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Companies covered: LBT, VTI, Quarterly Review

	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 - current)	25.2%
Cumulative Gain	822%
Av. Annual gain (14 yrs)	19.2%

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Bioshares

31 March 2017
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Delivering independent investment research to investors on Australian biotech, pharma and healthcare companies

Quarterly Review

Medical Cannabis Stocks Dominate Play in the March Quarter

A modest 2.4% gain for the **Bioshares Index** in the March quarter 2017 was overshadowed by large gains made by the fast-growing medicinal cannabis sub-sector, whose seven members averaged a gain of 186% for the quarter. Six of these medicinal cannabis stocks were amongst the top ten performers, with their respective performances discussed below. Growth has been stimulated by legislative changes enabling the use of medicinal cannabis in Australia, and more recently, the easing of import restrictions (see *Bioshares* 685).

The **Bioshares Large Cap Index** locked in a very strong gain of 19.1% for the quarter, with increases by CSL (+24%), Resmed (+25%), Cochlear (+32%) and Sigma Pharmaceuticals (+22%) offsetting losses by Mayne Pharma (-5%), Blackmores (-36%) and Sirtex Medical (-38%). Mayne Pharma and Sigma Pharmaceuticals have now been added to the Bioshares Large Cap Index.

The aggregate capitalisation of the Bioshares Large Cap Index was \$84 billion at March 31, 2017, and the capitalisation of the 120 ASX-listed life science companies included in the Bioshares Index was \$10.7 billion.

Three companies headed the Bioshares Index, ranked by capitalisation, led by API (\$999 million), Mesoblast (\$976 million) and Nanosonics (\$923 million). Nine companies recorded capitalisations of between \$200 million and \$500 million, 13 companies were capitalised between \$100 million and \$200 million, 21 between \$50-\$100 million, and 74 below \$50 million.

Outperformers

The stock which made the greatest gain (+1,293%) for the March quarter was Stem Cell United, a Singaporean company that has been focused on using stem cell technologies to develop traditional Chinese medicines. The surge in the company's share price followed an announcement on March 14, titled "SCU appoints Nevil Schoenmakers as Strategic Advisor to pursue opportunities in the Medicinal Cannabis market". The company itself

Cont'd over

Index Performance by Quarter (Change from previous Qtr)

	Q1 2016	Q2 2016	Q3 2016	Q4 2016	Q1 2017*
Bioshares Index	3.0%	-2.3%	15.1%	-7.7%	2.4%
Nasdaq Biotech Index	-23.0%	-1.2%	12.4%	-8.4%	10.7%
Bioshares Large Cap Index	-4.7%	9.3%	1.2%	-7.1%	19.1%
ASX 300 Index	-3.9%	3.0%	4.0%	4.0%	3.4%

*MYX and SIP included in Bioshares Large Cap Index from Q1 2017

Bioshares Index – Top 10 Outperformers – Mar. Quarter

Company	Code	Cap. \$m	Change - Quarter	Change - Year	Price 31/03/17
StemCell United	SCU	73	1293%	786%	\$0.195
Auscann Group Holdings	AC8	193	345%		\$0.890
MMJ Phytotech	MMJ	154	248%	212%	\$0.765
Botanix Pharmaceuticals	BOT	28	240%		\$0.068
Creso Pharma	CPH	44	226%		\$0.765
GI Dynamics	GID	38	204%	233%	\$0.070
Allegra Orthopaedics	AMT	28	127%	183%	\$0.340
Zelda Therapeutics	ZLD	59	126%	0%	\$0.088
MGC Pharmaceuticals	MXC	78	79%		\$0.077
Holista Colltech	HCT	28	62%	0%	\$0.160

referred to Schoenmakers being tagged as the “King of Cannabis” by *High Times*, in connection to his role as a pioneering cultivator of cannabis in the Netherlands.

Auscann Group Holdings completed a back-door listing during the quarter. It posted a 345% increase from its offer price of \$0.20. The company raised \$5 million. Auscann’s intends to develop medicines based on full spectrum cannabis plant extracts, undertake research into new medicinal cannabis strains, cultivation and extraction techniques, and to study the clinical efficacy of medicinal cannabis products resulting from its research and development.

The first medicinal cannabis company which listed on the ASX was MMJ Phytotech, which listed in January 2015, later merging with MMJ. Shares in MMJ Phytotech gained 248% over the quarter. This company is positioning itself for the legalising of the recreational cannabis market in Canada, which is expected to occur in mid 2018.

Botanix Pharmaceuticals’ shares increased by 240% over the quarter. Unlike other ASX-listed medicinal cannabis firms, Botanix is the only company developing a product aimed at the US market and aligned to more traditional pharmaceutical product development pathways. It is developing a synthetic version of cannabidiol (CBD), a non-psychoactive extract of cannabis, as treatment for acne and other skin conditions. During the quarter the company bought on board Dr Michael Thurn, an experienced drug developer who was CEO at Mimetica and Spinifex Pharmaceuticals, COO at Cytopia, Head of Drug Development at Xenome and a Senior Toxicologist at the TGA.

Botanix ended the quarter in a trading halt, announcing an intention to raise capital.

Creso Pharma shares rose 226% over the quarter. It took advantage of its strengthening share price to raise \$8 million. Creso is a “full plants extracts” company seeking to develop products for human and veterinary markets.

