to the proceeds of a sale of our common stock within the United States or conducted through certain United States-related financial intermediaries, unless the non-U.S. holder certifies under penalty of perjury that it is not a "United States person" as defined in the Code (and the payor does not have actual knowledge or reason to know that the beneficial owner is a "United States person" as defined in the Code), or it otherwise establishes an exemption.

Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules may be allowed as a refund or a credit against a non-U.S. holder's United States federal income tax liability provided the required information is timely furnished to the IRS.

FATCA withholding requirements

Sections 1471 to 1474 of the Code (such sections, and the Treasury Regulations and administrative guidance issued thereunder, commonly-referred to as FATCA) impose a 30% United States withholding tax on certain "withholdable payments" made to a "foreign financial institution" or a "nonfinancial foreign entity." "Withholdable payments" include payments of dividends (such as amounts treated as dividents paid with respect to shares of our common stock) in addition to certain other passive income type amounts. In

general, if a non-U.S. holder is a "foreign financial institution", the 30% withholding tax will apply to withholdable payments made to it, unless it enters into an agreement with the United States Department of Treasury to collect and provide substantial information regarding its United States account holders, including certain account holders that are foreign entities with United States owners, and to withhold 30% on certain "passthru payments". If it is a "non-financial foreign entity" FATCA also generally will impose a withholding tax of 30% on withholdable payments made to it unless it provides the withholding agent with a certification that it does not have any "substantial United States owners" or a certification identifying its direct and indirect substantial United States owners. Intergovernmental agreements, to the extent entered into between the United States and a non-U.S. holder's resident country, may modify the foregoing requirements and allow instead the avoidance of any FATCA withholding tax upon the satisfaction of the requirements of such intergovernmental agreement.

Non-U.S. holders should consult their own tax advisors regarding the impact of FATCA on their ownership and disposition of shares of our common stock and the potential applicability of any intergovernmental agreements.

Underwriting

We are offering the shares of common stock described in this prospectus through a number of underwriters. J.P. Morgan Securities LLC is acting as joint book-running manager of the offering and as representative of the underwriters. We have entered into an underwriting agreement with the underwriters. Subject to the terms and conditions of the underwriting agreement, we have agreed to sell to the underwriters, and each underwriter has severally agreed to purchase, at the public offering price less the underwriting discounts and commissions set forth on the cover page of this prospectus, the number of shares of common stock listed next to its name in the following table:

Name	Number of Shares
J.P. Morgan Securities LLC	
Total	6,600,000

The underwriters are committed to purchase all the common stock offered by us if they purchase any shares. The underwriting agreement also provides that if an underwriter defaults, the purchase commitments of non-defaulting underwriters may also be increased or the offering may be terminated.

The underwriters propose to offer the shares of common stock directly to the public at the public offering price set forth on the cover page of this prospectus and to certain dealers at that price less a concession not in excess of $ per share. Any such dealers may resell shares to certain other brokers or dealers at a discount of up to $ per share from the initial public offering price. After the initial offering of the shares to the public, the offering price and other selling terms may be changed by the underwriters. Sales of shares made outside of the United States may be made by affiliates of the underwriters.

The underwriters have an option to buy up to 990,000 additional shares of common stock from us to cover sales of shares by the underwriters which exceed the number of shares specified in the table above. The underwriters have 30 days from the date of this prospectus to exercise this option to purchase additional shares. If any shares are purchased with this option to purchase additional shares, the underwriters will purchase shares in approximately the same proportion as shown in the table above. If any additional shares of common stock are purchased, the underwriters will offer the additional shares on the same terms as those on which the shares are being offered.

The underwriting fee is equal to the public offering price per share of common stock less the amount paid by the underwriters to us per share of common stock. The underwriting fee is $ per share. The following table shows the per share and total underwriting discounts and commissions to be paid to the underwriters assuming both no exercise and full exercise of the underwriters' option to purchase additional shares.

	Without option to purchase additional shares exercise	With full option to purchase additional shares exercise
Per Share	$	$
Total	$	$

We estimate that the total expenses of this offering, including registration, filing and listing fees, printing fees and legal and accounting expenses, but excluding the underwriting discounts and commissions, will be approximately $.

A prospectus in electronic format may be made available on the web sites maintained by one or more underwriters, or selling group members, if any, participating in the offering. The underwriters may agree to allocate a number of shares to underwriters and selling group members for sale to their online brokerage account holders. Internet distributions will be allocated by the representative to underwriters and selling group members that may make Internet distributions on the same basis as other allocations.

We and our officers and directors have entered into lock-up agreements with the underwriters. Under these agreements, we and these other individuals have agreed, subject to specified exceptions, not to sell or transfer any common stock or securities convertible into, or exchangeable or exercisable for, common stock, during a period ending 90 days after the date of this prospectus, without first obtaining the written consent of J.P. Morgan Securities LLC.

Specifically, subject to specified exceptions, we and these other individuals have agreed not to:

- offer, pledge, issue, sell or contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, lend, or file with the Commission any registration statement under the Securities Act (other than on Form S-8 or on any successor form) relating to, or otherwise transfer or dispose of, directly or indirectly, any shares of common stock or any securities convertible into or exercisable or exchangeable for common stock;

- enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of the common stock, whether any such transaction described above is to be settled by delivery of common stock or other securities, in cash or otherwise;

- make any demand for or exercise any right with respect to the registration of any shares of our common stock or any securities convertible into or exchangeable or exercisable for shares of our common stock; or

- publicly announce an intention to do any of the foregoing;

except for (A) the offer, issuance and sale of the shares of common stock by the Company pursuant to this prospectus; (B) the issuance of shares by the Company pursuant to the Company's Amended and Restated 2004 Employee, Director and Consultant Stock Plan, 2012 Equity Incentive Plan, the Employee Stock Purchase Plan, and/or the 2016 Long-Term Incentive Plan as described in the Registration Statement and this prospectus; (C) securities issued by the Company in connection with a transaction that includes a commercial relationship (including joint ventures, marketing or distribution arrangements, collaboration agreements or intellectual property license agreements) or any acquisition of assets or not less than a majority or controlling portion of the equity of another entity; provided that the aggregate number of shares or securities issued pursuant to this clause (C) shall not exceed 5.0% of the total number of outstanding shares of common stock immediately following the issuance and sale of the shares of common stock pursuant to this prospectus; (D) for individuals, transfers of shares of common stock or any security convertible into or exercisable or exchangeable for common stock (i) as a bona fide gift, or gifts, (ii) to an immediate family member or a trust for the direct or indirect benefit of the individual or such immediate family member of the individual, or (iii) by will or intestacy, provided that each transferee, donee or distributee shall sign and deliver a lock-up letter substantially in the form of the lock-up agreements, and provided further that such transfer shall not involve a disposition for value and such transfer is not

reported or required to be reported in any public report or filing with the SEC during the 90 day period; (E) for individuals, the exercise of options granted under the Company's Amended and Restated 2004 Employee, Director and Consultant Stock Plan, 2012 Incentive Plan and/or 2016 Long-Term Incentive Plan provided that the shares of common stock delivered upon such exercise are subject to the restrictions set forth in the lock-up agreements; (F) for individuals, transfers of shares of common stock to the Company (i) as forfeitures to satisfy tax withholding and remittance obligations of the undersigned in connection with the vesting or exercise of equity awards granted pursuant to the Company's Amended and Restated 2004 Employee, Director and Consultant Stock Plan, 2012 Incentive Plan and/or 2016 Long-Term Incentive Plan or (ii) pursuant to a net exercise or cashless exercise by the individual of outstanding equity awards pursuant to the Company's Amended and Restated 2004 Employee, Director and Consultant Stock Plan, 2012 Incentive Plan and/or 2016 Long-Term Incentive Plan; (G) for individuals, the sale of shares of common stock to satisfy tax withholding obligations and (H) for individuals, the establishment of a trading plan that complies with Rule 10b5-1 under the Exchange Act; provided, however, that (i) the restrictions shall apply in full force to sales or other dispositions pursuant to such Rule 10b5-1 plan during the 90 day period and (ii) no public announcement or disclosure of entry into such Rule 10b5-1 plan is made or required to be made, including any filing with the SEC under Section 13 or Section 16 of the Exchange Act.

