16 Jan 2024

Ticker	Current Price
ASX:PAA	A$0.13

Market Data	
52-Week Range (A$)	0.065 – 0.140
3mth Avg Vol ('000)	348.3
Market Cap[1] (A$Mil)	50.0
Shares Out.[1] (Mil)	385.0
Est Cash[1] (A$Mil)	4.8
Est. Enterprise Value (A$Mil)	45.2
Debt as of Jun'23 (A$M)	0

Options		
Options @ Strike price	Expiry	Qty (Mil)
PAAOA @ A$0.15	30 Apr'26	121.9
Unlisted @ A$0.15	31 Dec'25	4.0
Unlisted @ A$0.10	28 Feb'26	2.7

Top 5 shareholders	
Hybrid Holdings Pty Ltd <Darcy Family Super Fund A/C>	5.8%
Mr Gerald James Van Blommestien + Mrs Gillian Van Blommestein	4.8%
Dr Roger Aston (Non-Exec. Chairman)	3.9%
MB Investment Capital Pty Ltd	2.6%
Mr Marcus Paul Hughes	2.3%

Valuation targets		
Indications	NPV_{12} (US$M)	NPV_{12} per share (A$)
MPL for ALS/MND in the US and EU	228.0	0.89
MPL for B-Cell Lymphoma in dogs	19.8	0.08
Total for PAA	**247.8**	**0.97**

PharmAust Limited (ASX: PAA)

Research Note

Cyprus Sia | Analyst | Spark Plus Pte Ltd. | cyprus@sparkplus.org

ENTERING A TRANSFORMATIVE YEAR. PharmAust (PAA) is repurposing Monepantel (MPL) for cancers and neurodegenerative diseases and has reached a pivotal phase for 2 indications – Motor Neurone Disease (MND) for humans and B-Cell Lymphoma for dogs. The Company is opening an IND with the FDA to progress towards a (pivotal) Phase 2/3 MND Study in 2Q'24 which is expected to cost ~A$30M and may be partially funded through non-dilutive means (Phase 1 was fully funded by FightMND). We opined PAA is at a pivotal stage given that the 2 most recent MND drugs were granted accelerated approval by the FDA based on Phase 2 trial results and offer modest benefit.

What are the Sparks?

Phase 1 MND Study with promising results anticipated in 1Q'24. Dosing in the Phase 1 MND Study (n=12 patients with MND/ALS) concluded in early Dec'23 with data currently being compiled and analyzed for release in 1Q'24. Interim results confirmed that MPL is safe and very well-tolerated. PBMC pharmacodynamic markers, p-RPS6KB1 and p-EIF4EBP1, were significantly reduced in most participants which confirms target enagement and inhibition of mTOR pathways. The biomarkers, urinary $p75^{ECD}$ levels and plasma Nfl protein concentrations, were stable or reduced providing preliminary evidence that MPL may be modifying the progression of MND. Most importantly, all participants are still alive, breathing unassisted, and swallowing which is very encouraging given the average lifespan of MND patients is 27.5 months and 1/3 of patients die within 12 months after the first diagnosis of MND.

Accelerating market with huge total addressable value. Global MND cases have grown ~70% over the past 3 decades to ~270K cases, outpacing the population growth, and is expected to continue growing over the next decade due to a growing aging population. However, there is no cure for MND to date with only 4 treatments approved – the most effective being the recently FDA approved Relyvrio™ which only extends life expectancy by 9 months, followed by Radicava™ (6 months), then Riluzole (3 months), and Qalsody for the niche 2% cases of ALS. These 4 drugs form an estimated US$610M MND drug market and is expected to grow beyond US$1B by 2029 with new entrants. Given the list price of US$158K/annum for Relyvrio™, the total addressable market for MND would be >US$40B if all MND patients seek the best treatment.

Orphan Drug Designation (ODD) grant expected early 1Q'24. An ODD would help expedite a drug development process, which could mean additional billions in revenue for blockbuster drugs, as it gives the Company access to specialised regulatory assistance from the FDA's Office of Orphan Products Development. Other incentives include tax credits, 7 years of marketing exclusivity, fee waivers, and the opportunity to apply for grants to support clinical trials, which significantly boosts the net present value of a drug and puts the company in the spotlight as an M&A target.

Positive canine study results paving the way for the pivotal field study in 1H'24. A Phase 2 B-Cell Lymphoma Study on 54 dogs was completed in Oct'23 which showed MPL achieved a 35% overall clinical benefit with a median TTP of 28 days. These compare favorably with the TTP of 29.5 days recorded by the existing treatment, LAVERDIA™, which was sold for US$64.5M to Dechra Pharmaceuticals in Jan'22. MPL has the added benefit of not being a chemotherapy drug which provides a safe environment for the owners at home and allows dogs to maintain an excellent quality of life and level of function. Application for an INAD is underway in the US is underway to commence a pivotal field study in 2024 to support product registration.

[1]PAA raised A$3.5M, before cost, through the issuance of 34,590,000 shares and 27,060,000 options on 13 Dec 2023.

Company Overview

PharmAust (PAA) is clinical-stage biotechnology company developing new therapeutics for human and animal health applications. The Company's lead drug candidate is monepantel (MPL), a small molecule drug currently being developed as a treatment for motor neurone disease (MND) for humans and B-Cell Lymphoma in canines. PAA owns several granted patents under its wholly owned subsidiary, Pitney Pharmaceuticals Pty Ltd, over the use of MPL in cancer therapy and neurodegenerative diseases such as Parkinson's Disease and Alzheimer's Disease.