Similarly, Zelda Pharmaceuticals, which is seeking to develop medicinal cannabis for the treatment of cancer, sleep and skin conditions, exploited share price gains to initiate a \$6 million placement. Likewise, MGC Pharmaceuticals (+79%), which combines Israeli,

Bioshares Index - Top 10 Underperformers – Mar. Quarter

Company	Code	Cap. \$m	Change - Quarter	Change - Year	Price 31/03/17
Phosphagenics	POH	19	-48%	67%	\$0.015
Compumedics	CMP	96	-38%	50%	\$0.540
Cynata Therapeutics	CYP	35	-34%	23%	\$0.480
Jayex Healthcare	JHL	5	-33%	-87%	\$0.030
Innate Immuno.	IIL	173	-30%	325%	\$0.765
Impedimed	IPD	270	-30%	-18%	\$0.720
Genera Biosystems	GBI	19	-30%	-24%	\$0.190
Adherium	ADR	30	-27%	-65%	\$0.175
Simavita	SVA	14	-27%	4%	\$0.055
Airxpanders	AXP	245	-26%	-24%	\$0.860

European and Australian medicinal cannabis product development activities, raised \$10 million during the quarter.

Underperformers

The worst performing stock in the Bioshares Index for the March quarter was Phosphagenics, with its shares falling 48%. This may have been due to the lapse of an exclusivity period attached to the signing of a non-binding term sheet with Terumo to develop, market and sell the TPM/Oxymorphone patch in Japan.

The backdrop to a 38% decrease in Compumedics shares over the quarter was a 7% decline from the previous corresponding period (pcp) in revenues, and an 88% decrease from the pcp in net profit for the half year ending December 31, 2016.

Demand for shares in Cynata Therapeutics (-34%) likely eased following the completion of a \$6 million capital raising. The stock was still 23% above its price from a year ago.

A legal dispute and GBP/AUD exchange rate movements appear to have contributed to the softening of shares in Jayex Healthcare, which fell 33% over the quarter.

Innate Immunotherapeutics lost 30% over the quarter, following high levels of trading driven by scrutiny of the company’s share register by US newspapers, which fell away following the confirmation of Tom Price (an Innate shareholder) as the new Secretary of the US Department of Health & Human Services.

Capital Raisings

Two IPOs (Visioneering Technologies and LifeSpot Health) and the backdoor listing of Auscann Group Holdings accounted for 25% (\$46.3 million) of the \$185 million raised during the March quarter.

Mesoblast raised ~\$53 million and AirXpanders raised \$45 million during the quarter.

Funding rounds expected to be completed next quarter include raisings by Zelda Therapeutics, Botanix Pharmaceuticals, Opthea, Allegra Orthopaedics and Brain Resource.

Bioshares

Capital Raisings by Australian-listed Biotech Companies Q1 2017

Company		Investment Manager or Investor	Type of Raising	Funds Raised (\$M)
Mesoblast	MSB	Bell Potter	Placement	\$53.3
AirXpanders	AXP	Canaccord Genuity	Placement	\$45.0
MGC Pharma	MXC	Merchant Corporate Advisory	Placement	\$10.0
Cynata	CYP	Shaw & Partners, CPS Capital Group	Placement	\$6.0
Creso Pharma	CPH		Placement (T1)	\$5.6
Benitec	BLT	Nant Capital (Nant Ventures)	Placement (T2)	\$5.5
Dorsavi	DVL	Bell Potter	Placement (T2)	\$2.0
Dorsavi	DVL		SPP	\$1.0
Biotech Capital	BTC		Placement	\$1.8
Biotech Capital	BTC		SPP	\$0.6
Rhinomed	RNO	Whitney George	Placement	\$2.1
Dimerix	DXB	Westar Capital	Placement	\$2.0
Innate Immunotherapeutics	ILL	Bell Potter	Placement	\$2.0
Analytica	ALT	Michael Monsour, INOV8 LLC	Placement	\$1.5
Pharmaust	PAA		Rights Issue Shortfall	\$0.5
Visioneering	VTI	Canaccord Genuity	IPO	\$33.3
Auscann Group	AC8	CPS Capital	BDL	\$5.0
Lifespot Health	LSH	Peak Asset Management	IPO	\$8.0

Total raised in Q1 2016

\$185.2

BDL: Back-door listing

Bioshares Model Portfolio (31 March 2017)							Portfolio Changes – 31 March 2017
Company	Code	Price (current)	Price added to portfolio	Recommend- ation	Cap'n (\$M)	Date added	
Clinuvel Pharmaceuticals	CUV	\$6.87	\$4.15	Spec Hold A	\$328	December 2014	IN: VTI has been added [Spec Buy A]
Viralytics	VLA	\$1.200	\$0.300	Spec Buy B	\$288	August 2013	
Impedimed	IPD	\$0.720	\$0.245	Spec Buy A	\$270	December 2013	OUT: No changes
AirXpanders	AXP	\$0.860	\$0.745	Spec Buy A	\$245	September 2015	
Somnomed	SOM	\$3.30	\$0.94	Buy	\$186	January 2011	Corrections In Bioshares 685-689, the recommendation for IIL was incorrectly shown as Spec Hold A [Correct: Spec Buy A]. In Bioshares 688, the recommendation for RNO was incorrectly shown as Spec Hold B[Correct: Spec Buy B]. The corrections are consistent with recom- mendations accompany- ing respective commen- tary.
Bionomics	BNO	\$0.375	\$0.295	Spec Buy A	\$181	March 2016	
Innate Immunotherapeutics	IIL	\$0.765	\$0.190	Spec Buy A	\$173	November 2014	
Opthea	OPT	\$0.810	\$0.160	Spec Buy A	\$123	November 2014	
Cogstate	CGS	\$1.020	\$0.13	Spec Buy A	\$115	November 2007	
Osprey Medical	OSP	\$0.430	\$0.695	Spec Buy B	\$111	September 2015	
Pharmaxis	PXS	\$0.290	\$0.260	Spec Buy B	\$92	December 2016	
Visioneering Technologies	VTI	\$0.435	\$0.435	Spec Buy A	\$86	March 2017	
Dorsavi	DVL	\$0.400	\$0.480	Spec Buy B	\$67	December 2016	
Factor Therapeutics	FTT	\$0.070	\$0.054	Spec Buy B	\$51	September 2016	
GI Dynamics	GID	\$0.070	\$0.024	Spec Buy C	\$38	May 2016	
IDT Australia	IDT	\$0.140	\$0.260	Spec Buy B	\$35	August 2013	
Adherium	ADR	\$0.175	\$0.495	Spec Buy A	\$30	March 2016	
Rhinomed	RNO	\$0.018	\$0.032	Spec Buy B	\$17	December 2015	