We have agreed to indemnify the underwriters against certain liabilities, including liabilities under the Securities Act.

Our common stock is listed on Nasdaq Capital Market under the symbol "STML."

In connection with this offering, the underwriters may engage in stabilizing transactions, which involves making bids for, purchasing and selling shares of common stock in the open market for the purpose of preventing or retarding a decline in the market price of the common stock while this offering is in progress. These stabilizing transactions may include making short sales of the common stock, which involves the sale by the underwriters of a greater number of shares of common stock than they are required to purchase in this offering, and purchasing shares of common stock on the open market to cover positions created by short sales. Short sales may be "covered" shorts, which are short positions in an amount not greater than the underwriters' option to purchase additional shares referred to above, or may be "naked" shorts, which are short positions in excess of that amount. The underwriters may close out any covered short position either by exercising their option to purchase additional shares, in whole or in part, or by purchasing shares in the open market. In making this determination, the underwriters will consider, among other things, the price of shares available for purchase in the open market compared to the price at which the underwriters may purchase shares through the option to purchase additional shares. A naked short position is more likely to be created if the underwriters are concerned that there may be downward pressure on the price of the common stock in the open market that could adversely affect investors who purchase in this offering. To the extent that the underwriters create a naked short position, they will purchase shares in the open market to cover the position.

The underwriters have advised us that, pursuant to Regulation M of the Securities Act, they may also engage in other activities that stabilize, maintain or otherwise affect the price of the common stock, including the imposition of penalty bids. This means that if the representative of the underwriters purchase common stock in the open market in stabilizing transactions or to cover short sales, the representative can require the underwriters that sold those shares as part of this offering to repay the underwriting discount received by them.

These activities may have the effect of raising or maintaining the market price of the common stock or preventing or retarding a decline in the market price of the common stock, and, as a result, the price of

the common stock may be higher than the price that otherwise might exist in the open market. If the underwriters commence these activities, they may discontinue them at any time. The underwriters may carry out these transactions on the Nasdaq Capital Market, in the over-the-counter market or otherwise.

In addition, in connection with this offering certain of the underwriters (and selling group members) may engage in passive market making transactions in our common stock on The Nasdaq Capital Market prior to the pricing and completion of this offering. Passive market making consists of displaying bids on The Nasdaq Capital Market no higher than the bid prices of independent market makers and making purchases at prices no higher than these independent bids and effected in response to order flow. Net purchases by a passive market maker on each day are generally limited to a specified percentage of the passive market maker's average daily trading volume in the common stock during a specified period and must be discontinued when such limit is reached. Passive market making may cause the price of our common stock to be higher than the price that otherwise would exist in the open market in the absence of these transactions. If passive market making is commenced, it may be discontinued at any time.

Certain of the underwriters and their affiliates have provided in the past to us and our affiliates and may provide from time to time in the future certain commercial banking, financial advisory, investment banking and other services for us and such affiliates in the ordinary course of their business, for which they have received and may continue to receive customary fees and commissions. In addition, from time to time, certain of the underwriters and their affiliates may effect transactions for their own account or the account of customers, and hold on behalf of themselves or their customers, long or short positions in our debt or equity securities or loans, and may do so in the future.

Other than in the United States, no action has been taken by us or the underwriters that would permit a public offering of the securities offered by this prospectus in any jurisdiction where action for that purpose is required. The securities offered by this prospectus may not be offered or sold, directly or indirectly, nor may this prospectus or any other offering material or advertisements in connection with the offer and sale of any such securities be distributed or published in any jurisdiction, except under circumstances that will result in compliance with the applicable rules and regulations of that jurisdiction. Persons into whose possession this prospectus comes are advised to inform themselves about and to observe any restrictions relating to the offering and the distribution of this prospectus. This prospectus does not constitute an offer to sell or a solicitation of an offer to buy any securities offered by this prospectus in any jurisdiction in which such an offer or a solicitation is unlawful.

In addition, in the United Kingdom, this document is being distributed only to, and is directed only at, and any offer subsequently made may only be directed at persons who are "qualified investors" (as defined in the Prospectus Directive) (i) who have professional experience in matters relating to investments falling within Article 19 (5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005, as amended (the "Order") and/or (ii) who are high net worth companies (or persons to whom it may otherwise be lawfully communicated) falling within Article 49(2)(a) to (d) of the Order (all such persons together being referred to as "relevant persons").

Any person in the United Kingdom that is not a relevant person should not act or rely on the information included in this document or use it as basis for taking any action. In the United Kingdom, any investment or investment activity that this document relates to may be made or taken exclusively by relevant persons. Any person in the United Kingdom that is not a relevant person should not act or rely on this document or any of its contents.

Notice to prospective investors in the European Economic Area

In relation to each Member State of the European Economic Area which has implemented the Prospectus Directive (each, a "**Relevant Member State**"), with effect from and including the date on which the Prospectus Directive is implemented in that Relevant Member State, no offer of shares may be made to the public in that Relevant Member State other than:

A. to any legal entity which is a qualified investor as defined in the Prospectus Directive;

B. to fewer than 100 or, if the Relevant Member State has implemented the relevant provision of the 2010 PD Amending Directive, 150, natural or legal persons (other than qualified investors as defined in the Prospectus Directive), as permitted under the Prospectus Directive, subject to obtaining the prior consent of the representative for any such offer; or

C. in any other circumstances falling within Article 3(2) of the Prospectus Directive, provided that no such offer of shares of our common stock shall result in a requirement for the publication by us or any underwriter of a prospectus pursuant to Article 3 of the Prospectus Directive.

For the purposes of this provision, the expression an "offer to the public" in relation to any shares of our common stock in any Relevant Member State means the communication in any form and by any means of sufficient information on the terms of the offer and any shares of our common stock to be offered so as to enable an investor to decide to purchase any shares of our common stock, as the same may be varied in that Member State by any measure implementing the Prospectus Directive in that Member State, the expression "Prospectus Directive" means Directive 2003/71/EC (and amendments thereto, including the 2010 PD Amending Directive, to the extent implemented in the Relevant Member State), and includes any relevant implementing measure in the Relevant Member State, and the expression "2010 PD Amending Directive" means Directive 2010/73/EU.

Prohibition of sales to EEA retail investors

The shares are not intended to be offered, sold or otherwise made available to and should not be offered, sold or otherwise made available to any retail investor in the European Economic Area ("EEA"). For these purposes, a retail investor means a person who is one (or more) of: (i) a retail client as defined in point (11) of Article 4(1) of Directive 2014/65/EU (as amended, "MiFID II"); or (ii) a customer within the meaning of Directive 2002/92/EC (as amended, the "Insurance Mediation Directive"), where that customer would not qualify as a professional client as defined in point (10) of Article 4(1) of MiFID II; or (iii) not a qualified investor as defined in Directive 2003/71/EC (as amended, the "Prospectus Directive"). Consequently no key information document required by Regulation (EU) No 1286/2014 (as amended, the "PRIIPs Regulation") for offering or selling the shares or otherwise making them available to retail investors in the EEA has been prepared and therefore offering or selling the shares or otherwise making them available to any retail investor in the EEA may be unlawful under the PRIIPS Regulation.

Notice to prospective investors in the United Kingdom

Each underwriter has represented and agreed that:

a) it has only communicated or caused to be communicated and will only communicate or cause to be communicated an invitation or inducement to engage in investment activity (within the meaning of Section 21 of the Financial Services and Markets Act 2000 ("FSMA") received by it in

connection with the issue or sale of the shares of our common stock in circumstances in which Section 21(1) of the FSMA does not apply to us; and

b) it has complied and will comply with all applicable provisions of the FSMA with respect to anything done by it in relation to the shares of our common stock in, from or otherwise involving the United Kingdom.

