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EQUITY RESEARCH
Company Report

February 26, 2015

Actinium Pharmaceuticals (ATNM - $ 3.43)

Healthcare/Biotechnology

Two Novel Acute Myeloid Leukemia (AML) Radiotherapeutics in Development Supported by Strong Balance Sheet

Ticker:	**ATNM**
Rating:	**Buy**
Price Target:	**$ 17.00**

We are transferring research coverage of ATNM to Yale Jen due to the departure of the covering analyst. We are re-initiating with Buy rating and 12-month target price of $17.

- **Novel radiotherapeutics with current emphasis on treatment of r/r and treatment naive AML.** In conjunction with its proprietary APIT platform, ATNM has developed two radiotherapeutics, Actimab-A and Iomab-B, as 1st line and HSCT-conditioning AML treatments, respectively.
- **Iomab-B, a novel HSCT conditioning therapy, will initiate a Phase III trial in early 3Q15.** ATNM is scheduled to start a Phase III study in early 3Q15 evaluating Iomab-B, an iodine 131 (^{131}I) CD45 targeted mAb as novel HSCT conditioning therapy in elderly r/r AML patients. The primary endpoint is durable complete response lasting for 6 months. The secondary endpoint is OS at one year. Topline results will potentially be available in mid-2017 – a critical catalyst, in our opinion. Robust results from the prior Phase I/II study demonstrated Iomab-B exhibited superior one year survival in r/r AML patients vs. HSCT or chemotherapy (30% vs. 10%) reported from MD Anderson's database.
- **Promising Actimab-A interim efficacy results as 1st-line therapy in AML from Phase I/II study.** From the ongoing Phase I/II study as a 1st line therapy in elderly AML patients, Actimab-A, an Actinium-225 (^{225}Ac) CD33 targeted mAb, exhibited robust interim efficacy results with median OS of 9.1 months (vs. 2.5 months from historical data) mainly in secondary AML patients from the Phase I portion of the study. More data is expected at the 2015 ASH conference.
- **Balance sheet should alleviate ATMN financing concerns and facilitate advancement of lead program through reporting of critical clinical results.** We believe the recent financing of ~$21.6MM should mitigate the concern around insufficient resources and should carry the company through completion of the Iomab-B Phase III study and data release.
- **Substantial upside remains.** We are reassuming our coverage of ATNM with Buy rating and a $17 price target to reflect the advancements of two promising radiotherapeutics. Our valuation is based on our peer comparable and probability-adjusted-NPV-driven sum-of-the-parts analyses.

Trading Data:

Last Price (02/26/2015)	$ 3.43
52–Week High (4/3/2014)	$ 15.00
52–Week Low (2/24/2015)	$ 3.35
Market Cap. (MM)	$ 121
Shares Out. (MM)	35

Earnings Estimates: (per share)

(Dec)	1Q	2Q	3Q	4Q	FY	P/E
FY-15E	-0.22	-0.23	-0.24	-0.24	-0.94	NM
FY-14E	-0.66A	0.14A	-0.21A	-0.23	-0.96	NM
FY-13A	0.02	-0.10	-0.03	-0.25	-0.36	NM
FY-12A	NA	NA	NA	NA	-4.46	NM

Source: Laidlaw & Company estimates

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Investment thesis

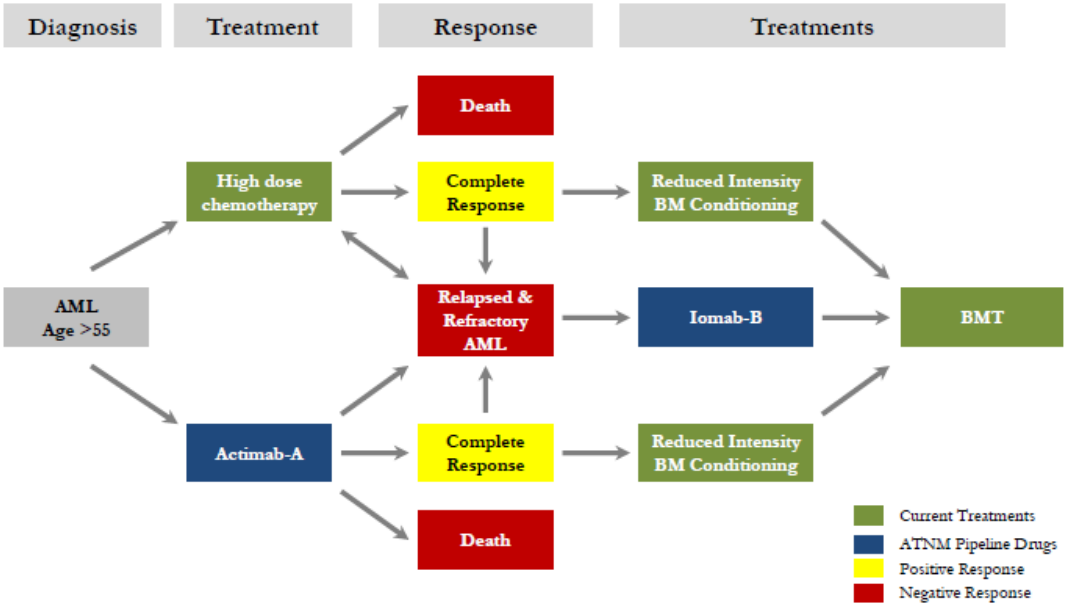
Our $17 price target is based on a blended measurement of NPV driven sum-of-the-parts and comparable analyses.

- **We are transferring research coverage of ATNM to Yale Jen due to the departure of the covering analyst. We are re-initiating with Buy rating and 12-month target price of $17.** Actinium Pharmaceuticals is a mid-clinical stage biopharmaceutical company focusing on the development of radiotherapeutics for cancer treatment. Both its clinical stage products are potential treatments of different stages of acute myeloid leukemia (AML).

Iomab-B is a beta particle emitting, via radioisotope iodine 131 (131I), CD45 targeted monoclonal antibody (mAb); and Actimab-A is an alpha emitting [via radioisotope Actinium-225 (225Ac)] CD33 targeted mAb

- **Two lead products, Iomab-B and Actimab-A, could play critical roles in managing separate stages of acute myeloid leukemia (AML).** Actinium Pharmaceuticals' two lead products, Iomab-B and Actimab-A, have the potential to treat different stages of AML (Figure 1). Iomab-B is a beta particle emitting, via radioisotope iodine 131 (^{131}I)-linked, CD45 targeted monoclonal antibody (mAb) that is being developed for a hematopoietic stem cell transplantation (HSCT) conditioning regimen for relapsed/refractory (r/r) elderly and very sick AML patients. We estimate that ATNM will start a Phase III study for Iomab-B in AML in mid-2015 (possibly in early 3Q15). Actimab-A is an alpha emitting, via radioisotope Actinium-225 (^{225}Ac)-linked, CD33 targeted mAb that could provide a potentially safer first-line treatment for elderly and very sick AML patients.

Figure 1: Value proposition of Iomab-B and Actimab-A on AML treatment



Source: Company presentation

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The Phase I/II study demonstrated robust results with estimated one-year survival of all patients, relapsed AML and refractory AML of 41%, 46% and 38%, respectively.