Selected Clinical Trial Developments - Q1 2017

Company	Code	Product/Therapeutic	Event
Avita Medical	AVH	ReCell (autologous cell harvesting device) (treatment of burns)	Announced last patient visit for US pivotal trial; 30 pts, 27 pts completed 52 w weeks follow up
BARD1 Life Sciences	BD1	Ovarian Cancer test (ELISA-based, 12 peptide panel) (refer WO2012038932)	Completed 348 sample ovarian cancer diagnostic test trial, achieving specificity of 87% and sensitivity of 90%
Biotron	BIT	BIT225 (HIV-1 therapy)	Commenced Phase II trial in combination w ith cART; 9 pts 100mg/day, 27 pts 200 mg day
GI Dynamics	GID	Endobarrier (implantable, removable gastrointestinal sleeve) (diabetes and obesity)	Completed enrolment in trial w ith 20 adolescents; at 12 months, show ed a 10% reduction in BMI, 6% reduction in HbA1cm and a 49% reduction in HOMA-IR, a measure of insulin resistance and beta-cell function
Immuron	IMC	IMC-124E (NASH) (oral anti-LPS polyclonal antibody)	Completed recruitment in Phase II trial; 120 pts randomised(w ith additional 12 in screening allow ed to proceed to randomisation)
Immuron	IMC	IMC-124E (Pediatric Fatty Liver disease) (oral anti-LPS polyclonal antibody)	Enrolled first pt in 30 pt trial
MMJ Phytotech	MMJ	PTL101 (Gelpell-CBD capsules) (epilepsy)	Initiated Phase II trial; adjunctive therapy in refractory epileptic children
Neuren Pharmaceuticals	NEU	trofinetide (NNZ-2566) (Rett syndrome)	Reported achieving statistically significant results for highest dose (200mg) for three of five endpoints based on caregiver and clinician assessments; trial period ave 11 w weeks
Neurotech International	NTI	Mente Autism (neurofeedback device)	Closed recruitment in 64 pt trial
Oncosil	OSL	Oncosil (pancreatic cancer)	Recruited first pt in 20 pt trial required for supplemental data for CE Mark; trial is a componet of global pivotal trial
Paradigm Biopharmaceuticals	PAR	Pentosan Polysulphate Sodium (PPS) (allergic rhinitis (hay fever))	Completed treatment of last pt in 80 pt, Phase IIa, doubleblind, placebo controlled, cross over alleggen challenge study
Prima Biomed	PRR	IMP321 (modulates LAG3) (unresectable or met. melanoma)	Recruited second cohort (6mg dose) of 6 pts in combination trial of IMP321 w ith Keytruda
Pharmaxis	PXS	Bronchitol (cystic fibrosis)	Completed treatment of last pt in 423 pt trial. A 26 w week randomised, double blind pallel group study
Starpharma	SPL	VivaGel (SPL7013) (prevention of recurrence of bacterial vaginosis)	Completed recruitment for tw o Phase III trials(620 pts in each); 16 w eek treatment period;

LBT Innovations – APAS Independence Unveiled

LBT Innovations (LBT: \$0.325) this week unveiled its second pathology automation instrument, called APAS Independence.

The working product will be showcased at a major clinical microbiology conference next month, ahead of a market launch towards the end of 2017.

APAS Independence delivers efficiencies in the culture plate analysis used by pathology businesses and hospitals to detect bacterial infections in patient samples.

The new LBT product can process 240 culture plates in one hour. It automates three of the 15 steps in culture plate processing. The company's first instrument, called Microstreak, automates another one of those steps, that being the automated streaking of the patient sample on an agar culture plate.

The APAS Independence will sell for around US\$300,000 said CEO Brent Barnes. The instrument has been developed under a joint venture with engineering group Hettich AG in Germany, with the JV called Clever Culture Systems.

The first device has been manufactured by engineering and design group Planet Innovation in Melbourne, which will continue to make the early products until manufacture is transferred to Hettich.

LBT will be responsible for building and updating the software and will be paid for that service. The profits from the JV will be shared equally. Currently, former LBT CEO Lusie Guthrie is chair of the JV and the general manager is Peter Bradley from LBT.

The JV will sell the instrument through distributors throughout the world in all regions except for Australia where the system will be sold direct. Australia will serve as an early testing market, where product release and early use can be closely monitored and supported.