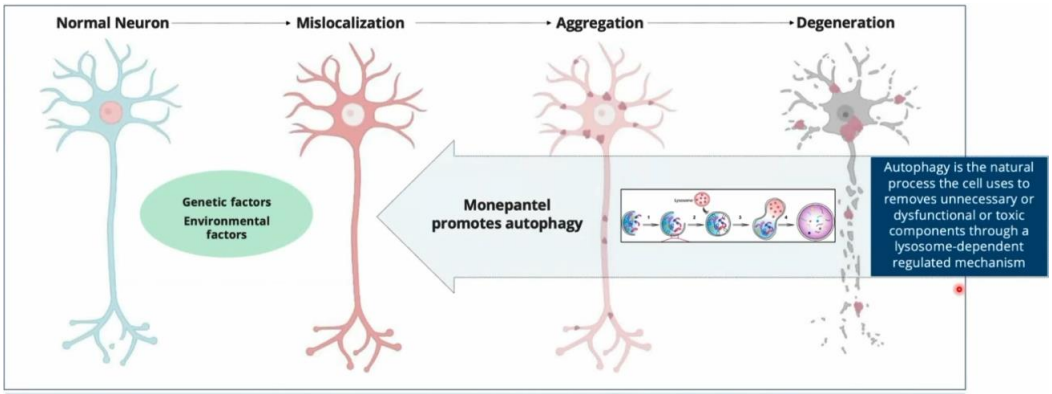
MPL for MND

About Monepantel (MPL)

MPL is a veterinary drug currently sold as an anti-parasitic medication (known as Zolvix® sold by Elanco) for animals in over 38 countries. PAA discovered independently that MPL interacts in a previously unrecognized "off-target" fashion with the mTOR (mechanistic Target Of Rapamycin) pathway, an important regulatory pathway in mammalian cells, that is believed to have relevant therapeutic value in a wide range of diseases. As such, PAA has acquired all the rights to MPL from UNSW-NSI, the commercial arm of the University of NSW, and the analogues from Nihon Nohyaku, the original MPL developer, which allows them to develop and commercialise outcomes of mTOR pathway inhibition by MPL in cancer, COVID-19, and neurodegeneration.

Mechanism of action

It has been established that MPL inhibits the mTOR pathway and by doing so promotes autophagy, a natural process the cell uses to remove unnecessary, or dysfunctional, or toxic proteins. Studies have shown a build up in toxic proteins leads to the degeneration of nerve cells which causes MND and other neurodegenerative diseases.



Protein aggregation[1] is an important feature of MND/ALS pathology. Amyloid deposits from different proteins such as TDP-43, C9ORF72 dipeptide repeats, phosphorylated high molecular weight neurofilament protein, rho guanine nucleotide exchange factor, and FUS have been detected in MND/ALS motor neurons. These aberrant protein deposits become toxic to the cells, leading to neurodegeneration and are targets for therapeutic interventions.

[1]Suk, T.R., Rousseaux, M.W.C. The role of TDP-43 mislocalization in amyotrophic lateral sclerosis. *Mol Neurodegeneration* **15**, 45 (2020). https://doi.org/10.1186/s13024-020-00397-1

What is Motor Neurone Disease (MND)

MND is a group of rare neurological conditions where motor neurons, the nerve cells in the spinal cord and brain that control skeletal muscle movement, are progressively degenerated. It is life-shortening and has no cure currently. Patients diagnosed with MND gradually lose their ability to move, speak, swallow, or even breathe. In some cases, thinking and behaviour are also affected.

MND affects about 3.4 per 100,000 people globally with a higher prevalence in more developed countries (up to 9.1 in the US and 8.0 in Netherlands and Italy). The cause of MND is not known yet and it may develop in anyone (only 1 in 10 cases are inherited), more commonly in men than women, typically after the age of 40 years. There are 4 main (common) types of MND with ALS attributing to ~90% of all MND cases. As such, we refer MND to ALS and may used them interchangably in this report.

The 4 most common type of MND

Type (ranked by commonness)	Symptoms	Life expectancy
Amyotrophic lateral sclerosis (ALS)	Twitching, cramping, and wasting of muscles starting from the limbs to rest of the body and eventually paralysis. Late stage include difficulty breathing and swallowing.	27.5 months (average)
Bulbar onset MND or Progressive bulbar palsy (PBP)	Affects the muscles of the face, throat, and tongue with early symptons of slurring in speech or difficulty swallowing. May lead to ALS.	0.5 - 3 years
Progressive muscular atrophy (PMA)	Weakness and wasting of muscles in the legs, arms, hands, and body, gradually speading to other parts of the body after a number of years.	More than 5 years.
Primary lateral sclerosis (PLS)	Weakness and stiffness that usually begins in the lower limbs. Other symptoms may impact speech.	Average lifespan of normal humans but lowers quality of life.

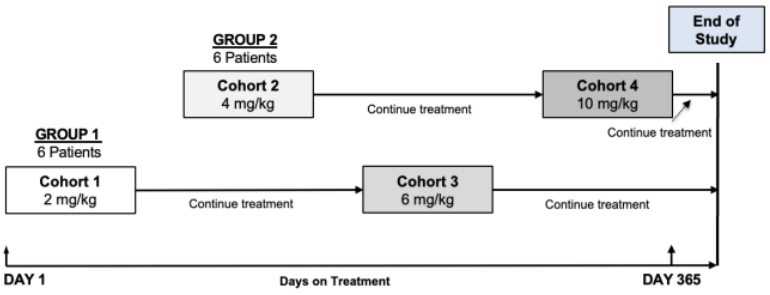
Clinical Trial

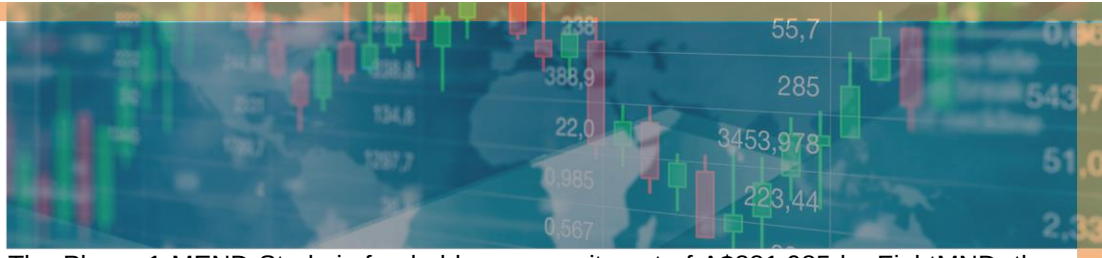
PAA completed dosing in its Phase 1 MND Study using MPL (Phase 1 MEND Study) on 1 Dec'23. The Company is collating and analyzing the results which are expected to be released in 1Q'24.