- **Encouraging Iomab-B Phase I/II trial results.** The Fred Hutchinson Cancer Research Center developed Iomab-B and conducted a Phase I/II study in advanced AML (81%) or high-risk myelodysplastic syndrome (MDS) patients along with standard reduced-intensity conditioning (RIC) regimens (which encompass fludarabine and total body irradiation or TBI of 2 Gy) before HSCT. The study demonstrated robust results with estimated one-year survival of all patients, relapsed AML and refractory AML of 41%, 46% and 38%, respectively[1] (Figure 2). The study also demonstrated that MTD for Iomab-B was ~ 24 Gy of exposure to liver. Further, the study exhibited 100% CRR and 100% engraftment by day 28. On the safety side, transplant related mortality was 14%, which was similar to that of RIC. Non-relapse mortality (NRM) rate at day 100 and overall was 10% and 20%, respectively.

Figure 2: One year survival results of Iomab-B from Phase I/II study

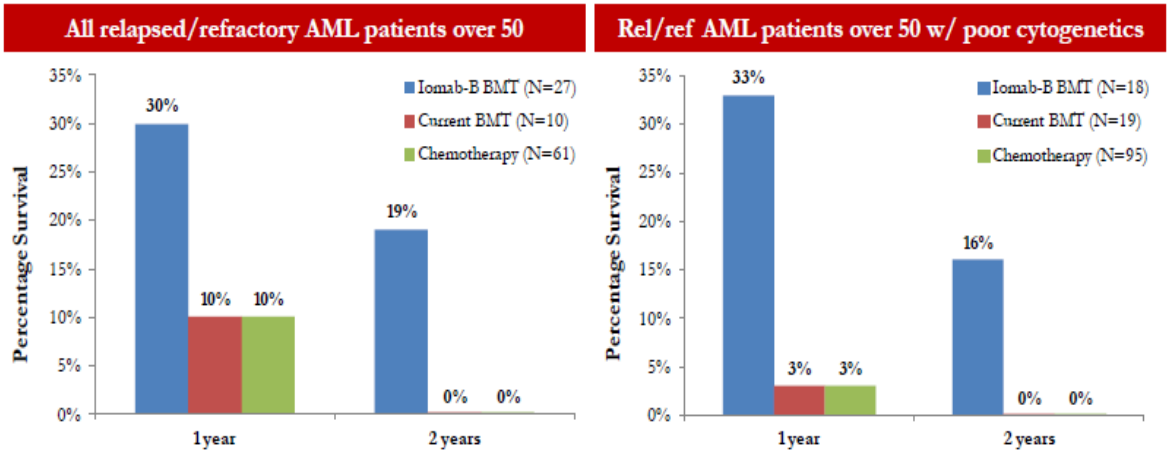
	All patients (n=58)	Patients at MTD (n=21)	Relapsed AML (n=12)	Refractory AML (n=8)
One-year survival	41%	48%	46%	38%

Source: Pagel, J.M., et. al., Blood (2009) 114:5444 – 5453; Laidlaw and co. research

One-year survival of r/r AML over 50 years old treated with Iomab-B were 30% (n=27); while HSCT and chemotherapy were 10% with the caveat of comparing different clinical studies or datasets.

By further examining the clinical data, researchers identified that the one-year survival of relapsed/refractory AML (r/r AML) patients over 50 years old (n=27) treated with Iomab-B were 30% while the cohort with poor cytogenetics within this patient group (n=18) was 33% (Figure 3). With the caveat of comparing different clinical studies or datasets, the survival results from the Iomab-B in AML Phase I/II are very robust compared to the one- and two-year survival results of similar AML patients treated with HSCT or chemotherapy based on patient outcomes from MD Anderson's database (Figure 3). In detail, one- and two-year survival of r/r AML (>50 years old) receiving RIC prior to HSCT and undertaking chemotherapy were 10% and 0% (n=10 for current HSCT and n=61 for chemotherapy), respectively (Figure 3, left).

Figure 3: One year survival of r/r AML comparison between Imoab-B Phase I/II trial and HSCT or chemotherapy from MD Anderson's database



Source: Company presentation

[1] *Pagel, J.M., et. al., Blood (2009) 114:5444 - 5453*

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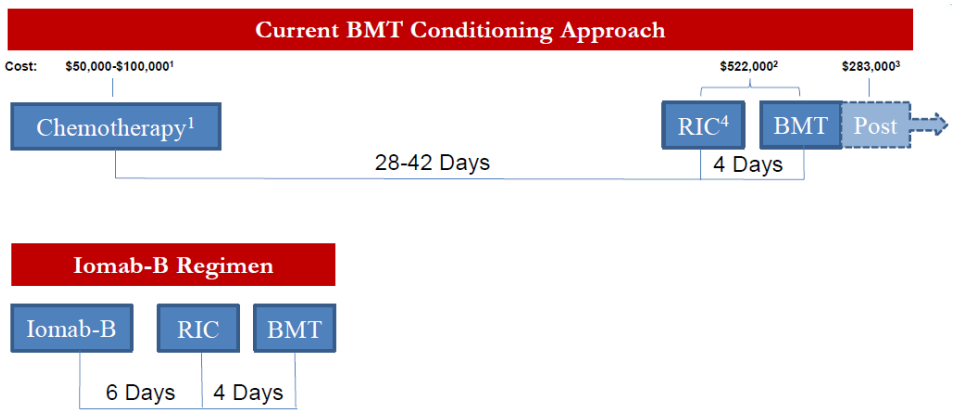
Given allogeneic HSCT is the treatment most likely to be curative for AML, a therapy that could potentially increase the number of eligible patients receiving HSCT and possibly increase the overall survival of AML patients would be a valuable treatment modality. Given the severe side effects of the standard high-dose chemotherapy-based preparative regimens, most medical centers limit the use of such regimens to patients younger than 55 years old. Reduced-intensity (RIC) conditioning regimens have been used as an alternative for older AML patients as well as patients with other comorbidities that are ineligible for taking standard high dose preparative regimens. Although the overall survival (OS) at 2 years for myeloablative (standard high dose) or RIC treated AML patients with remission, were relatively similar following HSCT (~50%), patients with active disease prepared by RIC before HSCT procedure did not have any survival benefit[2].

ATNM believe Iomab-B could have the potential as an alternative (and possibly even a replacement) to the high dose conditioning regimens with potential benefit of increased eligible patients, shortened treatment duration, and costs.

Despite increased total body irradiation (TBI) dose being positively correlated with improved relapse rate, the non-relapse mortality (NRM) rate could also increase as high level radiation has a negative impact on normal organ tolerance. Iomab-B could have the benefit of delivering targeted radiation to malignant cells in the marrow and spleen while reducing the impact on normal organs. Iomab-B's target, CD45, is a cell surface antigen expressed on most hematologic tissues, including 85–90% of ALL and AML cells, but does not appear on non-hematopoietic tissues. Given the severe side effects of standard high dose chemotherapy-based HSCT conditioning regimens, and robust Phase I/II results, ATNM believes Iomab-B could potentially provide an alternative (and possibly even a replacement) to the high dose conditioning regimens. Iomab-B also affords the potential benefits of increased patient eligibility, shortened treatment duration, and reduced costs (Figure 4).