Notice to prospective investors in Canada

The shares may be sold only to purchasers purchasing, or deemed to be purchasing, as principal that are accredited investors, as defined in National Instrument 45-106 Prospectus Exemptions or subsection 73.3(1) of the Securities Act (Ontario), and are permitted clients, as defined in National Instrument 31-103 Registration Requirements, Exemptions and Ongoing Registrant Obligations. Any resale of the shares must be made in accordance with an exemption from, or in a transaction not subject to, the prospectus requirements of applicable securities laws.

Securities legislation in certain provinces or territories of Canada may provide a purchaser with remedies for rescission or damages if this prospectus supplement (including any amendment thereto) contains a misrepresentation, provided that the remedies for rescission or damages are exercised by the purchaser within the time limit prescribed by the securities legislation of the purchaser's province or territory. The purchaser should refer to any applicable provisions of the securities legislation of the purchaser's province or territory for particulars of these rights or consult with a legal advisor.

Pursuant to section 3A.3 (or, in the case of securities issued or guaranteed by the government of a non-Canadian jurisdiction, section 3A.4) of National Instrument 33-105 Underwriting Conflicts (NI 33-105), the underwriters are not required to comply with the disclosure requirements of NI 33-105 regarding underwriter conflicts of interest in connection with this offering.

Notice to prospective investors in Switzerland

The shares of our common stock offered by this prospectus supplement may not be publicly offered in Switzerland and will not be listed on the SIX Swiss Exchange, or SIX, or on any other stock exchange or regulated trading facility in Switzerland. This document has been prepared without regard to the disclosure standards for issuance prospectuses under art. 652a or art. 1156 of the Swiss Code of Obligations or the disclosure standards for listing prospectuses under art. 27 ff. of the SIX Listing Rules or the listing rules of any other stock exchange or regulated trading facility in Switzerland. Neither this document nor any other offering or marketing material relating to the shares or the offering may be publicly distributed or otherwise made publicly available in Switzerland. Neither this document nor any other offering or marketing material relating to the offering, us or the shares of our common stock have been or will be filed with or approved by any Swiss regulatory authority. In particular, this document will not be filed with, and the offer of shares will not be supervised by, the Swiss Financial Market Supervisory Authority FINMA (FINMA), and any offers of shares of our common stock have not been and will not be authorized under the Swiss Federal Act on Collective Investment Schemes, or "CISA." The investor protection afforded to acquirers of interests in collective investment schemes under the CISA does not extend to acquirers of shares.

Notice to prospective investors in the United Arab Emirates

The shares have not been, and are not being, publicly offered, sold, promoted or advertised in the United Arab Emirates (including the Dubai International Financial Centre) other than in compliance with the laws of the United Arab Emirates (and the Dubai International Financial Centre) governing the issue, offering and sale of securities. Further, this prospectus supplement does not constitute a public offer of securities in the United Arab Emirates (including the Dubai International Financial Centre) and is not intended to be a public offer. This prospectus supplement has not been approved by or filed with the Central Bank of the United Arab Emirates, the Securities and Commodities Authority or the Dubai Financial Services Authority.

Notice to prospective investors in Australia

No placement document, prospectus, product disclosure statement or other disclosure document has been lodged with the Australian Securities and Investments Commission, or ASIC, in relation to the offering. This prospectus supplement does not constitute a prospectus, product disclosure statement or other disclosure document under the prospectus, product disclosure statement or other disclosure document under the Corporations Act. Any offer in Australia of the shares of our common stock offered by this prospectus supplement may only be made to persons (the "Exempt Investors") who are "sophisticated investors" (within the meaning of section 708(8) of the Corporations Act), "professional investors" (within the meaning of section 708(11) of the Corporations Act) or otherwise pursuant to one or more exemptions contained in section 708 of the Corporations Act so that it is lawful to offer the shares of our common stock without disclosure to investors under Chapter 6D of the Corporations Act. The shares of our common stock applied for by Exempt Investors in Australia must not be offered for sale in Australia for a period of 12 months after the date of allotment under the offering, except in circumstances where disclosure to investors under Chapter 6D of the Corporations Act would not be required pursuant to an exemption under section 708 of the Corporations Act or otherwise or where the offer is pursuant to a disclosure document which complies with Chapter 6D of the Corporations Act. Any person acquiring shares must observe such Australian on-sale restrictions. This prospectus supplement contains general information only and does not take account of the investment objectives, financial situation or particular needs of any particular person. It does not contain any securities recommendations or financial product advice. Before making an investment decision, investors need to consider whether the information in this prospectus supplement is appropriate to their needs, objectives and circumstances, and, if necessary, seek expert advice on those matters.

Notice to prospective investors in Hong Kong

The shares of common stock offered by this prospectus supplement have not been offered or sold and will not be offered or sold in Hong Kong, by means of any document, other than (a) to "professional investors" as defined in the Securities and Futures Ordinance (Cap. 571) of Hong Kong and any rules made under that Ordinance; or (b) in other circumstances which do not result in the document being a "prospectus" as defined in the Companies Ordinance (Cap. 32) of Hong Kong or which do not constitute an offer to the public within the meaning of that Ordinance. No advertisement, invitation or document relating to the shares has been or may be issued or has been or may be in the possession of any person for the purposes of issue, whether in Hong Kong or elsewhere, which is directed at, or the contents of which are likely to be accessed or read by, the public of Hong Kong (except if permitted to do so under the securities laws of Hong Kong) other than with respect to shares which are or are intended to be disposed of only to persons outside Hong Kong or only to "professional investors" as defined in the Securities and Futures Ordinance and any rules made under that Ordinance.

Notice to prospective investors in Japan

The shares have not been and will not be registered pursuant to Article 4, Paragraph 1 of the Financial Instruments and Exchange Act. Accordingly, none of the shares nor any interest therein may be offered or sold, directly or indirectly, in Japan or to, or for the benefit of, any "resident" of Japan (which term as used herein means any person resident in Japan, including any corporation or other entity organized under the laws of Japan), or to others for re-offering or resale, directly or indirectly, in Japan or to or for the benefit of a resident of Japan, except pursuant to an exemption from the registration requirements of, and otherwise in compliance with, the Financial Instruments and Exchange Act and any other applicable laws, regulations and ministerial guidelines of Japan in effect at the relevant time.

Notice to prospective investors in Singapore

This prospectus has not been registered as a prospectus with the Monetary Authority of Singapore. Accordingly, this prospectus and any other document or material in connection with the offer or sale, or invitation for subscription or purchase, of the shares of common stock offered by this prospectus supplement may not be circulated or distributed, nor may the shares be offered or sold, or be made the subject of an invitation for subscription or purchase, whether directly or indirectly, to persons in Singapore other than (i) to an institutional investor under Section 274 of the Securities and Futures Act, Chapter 289 of Singapore (the "SFA"), (ii) to a relevant person pursuant to Section 275(1), or any person pursuant to Section 275(1A), and in accordance with the conditions specified in Section 275 of the SFA or (iii) otherwise pursuant to, and in accordance with the conditions of, any other applicable provision of the SFA, in each case subject to compliance with conditions set forth in the SFA.

Where the shares are subscribed or purchased under Section 275 by a relevant person which is: (i) a corporation (which is not an accredited investor) the sole business of which is to hold investments and the entire share capital of which is owned by one or more individuals, each of whom is an accredited investor; or (ii) a trust (where the trustee is not an accredited investor) whose sole purpose is to hold investments and each beneficiary is an accredited investor, shares, debentures and units of shares and debentures of that corporation or the beneficiaries' rights and interest in that trust shall not be transferable for 6 months after that corporation or that trust has acquired the shares under Section 275 except: (1) to an institutional investor under Section 274 of the SFA or to a relevant person, or any person pursuant to Section 275(1A), and in accordance with the conditions, specified in Section 275 of the SFA; (2) where no consideration is given for the transfer; or (3) by operation of law.