The Phase 1 MEND Study is an open-label, multicentre study involving 12 patients with MND/ALS with the goal of determining the recommended Phase 2 dose based on safety and preliminary efficacy. The study design involves 2 groups of 6 patients with each group progressively receiving higher dose levels of MPL, subject to meeting a set of safety criteria, in a staggered design approach over time.

During the study, safety and tolerability, pharmacokinetic (MPL and its metabolite MPL sulfone (MPLS) in plasma and cerebrospinal fluid), pharmacodynamic (p-RPS6KB1 and p-EIF4EBP1 peripheral blood mononuclear cells), preliminary efficacy (ALS Functional Rating Scale–Revised, ALS Quality of Life Questionnaire, Edinburgh Cognitive and Behavioural ALS Screen, slow vital capacity and 3 Tesla MRI diffusion kurtosis imaging), and biomarkers (serum neurofilament/light chain, cerebrospinal fluid neurofilament/light chain and urinary p75 levels) measures are assessed.

Design of Phase 1 MEND Study





The Phase 1 MEND Study is funded by a commitment of A$881,085 by FightMND, the largest independent funder of MND research in Australia with the sole purpose of finding an effective treatment or a cure for MND. FightMND was co-founded by former AFL players, Neale Daniher, Pat Cunningham, and the late Dr. Ian Davis in 2014 and has funded more than A$84M in vital MND research to date.

Interim results

Interim analysis of the lower dose levels MPL was also readily absorbed and reached steady state levels on Day 1. Monepantel sulfone (MPLS), MPL's major metabolite achieved steady state levels on Day 8. Assays on the peripheral blood mononuclear cells (PBMC) pharmacodynamic mTOR markers, p-RPS6KB1 and p-EIF4EBP1, were significantly reduced in most participants treated with MPL confirming that adequate blood levels of MPL were obtained even at low doses to see pharmacodynamic effects on the mTOR pathway.

Decreased urinary p75ECD biomarker levels were seen in 3 out of 6 participants where data was available and there were no significant changes in plasma Neurofilament Light Chain (Nfl) protein concentrations in 11 out of 12 participants.

Patients have now completed dosing at the 10 mg/kg dose level. MPL was well-tolerated with no serious adverse events related to treatment with MPL or deaths have been reported during the study.

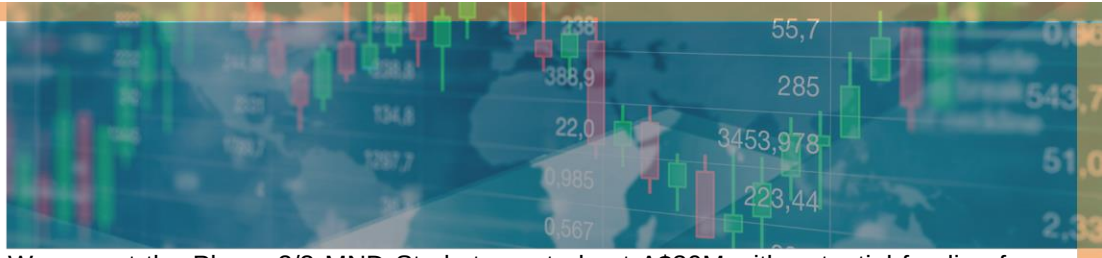
More importantly, all patients have now been treated continuously with MPL for between 8 - 13 months, most diagnosed with MND for about 24 months at the start of the trial, and are still alive. The zero death outcome is very encouraging given the average life expectancy of patients after being diagnosed with ALS is 27.5 months with 1/3 of patients die within 12 months after first diagnosis of ALS. It is also noted that, to date, none of the participants have had difficulty in swallowing and have not required ventilation or respiratory support which typically occurs after 2-3 years of developing ALS.

All participants are continuing treatment with MPL under a compassionate use program and will be invited to participate in a 12-month open-label extension study expected to commence in or around Jan'24. The fact that the participants are still willing to take MPL gives great confidence that the drug is well tolerated and possibly effective. We opined that the extension study will be an important leading indicator to the success rate of the upcoming Phase 2/3 MND study and supplement to an accelerated approval decision.

Next steps

The interim results from the Phase 1 MEND Study have been used to support an Orphan Drug Designation (ODD) application and the final results will be used to open an IND with the US FDA to commence a Phase 2/3 MND Study in 2Q'CY24. In the meantime, PAA has been awarded a Pre-IND meeting with the FDA to confirm the details and acceptability of the Company's proposed ongoing development program, including the requirements for non-clinical and clinical pharmacology, clinical chemistry, and manufacturing controls. Most importantly, it provides PAA with an opportunity to seek feedback from the FDA on the design of its planned Phase 2/3 MND Study and gain insights into the FDA's requirements for MPL to be potentially granted accelerated approval. These would significantly increase the confidence and probability of a successful IND application outcome. FDA has committed to provide written responses by 13 Feb'24.

PAA has partnered with Berry Consultants to design and analyse the planned adaptive Phase 2/3 MND Study. Berry Consultants is a leading clinical design specialist whom participated in the advisory committee meeting for the recently accelerated approved Relyvrio® for MND/ALS and also helped with the design of the HEALEY ALS Platform Trial - a perpetual multi-center, multi-regimen clinical trial evaluating the safety and efficacy of investigational products for the treatment of ALS.