Pre-launch Marketing

The APAS Independence will be exhibited at the industrial microbiology event ECCMID next month in Vienna, which last year had over 12,000 delegates from 120 countries.

The APAS Independence will be the first automated culture plate analysis system on the market, and is likely to be around two years ahead of any competitors.

The instrument will also be marketed at the ASM Microbe meeting in New Orleans in June, which also has around 12,000 delegates attend.

Accuracy Requirements

At the showcase this week, senior microbiology scientist at St Vincent's Hospital in Melbourne, Lisa Brenton, discussed the need for automation in microbiology in the pathology industry.

Brenton's team not only handles the diagnostic pathology work at St Vincent's, but also for the Eye and Ear Hospital in Melbourne,

for specialists and GPs, as well clinical trials groups such as Nucleus Network.

Brenton said that the market is demanding more and more from pathology groups due to an aging population living longer with chronic diseases and the emergence of antibiotic drug resistance.

Her pathology group is expected to be profitable, but also be able to increase its workload with less staff, in less time, maintain a high quality and reduce costs. Brenton said that bacteriology is not an area that has been well automated.

Brenton said that pathology groups would assess the accuracy of each instrument before converting from a manual process. Pathology groups are risk averse and St Vincent's would initially run the existing manual process in parallel with a new automated system such as the APAS Independence.

98% Sensitivity

In a US trial on 5,500 urine samples, the APAS Independence achieved over 98% sensitivity in detecting disease causing bacteria compared to around 96% sensitivity from manual processes by microbiologists.

Around half of pathology samples are to test for urine infections yet around 70% of these results are negative.

The APAS system allows negative result plates to be dismissed after capturing an image of each plate. Plates that record either a positive result or that require further investigation are grouped into five distinct columns.

In the company's FDA submission, it included results from over 10,000 samples where sensitivity of over 98% was recorded.

Another advantage with the APAS Independence system is that microscopy testing conducted 24 hours earlier with samples can be incorporated into the automated image reading system rather than the microbiologist manually referencing microscopy results for ambiguous samples, such as in patients that have been on antibiotic treatment.

Brenton concluded that by increasing automation in microbiology, it will free scientists to conduct more complex pathology work, absorb additional work, improve turnaround times, and improve sensitivity and sensitivity with patient sample testing.

LBT Innovations is capitalised at \$45 million. The company had \$5.3 million in cash at the end of December with an additional \$3.5 million raised in January (the second tranche associated with the \$7 million placement initiated in December).

Bioshares recommendation: **Speculative Buy Class A**

Bioshares

Visioneering Lists on ASX

Visioneering Technologies (VTI: \$0.435) listed on the ASX last week raising US\$25 million. (See IPO Profile in *Bioshares* 689).

Visioneering is based in Georgia, USA. The listing was coordinated by Canaccord Genuity, which has had built a successful track record of listing US companies on the local exchange.

Two Core Features

Visioneering Technologies' contact lenses utilise two key technologies or features. The first, and arguably the most important, is taken from pinhole camera technology.

Reading glasses or contact lenses for seeing short distances, use a lens to bend the light. In adults, this is generally because the cornea and crystalline lens stiffen as people age and can no longer bend the light sufficiently. This results in the focus point being *behind* the retina (our italics). So glasses or contact lenses are used to help bend the light more and bring the focus point back to the retina.

But what the Visioneering technology does is that for reading lenses, it uses a small clear aperture in the centre of the lens. That collects only light that passes through the centre of the cornea.

So there is no bending of light; peripheral light rays are purposefully obscured with a high blur peripheral lens. (This can be easily tried by readers; even a 90 year old can read without glasses if he or she is looking only through a pinhole, thereby blocking out out-of-focus peripheral light.)

For correcting vision for distant images, an almost standard lens is added. So rather than using a lens for close vision and a separate lens for distant images, the pin hole feature is used for reading, and an optical lens is used for distance. This dramatically reduces the difficulty in calibrating multifocal lenses for short and distant viewing, which is currently problematic, time consuming, and often results in compromises in vision and with users required to supplement current multifocal lenses with reading glasses.

The second added feature of Visioneering's lenses relates to the lens for distant images (and is possibly a byproduct of the first feature). For people who are short-sighted, the images are focused in *front* of the eye (due to having an elongated eyeball). Glasses or contact lenses are used to reduce the angle of the light to extend the focus further back to the retina. The problem with this approach, mainly in children, is that some of the peripheral light is focused behind the retina. This tells the brain that the eye is too short and should continue to grow, which exacerbates the original condition of short sightedness.

Visioneering's lenses continuously change from the centre of the lens, so that peripheral incoming light is purposefully blurred, whilst achieving focus for the central light waves. The brain then filters out the peripheral blur.

It is believed this feature will prevent progression of myopia (inability to see distant images clearly) that occurs through the above

process which is called peripheral hyperopia.

Myopia progression in children is a serious medical issue. Once children are diagnosed with myopia, their vision continues to deteriorate until the ages of 18 - 25. However this myopia progression is directly linked to a 4 - 16 fold increase in retinal detachment and a 2 - 5 fold increase in the probability of cataract and a fourfold increase in glaucoma later in life. The potential to hinder this progression of disease with the Visioneering contact lenses is another very appealing feature of this technology and of the company.

Discussion

Visioneering has been operating on a relative shoestring budget in recent years. Over the last three years it has spent only US\$10 million. The capital raise conducted will allow the company to more aggressively pursue its business. The company currently has five sales staff and this is expected to expand to 45 staff over the next 12 months.