Figure 4: Iomab-B value proposition vs. current BMT conditioning preparation



Source: Company presentation

- **Iomab-B Phase III study to start in early 3Q15, in our estimate.** With the recent successful capital raise, we believe ATNM has established a solid cash position to advance the Iomab-B program through its pivotal clinical study. ATNM needs to file an IND for the pivotal study as the manufacture of Iomab-B for earlier studies was done in Fred Hutchinson Cancer Research Center and the current production has moved to another facility (Goodwin Biotechnology, Inc.). The radio-isotope attachment is conducted by IBA Molecular North America. We estimate the IND meeting should

[2] *Shimoni, A., et. al., Leukemia (2006) 29: 322-328*

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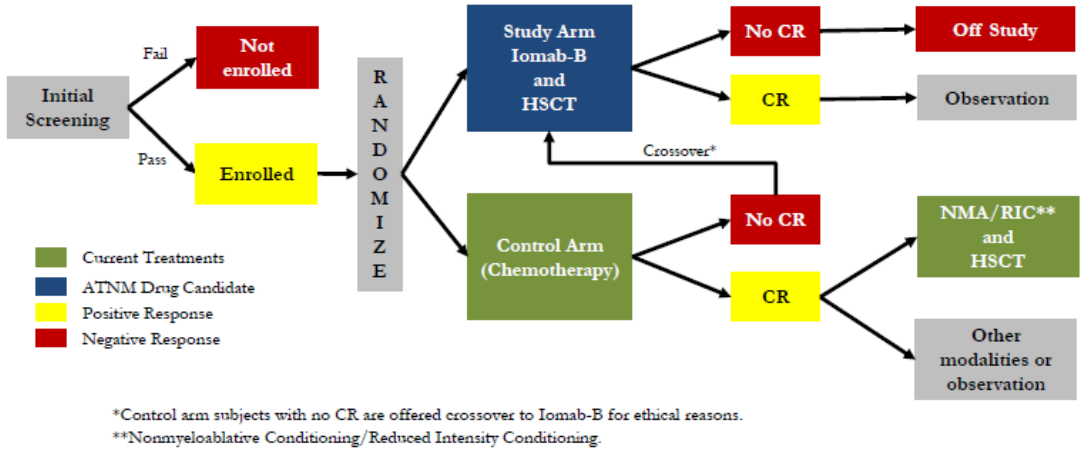
take place in 1Q15 and we estimate the Phase III study could start in early 3Q15.

The Iomab-B in AML Phase III study is a randomized, 150-patient, open-labelled and controlled trial. Primary endpoint is durable complete response for lasting at least 6 months; while secondary endpoint is overall survival at one year.

Earlier discussions between the FDA and ATNM during the end-of-Phase-II meeting indicated that a single pivotal study would be sufficient for potential approval if the study outcome is positive. The Iomab-B in AML Phase III study is a randomized, 150-patient, multicenter, open-label, controlled trial with two study arms evenly divided between the treatment and control group. The trial will be conducted in the U.S. with refractory AML patients over the age of 55. The control arm is the physician's choice of conventional care with curative intent (Figure 5). The primary endpoint is durable complete response lasting at least 6 months. The secondary endpoint is overall survival at one year. Patients will be randomized to receive either Iomab-B followed by HSCT or the control arm treatment. Patients in the treatment arm who achieve CR will be counted as success. Patients who achieve CR in chemotherapy control arm will undertake RIC followed by HSCT or other treatment modalities. Patients who fail to achieve CR will crossover to the Iomab-B treatment followed by HSCT arm and their clinical outcome would not be counted.

Figure 5: Iomab-B Phase III trial design



Source: Company presentation

We estimate the top-line results could potentially available in early 2H17 with BLA filing shortly after and with a possible FDA approval decision slated into late 2017 or 2018.

We estimate it could take approximately one year for patient recruitment and an additional three quarters for post-treatment follow-up. Given the study is open-label with DMSB quarterly review, there is a chance that the trial could be stopped on ethical grounds if the interim results were very robust. Under this scenario, ATNM could request the FDA for a potential accelerated approval. Otherwise, we estimate the top-line results could be available in early 2H17. Accordingly, ATNM could file their BLA shortly after with a possible FDA approval decision slated into late 2017 or 2018.

- **Iomab-B market could be more substantial if the AML pivotal study is successful.** Should results from Iomab-B in the AML Phase III study be robust and the product approved, we believe the commercial opportunity of Iomab-B could expand beyond AML to other hematological cancers, such as myelodysplastic syndrome (MDS), acute lymphoblastic leukemia (ALL), non-Hodgkin's lymphoma (NHL) and multiple myeloma (MM). While HSCT is considered a curative treatment modality, many patients are

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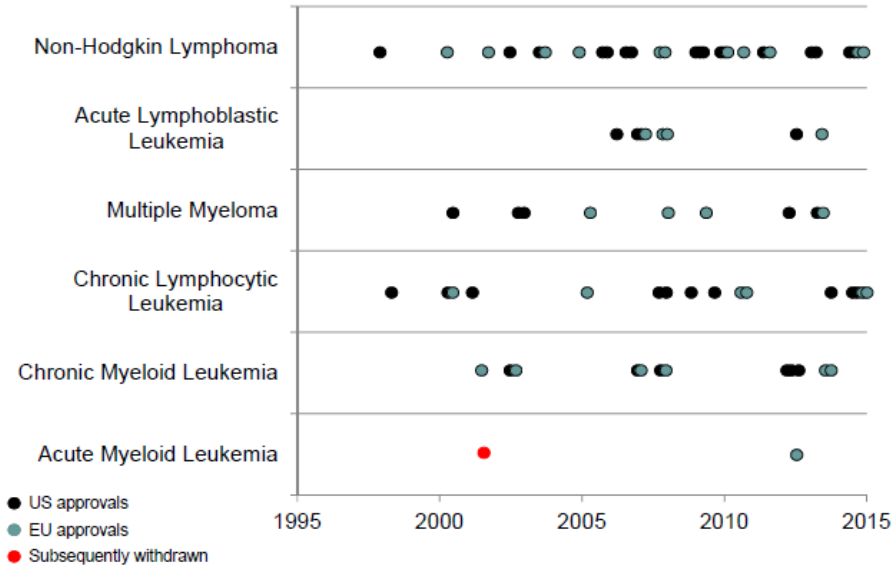
ineligible due to the severe side effects of standard high-dose chemotherapy-based preparative regimens. It is also noted that the development of effective therapies in AML is substantially behind other hematological cancer programs in recent years (Figure 6). As such, if the Iomab-B clinical study is successful and receives approval, the potential value commercially and to the patient meeting unmet medical needs, could be significant.

Figure 6: Approved therapy of AML is substantially behind other blood cancers



Source: Sunesis company presentation

- **Iomab-B market model.** Based on the development timeline and the 3Q15 start date for the Phase III, we estimate potential approval and launch in late 2017 or early 2018. Given the relatively modest number of oncologists treating advanced AML patients, ATNM could potentially commercialize Iomab-B via a relatively small sales force. Further, it is estimated that 10 medical centers perform more than 30% of transplantation in AML (Figure 7), and many are likely to participate in the Phase III study. Iomab-B could potentially gain substantial recognition by physicians prior to approval.

