ASX Announcement

27th July 2018

ANP to Present at 14th Annual Bioshares Biotech Summit

Antisense Therapeutics Limited ("the Company or "ANP"), is presenting at the 14th Annual Bioshares Biotech Summit in Queenstown, New Zealand.

The presentation by CEO & Managing Director Mark Diamond is to be given today at the "Drugs are Good" session and will be on the Company's ATL1102 Duchenne Muscular Dystrophy program, currently undergoing a Phase II clinical trial at the Royal Childrens Hospital in Melbourne. The Bioshares event is on 27-28 July with delegates from the biotech industry as well as biotech analysts and investors.

A copy of the presentation follows this announcement.

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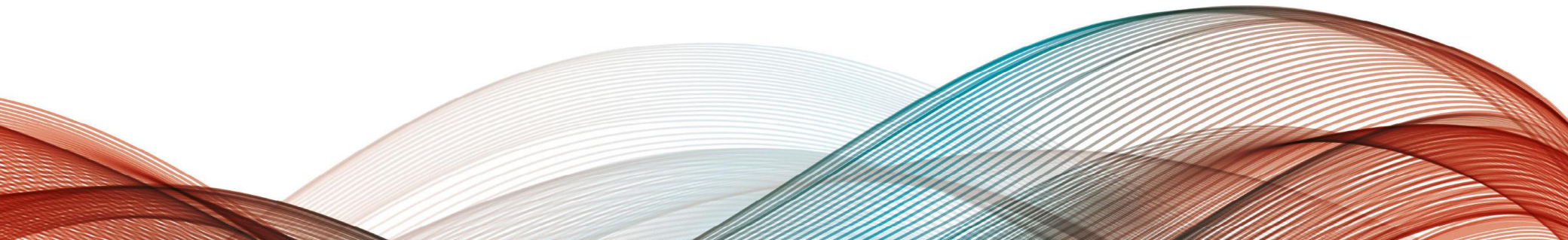
About Antisense Therapeutics Limited (ASX: ANP) is an Australian publicly listed biopharmaceutical company, developing and commercialising antisense pharmaceuticals for large unmet markets. The products are in-licensed from Ionis Pharmaceuticals Inc. (NASDAQ:IONS), world leaders in antisense drug development and commercialisation. ATL1102 (injection) has successfully completed a Phase II efficacy and safety trial, significantly reducing the number of brain lesions in patients with relapsing-remitting multiple sclerosis (RRMS). ATL1103 drug designed to block GHr production successfully reduced blood IGF-I levels in Phase II clinical trials in patients with the growth disorder acromegaly. The Company is conducting a Phase II clinical trial of ATL1102 in DMD patients at the Royal Childrens Hospital, Melbourne.

About ATL1102 ATL1102 is an antisense inhibitor of CD49d, a subunit of VLA-4 (Very Late Antigen-4). Antisense inhibition of VLA-4 expression has demonstrated activity in a number of animal models of inflammatory disease including asthma and MS with the MS animal data having been published in a peer reviewed scientific journal. ATL1102 was shown to be highly effective in reducing MS lesions in a Phase IIa clinical trial in RR-MS patients. The ATL1102 Phase IIa clinical data has been published in the medical Journal ***Neurology*** (Limmroth, V. et al Neurology, 2014; 83(20): 1780-1788).

About DMD Duchenne Muscular Dystrophy (DMD) is an X-linked disease that affects 1 in 3600 to 6000 live male births (Bushby *et al*, 2010). DMD occurs as a result of mutations in the dystrophin gene which causes reduction in or absence of the dystrophin protein. Children with DMD have dystrophin deficient muscles and are susceptible to contraction induced injury to muscle that triggers the immune system which exacerbates muscle damage as summarized in a publication by the Director of the FDA CDER (Rosenberg et al, 2015). Ongoing deterioration in muscle strength affects lower limbs leading to impaired mobility, and also affects upper limbs, leading to further loss of function and self-care ability. The need for wheelchair use can occur in early teenage years with a mean age of 13, with respiratory, cardiac, cognitive dysfunction also emerging. Patients with immune T cells expressing high levels of CD49d have more severe and progressive disease and are wheelchair bound by the age of 10 (Pinto Mariz et al, 2015). With no intervention, the mean age of life is approximately 19 years. The management of the inflammation associated with DMD is currently addressed via the use of corticosteroids, however they are acknowledged as providing insufficient efficacy and are associated with significant side effects. As a consequence, there is an acknowledged high need for new therapeutic approaches for the treatment of inflammation associated with DMD. https://mdaustralia.org.au.