We expect the Phase 2/3 MND Study to cost about A$30M with potential funding from FightMND and other non-dilutive options including clinical trial grants eligible to ODD holders and from Northern Eastern ALS Consortium who are subsidising the HEALEY ALS Platform Trial. PAA has been invited by FightMND to submit a full grant application for its Phase 2 MND Study by 24 Mar'2024. Successful applicants may receive up to A$1.8M in cash and will be notified in Jul'24. The cost and duration of the Phase 2/3 MND Study may be significantly reduced by about 30% and 50% respectively if the Company is accepted into the HEALEY ALS Platform Trial.

We also note that the recent FDA drug approvals (Relyvrio® and QALSODY) for ALS received accelerated approvals based on the results from Phase 2 studies with small patient group sizes of less than 100 patients. Therefore, we deemed a Phase 2 trial for MND/ALS using MPL will have a high probability of getting an accelerated approval if the results are positive.

An ODD would help expedite a drug development process, which could mean additional billions in revenue for blockbuster drugs, as it gives the Company access to specialised regulatory assistance from the FDA's Office of Orphan Products Development. Other incentives include 25% tax credits for clinical trial expenses in the US, 7 years of marketing exclusivity, waiver of Prescription Drug User Free Act (PDUFA) fees which cost ~US$2.9M in 2021, and the opportunity to apply for grants to support clinical trials. Possessing an ODD often puts the company in the spotlight for larger pharmaceutical companies looking for M&A targets. The FDA will complete a review of the ODD within 90 days of receiving the submission which suggests a timeline before the end of Feb'24 for PAA.

MND Market

There are an estimated 268,674 people living with MND globally in 2019, a ~70% increase from the recorded cases in 1990 as compared to a ~46% increase in the global population. This increase may be attributed to improved accessibility and affordability to medical facilities resulting in more diagnosed cases from the previously undiagnosed cases or a more sedan but stressful lifestyle in general. Regardless, the number of MND cases is expected to continue growing over the next decade due to the growing aging population.

There are 4 drugs approved for the treatment of MND currently but none are disease modifying. Relyvrio, developed by Amylyx Pharmaceuticals Inc (AMLX) which received accelerated approval by the FDA in Sep'22 for the treatment of ALS, with clinical data shown to delay the progression of ALS for 9 months. Relyvrio has a list price of US$158K per annum in the US, a slight discount to its closest contender's (Radicava®) US$170K per annum.

Table of approved MND/ALS drugs

Brand	Company	Benefits	Action of Mechanism	Mode of Application	List Price (US$ p.a)	Approved by FDA	Annual sales (US$M)
Rilzoule	Generic	Delay progression by 2-3 months (SOC)	Block the release of glutamate	Oral	2,000-8,000	1995	120
Radicava/ Radicut	Mitsubishi Tanabe	Delay progression by 6 months	Free radical scavenger - remove the molecules that contribute to oxidative stress damage to neurons	IV or Oral	170,000	May-17	190
Relyvrio	Amylyx Pharmaceuticals	Delay progression by 9 months	Blocks stress signals within two cellular compartments, specifically mitochondria and the endoplasmic reticulum.	Oral	158,000	Sep-22	294
QALSODY	Biogen	Reduces SOD1 protein by 35% and bloodstream levels of NfL by 50% (**only 1-2% of ALS cases are SOD1 related**)	Bind to RNA produced from mutated SOD1 genes to stop production of toxic SOD1 proteins	IV	199,220	Apr-23	

Based on the numbers, the total addressable market for MND drugs exceeds US$40B if all patients adopt the best treatment. However, due to awareness, accessibility, and affordability, the current MND/ALS drugs market is estimated to be US$610M, mainly from Relyvrio® (US$294M), Radicava® (US$190M), and rilzole (US$120M). This translates to

an estimated 30,000 ALS patients being treated annually or only ~10% of the total population diagnosed with MND.

The MND drugs market is expected to grow beyond US$1B by 2029 driven by a growing silver generation, better accessibility to treatment, a stronger emphasis on quality of life by the general public, new drugs in the pipeline expected to become commercial, and a longer life expectancy for those undergoing treatment.

Potential pathway to monetisation

We narrowed down 2 pathways to monetisation of MPL for MND, commercialisation or acquisition by a larger pharmaceutical company. We opined the latter to have a higher possibility given our interpretation of the messaging done by the Company. PAA has pointed out the nearly 2x increase in M&A activities by big pharmaceutical companies in recent years (2018-2021) within the rare disease treatment space due to better economics on these drugs – 39% of orphan drugs have list prices above US$100,000 per year. FDA approvals for rare disease drugs have also increased to make up half of all FDA approvals between 2015 and 2022. With the increase in 'demand' for the rare disease drug market, the average deal size has also grown significantly by ~3x in the same period to about US$290M per deal.

High Value R&D Deals

Up till Oct'23, at least 49 deals within the central nervous system (<50% of total rare diseases) of the rare diseases space have been announced, totaling US$13.2B which exceeded the total number of deals and more than doubled the aggregate value in 2022. Among these is Biogen's US$7.3B acquisition of Reata Pharmaceuticals, Biohaven's US$970M acquisition of the BHV-8000 drug from Hangzhou HighlightII Pharmaceutical Co. which is believed to have an impact on neurodegenerative diseases and neuroinflammatory disorders including ALS and Parkinson's, and Takeda licensing AcuraStem's AS-202 drug for ALS for an aggregated US$580M.

Valuation on MND indication

On the commercialisation pathway, we value (risk-adjusted) the rights to MPL for MND in the US and EU to be **US$228.0M (A$342.0M)** based on the following assumptions.