Legal matters

The validity of the common stock offered by this prospectus supplement and the accompanying prospectus will be passed upon for us by Alston & Bird LLP, New York, New York. The underwriters have been represented by Davis Polk & Wardwell LLP, New York, New York.

Experts

The financial statements of Stemline Therapeutics, Inc. included in Stemline Therapeutics, Inc.'s Annual Report on Form 10-K for the year ended December 31, 2017 have been audited by Ernst & Young LLP, independent registered public accounting firm, as set forth in their report thereon, included therein, and incorporated herein by reference. Such financial statements are incorporated herein by reference in reliance upon such report given on the authority of such firm as experts in accounting and auditing.

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Where you can find more information

We file reports with the SEC on an annual basis using Form 10-K, quarterly reports on Form 10-Q and current reports on Form 8-K. You may read and copy any such reports and amendments thereto at the SEC's Public Reference Room at 100 F Street, N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for information on the operation of the Public Reference Room. Additionally, the SEC maintains a website that contains annual, quarterly and current reports, proxy statements, and other information that issuers (including us) file electronically with the SEC. The SEC's website address is http://www.sec.gov. You can also obtain copies of materials we file with the SEC from our Internet website found at www.stemline.com. Our stock is quoted on The Nasdaq Capital Market under the symbol "STML."

Incorporation of certain information by reference

The SEC allows us to "incorporate by reference" information from other documents that we file with it, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is considered to be part of this prospectus supplement and the accompanying prospectus. Information contained in this prospectus supplement and the accompanying prospectus, and information that we file with the SEC in the future and incorporate by reference in this prospectus supplement and the accompanying prospectus, will automatically update and supersede this information. We incorporate by reference in this prospectus supplement and the accompanying prospectus the documents listed below, any future documents we file with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act after the date of this prospectus supplement and until the completion or termination of this offering (in each case, except for the information in any of the foregoing Current Reports on Form 8-K furnished under Item 2.02 or Item 7.01 thereof):

(a) Our Annual Report on Form 10-K for the year ended December 31, 2017;

(b) Our Quarterly Reports on Form 10-Q for the quarters ended March 31, 2018, June 30, 2018 and September 30, 2018;

(c) Our Current Reports on Form 8-K filed with the SEC on January 24, 2018, March 16, 2018, April 17, 2018, May 10, 2018, June 22, 2018, June 26, 2018, August 9, 2018, August 13, 2018, November 8, 2018 and December 21, 2018; and

(d) Description of our common stock, which is contained in the Registration Statement on Form 8-A, as filed with the SEC on July 30, 2012, as supplemented by the Description of Common Stock found on page 4 of the accompanying prospectus and including any amendments or reports filed for the purpose of updating such description.

A statement contained in a document incorporated by reference into this prospectus supplement and the accompanying prospectus shall be deemed to be modified or superseded for purposes of this prospectus supplement and the accompanying prospectus to the extent that a statement contained in this prospectus supplement, the accompanying prospectus, or in any other subsequently filed document which is also incorporated in this prospectus supplement and the accompanying prospectus modifies or replaces such statement. Any statements so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this prospectus supplement and the accompanying prospectus.

You may request, orally or in writing, a copy of any or all of the documents incorporated herein by reference. These documents will be provided to you at no cost, by contacting: Stemline Therapeutics, Inc., 750 Lexington Avenue, Eleventh Floor, New York, NY 10022, (646) 502-2311, email address: info@stemline.com. In addition, copies of any or all of the documents incorporated herein by reference may be accessed at our website at www.stemline.com. The information contained in, or that can be accessed through, our website is not part of, and is not incorporated into, this prospectus supplement or the accompanying prospectus.

You should rely only on information contained in, or incorporated by reference into, this prospectus supplement. We have not authorized anyone to provide you with information different from that contained in this prospectus supplement or incorporated by reference in this prospectus supplement.

PROSPECTUS

$175,000,000

Stemline Therapeutics, Inc.

Common Stock
Preferred Stock
Warrants
Debt Securities
Units

The following are types of securities that we may offer, issue and sell from time to time, together or separately:

- shares of our common stock;
- shares of our preferred stock;
- warrants;
- debt securities; and
- units consisting of any combination of our common stock, preferred stock, warrants or debt securities.

We may offer these securities in amounts, at prices, and on terms determined at the time of offering. We may sell these securities directly to you through agents we select or through underwriters and dealers we select. If we use agents, underwriters or dealers to sell these securities, we will name them and describe their compensation in a prospectus supplement. You should read this prospectus and any prospectus supplement carefully before you invest.

This prospectus provides a general description of the securities we may offer. Each time we sell securities, we will provide specific terms of the securities offered in a supplement to this prospectus. The prospectus supplement may also add, update or change information contained in this prospectus. You should read this prospectus and the applicable prospectus supplement carefully, together with additional information described under the heading "Where You Can Find More Information," before you invest in any securities. This prospectus may not be used to consummate a sale of securities unless accompanied by the applicable prospectus supplement.

Our common stock is traded on the Nasdaq Capital Market under the symbol "STML." On August 7, 2017, the per share closing price of our common stock as reported on the Nasdaq Capital Market was $8.85 per share.

Investing in our securities involves certain risks. See "Risk Factors" in our Annual Report on Form 10-K for the year ended December 31, 2016, as well as our Quarterly Reports on Form 10-Q for the periods ended March 31, 2017 and June 30, 2017, which have been filed with the SEC and are incorporated by reference into this prospectus. You should read the entire prospectus carefully before you make your investment decision.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

The date of this prospectus is August 18, 2017.

Table of Contents

STEMLINE THERAPEUTICS, INC.

Overview

We are a clinical stage biopharmaceutical company focused on discovering, acquiring, developing and potentially commercializing innovative oncology therapeutics that target difficult to treat cancers. We are currently developing three clinical stage product candidates: SL-401, SL-801, and SL-701.

SL-401

SL-401 is a targeted therapy directed to the interleukin-3 receptor, or IL-3R (CD123), present on a wide range of hematologic cancers. SL-401 is being advanced through a pivotal Phase 2 trial in patients with blastic plasmacytoid dendritic cell neoplasm, or BPDCN. SL-401 is also being assessed in additional indications including in Phase 1/2 trials of patients with myeloproliferative neoplasms, or MPNs, focused on chronic myelomonocytic leukemia, or CMML, and myelofibrosis; acute myeloid leukemia, or AML, in complete remission with minimal residual disease, or MRD; and in combination with other agents in relapsed/refractory multiple myeloma. Factors that may impact next steps for SL-401 in these additional indications include enrollment trends, safety and efficacy results, regulatory and other considerations.

SL-401 was granted Breakthrough Therapy Designation, or BTD, by the U.S. Food and Drug Administration, or FDA, for BPDCN in August 2016. The FDA awarded Orphan Drug status to SL-401 for the treatment of AML in February 2011 and for BPDCN in June 2013. The European Medicines Agency, or EMA, awarded Orphan Drug status to SL-401 for the treatment of AML in October 2015 and for BPDCN in November 2015.

In the second half of 2017, we plan to announce results from the pivotal Phase 2 trial of SL-401 in BPDCN, including data from the Stage 3 cohort. If, in our view, the results of this trial could support pursuing marketing approval, which it may not, we plan to include such results as part of a Biologics License Application, or BLA, that seeks U.S. marketing approval, and we anticipate such a filing could begin in the fourth quarter of 2017 or first quarter of 2018.