antisense THERAPEUTICS

Bioshares Biotech Summit 2018

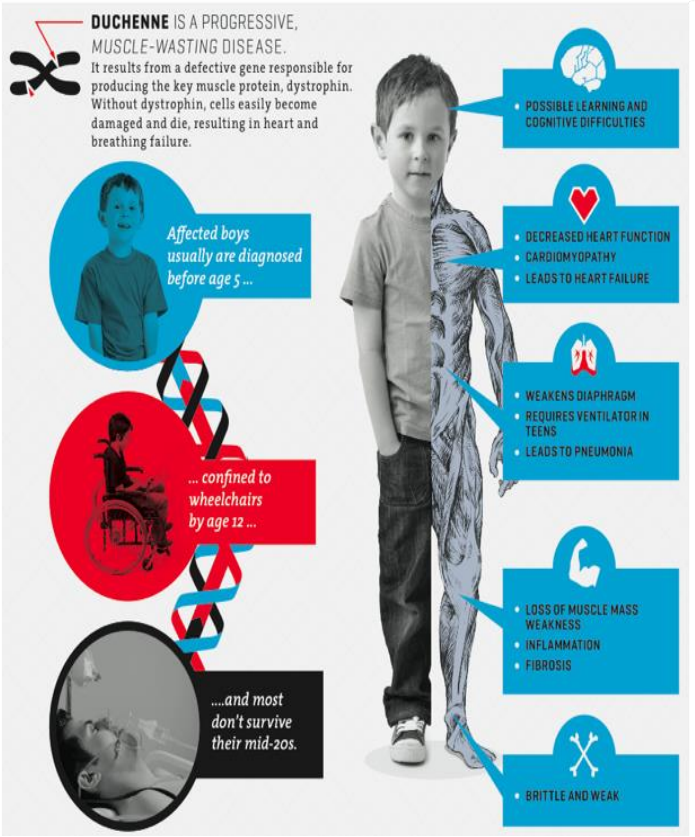


Lessons learned driving drug development strategy

- Importance of a clear development, regulatory and commercialisation pathway (for both market and regulators), however the need to be able to flex as things change
- The challenge of balancing development risk with potential market reward in portfolio selection
- The greater the market need, and your product's fit for that purpose, the better
- The more validation (evidence to support your drug being active in the target disease) the better
- Everybody (nowadays at least) loves 'Orphan'
- Knowledge is king. Know the
    - *product competition (on market and in development) and how your product stacks up*
    - *your customer and their requirements (e.g. pharma co if you are to out-license)*
    - *the value of your asset (comparable/benchmarks)*
- "Hot" is helpful
- Work only with the best in class operators with specific disease experience (CRO's, Reg Consultants etc)
- Development always takes longer and costs more than forecast (need for conservatism and contingencies)
- The value of perseverance (with a mind to avoid the flogging of dead horses)

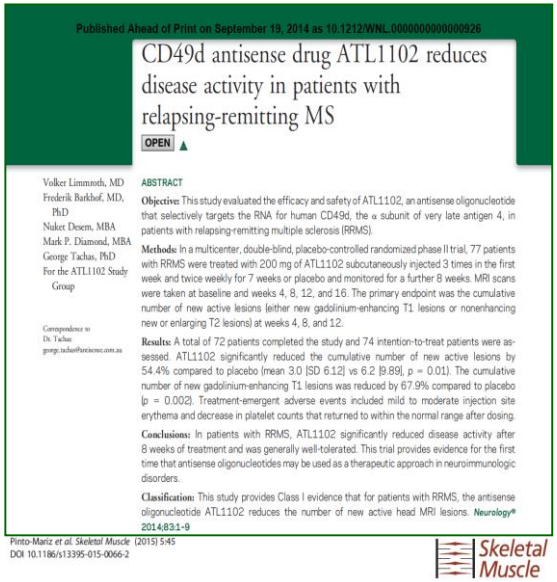
Disease area gaps: ATL1102 (targeting CD49d) for DMD

