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Bioshares

22 September 2017
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Delivering independent investment research to investors on Australian biotech, pharma and healthcare companies

	Bioshares Portfolio
Year 1 (May '01 - May '02)	21.2%
Year 2 (May '02 - May '03)	-9.4%
Year 3 (May '03 - May '04)	70.6%
Year 4 (May '04 - May '05)	-16.3%
Year 5 (May '05 - May '06)	77.8%
Year 6 (May '06 - May '07)	17.4%
Year 7 (May '07 - May '08)	-36%
Year 8 (May '08 - May '09)	-7.4%
Year 9 (May '09 - May '10)	50.2%
Year 10 (May '10 - May'11)	45.4%
Year 11 (May '11 - May '12)	-18.0%
Year 12 (May '12 - May '13)	3.1%
Year 13 (May '13 - May '14)	26.6%
Year 14 (May '14 - May '15)	23.0%
Year 15 (May '15 - May '16)	33.0%
Year 16 (May '16 - May '17)	16.8%
Year 17 (May '17 - Current)	-5.5%
Cumulative Gain	713%
Av. Annual gain (14 yrs)	17.2%

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Extract from Bioshares –

PharmAust – Drug Reformulation in Progress

PharmAust (PAA: $0.057) is working on reformulating its oncology drug candidate, monepantel (MPL). There are two issues with the potential cancer therapy that need to be overcome to make it clinically viable, aside from achieving required therapeutic efficacy. The first is to reduce the large pill burden, and the second is removing the unpalatable taste of the compound.

MPL was developed by Novartis Animal Health which was acquired by Elanco (Eli Lilly) in 2015. The drug, called Zolvix, is used as an anti-parasitic in the livestock industry. A bitter taste was added to the drug to prevent unwanted digestion of the compound.

PharmAust is developing MPL as a treatment for human and companion animal cancers.

Reformulation

In early 2016 PharmAust contracted Juniper Pharma Services to re-formulate the MPL solution into capsules. However, the pill burden was high, at one capsule per kilogram (20 capsules for a large dog) and the bitter taste remained within the capsule.

In June this year, PharmAust commissioned BRI Pharmaceutical Research in Canada to reformulate the compound, with the aim being to increase its concentration 10-fold, and to improve bioavailability by between 50% - 80%, according to PharmAust CEO Richard Hopkins.

This week PharmAust reported that BRI believes it can achieve up to a six-fold improvement in drug concentration from initial efforts, with multiple options available for masking the drug taste.

Once reformulation of the drug has been completed, with a target date being the end of 2017, bioavailability studies will be conducted to assess improved drug properties from the reformulation process. If reformulation is successful, scale up of manufacture will be completed to produce sufficient reformulated product for human and animal oncology studies, which are expected to start in mid 2018.

One of the positive features of MPL is its very benign safety profile. It has been assessed in four animal species for periods of up to one year. Its dose could be increased to 1,000mg/kg in dogs without any toxic side effects. By comparison, in the human cancer study completed last year, the maximum dose reached was only 25mg/kg, with some patients being unable to manage that level because of the drug's unpalatability.

Previous Clinical Data

Data from a Phase I human study showed that stable disease was achieved in 50% of the patients (two from four) who received the 5mg/kg dose. However, side effects were an issue, which included nausea, vomiting and diarrhea. These are likely to be reduced from a more concentrated drug form with taste masking.

Cont'd over

A Phase II study in dogs with lymphoma is underway in NSW and Queensland. Data from the first four dogs treated with MPL showed that three dogs achieved stable disease with tumour reduction after only two weeks of treatment.

The tumour reduction in these dogs was between 2% - 11%, with tumour progression expected to be seen over this period. Results from up to 10 dogs treated with MPL are due by the end of this year.

The three dogs that responded to treatment had B-cell lymphoma with the non-responder having T-cell lymphoma, which is a more difficult to treat form of the disease according to Hopkins.

Elanco Option Agreement

The MPL compound is owned by Elanco, with composition-of-matter patent protection out to 2024. Elanco has a first right of refusal to option use of the compound for the treatment of canine cancers. If Elanco does not take up the option, then PharmAust would require a license from Elanco to commercialise the drug independently or through another partner for the treatment of canine cancers.

Earlier this month, PharmAust was granted a European patent for the treatment of cancer using MPL and similar derivatives.

In June, PharmAust was granted a European patent for the treatment on non-cancer diseases, such as neurodegenerative diseases and age-related disorders, using MPL and other aminoacetonitrile derivatives.