SL-801

SL-801 is a structurally novel, oral, small molecule, reversible inhibitor of Exportin-1, or XPO1, a tumor-promoting nuclear transport protein. SL-801 has demonstrated potent preclinical in vitro and in vivo antitumor activity against a wide array of solid and hematologic cancers. SL-801's potential ability to reversibly bind XPO1 may offer the possibility to mitigate side effects and help optimize the therapeutic index. We are currently enrolling patients with advanced solid tumors in a Phase 1 dose escalation trial of single agent SL-801. We have completed five dose levels, and are currently enrolling patients in the sixth dosing cohort. We plan to provide an update on this Phase 1 trial at a medical conference later this year.

SL-701

SL-701 is an immunotherapy designed to direct the immune system to attack targets present on brain cancer, and is comprised of several short synthetic peptides that correspond to epitopes of targets including IL-13Rα2, EphA2, and survivin. We conducted a Phase 2 trial of SL-701 in adult patients with second-line glioblastoma, or GBM. In Stage 1 of this trial, SL-701 was administered as a single agent, with the immunostimulants GM-CSF and Imiquimod. In Stage 2 of the trial, SL-701 was administered in combination with bevacizumab, with the immunostimulant poly-ICLC. Both stages of the trial have completed enrollment and dosing and patients are being followed for survival. Survival trends and other data will be considered when deciding next steps for the program. These steps may include conducting larger studies, including randomized studies, further combination studies with novel

agents, (e.g., checkpoint inhibitors), that could be conducted alone or via partnerships; or cessation of the program. If additional studies are conducted, this may entail significant manufacturing campaigns and commitments around SL-701 and certain immunostimulants depending upon the choice and availability of immunostimulants. SL-701 was awarded Orphan Drug designation from the FDA for the treatment of glioma in January 2015.

Our Company

We were incorporated under the laws of the State of Delaware in August 2003. Our principal executive office is located at 750 Lexington Avenue, Eleventh Floor, New York, New York 10022 and our telephone number is (646) 502-2311.

THE OFFERING	
Use of proceeds	We intend to use the net proceeds of any offering as set forth in the applicable prospectus supplement.
NASDAQ Capital Market symbol	STML

FORWARD-LOOKING STATEMENTS

This prospectus includes statements that are, or may be deemed, "forward-looking statements." In some cases, these forward-looking statements can be identified by the use of forward-looking terminology, including the terms "believes," "estimates," "anticipates," "expects," "plans," "intends," "may," "could," "might," "will," "should," "approximately" or, in each case, their negative or other variations thereon or comparable terminology, although not all forward-looking statements contain these words. They appear in a number of places throughout this prospectus and include statements regarding our intentions, beliefs, projections, outlook, analyses or current expectations concerning, among other things, our history of net operating losses and uncertainty regarding our ability to obtain capital and achieve profitability, our ability to develop and commercialize our product candidates, our ability to advance our development programs, enroll our trials, and achieve clinical endpoints, our ability to use or expand our technology to build a pipeline of product candidates, our ability to obtain and maintain regulatory approval of our product candidates and comply with ongoing regulatory requirements, our ability to successfully operate in a competitive industry and gain market acceptance by physician, provider, patient, and payor communities, our reliance on third parties, unstable economic or market conditions, and our ability to obtain and adequately protect intellectual property rights for our product candidates.

By their nature, forward-looking statements involve risks and uncertainties because they relate to events, competitive dynamics, and healthcare, regulatory and scientific developments and depend on the economic circumstances that may or may not occur in the future or may occur on longer or shorter timelines than anticipated. Although we believe that we have a reasonable basis for each forward-looking statement contained in this prospectus, we caution you that forward-looking statements are not guarantees of future performance and that our actual results of operations, financial condition and liquidity, and the development of the industry in which we operate may differ materially from the forward-looking statements contained in this prospectus. In addition, even if our results of operations, financial condition and liquidity, and the development of the industry in which we operate are consistent with the forward-looking statements contained in this prospectus, they may not be predictive of results or developments in future periods.

WHERE YOU CAN FIND MORE INFORMATION

We file reports with the SEC on an annual basis using Form 10-K, quarterly reports on Form 10-Q and current reports on Form 8-K. You may read and copy any such reports and amendments thereto at the SEC's Public Reference Room at 100 F Street, N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for information on the operation of the Public Reference Room. Additionally, the SEC maintains a website that contains annual, quarterly, and current reports, proxy statements, and other information that issuers (including us) file electronically with the SEC. The SEC's website address is http://www.sec.gov. You can also obtain copies of materials we file with the SEC from our Internet website found at www.stemline.com. Our stock is quoted on the Nasdaq Capital Market under the symbol "STML."

IMPORTANT INFORMATION ABOUT THIS PROSPECTUS

This prospectus is part of a "shelf" registration statement that we filed with the SEC. By using a shelf registration statement, we may sell our securities, as described in this prospectus, from time to time in one or more offerings. We may use the shelf registration statement to offer and sell securities described in this prospectus. Each time we sell securities, we will provide a prospectus supplement to this prospectus that contains specific information about the terms of such offering. The supplement may also add, update or change information contained in this prospectus. Before purchasing any securities, you should carefully read both this prospectus and any supplement, together with the additional information incorporated into this prospectus or described under the heading "Where You Can Find More Information."

You should rely only on the information contained or incorporated by reference in this prospectus and any prospectus supplement. We have not authorized any other person to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely on it. We will not make an offer to sell securities in any jurisdiction where the offer or sale is not permitted. You should assume that the information appearing in this prospectus, as well as information we previously filed with the SEC and have incorporated by reference, is accurate as of the date on the front cover of this prospectus only, or when such document was filed with the SEC. Our business, financial condition, results of operations and prospects may have changed since the relevant date.

We will not use this prospectus to offer and sell securities unless it is accompanied by a prospectus supplement that more fully describes the terms of the offering.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to "incorporate by reference" the information we file with them. This means that we can disclose important information to you by referring you to those documents instead of having to repeat the information in this document. The information incorporated by reference is considered to be part of this prospectus, and later information that we file with the SEC will automatically update and supersede this information. We incorporate by reference the documents listed below and any future filings made with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act (1) after the date of the initial registration statement, as amended, and prior to effectiveness of the registration statement, and (2) after the date of this prospectus and prior to the termination of this offering. Such information will automatically update and supersede the information contained in this prospectus and the documents listed below; provided, however, that we are not, unless specifically indicated, incorporating any information furnished under Item 2.02 or Item 7.01 of any current report on Form 8-K, whether listed below or filed in the future, or related exhibits furnished pursuant to Item 9.01 of Form 8-K:

(a) Our Annual Report on Form 10-K for the year ended December 31, 2016;

(b) Our Quarterly Report on Form 10-Q for the quarters ended March 31, 2017 and June 30, 2017;

(c) Our Current Reports on Form 8-K filed with the SEC on January 6, 2017, January 20, 2017, March 17, 2017, March 24, 2017, May 11, 2017, June 20, 2017 and August 8, 2017;

(d) Our Definitive Proxy Statement on Schedule 14A, filed with the SEC on May 1, 2017; and

(e) Description of our common stock, which is contained in the Registration Statement on Form 8-A, as filed with the SEC on July 30, 2012, as supplemented by the Description of Common Stock found on page 6 of the base prospectus and including any amendments or reports filed for the purpose of updating such description.

We will provide to each person, including any beneficial owner, to whom a copy of this prospectus is delivered, a copy of any or all of the information that we have incorporated by reference into this prospectus. We will provide this information upon written or oral request at no cost to the requester. You may request this information by contacting our corporate headquarters at the following address: 750 Lexington Avenue, Eleventh Floor, New York, New York 10022, Attn: Chief Accounting Officer, or by calling (646) 502-2311.

RATIO OF EARNINGS/ DEFICIENCY TO FIXED CHARGES

The following table sets forth, for each of the periods presented, our ratio of earnings to fixed charges and our coverage deficiency. You should read this table in conjunction with the financial statements and notes incorporated by reference in this prospectus.