- Duchenne Muscular Dystrophy (DMD) is a devastating genetic muscular disease caused by loss of dystrophin with progressive muscle wasting and associated muscle injury leading to inflammation and fibrosis (100% mortality)
- Affects boys with an incidence of ~1 in 3,500 and prevalence of ~44,000 in US & EU
- Dystrophin restoration treatments recently approved – eteplirsen (Exondys 51:Sarepta Therapeutics) for the 13% of patients amenable to Exon 51 skipping
- Key challenge in management of DMD patients is to reduce the inflammation that exacerbates muscle fibre damage
- Corticosteroids (CS) **only** used to treat the inflammation in DMD but have insufficient efficacy and significant side effects e.g. weight gain, reduced bone density, and growth retardation
  - *CS not as effective in patients with a greater no. of CD49d receptors on T cells*



Key drivers for moving ATL1102 into development for DMD

- Clear need for improved therapies to ameliorate DMD severity and delay disease progression
- ATL1102, an antisense drug to CD49d, shown to be a highly active immunomodulatory drug with potent effects on inflammatory processes in MS patients
  - *90% reduction in inflammatory brain lesions vs placebo [Limmroth V et al Neurology 2014]*
  - *Reduced CD49d on T and B cells, and T and B cell numbers by ~25 and 50% respectively*
  - *Pre-clinical and clinical data in MS has supported move directly into 6 month patient trial (effective leveraging of substantial investment and progress made to date in MS)*
- Pivotal scientific publication confirming CD49d as a potential target for DMD therapy
  - *DMD patients with greater no. of circulating T cells with high levels of CD49d (alpha chain of VLA-4) expression have both more severe and rapid progression of disease [Pinto-Mariz et al Skeletal Muscle 2015]*
  - *Ambulant patients on CS suggesting CS do not reduce CD49dhi expression on T cells*
  - *CS treatment does not modulate CD49d expression on T cells in MS*
  - *Non-ambulant DMD patients have greatest no. of CD49d high expressing T cells*
- DMD is an orphan indication so will benefit from IP and development incentives
- Support of experts (refer Scientific Advisory Board)



Published Ahead of Print on September 19, 2014 as 10.1212/WNL.0000000000000926

CD49d antisense drug ATL1102 reduces disease activity in patients with relapsing-remitting MS

OPEN

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ABSTRACT

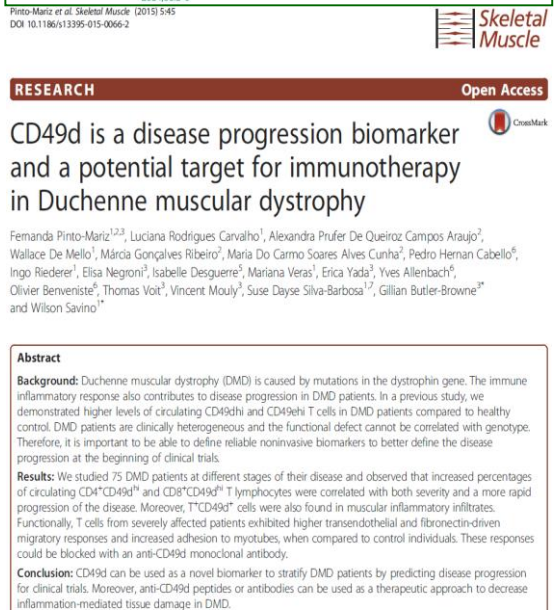
Objective: This study evaluated the efficacy and safety of ATL1102, an antisense oligonucleotide that selectively targets the RNA for human CD49d, the α subunit of very late antigen 4, in patients with relapsing-remitting multiple sclerosis (RRMS).

Methods: In a multicenter, double-blind, placebo-controlled randomized phase II trial, 77 patients with RRMS were treated with 200 mg of ATL1102 subcutaneously injected 3 times in the first week and twice weekly for 7 weeks or placebo and monitored for a further 8 weeks. MRI scans were taken at baseline and weeks 4, 8, 12, and 16. The primary endpoint was the cumulative number of new active lesions (either new gadolinium-enhancing T1 lesions or nonenhancing new or enlarging T2 lesions) at weeks 4, 8, and 12.