The reason for patenting this application is that MPL impacts the mTOR biological pathway which is known to play a role in neurodegenerative and age-related diseases. It is probably too early to attribute any value to this application, although developments in this area will be worth monitoring.

In June PharmAust was also granted a patent in Japan around the use of MPL for the treatment of cancer. This same patent was granted in China in May. In the same month an Australian patent was granted around the use of MPL in non-cancer indications.

PharmAust is seeking to move into a strategic partnership with Elanco around the MPL asset. While an agreement will be required for commercialisation in the animal health area before 2024 (Elanco patent expiry), regulatory approval for human use is unlikely before 2024 and as such may not require a license agreement.

Novel MPL Analogues

In 2013 PharmAust started working with Japanese group Nihon Nohyaku to develop novel analogues of MPL. Over 50 novel compounds have been created. Earlier this month PharmAust negotiated full rights to these compounds in return for Nihon to receive a royalty from any product sales.

The compounds will be synthesised by PharmAust's subsidiary, Epichem, which will also optimise any potential drug candidates for preclinical and clinical development. The Epichem business generated revenue of $3.0 million in FY2017 and that is expected to grow to $4 million this year.

The development of any MPL analogues will allow PharmAust to commercialise the technology without restriction from any third parties.

Summary

PharmAust has a number of key milestones it is seeking to meet over the next 12 months. These include:

- Results from NSW and QLD canine study (approx. 10 dogs)
- Reformulation of MPL
- Screening of MPL analogues
- Commencement of human cancer study with reformulated MPL
- Commencement of canine study with reformulated MPL

The appeal in working with a compound such as MPL is that its safety profile has been firmly established. PharmAust has shown cancer treatment activity in dogs and humans both from hitting known cancer biomarkers, and in tumour reduction and stabilisation respectively, although efficacy must be established in comprehensive human studies.

Creation of an improved formulation is the primary objective for the company, with the current formulation proving limiting in compliance and in achieving full clinical benefit.

Pharmaust addressed a key weakness earlier this year with appointment of a CEO, Dr Richard Hopkins and CSO, Dr Richard Mollard. In a similar vein, the company could also benefit from the appointment of more board members with experience in drug development strategy, clinical trials management and experience in pharmaceutical partnering.

PharmAust is capitalised at $8.4 million. The company had $2.6 million cash at June 30 and recorded a loss of $1.3 million for FY2017.

Bioshares recommendation: **Speculative Hold Class B**
(To be reviewed upon satisfactory reformulation of MPL)

Bioshares

How Bioshares Rates Stocks

For the purpose of valuation, Bioshares divides biotech stocks into two categories. The first group are stocks with existing positive cash flows or close to producing positive cash flows. The second group are stocks without near term positive cash flows, history of losses, or at early stages of commercialisation. In this second group, which are essentially speculative propositions, Bioshares grades them according to relative risk within that group, to better reflect the very large spread of risk within those stocks. For both groups, the rating "Take Profits" means that investors may re-weight their holding by selling between 25%-75% of a stock.

Group A

Stocks with existing positive cash flows or close to producing positive cash flows.

Buy	CMP is 20% < Fair Value
Accumulate	CMP is 10% < Fair Value
Hold	Value = CMP
Lighten	CMP is 10% > Fair Value
Sell	CMP is 20% > Fair Value

(CMP–Current Market Price)

Group B

Stocks without near term positive cash flows, history of losses, or at early stages commercialisation.

Speculative Buy – Class A
These stocks will have more than one technology, product or investment in development, with perhaps those same technologies offering multiple opportunities. These features, coupled to the presence of alliances, partnerships and scientific advisory boards, indicate the stock is relative less risky than other biotech stocks.

Speculative Buy – Class B
These stocks may have more than one product or opportunity, and may even be close to market. However, they are likely to be lacking in several key areas. For example, their cash position is weak, or management or board may need strengthening.

Speculative Buy – Class C
These stocks generally have one product in development and lack many external validation features.

Speculative Hold – Class A or B or C
Sell

Corporate Subscribers: Cogstate, Bionomics, Impedimed, LBT Innovations*,Viralytics, Opthea, RHS, Innate Immunotherapeutics, Anatara Life Sciences, ResApp, Pharmaxis, Starpharma, Dimerix, Cyclopharm, Adalta, Immuron, Medibio, Phylogica *LBT was inadvertently deleted from this list from edition 688 onwards