- Base Case: Independent clinical trial (Not on HEALEY ALS platform).
- CAPEX of A$30M (25% funded from FightMND and other non-dilutive options).
- Commercialisation in 1H'2027.
- Prevalance of 9.1 per 100,000 people in the US and 6.0 per 100,000 in EU.
- Peak market share (% of total MND cases diagnosed) of 10% from 2034 to 2040 (patent expected to be granted) before declining to 6.5% in 2042.
- List Price of US$150,100/annum with a 5% decline every 3 years till 2040 and down to US$59,906/annum by 2042.
- Wholesale Price at 60% of List Price and 70% after 2040.
- Peak Revenue of US$499.4M in 2035.
- Peak gross margin of 94.1% and peak PBT margin of 66.2% in 2035.
- Corporate tax of 30%.
- Discount rate of 12%.
- Terminal growth of 3%.
- Risk-adjusted for 30% of future cashflows post commercialisation.
- USD/AUD of 1.50.

The Base Case translates to a share price of **A$0.89 per share** or 6.8x the current price of A$0.13.

In our bull case, where the Phase 2/3 MND Study is accepted into the HEALEY ALS Platform, our valuation becomes US$241.6M (A$363.0M) which translate to a share price of A$0.94 or 7.24x the current price. The changes in assumptions include a 30% reduction in CAPEX and commercialisation in 1H'2026.

MPL for B-Cell Lymphoma

A Phase 2 veterinary clinical study of MPL for the treatment of B-Cell Lymphoma in dogs (Phase 2 Canine trial) across Australia, New Zealand, and USA was completed in Oct'23. The Phase 2 Canine study was an open-label, single-arm, dose-finding study where 54 dogs (23 females, 31 males) were treated for 28 days across 5 dose regimens shown below.

Phase 2 Canine Study dose regimen

Dose Regimen	Monepantel Dose, mg/kg BW per day		Dogs Treated
	Loading (Day 1)	Maintenance (Day 2–28)	
1	180	180	7
2	10	10	6
3	50	25	5
4	100	50	18
5	100	25	18

The profile of dogs includes mixed breeds having late-stage disease at diagnosis (61.5% stage 4, 28.8% stage 5) with prescapular (92.3%), popliteal (90.4%), and submandibular (78.8%) lymphomas. The median age is 8 years (3 – 13 years) and the median weight is 29.6kg (6.5kg – 87 kg). The safety and efficacy of the drug were accessed with the primary endpoints, shown below, measured.

Primary Endpoints of the Phase 2 Canine Study and their definitions

Primary Endpoints		Methodology	
Overall Response Rate (ORR)	Complete Response (CR)	The disappearance of all evidence of disease, and all lymph nodes	Overall Clinical Benefit (OCB)
	Partial Response (PR)	A 30% or greater decrease in the mean sum of the longest diameter of all target lesions from baseline	
	Stable Disease (SD)	Neither sufficient decrease to qualify for PR nor sufficient increase to qualify for PD	
	Progressive Disease (PD)	A 20% or greater increase in the mean sum of the longest diameter of all target lesions with reference to the smallest mean sum longest diameter recorded of all target lesions	
Time to Progression (TTP)		the time from the first date of treatment to the date that the dog developed clinical or radiographic signs of PD or died from any cause, including euthanasia	
Quality of Life (QoL)		Energy level, appetite, signs of nausea or vomiting, water intake, and general LoF assessed by dog owners using a number ranging from 1 (very poor) to 10 (normal) throughout the treatment.	
Level of Function (LoF)		Assessed by dog owners using visual analogue scale ranking between 1 (normal pet) to 4 (very weak/completely disabled)	

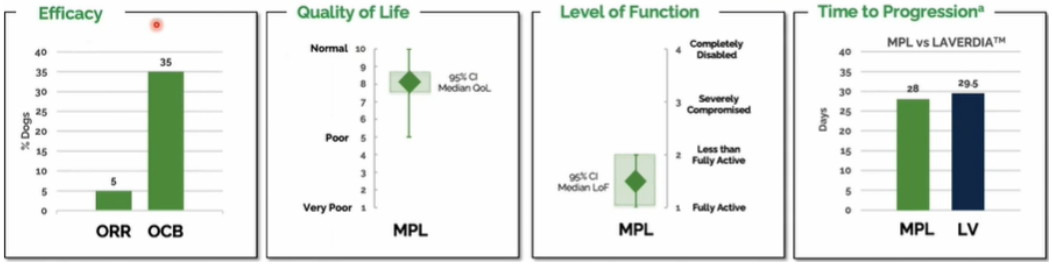
Results

The study showed that MPL was safe and well-tolerated by the dogs with an overall clinical benefit of 35% (14 of 40 dogs, the other 14 dogs were excluded due to protocol violations) was achieved. Overall clinical benefit (OCB) is determined as dogs with CR, PR, or SD. Of the 14 dogs in OCB, 2 were observed to be PR and 12 being SD which confirms that MPL has significant anti-cancer activity and offers disease stabilisation.

The median TTP for dogs in OCB was 28 days, where 10 dogs (25%) had TPP >50 days and 5 (12.5%) had TPP >80 days. This compares favorably with the current treatment, LAVERDIA™, which recorded a median TTP of 29.5 days with 34% with TTP >55 days and 6% with TTP >180 days in a field study (n=50) conducted for product registration.

The median QoL score for 43 evaluable dogs across the Phase 2 Canine trial was 8 with >74.4% rated >8/10. LoF score was just below 'normal pet' at 1.5 with no dogs rated >2.0.

Results of the Phase 2 Canine Trial



What is B-Cell Lymphoma?