Results: A total of 72 patients completed the study and 74 intention-to-treat patients were assessed. ATL1102 significantly reduced the cumulative number of new active lesions by 54.4% compared to placebo (mean 3.0 [SD 6.12] vs 6.2 [9.89], $p = 0.01$). The cumulative number of new gadolinium-enhancing T1 lesions was reduced by 67.9% compared to placebo ($p = 0.002$). Treatment-emergent adverse events included mild to moderate injection site erythema and decrease in platelet counts that returned to within the normal range after dosing.

Conclusions: In patients with RRMS, ATL1102 significantly reduced disease activity after 8 weeks of treatment and was generally well-tolerated. This trial provides evidence for the first time that antisense oligonucleotides may be used as a therapeutic approach in neuroimmunologic disorders.

Classification: This study provides Class I evidence that for patients with RRMS, the antisense oligonucleotide ATL1102 reduces the number of new active head MRI lesions. *Neurology®* 2014;83:1-9



Pinto-Mariz *et al. Skeletal Muscle* (2015) 5:45
DOI 10.1186/s13395-015-0066-2

Skeletal Muscle

RESEARCH Open Access

CD49d is a disease progression biomarker and a potential target for immunotherapy in Duchenne muscular dystrophy

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Abstract

Background: Duchenne muscular dystrophy (DMD) is caused by mutations in the dystrophin gene. The immune inflammatory response also contributes to disease progression in DMD patients. In a previous study, we demonstrated higher levels of circulating CD49dhi and CD49ehi T cells in DMD patients compared to healthy control. DMD patients are clinically heterogeneous and the functional defect cannot be correlated with genotype. Therefore, it is important to be able to define reliable noninvasive biomarkers to better define the disease progression at the beginning of clinical trials.

Results: We studied 75 DMD patients at different stages of their disease and observed that increased percentages of circulating $CD4^+CD49d^{hi}$ and $CD8^+CD49d^{hi}$ T lymphocytes were correlated with both severity and a more rapid progression of the disease. Moreover, T^+CD49d^+ cells were also found in muscular inflammatory infiltrates. Functionally, T cells from severely affected patients exhibited higher transendothelial and fibronectin-driven migratory responses and increased adhesion to myotubes, when compared to control individuals. These responses could be blocked with an anti-CD49d monoclonal antibody.

Conclusion: CD49d can be used as a novel biomarker to stratify DMD patients by predicting disease progression for clinical trials. Moreover, anti-CD49d peptides or antibodies can be used as a therapeutic approach to decrease inflammation-mediated tissue damage in DMD.

ATL1102 for DMD – Scientific Advisory Board

Dr. Ian Woodcock MD (Principal-Investigator)

Royal Childrens Hospital (RCH) Neuromuscular Fellow, Melbourne Australia

Professor Monique Ryan MD (Co- Investigator)

Director Neurology Department, Head of Royal Children's Hospital, Neuromuscular Clinic RCH, MCRI, Melbourne Australia

Professor Steve Wilton Ph.D

Western Australian Neuroscience Research Institute (NRI), Foundation Chair in Molecular Therapy at Murdoch University, Perth, Western Australia: Inventor of eteplirsen to restore dystrophin in DMD

Professor Sue Fletcher, PhD

Principal Research Fellow, NRI Murdoch University, Perth, Western Australia: Inventor of eteplirsen to restore dystrophin in DMD