  With the combined high treatment failure and relapse rate of current first line treatment, we estimate nearly 65% of first-line treated AML patients could be eligible for Iomab-B treatment. Based on a treatment cost of $85,000, we project annual peak sales could reach $300+MM (Figure 8). Based on our assumptions, we estimate the potential HSCT figure could increase to 8,000+ transplants, substantially higher than the recent (2011) estimate of ~3,000 transplants based on a report by the Center for International Blood & Marrow Transplant Research (CIBMTR).

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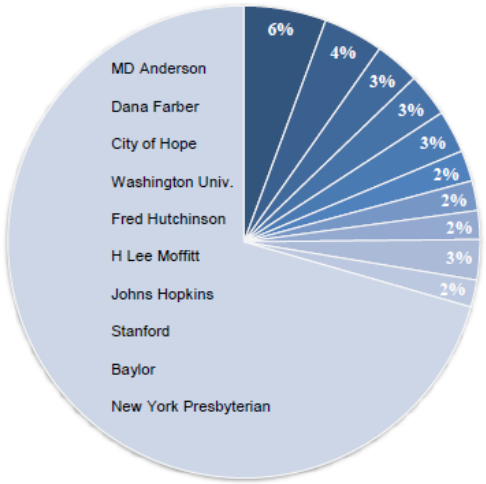
Figure 7: Approximately 30% of AML transplantaion were done in 10 centers



Source: Company presentation

Figure 8: Iomab-B in 2nd line BMT conditioning AML Revenue Model

Iomab-B in 2nd line BMT conditioning AML Revenue Model	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total AML incidiences - U.S.	19,383	19,480	19,577	19,675	19,773	19,872	19,972	20,072	20,172	20,273	20,374	20,476	20,578
R/R AML	12,599	12,662	12,725	12,789	12,853	12,917	12,982	13,046	13,112	13,177	13,243	13,309	13,376
AML prevalence - U.S.	35,705	35,884	36,063	36,244	36,425	36,607	36,790	36,974	37,159	37,345	37,531	37,719	37,907
AML with more than one year	23,106	23,222	23,338	23,455	23,572	23,690	23,808	23,927	24,047	24,167	24,288	24,410	24,532
R/R AML	2,311	2,322	2,334	2,345	2,357	2,369	2,381	2,393	2,405	2,417	2,429	2,441	2,453
Total AML eligible for BMT	14,909	14,984	15,059	15,134	15,210	15,286	15,362	15,439	15,516	15,594	15,672	15,750	15,829
% treated by Iomab-B	3%	10%	20%	28%	36%	44%	49%	53%	55%	56%	57%	57%	57%
R/R AML treated by Iomab-B	447	1,498	3,012	4,238	5,476	6,726	7,528	8,183	8,534	8,733	8,933	8,978	9,023
Iomab-B Price ($)	85,000	87,550	90,177	92,882	95,668	98,538	101,494	104,539	107,675	110,906	114,233	117,660	121,190
U.S. Iomab-B Sales ($ MM)	**16**	**54**	**109**	**154**	**199**	**246**	**277**	**303**	**317**	**326**	**335**	**339**	**342**

Source: Company presentation

Actimab-A is substantially superior to Bismab-A based on effectiveness (>500X), costs of goods (10X lower) and ease of production (can be manufactured centrally).

- **Actimab-A targets clinically validated CD33 as AML treatment** Actimab-A is an alpha emitting, via radioisotope Actinium-225 (^{225}Ac), conjugated CD33 targeted mAb (lintuzumab). Actimab-A is derived from an earlier compound, Bismab-A, which also is based on lintuzumab, or HuM195, but conjugated with another alpha emitting isotope, bismuth-213. Actimab-A is substantially superior to Bismab-A based on effectiveness (>500X), costs of goods (10X lower) and ease of production (can be manufactured centrally). CD33 is a well validated molecular target for AML treatment. Approved in 2000, Mylotarg, developed by Wyeth (currently part of Pfizer), was the first CD33-targeted antibody drug conjugate (ADC) as a treatment for CD33-positive AML patients over 60 years of age in first relapse. Pfizer filed an NDA in 4Q10 withdrawing Mylotarg from the market. Subsequent confirmatory clinical studies (SWOG S0106), failed to show clinical benefit and improvement of survival, and with higher toxicities. Given that the coupling technology for linking an antibody to the toxin was a new technology, it is believed that a premature loss of the toxic payload negatively impacted the safety profile.

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In addition, two large clinical studies (ALFA-0701[3] with n=280, and AML-16 with n=1115) have demonstrated clinical efficacy as a first-line treatment in AML patients (>50 years old). As such, we believe such information suggests that CD33 is a validated target for AML therapy.

Summary of the current 1st line AML treatment: For treatment naïve AML patients, the only approved therapy is so-called induction therapy, which is mainly comprised of anthracycline, (such as daunorubicin, doxorubicin or idarubicin) combined with cytarabine in a so called 7+3 treatment. In this course of treatment, anthracycline is usually given in the first 3 days of treatment, while cytarabine is started at the same time but is given for 7 to 10 days of treatment. A second treatment could follow if blast cells are still very evident. In this event the drugs considered would expand to include other chemotherapies, including hypomethylating agents such as Vidaza, in addition to the 7+3 regimen. Should remission occur but with minor amount of blasts remaining, patients will be treated with "consolidation therapy" with the objective of eradicating remaining AML cells to prevent relapse. HSCT could be an option for eligible AML patients with blast cells that are completely or almost completely eradicated.

ATNM develops Actimab-A as a treatment for elder AML patients based on a "low-intensity hypothesis" to potentially better extend overall survival in this patient cohort even without high CR rates.

- **Actimab-A early clinical results encouraging.** ATNM is developing Actimab-A as a treatment for elderly AML patients based on a "low-intensity hypothesis" to better extend overall survival in this patient cohort even without high CR rates. It is estimated that less than 30% of the elderly (60+ years old) AML patients undertake standard high intensity chemotherapies while near half of elderly patients seek treatment in various clinical studies. Approximately 20% of patients receive only supportive care. Of key concern for elderly AML patients taking high intensity chemotherapies are the considerable side effects. An earlier Phase I dose escalation study (at 0.5, 1, 2, 3, or 4 μCi/kg, with total dose, 23–390 μCi) in relapsed/refractory AML demonstrated that Actimab-A in fractionated doses is feasible, safe at doses < 4 μ Ci/kg, and has anti-leukemic activity across all dose levels studied with no acute toxicities observed.

ATNM is currently conducting a Phase I/II study evaluating Actimab-A in newly diagnosed AML as a first-line treatment. Phase I is a dose-escalating study designed to identify MTD; while the Phase II portion is to treat AML patients at MTD (n~ 47).

The Phase I/II study. ATNM is currently conducting a Phase I/II study evaluating Actimab-A in newly diagnosed AML patients as a first-line treatment. It is an open-label trial with two study portions: Phase I is a dose-escalating study (with n up to 21) designed to identify the MTD of Actimab-A+ low dose cytarabine (LDAC), while the Phase II portion is to treat AML patients at MTD with Actimab-A+LDAC with n~ 47. During the Phase I portion of the study, each dose cohort will include three patients with several weeks between dosing. Management has indicated the study currently is heading to cohort four. The company reported encouraging interim analysis of the Phase I portion of the study at the 2014 ASH conference. The study demonstrated treatment efficacy in eradicating blast cells and improved median overall survival – an outcome that is consistent with the earlier positive results from Bismab-A – the first generation and much less potent CD-33 targeted radiotherapeutic.