Visioneering will sell its products directly in the US to optometrists, of which there are around 45,000, and via distributors outside of the US. The company's head of sales is Tony Sommer. Sommer was previously head of sales for Bausch & Lomb's US Vision Care business, which is one of the company's four main competitors.

The other three majors in this market are Vistakon (Johnson & Johnson), Cooper Vision, and CIBA Vision (Novartis). These companies dominate 95% of the global market. This intense market domination by these majors is a key risk for Visioneering.

On the plus side for Visioneering is that this is a market that does not rely on reimbursement, which reduces one of the market barriers. It is a very large market valued at more than US\$5.4 billion in the US alone.

Visioneering has developed products that deliver clear benefits to the market, particularly around multifocal contact lenses. And the company has been able to generate positive customer reviews for its products; in a pre-market evaluation of its product the NaturalVue MF, patients preferred this multifocal lens over existing multifocals on the market on a four to one basis.

Visioneering is capitalised at \$86 million. On a pro forma basis, the company had \$38 million at the end of last year (including funds raised in the IPO).

The stock has been added to the Bioshares Model Portfolio

Bioshares recommendation: **Speculative Buy Class A**

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Correction

In our of IPO feature of VTI in *Bioshares* 689, the name of the company's CEO was incorrect. His correct name is Dr Stephen Snowdy.

The ASX-Listed Life Sciences Sector

March 31, 2017: Capitalisation \$95.2 billion, 128 companies

Bioshares Large Cap. Index

Company	Code	Cap. \$m	Principal Activities	Change - Quarter	Change - Year	Price 31/03/17
CSL	CSL	56,989	Manufactures pharmaceutical products including vaccines and human plasma fractions	25%	24%	\$125.33
Resmed Inc.	RMD	13,156	Manufactures diagnostic and treatment equipment for sleeping disordered breathing	8%	25%	\$9.29
Cochlear	COH	7,766	Manufactures cochlear hearing implants	10%	32%	\$135.23
Mayne Pharma Group	MYX	2,145	Manufactures, develops and markets generic drugs, with operations in Australia and the USA	6%	-5%	\$1.425
Blackmores	BKL	1,939	Manufactures vitamin, mineral and herbal supplements and skin & hair products in Australia and N.Z.	9%	-36%	\$112.540
Sigma Pharmaceuticals	SIP	1,387	Pharmaceutical manufacturing and wholesaling	0%	22%	\$1.29
Sirtex Medical	SRX	1,033	The company's core technology uses radioactive particles to irradiate tumours in the liver. Approved for use in most major regions.	26%	-38%	\$17.900

Capitalisation Total 84,414

Bioshares Index

Company	Code	Cap. \$m	Principal Activities	Change - Quarter	Change - Year	Price 31/03/17
API	API	999	Pharmaceutical wholesaler	-1%	4%	\$2.040
Mesoblast	MSB	976	Developing cellular medicines based on its proprietary mesenchymal lineage adult stem cells for high, unmet medical needs including advanced heart failure, chronic low back pain, acute graft versus host disease and inflammatory conditions such as biologic refractory rheumatoid arthritis.	59%	-11%	\$2.280
Nanosonics	NAN	923	Developing a novel disinfection technology, the first product is a point of care ultrasound probe disinfection unit, branded Trophon EPR	0%	55%	\$3.100
Reva Medical	RVA	407	Developing the Fantom scaffold, its third version of a bioresorbable coronary stent	-13%	-14%	\$0.950
Clinuvel Pharmaceuticals	CUV	328	Developing an analogue of the alpha-MSH protein, named Scenesse, as a photo-protective agent. Approved in Europe.	-8%	64%	\$6.870
Medical Developments	MVP	297	Commercialising the Pentrox inhaler for temporary pain relief. Used widely in ambulances across Australia.	14%	-4%	\$5.050
Viralytics	VLA	288	Developing a cancer treatment based on the application of viruses (oncolytic virus technology)	1%	85%	\$1.200
Impedimed	IPD	270	Markets products that aid the diagnosis of secondary lymphoedema, muscle wasting and other disorders	-30%	-18%	\$0.720
Starpharma Holdings	SPL	247	Developer of pharmaceutical and agricultural applications of chemical scaffolds known as 'dendrimers'	-8%	-1%	\$0.670
Airxpanders	AXP	245	Design, manufacture and distributor of the Aeroform, a patient controlled tissue expander, for use in breast reconstruction after mastectomy	-26%	-24%	\$0.860