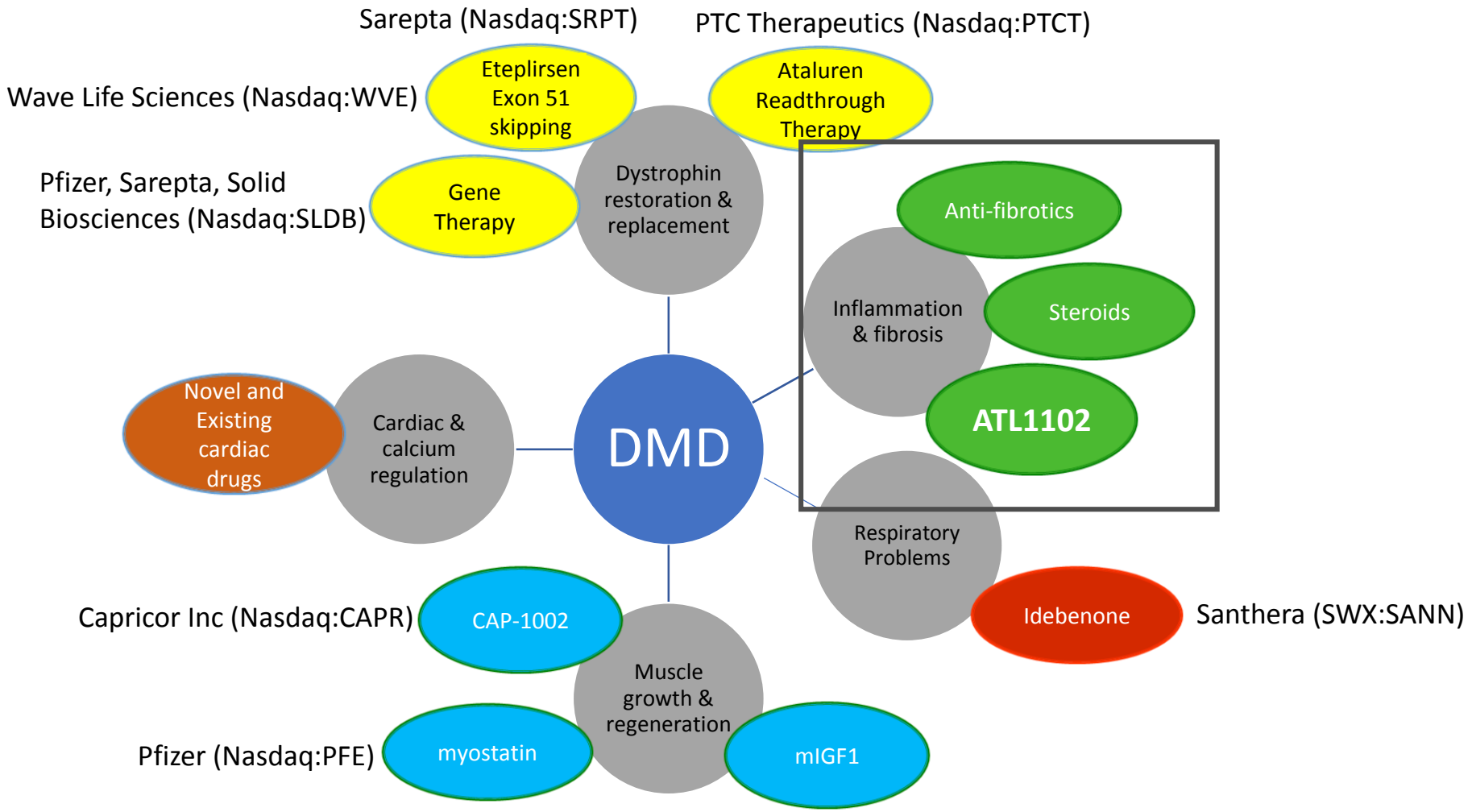
Dr. Gillian Butler-Browne, PhD

Director, Centre of Research in Myology, Sorbonne Universités, INSERM, Paris, France: Expert in inflammatory muscle disease

Mr William Goolsbee (SAB Chairman)

Antisense Therapeutics Ltd, non- executive director. Chairman, Sarepta Therapeutics, 2010-2014, the developers of eteplirsen for the treatment of DMD

Treatment development focuses across all DMD Intervention points[6]