The results presented at ASH include nine elderly (+70 years old) patients, seven of which were classified as secondary AML (antecedent MDS). Five had been treated with HSCT or a hypomethylating agent (HMA). On the

[3] *Castaigne, S. et. al., Lancet (2012) 379: 1508 -1516*

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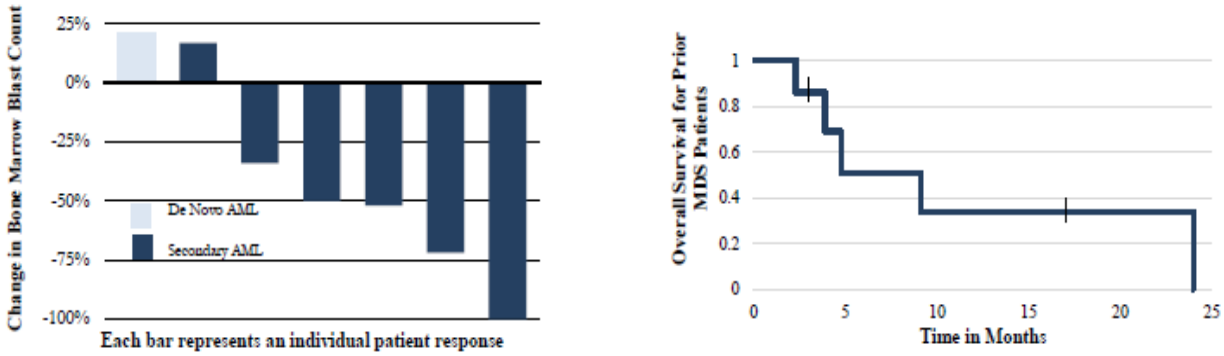
Median overall survival (OS) of Actimab-A-treated the secondary AML cohort was 9.1 months, which compared favorably to the 2.5 months from historical data.

safety side, no significant drug-related safety issues have been identified. On the efficacy side, five out of the seven evaluable patients exhibited bone marrow blast reduction (mean: 61%) (Figure 9, left). It is interesting to note that blast reduction occurred in secondary AML patients. In addition, median overall survival (OS) of the secondary AML cohort was 9.1 months, which compared favorably to the 2.5 months observed in historical data (Figure 8, right). Figure 10 illustrates more detailed comparisons, particularly survival benefits, between the interim results from Actimab-A in secondary AML and two reported analyses of historical clinical performance of secondary AML. Recognize that this is comparing clinical data from different clinical studies.

Figure 9: Interim results from Actimab-A Phase I/II trial



Source: Company presentation

Figure 10: Interim survial results from Actimab-A Phase I/II trial vs. two earlier larger studies

	US study[1]	International study[2]	Actimab-A PI/II data
Number of patients	955	188	7
Median age (range)	78 (65-80+)	69 (34-87)	76 (73-81)
Best Supportive Care	61.6%[3]	50%	NA
Disease Modifying Therapy	38.4%[3]	50%	NA
Median Overall Survival, Best Supportive Care	2 months	2.6 months	**9.1 months**
Median Overall Survival, Disease Modifying Therapy	5 months	5.1 months[4]	
Overall OS, median	NA	4.7 months	

Source: Company presentation

We also anticipate additional clinical results; possibly mainly from the dose escalating portion could be available in 4Q15 at the 2015 ASH conference.

Although the number of patient is very small, we believe the interim results are very encouraging, given that all patients have been treated with doses lower than the MTD, which has not been determined. Given the dose escalating Phase I study is still ongoing, it will be interesting to see whether Actimab-A continues to demonstrate efficacy in secondary AML and / or elderly AML patients. We estimate the MTD finding study could potentially be completed in late 1H15 or early 2H15, while the Phase II portion of the trial could start in 2H15, with results potentially available in 2016. We also anticipate additional clinical results from the dose escalating portion of the trial to be available in 4Q15 at the ASH conference.

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- **Commercial viability of radiotherapeutics for cancer treatment.** The commercial performance of the two prior approved radiotherapies, Zevalin (^{90}Yttrium ibritumomab tiuxetan), and Bexxar (^{131}Iodine tositumomab) have been significantly below expectations. There are concerns as to whether another radioisotope conjugated monoclonal antibody will realize meaningful commercial success. Both prior radiotherapies are CD20-targeted monoclonal antibodies and indicated for the treatment of relapsed/refractory non-Hodgkin's lymphoma (NHL). Approved in 2002, Zevalin is currently marketed by Spectrum Pharmaceutical while Bexxar was sold initially by GlaxoSmithKline's after it was approved in 2003. The company discontinued production and marketing in 1Q14. However, by the time both CD-20 targeted radiotherapies were approved, Rituxan (approved in 1997) was well entrenched and established as effective standard of care for NHL treatment. NHL patients are mainly managed by oncologists (both academic and community-based). Rituxan can be administrated at a physician's office providing additional revenue. While the clinical efficacy of both radiotherapies is on par with Rituxan, the unmet need was rather limited. Both Zevalin and Bexxar need to be administrated by radiation oncologist or radiologists and, therefore, have rather limited 'touch" to NHL patients.

We believe the unmet need of the AML treatment landscape is very different from NHL of more than a decade ago. In second-line for r/r AML treatment leading to HSCT, there currently are no approved drugs while the survival outlook remains very dismal.

We believe the AML market dynamics are significantly different than in the NHL market. There are currently no approved drugs for r/r AML patients and their survival is dismal. In addition, most r/r AML patients are treated in academic and specialized medical centers and many of them have or will participate in Iomab-B clinical studies. For treatment naïve elderly AML patients, the relatively low percentage (~30%) of patients taking the standard 7+3 regimen points to the need for a better tolerated and efficacious treatment. As such, an effective therapy, regardless of format, could potentially gain significant market share.

We believe radiotherapy has gained renewed interest from pharmaceutical companies supported by the recent acquisition of Norwegian-based Algeta by Bayer for $2.9 billion.

Lastly, we believe radiotherapy has gained renewed interest from pharmaceutical companies supported by the recent acquisition of Norwegian-based Algeta by Bayer for $2.9 billion. Algeta developed Xofigo, a salt form of Radium-223 (^{223}Ra) – an alpha-emitting radioisotope – which accumulates preferentially in areas of the bone with high turnover. Xofigo was approved as a treatment of castration-resistant prostate cancer patients with symptomatic bone metastases and no known visceral metastatic disease. Prior to acquisition, Xofigo generated ~$211MM sales in the prior 12 months. In addition, Bayer indicated the company will explore the potential conjugating ^{223}Ra to therapeutic monoclonal antibodies to develop novel therapeutics.

- **Does overall survival need to be the primary endpoint?** Given that overall survival (OS) has been used as the primary endpoint in multiple r/r AML pivotal studies, the question is whether other non-survival related endpoints could be considered approvable by the FDA and other regulatory agencies. Examples of pivotal studies in r/r AML with OS as the primary endpoint include quizartinib (developed by Ambit, which was recently acquired by Daiichi Sankyo) in FLT3 mutated r/r AML (a Phase III study designed as quizartinib vs. salvage chemotherapy and the study is ongoing) and the recently completed study of qinprezo (vosaroxin) developed by Sunesis (VALOR) which is designed as vosaroxin + intermediate dose cytarabine (IDAC) vs. IDAC.