(in thousands)	Six Months Ended June 30, 2017	Year Ended December 31, 2016	Year Ended December 31, 2015	Year Ended December 31, 2014	Year Ended December 31, 2013	Year Ended December 31, 2012
Net loss	(30,022,946)	(38,303,005)	(37,243,861)	(28,829,975)	(24,196,511)	(6,274,782)
Ratio of earnings to fixed charges(1)	N/A	N/A	N/A	N/A	N/A	N/A
Coverage deficiency	(30,022,946)	(38,303,005)	(37,243,861)	(28,829,975)	(24,196,511)	(6,274,782)

(1) We did not record earnings for the six months ended June 30, 2017, and for the years ended December 31, 2016, 2015, 2014, 2013 and 2012. Accordingly, our earnings were insufficient to cover fixed charges for such periods and we are unable to disclose a ratio of earnings to fixed charges for such periods.

DESCRIPTION OF SECURITIES WE MAY OFFER

This prospectus contains summary descriptions of the securities we may offer from time to time. These summary descriptions are not meant to be complete descriptions of each security. The particular terms of any security will be described in the related prospectus supplement.

DESCRIPTION OF COMMON STOCK

The following summary of the terms of our common stock may not be complete and is subject to, and qualified in its entirety by reference to, the terms and provisions of our restated certificate of incorporation and our amended and restated by-laws. You should refer to, and read this summary together with, our restated certificate of incorporation and amended and restated by-laws to review all of the terms of our common stock that may be important to you.

Common Stock

Under the terms of our restated certificate of incorporation, we are authorized to issue a total of 53,750,000 shares of common stock, par value $0.0001 per share. As of August 8, 2017, we had issued and outstanding 25,280,024 shares of our common stock. All outstanding shares of our common stock are fully paid and nonassessable. Our common stock is listed on The Nasdaq Capital Market and trades under the symbol "STML" and has been publicly traded since January 29, 2013. Prior to that time, there was no public market for our common stock.

Holders

The number of record holders of our 25,280,024 shares of outstanding common stock as of August 8, 2017 was 136. This number does not include beneficial owners whose shares are held by nominees in street name.

Dividends

We have never declared or paid any cash dividends on our common stock and do not anticipate paying any cash dividends in the foreseeable future. Any future determination to pay dividends will be at the discretion of our board of directors.

Voting Rights

Holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of stockholders and do not have cumulative voting rights. Holders of our common stock are not entitled to vote on any amendment to our restated certificate of incorporation that relates solely to the terms of one or more outstanding series of preferred stock. An election of directors by our stockholders will be determined by a plurality of the votes cast by the stockholders entitled to vote on the election. Holders of common stock are entitled to receive proportionately any dividends as may be declared by our board of directors, subject to any preferential dividend rights or other rights of outstanding preferred stock.

Liquidation and Dissolution

In the event of our liquidation or dissolution, the holders of common stock are entitled to receive proportionately all assets available for distribution to stockholders after the payment of all debts and other liabilities and subject to the preferential or other rights of any outstanding preferred stock. Holders of common stock have no preemptive, subscription, redemption, conversion or similar rights. The rights, preferences and privileges of holders of common stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of preferred stock that we may designate and issue in the future.

Transfer Agent

The transfer agent and registrar for our common stock is Computershare Trust Company, N.A.

Anti-Takeover Provisions

Section 203 of the Delaware General Corporation Law

We are subject to Section 203 of the Delaware General Corporation Law. Subject to certain exceptions, Section 203 prevents a publicly held Delaware corporation from engaging in a "business combination" with any "interested stockholder" for three years following the date that the person became an interested stockholder, unless the interested stockholder attained such status with the approval of our board of directors or unless the business combination is approved in a prescribed manner. A "business combination" includes, among other things, a merger or consolidation involving us and the "interested stockholder" and the sale of more than 10% of our assets. In general, an "interested stockholder" is any entity or person beneficially owning 15% or more of our outstanding voting stock and any entity or person affiliated with or controlling or controlled by such entity or person.

Staggered board; removal of directors

Our restated certificate of incorporation and our amended and restated by-laws divide our board of directors into three classes with staggered three-year terms. In addition, a director may be removed only for cause and only by the affirmative vote of the holders of at least 75% of the votes that all our stockholders would be entitled to cast in an annual election of directors. Any vacancy on our board of directors, including a vacancy resulting from an enlargement of our board of directors, may be filled only by vote of a majority of our directors then in office. The classification of our board of directors and the limitations on the removal of directors and filling of vacancies could make it more difficult for a third party to acquire, or discourage a third party from seeking to acquire, control of our Company.

Super-majority voting

The Delaware General Corporation Law provides generally that the affirmative vote of a majority of the shares entitled to vote on any matter is required to amend a corporation's certificate of incorporation or by-laws, unless a corporation's certificate of incorporation or by-laws, as the case may be, requires a greater percentage. Our amended and restated by-laws may be amended or repealed by a majority vote of our board of directors or the affirmative vote of the holders of at least 75% of the votes that all our stockholders would be entitled to cast in an annual election of directors. In addition, the affirmative vote of the holders of at least 75% of the votes which all our stockholders would be entitled to cast in an election of directors is required to amend or repeal or to adopt any provisions inconsistent with any of the provisions of our certificate of incorporation described in the prior two paragraphs.

Stockholder action; special meeting of stockholders

Our restated certificate of incorporation provides that any action required or permitted to be taken by our stockholders must be effected at a duly called annual or special meeting of such stockholders and may not be effected by any consent in writing by such stockholders. Our restated certificate of incorporation and our amended and restated by-laws also provide that, except as otherwise required by law, special meetings of our stockholders can only be called by our chairman of the board, our chief executive officer or our board of directors and business transacted at any special meeting is limited to the stated purposes of the meeting.

Authorized but unissued shares

The authorized but unissued shares of common stock and preferred stock are available for future issuance without stockholder approval, subject to any limitations imposed by the listing standards of The Nasdaq Capital Market. These additional shares may be used for a variety of corporate finance transactions, acquisitions and employee benefit plans. The existence of authorized but unissued and unreserved common stock and preferred stock could make more difficult or discourage an attempt to obtain control of us by means of a proxy contest, tender offer, merger or otherwise.

DESCRIPTION OF PREFERRED STOCK

The following summary of the terms of our preferred stock may not be complete and is subject to, and qualified in its entirety by reference to, the terms and provisions of our restated certificate of incorporation and our amended and restated by-laws. You should refer to, and read this summary together with, our restated certificate of incorporation and amended and restated by-laws to review all of the terms of our preferred stock that may be important to you.

Under the terms of our restated certificate of incorporation, our board of directors is authorized to issue up to 5,000,000 shares of preferred stock, par value $0.0001 per share. Our board of directors may issues shares of preferred stock in one or more series without stockholder approval, and has the discretion to determine the rights, preferences, privileges and restrictions, including voting rights, dividend rights, conversion rights, redemption privileges and liquidation preferences, of each series of preferred stock. We may amend from time to time our restated certificate of incorporation to increase the number of authorized shares of preferred stock. Any such amendment would require the approval of the holders of a majority of the voting power of the shares entitled to vote thereon. As of the date of this prospectus, we have 5,000,000 shares of preferred shares authorized, but no shares of preferred stock outstanding.

It is not possible to state the actual effect of the issuance of any shares of preferred stock upon the rights of the holders of common stock until the board of directors determines the specific rights of the holders of preferred stock. However, effects of the issuance of preferred stock include restricting dividends on common stock, diluting the voting power of common stock, impairing the liquidation rights of common stock, and making it more difficult for a third party to acquire us, which could have the effect of discouraging a third party from acquiring, or deterring a third party from paying a premium to acquire, a majority of our outstanding voting stock.