Bioshares Index

Company	Code	Cap. \$m	Principal Activities	Change - Quarter	Change - Year	Price 31/03/17
AFT Pharmaceuticals	AFP	236	Development and sales of pharmaceuticals in Australasia and Rest-of-World	-18%	-2%	\$2.440
ResApp Health	RAP	221	Developing digital healthcare solutions to diagnose and manage respiratory conditions	1%	48%	\$0.370
Auscann Group Holdings	AC8	193	Developing medical cannabis products for the Australian market	345%		\$0.890
Somnomed	SOM	186	Markets oral devices for the treatment of sleep apnea and snoring.	-15%	29%	\$3.300
Bionomics	BNO	181	Developing drugs to treat cancer and CNS diseases, and has also developed a gene diagnostic for epilepsy.	14%	17%	\$0.375
Innate Immuno-therapeutics	IIL	173	Developing MIS416 to treat secondary progressive multiple sclerosis	-30%	325%	\$0.765
Medlab Clinical	MDC	166	Development, production and marketing of nutraceuticals. Also developing cannabis product to treat cancer patients with intractable pain.	9%	323%	\$0.930
MMJ Phytotech	MMJ	154	Developing medical cannabis products	248%	212%	\$0.765
Polynovo	PNV	151	Developing novel polymer-based products for treating wounds and burns	-7%	-4%	\$0.270
Ellex Medical Lasers	ELX	133	Develops, manufactures and markets solid state ophthalmic lasers used to treat secondary cataracts and retinal disorders.	-21%	41%	\$1.100
Neuren Pharmaceuticals	NEU	125	Developing neuroprotective therapeutics	25%	-36%	\$0.070
Opthea	OPT	123	Developing OPT-302 to treat wet AMD (an eye disease)	-4%	91%	\$0.810
OBJ	OBJ	121	Developing transdermal drug delivery technologies	-1%	-17%	\$0.068
Cogstate	CGS	115	Markets cognitive performance diagnostic products	-16%	70%	\$1.020
Osprey Medical	OSP	111	Markets DYEVERT, a device which reduces the amount of dye needed in imaging procedures	-7%	46%	\$0.430
Compumedics	CMP	96	Develops, manufactures and markets sleep diagnostic and monitoring equipment.	-38%	50%	\$0.540
Pharmaxis	PXS	92	Markets the lung function test, Aridol. Bronchitol is approved in Europe for the management of cystic fibrosis. Developing a suite of compounds from amine oxidase platform.	4%	7%	\$0.290
Visioneering Technologies	VTI	86	Markets a next-generation contact lens	4%	0%	\$0.435
pSiVida	PVA	86	Developing drug delivery technologies, with a special focus on ophthalmic applications	-3%	-30%	\$2.500
Admedus	AHZ	85	Diversified medical products group. Markets Cardiocel, a bio-scaffold and is also developing a HSV-2 vaccine.	-7%	-32%	\$0.335
Clovercorp	CLV	83	Development and production of omega-3 food additives from tuna oil	-4%	15%	\$0.500
MGC Pharmaceuticals	MXC	78	A medical and cosmetic cannabis company with growing operations in Slovenia. Acquired Czech company Panax Pharma.	79%		\$0.077
Living Cell Technologies	LCT	74	Developing cell therapies for diabetes, Parkinson's disease and Huntington's disease	46%	141%	\$0.130

Bioshares Index

Company	Code	Cap. \$m	Principal Activities	Change - Quarter	Change - Year	Price 31/03/17
StemCell United	SCU	73	Applies a proprietary stem cell technology to culture and grow plant extracts for use in Traditional Chinese Medicine	1293%	786%	\$0.195
Universal Biosensors	UBI	72	Development, manufacture and commercialisation of a range of in vitro diagnostic tests for point-of-care use	32%	12%	\$0.410
SDI	SDI	71	Manufacture & distribution of amalgam (fillings) & other dental materials and product R&D	-18%	24%	\$0.600
Dorsavi	DVL	67	Commercialising a wireless sensor movement monitoring system and products for use in the Elite Sports, OH&S and medical/physiotherapy markets	-26%	0%	\$0.400
Prima Biomed	PRR	64	Development of cancer immuno-therapy company, based on targeting LAG-3.	-14%	-24%	\$0.031
Avita Medical	AVH	62	Markets ReCell, a skin repair product	-18%	-7%	\$0.098
Phylogica	PYC	62	Developing peptide compound libraries for use in human therapeutics	24%	121%	\$0.031
Vita Life Sciences	VSC	62	Development, manufacture and distribution of prescription and OTC medicines as well as complementary and alternative medicines, dietary supplements and health foods	-15%	-38%	\$1.105
Anatara Life Sciences	ANR	59	Developing a natural antibiotic for the animal production industries	14%	-12%	\$1.200
Zelda Therapeutics	ZLD	59	A medical cannabis company researching treatments for cancer, dermatological indications and for sleep disorders	126%	0%	\$0.088
Micro-X	MX1	58	Development of a mobile medical x-ray imager for hospitals, a version for deployed military use and a mobile security back	1%	0%	\$0.490
Medibio	MEB	54	Commercialising a test for depression and anxiety	-6%	60%	\$0.360
Factor Therapeutics	FTT	51	Developing VF-001, for the treatment of venous leg ulcers and potentially to treat ocular conditions	3%	84%	\$0.070
Acrux	ACR	48	Developer of the transdermal drug products Axiron, Evamist/Ellavie and Recuvyra	-6%	-52%	\$0.290
Paradigm Biopharm.	PAR	48	Development of existing approved drug, pentosan polysulphate sodium to treat bone marrow oedema and allergic rhinitis	22%	58%	\$0.475
Cyclopharm	CYC	48	A nuclear medicine company that markets the Technegas lung imaging system	-11%	50%	\$0.810
LBT Innovations	LBT	45	Developer of innovative products which deliver productivity benefits across a range of life science settings	-7%	141%	\$0.325
ITL	ITD	45	Develops and distributes medical devices such as safety equipment to prevent needle stick injuries and sterile preparation kits.	38%	129%	\$0.470
Genetic Signatures	GSS	45	Development and sale of molecular diagnostics(MDx) kits and products	-4%	-22%	\$0.430
Oventus	OVN	45	Developing an oral appliance to treat sleep apnea and snoring	-6%		\$0.620