We view the Iomab-B study design and objective as different from most other clinical studies in the r/r AML setting, as the latter mainly try to determine clinical benefit of a single (or in combination) drug(s) alone either with or without HSCT.

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The Iomab-B Phase III trial study design combined Iomab-B conditioning followed by HSCT to demonstrate potential improvements over the conventional chemotherapy conditioning regimen. As HSCT is also the most curative therapy for AML, durable response, in our opinion, could be a reasonable measure to determine the level of HSCT improvement. The Iomab-B study design and objective are different from most other clinical studies in the r/r AML setting, as the latter mainly try to determine clinical benefit of a single (or in combination) drug(s) alone either with or without HSCT. ATNM discussed this with the FDA based on the positive Phase II results and we speculate the FDA minutes could be supportive. Lastly, a substantial number of approvals of hematological cancer therapeutics have been based on non-survival primary endpoints, such as recently approved Blincyto (blinatumomab) in Philadelphia chromosome-negative (Ph-) relapsed or refractory B-cell precursor acute lymphoblastic leukemia (ALL) developed by Amgen.

A substantial number of approval of hematological cancer therapeutics have been based on non-survival primary endpoints, such as recently approved Blincyto (blinatumomab)

- **Strong balance sheet mitigates ATNM financing overhang and fuels development through reporting of clinical data.** The company recently completed an equity offering (Laidlaw and Co. acted as book-running manager) with net proceeds of ~$21.7MM. Combined with the existing cash, we estimate the company has cash and cash equivalents of ~$30MM (pro forma), enough to support the company's operation into mid-2017. ATNM's share price has been range-bound for more than six months prior to the recent financing. Assuming one of the concerns was that the company lacked sufficient cash to advance clinical programs (mainly Iomab-B into Phase III trial) forward, we believe ATNM's current cash position mitigates this concern. As such, we anticipate ATNM share performance over the near term will likely mainly reflect the clinical advancements of the two lead programs.

Strong balance sheet mitigates ATNM financing overhang and fuels development through reporting of clinical data

- **Additional radiotherapies in pipeline could address treatments for both hematological and solid tumors.** ATNM is an emerging radiotherapeutics company developing therapeutics based on both alpha- and beta-emitting radio-isotopes attaching to monoclonal antibodies as a potential cancer treatment. Alpha-particle emitters release high energy particles (4 – 8 MeV) that travel only short distances (0.6 mm) thus sparing non-target tissues from the effects of irradiation. Beta-particle emitters have a longer particle range with varying ability to penetrate tissue (1 – 10 mm) that is suitable for tumors of varying diameters and with relatively lower energy (0.2 – 2 MeV) (Figure 11).

  ATNM's lead radiotherapeutics platform technology is Alpha Particle Immunotherapy Technology (APIT). The patented APIT platform technology has been co-developed with Memorial Sloan- Kettering Cancer Center. APIT is based on attaching actinium-225 (^{225}Ac) or bismuth-213 (^{213}Bi-) alpha-emitting radioisotopes to monoclonal antibodies through the use of a chelating agent. APIT is protected via 39 issued and pending patents. Among them, five are issued and two are pending in the U.S., and 30 international patents have been granted. In addition to Iomab-B and Actimab-A, the company is scheduled to develop additional radiotherapeutics for other hematological and solid tumors. ATNM plans to announce the advancement one more radiotherapeutic in 2015.

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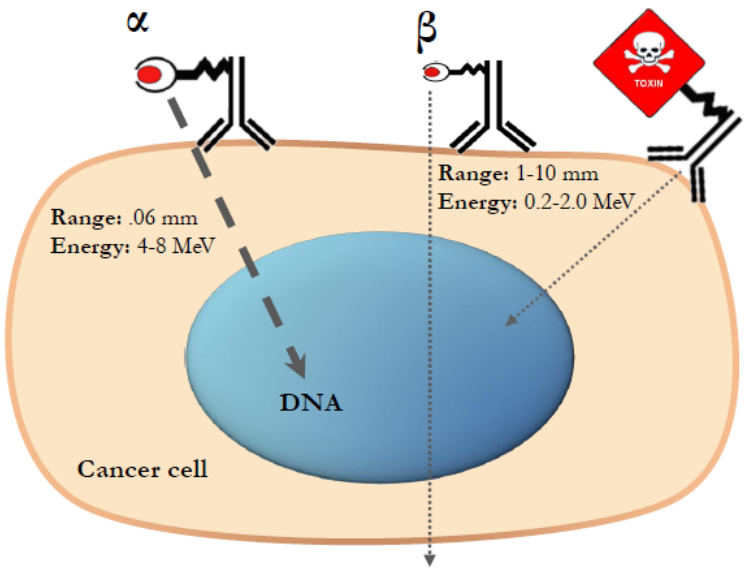
Figure 11: Different types of radio-active payload conjugated to antibodies in cancer therapy



Source: Company presentation

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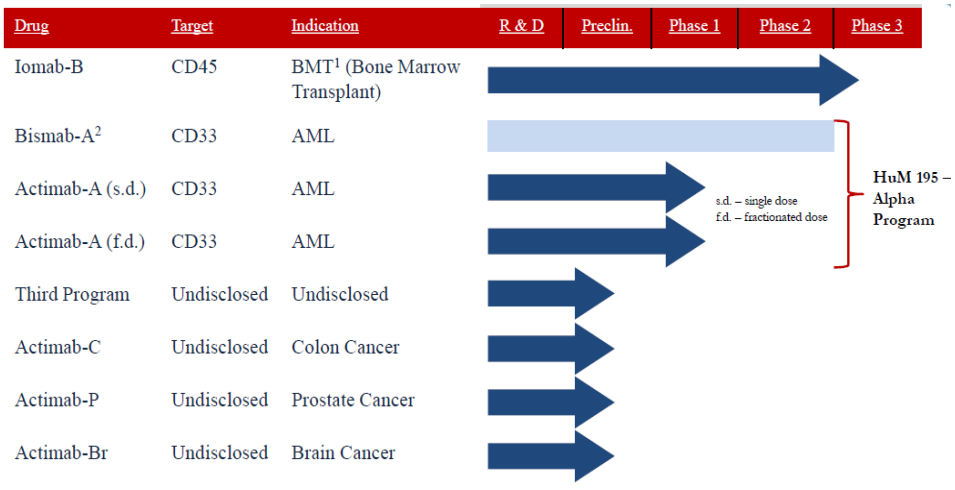
Anticipated milestones in 2015 and beyond

Product	Indication	Event	Timing	Importance
Iomab-B	Acute Myeloid Leukemia (AML) second line for conditioning for BMT	Potentially file IND for Phase III study	**1Q15**	***
		Potentially enroll first patient for Phase III study	**3Q15**	***
		Potentially report Phase III study top-line results	**Mid-2017**	****
		Potentially file for BLA	**3Q17**	***
		Potential FDA decision	**1H18**	****
Actimab-A	Acute Myeloid Leukemia (AML) first line	Potentially complete the Phase I portion of the Phase I/II study	**1H15**	***
		Potentially start the the Phase II portion of the Phase I/II study	**2H15**	***
		Potentially report Phase II study top-line results	**2H16**	****

***** / ***** Major catalyst event that could impact share price very significantly while *** event is more informative*

Source: Laidlaw & Company estimates and company presentation.