The particular terms of any series of preferred stock being offered by us will be described in the prospectus supplement relating to that series of preferred stock. Those terms may include:

- the title and liquidation preference per share of the preferred stock and the number of shares offered;
- the purchase price of the preferred stock;
- the dividend rate (or method of calculation);
- the dates on which dividends will be paid and the date from which dividends will begin to accumulate;
- any redemption or sinking fund provisions of the preferred stock;
- any listing of the preferred stock on any securities exchange or market;
- any conversion provisions of the preferred stock;
- the voting rights, if any, of the preferred stock; and
- any additional dividend, liquidation, redemption, sinking fund and other rights, preferences, privileges, limitations and restrictions of the preferred stock.

The preferred stock will, when issued, be fully paid and non-assessable.

DESCRIPTION OF WARRANTS

We may issue warrants to purchase shares of our common stock and/or preferred stock in one or more series together with other securities or separately, as described in each applicable prospectus supplement.

The prospectus supplement relating to any warrants we offer will include specific terms relating to the offering. These terms will include some or all of the following:

- the title of the warrants;
- the aggregate number of warrants offered;
- the designation, number and terms of the shares of common stock purchasable upon exercise of the warrants and procedures by which those numbers may be adjusted;
- the exercise price of the warrants;
- the dates or periods during which the warrants are exercisable;
- the designation and terms of any securities with which the warrants are issued;
- if the warrants are issued as a unit with another security, the date on and after which the warrants and the other security will be separately transferable;
- if the exercise price is not payable in U.S. dollars, the foreign currency, currency unit or composite currency in which the exercise price is denominated;
- any minimum or maximum amount of warrants that may be exercised at any one time;
- any terms relating to the modification of the warrants;
- any terms, procedures and limitations relating to the transferability, exchange or exercise of the warrants; and
- any other specific terms of the warrants.

DESCRIPTION OF DEBT SECURITIES

We may offer debt securities which may be senior, subordinated or junior subordinated and may be convertible. Unless otherwise specified in the applicable prospectus supplement, our debt securities will be issued in one or more series under an indenture to be entered into between us and a trustee. We will issue the debt securities offered by this prospectus and any accompanying prospectus supplement under an indenture to be entered into between us and the trustee identified in the applicable prospectus supplement. The terms of the debt securities will include those stated in the indenture and those made part of the indenture by reference to the Trust Indenture Act of 1939, as in effect on the date of the indenture. We have filed a copy of the form of indenture as an exhibit to the registration statement in which this prospectus is included. The indenture will be subject to and governed by the terms of the Trust Indenture Act of 1939.

The following description briefly sets forth certain general terms and provisions of the debt securities that we may offer. The particular terms of the debt securities offered by any prospectus supplement and the extent, if any, to which these general provisions may apply to the debt securities, will be described in the related prospectus supplement. Accordingly, for a description of the terms of a particular issue of debt securities, reference must be made to both the related prospectus supplement and to the following description.

Debt Securities

The aggregate principal amount of debt securities that may be issued under the indenture is unlimited. The debt securities may be issued in one or more series as may be authorized from time to time pursuant to a supplemental indenture entered into between us and the trustee or an order delivered by us to the trustee. For each series of debt securities we offer, a prospectus supplement accompanying this prospectus will describe the following terms and conditions of the series of debt securities that we are offering, to the extent applicable:

- title and aggregate principal amount;
- whether the debt securities will be senior, subordinated or junior subordinated;
- applicable subordination provisions, if any;
- provisions regarding whether the debt securities will be convertible or exchangeable into other securities or property of the Company or any other person;
- percentage or percentages of principal amount at which the debt securities will be issued;
- maturity date(s);
- interest rate(s) or the method for determining the interest rate(s);
- whether interest on the debt securities will be payable in cash or additional debt securities of the same series;
- dates on which interest will accrue or the method for determining dates on which interest will accrue and dates on which interest will be payable;
- whether the amount of payment of principal of, premium, if any, or interest on the debt securities may be determined with reference to an index, formula or other method;
- redemption, repurchase or early repayment provisions, including our obligation or right to redeem, purchase or repay debt securities under a sinking fund, amortization or analogous provision;
- if other than the debt securities' principal amount, the portion of the principal amount of the debt securities that will be payable upon declaration of acceleration of the maturity;
- authorized denominations;
- form;
- amount of discount or premium, if any, with which the debt securities will be issued, including whether the debt securities will be issued as "original issue discount" securities;
- the place or places where the principal of, premium, if any, and interest on the debt securities will be payable;
- where the debt securities may be presented for registration of transfer, exchange or conversion;
- the place or places where notices and demands to or upon the Company in respect of the debt securities may be made;
- whether the debt securities will be issued in whole or in part in the form of one or more global securities;
- if the debt securities will be issued in whole or in part in the form of a book-entry security, the depository or its nominee with respect to the debt securities and the circumstances under which

the book-entry security may be registered for transfer or exchange or authenticated and delivered in the name of a person other than the depository or its nominee;

- whether a temporary security is to be issued with respect to such series and whether any interest payable prior to the issuance of definitive securities of the series will be credited to the account of the persons entitled thereto;
- the terms upon which beneficial interests in a temporary global security may be exchanged in whole or in part for beneficial interests in a definitive global security or for individual definitive securities;
- the guarantors, if any, of the debt securities, and the extent of the guarantees and any additions or changes to permit or facilitate guarantees of such debt securities;
- any covenants applicable to the particular debt securities being issued;
- any defaults and events of default applicable to the debt securities, including the remedies available in connection therewith;
- currency, currencies or currency units in which the purchase price for, the principal of and any premium and any interest on, such debt securities will be payable;
- time period within which, the manner in which and the terms and conditions upon which the Company or the purchaser of the debt securities can select the payment currency;
- securities exchange(s) on which the debt securities will be listed, if any;
- whether any underwriter(s) will act as market maker(s) for the debt securities;
- extent to which a secondary market for the debt securities is expected to develop;
- provisions relating to defeasance;
- provisions relating to satisfaction and discharge of the indenture;
- any restrictions or conditions on the transferability of the debt securities;
- provisions relating to the modification of the indenture both with and without the consent of holders of debt securities issued under the indenture;
- any addition or change in the provisions related to compensation and reimbursement of the trustee;
- provisions, if any, granting special rights to holders upon the occurrence of specified events;
- whether the debt securities will be secured or unsecured, and, if secured, the terms upon which the debt securities will be secured and any other additions or changes relating to such security; and
- any other terms of the debt securities that are not inconsistent with the provisions of the Trust Indenture Act (but may modify, amend, supplement or delete any of the terms of the indenture with respect to such series of debt securities).

General

One or more series of debt securities may be sold as "original issue discount" securities. These debt securities would be sold at a substantial discount below their stated principal amount, bearing no interest or interest at a rate which at the time of issuance is below market rates. One or more series of debt securities may be variable rate debt securities that may be exchanged for fixed rate debt securities.

United States federal income tax consequences and special considerations, if any, applicable to any such series will be described in the applicable prospectus supplement.

Debt securities may be issued where the amount of principal and/or interest payable is determined by reference to one or more currency exchange rates, commodity prices, equity indices or other factors. Holders of such debt securities may receive a principal amount or a payment of interest that is greater than or less than the amount of principal or interest otherwise payable on such dates, depending upon the value of the applicable currencies, commodities, equity indices or other factors. Information as to the methods for determining the amount of principal or interest, if any, payable on any date, the currencies, commodities, equity indices or other factors to which the amount payable on such date is linked and certain additional United States federal income tax considerations will be set forth in the applicable prospectus supplement.

The term "debt securities" includes debt securities denominated in U.S. dollars or, if specified in the applicable prospectus supplement, in any other freely transferable currency or units based on or relating to foreign currencies.

We expect most debt securities to be issued in fully registered form without coupons and in denominations of $2,000 and any integral multiples thereof. Subject to the limitations provided in the indenture and in the prospectus supplement, debt securities that are issued in registered form may be transferred or exchanged at the principal corporate trust office of the trustee, without the payment of any service charge, other than any tax or other governmental charge payable in connection therewith.