Lymphoma is a group of cancers resulting from a change or overgrowth of lymphocytes (B-Cells or T-Cells), a type of white blood cells that help the immune system fight off infection and are highly concentrated in organs that play an important role in the immune system. B cells create antibodies that destroy invading bacteria, viruses, and toxins before they affect a cell while T cells destroy infected or cancerous cells. Lymphoma is a common cancer accounting for 15-20% (70% are B-Cells and 30% T-Cells) of new cancer diagnoses in dogs or about 70,000 dogs annually in the US.

B-Cell Lymphoma in dogs has a poor prognosis. The average dog dies within 30 days after diagnosis if no treatment is initiated. Current treatment is limited to chemotherapies which extend survival time for about 12 months. The most frequently adopted protocol, CHOP (a regime of 4 drugs, cyclophosphamide, hydroxydaunorubicin, vincristine, and prednisone), works in 80% - 95% of cases but often has significant side effects, including gastrointestinal disturbances, bone marrow suppression, and immunosuppression, which vary in severity and may require supportive care or dose adjustments. Other chemotherapy drugs include Tanovea (lower frequency of administration) and LAVERDIA™ (more convenient and less expensive).

MPL vs other treatment for B-Cell Lymphoma in dogs

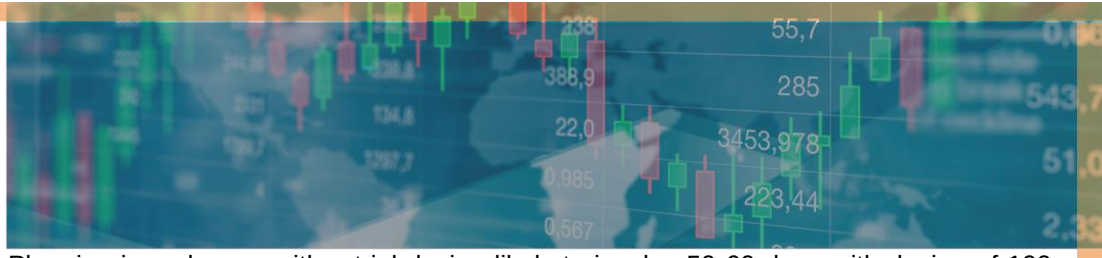
CHOP and Tanovea are IV administered that require frequent visits (weekly or once every 3 weeks respectively) to the vet and as such, are relatively expensive at up to US$12,000 over the course of treatment. LAVERDIA™ is an oral tablet, that can be administered at home, costs lesser at ~US$3,600 annually, but remains a chemotherapy drug.

Chemotherapy are strong cytoxic agents that penetrates the body and kills both bad and good cells therefore, special instructions for handling and administering the drug are required during treatments. These include no direct skin contact with the drug and the excretions (including saliva) of the dog and keeping these out of reach from pregnant ladies, soon-to-be pregnant ladies, and kids, as well as storing them away from food or food preparation areas. Dogs under chemotherapy show exceptionally poor QoL, not only from the deteriorating health but also the reduced care and physical interactions from their owners.

MPL, on the other hand, is a small molecule (oral) drug that provides a safe environment for the people and other animals around and likely maintains or improves the dog's QoL over the course of treatment. As such, we opined that MPL has the potential to become the next SOC if proven to show similar or better results to LAVERDIA™.

Next steps

PAA is progressing with an (Investigational New Animal Drug) INAD application with the FDA's Center for Veterinary Medicine (CVM) based on the positive results from the Phase 2 Clinical study. Upon approval, the Company plans to commence a target animal safety study and a pivotal (field) study, in parallel, in 2024 to support product registration (commercialisation).



Planning is underway with a trial design likely to involve 50-60 dogs with dosing of 100 mg/kg initial loading followed by 25 mg/kg maintenance. The estimated timeline is 3-4 months for the INAD approval, 1 year for pivotal study, 1 year for new animal drug applications and commercial partnership discussion, and commercialisation in 2026. The study will incorporate feedback from potential partners and continue to proceed in parallel with business development efforts.

Potential licensing

It is worth noting that LAVEDIA™ is acquired by Dechra Pharmaceuticals (LSE:DPH) for US$62.5M in Jan'22, 1 year after it was given conditional approval by the FDA. PAA may look to divest its rights on MPL for the treatment of Lymphoma in dogs upon receiving FDA approvals or when sufficient data points support the efficacy of its drug.

Valuation on MPL for B-Cell Lymphoma in dogs

We value the rights to MPL for the treatment of B-Cell Lymphoma in canines globally to be **US$19.8M (A$29.7M)** based on the reference to the acquisition price of LAVERDIA™ less the CAPEX assumption of US$6M, a discount of 70% for B-Cell Lymphoma only, and risk-adjustment of 50% for the uncertainty of the field study outcome.

Key risks

Funding risk. PAA is expected to commence 2 pivotal trials in 2024 which could cost ~US$26M (A$39.1M) in total. This is an excess to the Company's estimated cash position of A$4.8M (post raising A$3.5M and receiving A$553K R&D tax incentive). Failure to secure additional capital for the pivotal trials is likely to delay the progress toward commercialisation or monetisation of the assets. An aggressive raise may also dilute existing shareholders and affect the share price. With that said, possible dilutive funding of up to A$18.9M may be obtained from the existing 126.0M options exercisable at A$0.15 (15.4% premium to current price).