Bioshares Index

Company	Code	Cap. \$m	Principal Activities	Change - Quarter	Change - Year	Price 31/03/17
Alcidion	ALC	45	Markets a health informatics platform, which incorporates an intelligent EMR, clinical decision support engine, data Integration capability, smartforms, terminology support and standards based web services	-15%	45%	\$0.074
Oncosil Medical	OSL	45	Developing Oncosil, a brachytherapy for pancreatic cancer and liver cancer	10%	-44%	\$0.095
Volpara	VHT	44	Markets breast density assessment tools and analytics, for use with breast X-ray screening programs	-6%		\$0.470
Creso Pharma	CPH	44	A developer of medical cannabis therapies. Headquartered in Zug, Switzerland. Acquired Hemp Industries, which grows hemp in Slovakia.	226%		\$0.765
Immuron	IMC	44	Sales and development of hyper-immune bovine colostrum products for therapeutic use	57%	6%	\$0.425
Orthocell	OCC	40	Developing and marketing regenerative medicine products	4%	8%	\$0.395
Unilife Corporation	UNS	39	Developer of retractable syringes.	-24%	-72%	\$0.038
Actinogen Medical	ACW	38	Developing Xanamem for the treatment of dementia in Alzheimer's disease patients	-13%	-14%	\$0.063
Noxopharm	NOX	38	Developing a cancer treatment, NOX66, a formulation of idronoxil, which targets NADH oxidase 2.	6%		\$0.445
GI Dynamics	GID	38	Commercialising the Endobarrier, an implantable polymer liner for the management of obesity and diabetes	204%	233%	\$0.070
Prana Biotechnology	PBT	37	Developing drugs to treat CNS diseases such as Alzheimer's and Parkinson's	54%	11%	\$0.071
Anteo Diagnostics	ADO	37	Developer of a biological coatings technology that can be applied to immunoassays, bio-separations, drug delivery and other medical devices. Has acquired Belgian company, DIAsource Immunoassays.	-20%	-37%	\$0.033
TBG Diagnostics	TDL	37	Formerly Progen Pharmaceuticals (PGL). Now focused on development of HLA SSA and SBT diagnostic kits and related services. To acquire 51% of RBC Biosciences.	-6%	-23%	\$0.170
Mach 7	M7T	36	Sale of enterprise imaging management platform, and 3D medical specific printing and holographic projection solutions. Completed share consolidation, 10:1	-24%	-52%	\$0.290
Vectus Biosystems	VBS	36	Developing an anti-fibrotic compound, VB0004, with applications in heart and kidney disease	7%	24%	\$1.550
Asian American Medical Group	AJJ	36	Manages liver treatment centres in Asia; expanding into radiation oncology	0%	9%	\$0.120
Cellmid	CDY	36	Developing therapies that target the midkine protein. Recently launched a range of hair loss products through Advangen subsidiary.	42%	118%	\$0.037
Cynata Therapeutics	CYP	35	Stell cell technology company aiming to produce unlimited uniform, pharmaceutical grade MSCs from a single donor.	-34%	23%	\$0.480
Benitec Biopharma	BLT	35	R&D company focusing on gene silencing, specifically DNA delivered RNAi technology	55%	48%	\$0.170
IDT Australia	IDT	35	Manufacturer of pharmaceutical ingredients to international standards for major pharmaceutical groups.	-22%	-56%	\$0.140

Bioshares Index

Company	Code	Cap. \$m	Principal Activities	Change - Quarter	Change - Year	Price 31/03/17
Imugene	IMU	35	Developing a Her2 positive cancer vaccine technology	-16%	60%	\$0.016
Novogen	NRT	32	Developing 'super' benzopyrans for the treatment of cancer	-20%	-48%	\$0.067
Regeneus	RGS	31	Commercialisation of autologous adipose derived stem cells and factors. Markets HiQCell for human use and CryoShot for veterinary use.	-9%	-9%	\$0.150
Medadvisor	MDR	31	Medication adherence software platform company	-6%	6%	\$0.033
Adherium	ADR	30	Commercialising the Smartinhaler range of devices that attach to prescription third-party inhalers, which improve compliance and efficacy	-27%	-65%	\$0.175
Holista Colltech	HCT	28	Extracts collagen from sheepskins and markets natural healthcare products.	62%	0%	\$0.160
Allegra Orthopedics	AMT	28	A developer and manufacturer of prosthetic implants and medical devices.	127%	183%	\$0.340
Botanix Pharmaceuticals	BOT	28	Developing BTX1503 for the treatment of acne. BT1503 combines synthetic cannabidiol with a transdermal drug delivery system, Permetrex.	240%		\$0.068
Neurotech International	NTI	26	Development and sales of Mente (and platform), a treatment for improving behaviours of people with autism and other neurological conditions	-22%		\$0.300
Optiscan Imaging	OIL	26	Manufactures confocal microscopes for clinical diagnosis	17%	250%	\$0.070
Genetic Technologies	GTG	24	Markets Brevagen, a breast cancer risk prediction tool. Plans to divest its genetics business to Primary Health Care.	-9%	-47%	\$0.010
SUDA	SUD	24	Developing the anti-malarial product ArTiMist. Acquired drug delivery technology and suite of products in development from Novodel	5%	-16%	\$0.021
Probiotec	PBP	23	Manufacturer, marketer and distributor of a range of over the counter (OTC) pharmaceuticals, complementary medicines and speciality ingredients	-10%	-6%	\$0.450
Lifespot Health	LSH	22	Acquired Lifespot AG, which has been developing a system for the diagnosis and evaluation of skin diseases, and BodyTel AG, which has been developing a system for the management, diagnosis and evaluation of chronic disease	50%		\$0.300
USCOM	UCM	22	Marketing the Uscom non-invasive heart output function monitor, BP+ non-invasive central blood pressure product and digital ultrasonic spirometry products	-18%	-5%	\$0.200
Prescient Therapeutics	PTX	21	Developing compounds to treat various cancers	16%	16%	\$0.100
BARD1 Life Sciences	BD1	20	Developing cancer diagnostics and therapies. Lead program is the BARD1 lung cancer test. Acquired Swiss company BARD1AG.	9%		\$0.037
Genera Biosystems	GBI	19	Develops, manufactures and distributes advanced molecular diagnostic tests, with a particular focus on women's health.	-30%	-24%	\$0.190
Phosphagenics	POH	19	Commercialising a platform technology (alpha-tocopherol) , for human and animal applications.	-48%	67%	\$0.015
Respiri	RSH	18	Respiratory and pulmonary devices company. Markets Airsonea, an ehealth product.	0%	27%	\$0.042