Global Securities

The debt securities of a series may be issued in whole or in part in the form of one or more global securities that will be deposited with, or on behalf of, a depositary identified in the prospectus supplement. Global securities will be issued in registered form and in either temporary or definitive form. Unless and until it is exchanged in whole or in part for the individual debt securities, a global security may not be transferred except as a whole by the depositary for such global security to a nominee of such depositary or by a nominee of such depositary to such depositary or another nominee of such depositary or by such depositary or any such nominee to a successor of such depositary or a nominee of such successor. The specific terms of the depositary arrangement with respect to any debt securities of a series and the rights of and limitations upon owners of beneficial interests in a global security will be described in the applicable prospectus supplement.

Governing Law

The indenture and the debt securities shall be construed in accordance with and governed by the laws of the State of New York.

DESCRIPTION OF UNITS

We may issue, in one more series, units comprised of shares of our common stock or preferred stock, warrants to purchase common stock or preferred stock, debt securities or any combination of those securities. Each unit will be issued so that the holder of the unit is also the holder of each security included in the unit. Thus, the holder of a unit will have the rights and obligations of a holder of each included security. The unit agreement under which a unit is issued may provide that the securities included in the unit may not be held or transferred separately, at any time or at any time before a specified date.

We may evidence units by unit certificates that we issue under a separate agreement. We may issue the units under a unit agreement between us and one or more unit agents. If we elect to enter into a unit agreement with a unit agent, the unit agent will act solely as our agent in connection with the units and will not assume any obligation or relationship of agency or trust for or with any registered holders of units or beneficial owners of units. We will indicate the name and address and other information regarding the unit agent in the applicable prospectus supplement relating to a particular series of units if we elect to use a unit agent.

We will describe in the applicable prospectus supplement the terms of the series of units being offered, including:

- the designation and terms of the units and of the securities comprising the units, including whether and under what circumstances those securities may be held or transferred separately;
- any provisions of the governing unit agreement that differ from those described herein; and
- any provisions for the issuance, payment, settlement, transfer or exchange of the units or of the securities comprising the units.

The other provisions regarding our common stock, preferred stock, warrants and debt securities as described in this section will apply to each unit to the extent such unit consists of shares of our common stock, preferred stock, warrants and/or debt securities.

PLAN OF DISTRIBUTION

We may sell the securities covered in this prospectus from time to time in one or more of the following ways:

- through underwriters or dealers;
- in short or long transactions;
- directly to a limited number of purchasers or to a single purchaser;
- through agents; or
- through a combination of any of these methods of sale.

Each time that we use this prospectus to sell securities, we will also provide a prospectus supplement that contains the specific terms of the offering. The prospectus supplement will set forth the terms of the offering of the securities, including:

- the name or names of any underwriters, dealers or agents and the amounts of any securities underwritten or purchased by each of them; and
- the purchase price of the securities being offered and the proceeds to us and any discounts, commissions or concessions allowed or reallowed or paid to dealers.

The purchase price and any discounts or concessions allowed or reallowed or paid to dealers may be changed from time to time.

If underwriters are used in the sale of any securities, the securities will be acquired by the underwriters for their own account and may be resold from time to time in one or more transactions, including negotiated transactions, at a fixed public offering price or at varying prices determined at the time of sale. The securities may be either offered to the public through underwriting syndicates represented by managing underwriters, or directly by underwriters. Generally, the underwriters' obligations to purchase the securities will be subject to certain conditions precedent. The underwriters will be obligated to purchase all of the securities if they purchase any of the securities.

We may sell the securities through agents from time to time. The prospectus supplement will name any agent involved in the offer or sale of the securities and any commissions we pay to them. Generally, any agent will be acting on a best efforts basis for the period of its appointment.

We may authorize underwriters, dealers or agents to solicit offers by certain purchasers to purchase the securities from us at the public offering price set forth in the prospectus supplement pursuant to delayed delivery contracts providing for payment and delivery on a specified date in the future. The contracts will be subject only to those conditions set forth in the prospectus supplement, and the prospectus supplement will set forth any commissions we pay for solicitation of these contracts.

Agents and underwriters may be entitled to indemnification by us against certain civil liabilities, including liabilities under the Securities Act of 1933, as amended, or to contribution with respect to payments which the agents or underwriters may be required to make in respect thereof. Agents and underwriters may be customers of, engage in transactions with, or perform services for us in the ordinary course of business.

We may enter into derivative transactions with third parties, or sell securities not covered by this prospectus to third parties in privately negotiated transactions. If the applicable prospectus supplement indicates, in connection with those derivatives, the third parties may sell securities covered by this prospectus and the applicable prospectus supplement, including in short sale transactions. If so, the third party may use securities pledged by us or borrowed from us or others to settle those sales or to close out any related open borrowings of securities, and may use securities received from us in

settlement of those derivatives to close out any related open borrowings of securities. The third party in such sale transactions will be an underwriter and will be identified in the applicable prospectus supplement (or a post-effective amendment). We may also use underwriters or such other third parties with whom we have a material relationship. We will describe the nature of any such relationship in the applicable prospectus supplement.

In compliance with the guidelines of the Financial Industry Regulatory Authority, Inc., or FINRA, the maximum compensation to be received by a FINRA member or independent broker-dealer may not exceed 8% of the offering proceeds. It is anticipated that the maximum compensation to be received in any particular offering of securities will be less than this amount.

At-the-Market Offerings

Upon written instruction from us, a sales agent party to a distribution agency agreement with us will use its commercially reasonable efforts to sell on our behalf, as our agent, the shares of common stock offered as agreed upon by us and the sales agent. We will designate the maximum amount of shares of common stock to be sold through the sales agent, on a daily basis or otherwise as we and the sales agent agree. Subject to the terms and conditions of the applicable distribution agency agreement, the sales agent will use its commercially reasonable efforts to sell, as our sales agent and on our behalf, all of the designated shares of common stock. We may instruct the sales agent not to sell shares of common stock if the sales cannot be effected at or above the price designated by us in any such instruction. We may suspend the offering of shares of common stock under any distribution agency agreement by notifying the sales agent. Likewise, the sales agent may suspend the offering of shares of common stock under the applicable distribution agency agreement by notifying us of such suspension.

We also may sell shares to the sales agent as principal for its own account at a price agreed upon at the time of sale. If we sell shares to the sales agent as principal, we will enter into a separate agreement setting forth the terms of such transaction.

The offering of common stock pursuant to a distribution agency agreement will terminate upon the earlier of (1) the sale of all shares of common stock subject to the distribution agency agreement or (2) the termination of the distribution agency agreement by us or by the sales agent.

Sales agents under our distribution agency agreements may make sales in privately negotiated transactions and/or any other method permitted by law, including sales deemed to be an "at-the-market" offering as defined in Rule 415 promulgated under the Securities Act, sales made directly on the Nasdaq Capital Market, the existing trading market for our common stock, or sales made to or through a market maker other than on an exchange. The name of any such underwriter or agent involved in the offer and sale of our common stock, the amounts underwritten, and the nature of its obligations to take our common stock will be described in the applicable prospectus supplement.

LEGAL MATTERS

The legality and validity of the securities offered from time to time under this prospectus will be passed upon by Alston & Bird LLP, New York, New York.

EXPERTS

The financial statements of Stemline Therapeutics, Inc. appearing in Stemline Therapeutics, Inc's Annual Report (Form 10-K) for the year ended December 31, 2016 have been audited by Ernst & Young LLP, independent registered public accounting firm, as set forth in their report thereon, included therein, and incorporated herein by reference. Such financial statements are incorporated herein by reference in reliance upon such report given on the authority of such firm as experts in accounting and auditing.

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6,600,000 shares

Common stock

Prospectus supplement

J.P. Morgan

, 2019