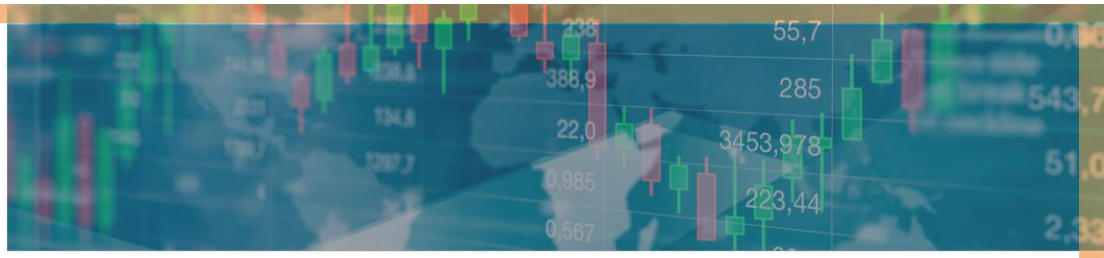
Clinical trial or R&D risk. Every innovation has a probability of success (POS) which is lower than 1. There is no guarantee that MPL will eventually become a commercial drug for MND or B-Cell Lymphoma nor achieve a successful outcome for its upcoming trials or IND applications. However, each data point and trial completed by PAA would derisked the project and bring the POS closer to 1. Investors should access and apply their own POS multiple when valuating the Company.

Competition. The research pipeline for a new MND treatment consists of more than 15 other drug candidates. Each has its possibility of becoming a breakthrough for treating MND and may affect MPL's market share in the future.

Interest rate risk. Rising interest rate environment is generally negative for the equities market and especially so for the small caps with negative FCF. Although RBA and Fed have paused interest rate hikes for the time being, it is uncertain if they will continue to do so in 2024. With that said, a falling interest rate environment is likely positive for PAA.

Board and Management

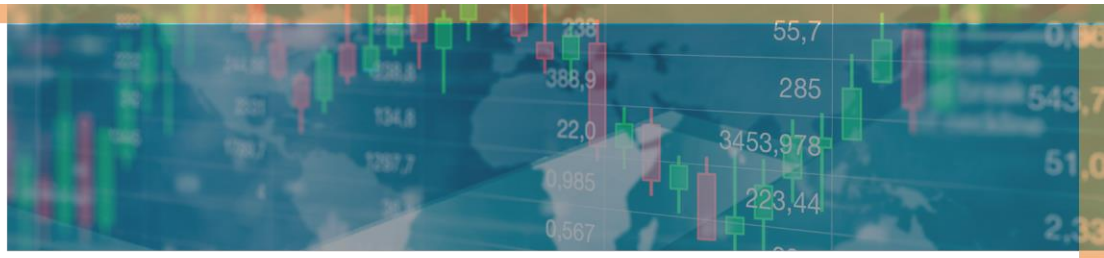
Dr Roger Aston Non-Executive Chairman	Dr Aston brings more than 40 years' experience in the pharmaceutical and healthcare industries in senior roles in the UK, Asia Pacific and Australia. He has had extensive experience on boards and as Chief Executive Officer of many private and publically listed biotechnology companies. During his career, he has been closely involved in start-up companies and major pharmaceutical companies. Aspects of his experience include FDA and EU product registration, clinical trials, global licensing agreements, fundraising through private placements, and a network of contacts within the pharmaceutical, banking and stock broking sectors.
Dr Michael Thurn CEO	Michael has over 25 years experience in technical, regulatory, commercial and management roles in research organisations and industry, including early stage, fast growing, private and publicly listed biotechnology companies. In the Biotechnology industry, Michael has held leadership roles at MARP Therapeutics, Botanix Pharmaceuticals (ASX:BOT), Mimetica, Spinifex Pharmaceuticals, Cytopia, Xenome and Novogen. During this time, he has guided a number of New Chemical Entities through discovery, preclinical and clinical development. Michael has led a variety of US IND applications across a range of therapeutic areas and evaluated drugs and vaccines for registration during his engagement at the TGA. Michael currently sits on the Australian Boards of MARP Therapeutics, Impel Neuorpharma, Erasca and Inmagene.
Robert Bishop Executive Director	Mr Robert Bishop (Executive Director) Robert has 30 years' experience in corporate finance and equity capital markets. Having worked extensively in London and Sydney, first as a lawyer at Linklaters & Paines and Allen, Allen & Hemsley; and then as a stockbroker and investment banker at Ord Minnett, Robert Fleming and, since 1998, at his Sydney based corporate finance business, First Capital Markets. He has extensive experience in the areas of stock market flotation's, licensing and compliance work.
Mr Neville John Bassett AM, FCA, B.Bus Non-Executive Director	Mr Bassett is a Chartered Accountant specialising in corporate, financial and management advisory services. He has been involved with numerous public company listings and capital raisings. His involvement in the corporate arena has also taken in mergers and acquisitions and includes significant knowledge and exposure to the Australian financial markets. He has a wealth of experience in matters pertaining to the Corporations Act, ASX listing requirements, corporate taxation and finance. He is a director or company secretary of a number of public and private companies. Neville is chairman of Westar Capital Limited, the holder of an Australian Financial Services Licence. He is a Fellow of Chartered Accountants Australia and New Zealand. He was a Director/Councillor of a major not-for-profit organisation for 26 years, serving 8 years as Chairman before his retirement in 2017. Neville was awarded a Member of the Order of Australia (AM) in the 2015 Australia Day Honours.
Sam Wright Finance Director	Sam Wright is experienced in the administration of ASX listed companies, corporate governance and corporate finance. He joined the Company as the Financial Controller in September 2006, was appointed as the Company Secretary in August 2007, and has been a Director of the Company since October 2008. Mr Wright has over twenty years' experience in the pharmaceutical, biotech and healthcare industry and is a member of the Australian Institute of Company Directors, the Financial Services Institute of Australasia, and the Chartered Secretaries of Australia. Mr Wright is currently is Non-Executive Director & Company Secretary for ASX listed company, Structural Monitoring Systems Plc. Sam is Non-Executive Director for ASX listed Reach Resources Limited and Great Dirt Resources Ltd and Company Secretary for ASX listed Buxton Resources Ltd. Sam has also filled the role of Director and Company Secretary with companies in Australia, North America and the United Kingdom. He is the Managing Director of Perth-based corporate advisory firm Straight Lines Consultancy, specialising in the provision of corporate services to public companies. Mr Wright has extensive experience in relation to public company responsibilities, including ASX and ASIC compliance, control and implementation of corporate governance, statutory financial reporting, and shareholder relations with both retail and institutional investors.