Study Phases of drug candidates



Source: company presentation

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Financial projections and valuation

With the recent net equity offering (February 6, 2015) of ~$21.6MM, we estimate the company has cash of ~$30MM (pro forma). In addition, we estimate the company could potentially receive more cash should investors excise their warrants, potentially providing another $20MM. Together, ATNM's cash should be sufficient to support the company's operations entering into 2H17, by our estimate.

Our probability-adjusted-PV-driven, sum-of-the-parts analysis illustrates a breakdown of value for each pipeline asset, with Iomab-B in r/r AML in conditioning for HSCT accounting for 49% of the total value, while Actimab-a in first-line AML, and the pipeline from the APIT platform for future indications account for 29% and 19%, respectively. As such, our supplemented probability-adjusted-PV-driven, sum-of-the-parts analysis suggests a 12-month target price of $17.07.

NPV driven sum-of-the-parts analysis

Iomab-B	**2nd line BMT conditioning AML**			
		NPV =	**$525**	
		Probability =	**54%**	
		Adjusted NPV =	**$285**	
		PV per share =	**$8.36**	**49%**
Actimab-A	**1st line AML**			
		NPV =	**$858**	
		Probability =	**19%**	
		Adjusted NPV =	**$167**	
		PV per share =	**$4.89**	**29%**
APIT pipeline				
		NPV =	**$320**	
		Probability =	**35%**	
		Adjusted NPV =	**$112**	
		PV per share =	**$3.29**	**19%**
Cash				
		Adjusted NVP =	**$18.0**	
		NVP per share =	**$0.53**	**3%**
		Total =	**$17.07**	**100%**

Source: Laidlaw & Company estimates

For the peer comparable analysis, we have chosen a group of oncology development companies as peers. As such, our peer comparable analysis suggested a 12-month target price for ATNM of $16.54.

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Oncology peer comparable analysis

Company	Ticker	Rating	Target Price ($)	Price ($) (2/13/15)	Shares Outstanding (MM)	Market Cap ($ MM)	Cash ($ MM)	Debt ($ MM)	Tech Value ($ MM)	Most Advanced Development Stage	Major Indication
TG Therapeutics	**TGTX**	NR	NA	13.13	44	577	67	0	510	Phase II	MCL, CLL
Epizyme	**EPZM**	NR	NA	21.58	34	737	212	0	526	Phase I/II	AML, NHL
Immune Design	**IMDZ**	NR	NA	25.34	17	428	65	0	363	Phase I	Solid tumors
Celator Pharmaceuticals	**CPXX**	Buy	NA	3.10	34	104	20	0	84	Phase III	AML
Stemline Therapeutics	**STML**	NR	NA	14.07	13	182	80	0	102	Phase II	AML, BPDCN
Tesaro	**TSRO**	NR	NA	38.49	36	1387	296	0	1091	Phase III	Breast, solid tumor
Innate Pharma SA	**IPHYF**	NR	NA	11.28	53	597	82	0	515	Phase II	AML, MM, solid tumors
Xencor	**XNCR**	NR	NA	15.47	31	486	61	0	425	Phase II	NHL, CLL, ALL
MEI Pharma	**MEIP**	NR	NA	5.00	33	166	79	0	88	Phase II	AML, MDS
MacroGenics	**MGNX**	NR	NA	34.09	28	947	179	0	768	Phase II	Breast, solid tumor, AML
Karyopharm Therapeutics	**KPTI**	NR	NA	27.12	33	887	227	0	660	Phase III	AML, MM, DLBCL
Average						**527**	*112*	*0*	**467**		
Actinium Pharmaceuticals	**ATNM**	**Buy**	**17.00**	**3.60**	**30**	**108**	**30**	**0**	**78**	**Phase II/III**	**AML**

RNN share fair value matching its Phase I/II oncology peers = **$16.54**

Potential upside = **359%**

Source: Laidlaw & Company estimates

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Major risks

Risks of clinical study failure could have significant impacts on ATNM share value. Although the prior and ongoing studies have provided encouraging clinical outcomes, risks remain that some current trials might not meet study endpoints. As such, the value of the clinical assets could be significantly impaired and, therefore, ATNM shareholder value could diminish. Such a negative impact could be more pronounced if the clinical program is in very advanced development stages, such as Iomab-B in r/r AML or with high investor expectations. Regulatory risks are part of the clinical risks as even if a drug meets its' endpoints for pivotal studies, regulatory agencies might not grant approval.

Commercial risk even with approval, sales could be substantially below expectations. Even it is approved, the commercial sales of any drug could below expectations, resulting in diminished ATNM shareholder value. Factors that could impact the commercial outlook of a drug could include execution of marketing and sales, competition from other drugs, potential change of the treatment paradigm, and unrealistic expectations or projections.

Future capital raises could potentially dilute value of current shareholders. ATNM is still in the product development stage and additional financial resources maybe needed for further advancement of their product pipeline. The company may need to raise capital from financial markets to support its operations even if the company already has partners to provide milestone and other types of payments and/or product revenue. The company might not always be able to raise capital from financial markets at favorable terms. Share dilution under this scenario could reduce the value of the investment to current shareholders of the company.

Other radiotherapeutics have been approved but failed commercially, and this modality might not be broadly accepted and therefore limit its commercial potential. Although two radiotherapeutic drugs have already been approved and commercialized in the U.S. and other parts of the world, their revenue has been a disappointment. Nevertheless, we believe the market and unmet medical need for ATNM's products is different from that of the two prior radiotherapeutics. It is possible that going forward, radiotherapeutics-based medication could have limited use due to market acceptance. Such a scenario could reduce the market potential of radiotherapeutic drugs and have negative impact on ATNM shareholder value.

Limited trading liquidity limits shareholder options. ATNM shares have only been traded on the public market for a short time. Daily trading volume and name recognition are still relatively modest. This may impact shareholders wanting to increase or reduce their positions in a volatile stock market may face some constraints.