Recently Initiated Therapeutic Product Trials in DMD

Date Commenced	Company	Technology	Therapy ID	Phase	Pathological Process
Apr-18	Pfizer	Gene therapy	PF-06939926	Phase Ib	Dystrophin production
Apr-18	Capricor Inc	Cardiosphere-derived cell therapy	CAP-1002	Phase II	Cellular re-generation
Mar-18	Mallinckrodt	Synthetic melanocortin receptor aganist	MNK-1411	Phase II	Anti-inflammatory
Dec-17	Sarepta	Oligomer	SRP-5051	Phase I/IIa	Dystrophin production
Dec-17	Solid Biosciences	Vector-mediated gene transfer	SGT-001	Phase I/IIa	Dystrophin production
Nov-17	Wave Life Sciences	Exon skipping (Exon 51)	WVE-210201	Phase I	Dystrophin production
Oct-17	Italfarmaco	Histone deacetylase inhibitor	Givinostat	Phase II/III	Anti-fibrotic
Jul-17	PTC Therapeutics	Oxadiazole small molecule, unknown MoA	Ataluren	Phase III	Dystrophin production

Source: Adapted from Bioshares - 27 April 2018, Edition 740

Limited no of anti inflammatory drugs in development - MNK-1411 above, CAT-1004, VBP15 both have completed Phase 2 and target NF Kappa B, which is thought to be the MoA of the CS drugs that do not modulate CD49d expression

DMD Program Status – Phase II clinical trial

- ANP conducting a Phase II trial in DMD patients at the Royal Childrens Hospital (RCH) Melbourne
  - *Study in non-ambulant (wheel chair bound) boys 10 to 18 years of age with DMD*
  - *Will assess ATL1102's safety and tolerability and its effects on the inflammation that contributes to disease progression in DMD over 24 weeks of dosing at 25mg/week*
  - *Study is a safety and tolerability investigation while also looking to show a difference in serum biomarkers of inflammation and muscle damage and to detect a difference at 6 months in key clinical endpoints (e.g. the upper limb function of the boys)*
- 2016 Ricotti et al. reported a steady deterioration in disease endpoints over time in non-ambulant DMD patients receiving regular doses of corticosteroids
- **ATL1102 is the only CD49d targeting drug in clinical development for DMD** (ATL1102 is a more selective CD49d immunomodulator than the monoclonal Ab to CD49d causes a lethal side-effect)
- Trial costs eligible for R&D tax incentive refund
- Patient recruitment underway and based on study timeline projections study results by mid 2019

Positive trial results (if ATL1102 sufficiently well tolerated and active) expected to generate considerable investor and pharma company interest = potential partnering catalyst

Dr Ian R Woodcock
Neuromuscular Fellow, RCH, Melbourne Australia

Prof. Monique Ryan
Head of Neuromuscular Clinic RCH, Melbourne Australia
Consultant Neurologist

Value Creation Potential of ATL1102 for DMD - Sarepta Therapeutics

- Prior to the approval of Exondys 51, Sarepta had a market capitalisation (m/c) of ~US$60m (July 2012)
- Exondys 51 was approved by the FDA in late 2016 under the accelerated approval pathway based on the surrogate endpoint of dystrophin increase in skeletal muscle observed in some Exondys 51-treated patients
- Following FDA approval of Exondys 51 Sarepta's m/c peaked at US$3.3Billion (current m/c US$9Billion)
- Exondys 51 is the first FDA approved treatment for DMD, however is only useful in 13% of boys with the exon 51 mutation, where as inflammation contributes to disease progression in all DMD patients
- Cost per patient of Exondys 51 is US$300K/year
- First Qtr 2018 total net revenue for Exondys 51 was US$65 million
- Notably, Mr William Goolsbee, ex Chairman of Sarepta, is a non-executive director of ANP and Exondys 51 inventor, Professor Steve Wilton (Murdoch University, Perth) is a member of the Scientific Advisory Board

Relevant Deal transactions?

- Limited, likely reflecting small but growing R&D pipeline, however…

GlobalData.

2018 Is the Year for Making Strategic Alliances in DMD

Publication Date: **March 2018**

*'…In **2017, $2.2B was issued in capital raising deals involving DMD pipeline drugs**, and two-thirds of these deals were equity offerings. This suggests that companies were focusing on raising funds and investing in DMD research, which is likely to lead to further collaborative transactions in the coming years.*

*There was **very high investment activity in 2017**. Therefore, it is likely that these high value capital raisings will continue into 2018, but **will switch to favour DMD strategic alliances by the end of 2018 and into 2019**. As such, a big strategic alliance deal for DMD drugs is anticipated for later this year.'*

..Lisa Marris, GlobalData Common Content Databases Associate Analyst

Mark Diamond, CEO

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