Appendix – Financials

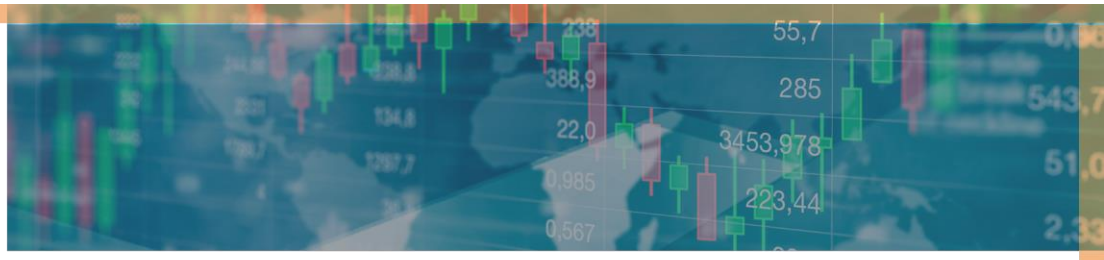
Income Statement

Income Statement	FY2021	FY2022	FY2023
A$	30-Jun-21	30-Jun-22	30-Jun-23
Revenue	2,140,320	3,381,273	2,823,906
Other income	1,531,325	1,129,432	1,076,391
Total revenue	3,671,645	4,510,705	3,900,297
COGS	-225,318	-314,343	-787,539
Employee benefits expense	-2,388,269	-2,975,520	-2,639,353
D&A	-298,263	-314,927	-326,549
Finance costs	-78,986	-88,511	-81,862
R&D expenses	-554,144	-758,655	-1,031,730
Administration expenses	-1,463,975	-1,766,958	-1,661,359
Impairment losses	0	0	-3,583,465
PBT	-1,337,310	-1,708,209	-6,211,560
Tax expense	0	0	0
PAT	-1,337,310	-1,708,209	-6,211,560
Basic and diluted EPS (AUD cents)	-0.42	-0.54	-1.93



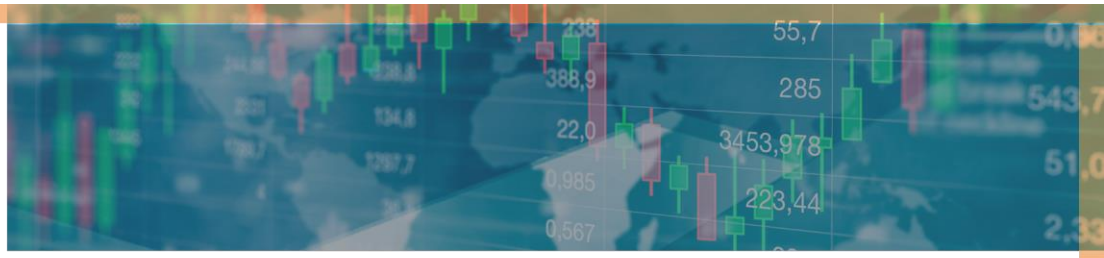
Balance Sheet

Balance Sheet A$	FY2021 30-Jun-21	FY2022 30-Jun-22	FY2023 30-Jun-23
Current assets			
Cash and CE	3,020,268	2,415,616	2,705,941
Trade and other receivables	241,949	185,322	148,233
Other current assets	86,342	86,884	167,055
Inventory	1,008,071	1,042,991	0
Total current assets	4,356,630	3,730,813	3,021,229
Non-current assets			
Intangible assets	3,142,089	3,109,567	3,107,476
PPE	3,454,879	3,237,900	1,641
Total non-current assets	6,596,968	6,347,467	3,109,117
Total assets	10,953,598	10,078,280	6,130,346
Current liabilities			
Trade and other payables	559,007	603,637	926,127
Borrowings	38,206	210,116	0
Employee benefits	205,720	214,117	262,786
Lease liabilities	108,433	137,952	158,454
Total current liabilities	911,366	1,165,822	1,347,367
Non-current liabilities			
Employee benefits	30,381	31,023	3,341
Lease liabilities	1,131,367	1,037,001	890,503
Total non-current liabilities	1,161,748	1,068,024	893,844
Total liabilities	2,073,114	2,233,846	2,241,211
Equity			
Issued capital	55,326,441	55,343,941	57,632,710
Reserves	2,093,161	2,747,820	2,715,312
Accumulated losses	-48,539,118	-50,247,327	-56,458,887
Total equity	8,880,484	7,844,434	3,889,135



Cash Flow Statement

Cashflow statement	FY2021	FY2022	FY2023
A$	30-Jun-21	30-Jun-22	30-Jun-23
Cash flows from operating activities			
Receipts from customers	2,191,105	3,437,900	2,783,011
Payments to suppliers and employees	-4,627,296	-5,811,085	-5,341,719
Other income	1,516,607	1,128,896	995,367
Interest received	14,718	537	81,025
Interest and other costs of finance	-33,099	-88,511	-81,862
Net cash from operating activities	-937,965	-1,332,263	-1,564,178
Cash flows from investing activities			
Payments for plant and equipment	-101,718	-43,379	-34,763
Payments for intangible assets	-36,319	0	-167
Net cash used in investing activities	-138,037	-43,379	-34,930
Cash flows from financing activities			
Proceeds from share issues (net)	1,536,508	718,498	2,243,764
Repayment of borrowing and leases	-320,734	-157,624	-354,331
Drawdown on borrowings	0	210,116	0
Net cash from financing activities	1,215,774	770,990	1,889,433
Cash at start	2,880,496	3,020,268	2,415,616
Cash at end	3,020,268	2,415,616	2,705,941



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