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Figure 1: Income Statement

Actinium Pharmaceuticals – Income Statement

($'000)	2011	2012	2013	1Q14	2Q14	3Q14	4Q14E	2014E	1Q15E	2Q15E	3Q15E	4Q15E	2015E	2016E	2017E	2018E	2019E	2020E
Revenue																		
Product revenue	0	0	0	-	-	-	-	0	-	-	-	-	0	0	0	15,970	53,768	180,276
Other revenue	0	0	0	-	-	-	-	0	-	-	-	-	0	0	0	0	0	0
Total revenue	0	0	0	-	-	-	-	0	-	-	-	-	0	0	0	15,970	53,768	180,276
Costs of goods															0	2,555	8,603	28,844
Gross sales															0	13,415	45,165	151,432
Research and development	324	3,440	2,667	1,676	2,002	3,773	3,811	11,263	3,849	3,903	4,450	4,628	16,830	24,235	31,505	34,341	37,431	40,426
General and administrative	2,959	4,506	3,919	2,461	2,415	3,257	3,322	11,455	3,356	3,389	3,423	3,457	13,625	14,306	16,309	17,124	17,980	18,879
Marketing and sales			0												7,000	19,600	30,380	31,899
Depreciation and amortization	1	1	2	1	8	14	18	42	16	16	16	16	64	64	64	64	64	64
Loss on disposition of equipment			4	-	-	-	-	0	-	-	-	-	0	0	0	0	0	0
Total Operating Expenses	2,960	4,507	3,925	4,138	4,425	7,045	7,151	22,759	7,221	7,308	7,889	8,101	30,518	38,605	54,878	71,129	85,856	91,268
Operating Incomes (losses)	(2,960)	(4,507)	(3,925)	(4,138)	(4,425)	(7,045)	(7,151)	(22,759)	(7,221)	(7,308)	(7,889)	(8,101)	(30,518)	(38,605)	(54,878)	(57,714)	(40,690)	60,163
Interest income (expense)	(175)	(1,099)	(3)	-	-	-	-	0	-	-	-	-	0	0	0	0	0	0
Gain on change in fair value of derivative liabilities	14	685	(4,179)	(12,561)	7,940	968	500	(3,153)	(200)	(200)	(200)	(200)	(800)	(880)	(968)	(1,065)	(1,171)	(1,288)
Total Other Income (Expense)	(161)	(414)	(4,182)	(12,561)	7,940	968	500	(3,153)	(200)	(200)	(200)	(200)	(800)	(880)	(968)	(1,065)	(1,171)	(1,288)
Net loss and comprehensive loss	(3,121)	(4,921)	(8,107)	(16,699)	3,515	(6,077)	(6,651)	(25,913)	(7,421)	(7,508)	(8,089)	(8,301)	(31,318)	(39,485)	(55,846)	(58,779)	(41,862)	58,875
Tax	0	0	0	-	-	-	-	0	-	-	-	-	0	0	0	0	0	(21,784)
Net Income (Loss)	(3,121)	(4,921)	(8,107)	(16,699)	3,515	(6,077)	(6,651)	(25,913)	(7,421)	(7,508)	(8,089)	(8,301)	(31,318)	(39,485)	(55,846)	(58,779)	(41,862)	37,091
Net Income (Loss) Applicable to Common Shareholders	(3,121)	(4,921)	(8,107)	(16,699)	3,515	(6,077)	(6,651)	(25,913)	(7,421)	(7,508)	(8,089)	(8,301)	(31,318)	(39,485)	(55,846)	(58,779)	(41,862)	37,091
Net Earnings (Losses) Per Share—Basic	($3.89)	($4.46)	($0.36)	($0.66)	$0.14	($0.21)	($0.23)	($0.96)	($0.22)	($0.23)	($0.24)	($0.24)	($0.94)	($1.11)	($1.53)	($1.57)	($1.09)	$0.94
Net Earnings (Losses) Per Share—Diluted	($3.89)	($4.46)	($0.36)	($0.66)	$0.10	($0.21)	($0.23)	($0.88)	($0.22)	($0.23)	($0.24)	($0.24)	($0.94)	($1.11)	($1.53)	($1.57)	($1.09)	$0.94
Shares outstanding—basic	802	1,104	22,753	25,228	25,796	28,497	28,697	27,054	33,141	33,241	33,541	34,041	33,491	35,491	36,491	37,491	38,491	39,491
Shares outstanding—diluted	802	1,104	22,753	25,228	35,862	28,497	28,697	29,571	33,141	33,241	33,541	34,041	33,491	35,491	36,491	37,491	38,491	39,491
Margin Analysis (% of Sales/Revenue)																		
Costs of goods																16%	16%	16%
R&D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	215%	70%	22%
SG&A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	107%	33%	10%
Operating Income (loss)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-361%	-76%	33%
Net Income	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-368%	-78%	21%
Financial Indicator Growth Analysis (YoY%)																		
Total Revenue		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	237%	235%
R&D		963%	-22%	54%	293%	385%	1198%	322%	130%	95%	18%	21%	49%	44%	30%	9%	9%	8%
SG&A		52%	-13%	164%	150%	292%	179%	192%	36%	40%	5%	4%	19%	5%	14%	5%	5%	5%
Marketing and sales																180%	55%	5%
Operating Income (Losses)		52%	-13%	342%	358%	748%	501%	480%	74%	65%	12%	13%	34%	26%	42%	5%	-29%	-248%
Pretax Income		58%	65%	-4310%	-255%	846%	19%	220%	-56%	-314%	33%	25%	21%	26%	41%	5%	-29%	-241%
Net Income		58%	65%	-4310%	-255%	846%	19%	220%	-56%	-314%	33%	25%	21%	26%	41%	5%	-29%	-189%
EPS		15%	-92%	-3670%	-233%	683%	-6%	169%	-66%	-266%	13%	5%	-2%	19%	38%	2%	-31%	-186%

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Source: Bloomberg LP; Company reports; Laidlaw & Company estimates.

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Additional information available upon request.

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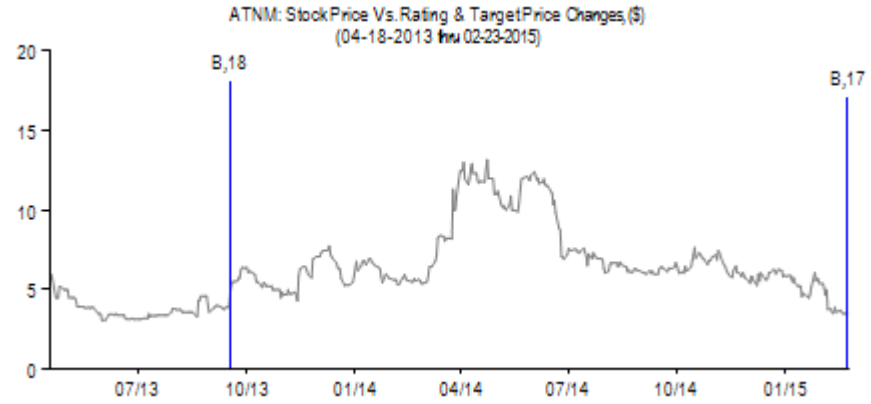
Rating and Price Target Change History



3 Year Rating Change History

Date	Rating	Closing Price ($)
09/17/2013	Buy (B)	4.90

3 Year Price Change History

Date	Target Price ($)	Closing Price, ($)
09/17/2013	18.00	4.90
02/23/2015	17.00	3.51*

** Previous Close2/20/2015*

Source: Laidlaw & Company **Created by: Blue-Compass.net**

Laidlaw & Company Rating System*		% of Companies Under Coverage With This Rating	% of Companies for which Laidlaw & Company has performed services for in the last 12 months	
			Investment Banking	Brokerage
Strong Buy (SB)	Expected to significantly outperform the sector over 12 months.	0.00%	0.00%	0.00%
Buy (B)	Expected to outperform the sector average over 12 months.	81.82%	36.36%	9.09%
Hold (H)	Expected returns to be in line with the sector average over 12 months.	4.55%	0.00%	0.00%
Sell (S)	Returns expected to significantly underperform the sector average over 12 months.	0.00%	0.00%	0.00%

ADDITIONAL COMPANIES MENTIONED

Pfizer (PFE – Not Rated)
Spectrum Pharmaceutical (SPPI – Hold)
GlaxoSmithKline (GSK – Not Rated)
Bayer (BAYRY – Not Rated)
Daiichi Sankyo (4568 – Not Rated)
Sunesis (SNSS – Not Rated)

Amgen (AMGN – Not Rated)

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