Bioshares Index

Company	Code	Cap. \$m	Principal Activities	Change - Quarter	Change - Year	Price 31/03/17
Adalta	1AD	18	Developing a protein drug, AD-114 for the treatment of idiopathic pulmonary fibrosis (IPF) and other human fibrotic diseases	35%		\$0.230
Recce	RCE	17	Development of an antibiotic ("RECCE") as a cancer treatment	36%	-13%	\$0.225
Rhinomed	RNO	17	Developing nasal technologies with applications for sport performance, sleep and drug delivery, Capital reconstruction 10:1 to occur.	-5%	-25%	\$0.018
Scigen	SIE	15	Developer and manufacturer of biopharmaceuticals. Company is based in Singapore and was spun out of Sonic Healthcare in 2002.	59%	440%	\$0.027
Analytica	ALT	14.6	A medical devices company developing the Pericoach product to aid in the management of female urinary incontinence	20%	100%	\$0.006
Simavita	SVA	14	Commercialising an instrumented incontinence assessment device	-27%	4%	\$0.055
Brain Resource Corp	BRC	13	Development and commercialisation of functional brain analysis techniques	-10%	-36%	\$0.090
Atcor Medical	ACG	13	Markets the SphygmoCor device, a noninvasive technology that provides information regarding the functioning of the cardiovascular system	-19%	-67%	\$0.057
Proteomics International	PIQ	12	Provider of protein chemistry analytical services. Seeking to commercialise a diabetic kidney disease diagnostic.	-20%	-17%	\$0.200
Biotron	BIT	12	Developing compounds to treat HCV and HIV	-5%	-46%	\$0.037
Race Oncology	RAC	12	Completing the development of a chemotherapy drug, called Bisantrene, which was the subject of more than 40 phase II clinical studies during the 1980s and 1990s.	16%		\$0.220
Dimerix	DXB	11	Developing a combination therapy, DMX200, to treat chronic kidney disease.	-25%	-14%	\$0.006
Resonance Health	RHT	9	Marketing the FerriScan technology, a non-invasive tool for measuring liver iron levels	-12%	28%	\$0.023
Cryosite	CTE	9	Provides specialised storage services, especially for umbilical cord blood	-5%	6%	\$0.190
Bluechiip	BCT	9	Development, manufacture and commercialisation of a tracking system for biological samples	-3%	28%	\$0.032
Invitrocue	IVQ	8	Singapore-based analytical services company (life sciences). Listed through BUN.	-9%	21%	\$0.085
Novita Healthcare	NHL	8	Formerly Avexa. Acquired Tali Health, a company focused on the diagnosis and treatment of children with intellectual disabilities (ex Monash Uni).	37%	-94%	\$0.037
Medical Australia	MLA	8	Manufacture and supply of medical devices and equipment.	20%	0%	\$0.055
PharmAust	PAA	7	Manages Epichem, a drug discovery business. Also developing a veterinary anti-parasitic compound (PPL-1) as a human and animal cancer therapy.	-14%	-58%	\$0.050

Bioshares Index

Company	Code	Cap. \$m	Principal Activities	Change - Quarter	Change - Year	Price 31/03/17
Antisense Therapeutics	ANP	6	Developing antisense compounds to treat multiple sclerosis and acromegaly	6%	-5%	\$0.038
Reproductive Health Sc.	RHS	6	Markets the pre-implantation IVF screening kit, EmbryoCollect	-23%	-17%	\$0.075
Patrys	PAB	5	Currently evaluating strategic collaborations and other complementary assets. Recently incensed two nucleus-penetrating antibodies, Deoxymabs 3E10 and 5C6	17%	-13%	\$0.007
Jayex Healthcare	JHL	5	Commercialisation of the Enlighten patient workflow platform	-33%	-87%	\$0.030
Bioxyne	BXN	4.3	Sale and distribution of probiotics	17%	0%	\$0.021
Invion	IVX	4	Evaluating Xtoll biologic for lupus and developing the drugs Nadalol and Zafirlukast for respiratory conditions	50%	-57%	\$0.003
Medigard	MGZ	3	Developed retractable syringe technology and other safety medical products.	43%	-21%	\$0.030
Memphasys	MEM	1	Developing a sperm separation technology, SpermSep. Formerly NuSep.	0%	-62%	\$0.005

Capitalisation Total 10,761

Listed Biotech Investment Funds or Companies

Company	Code	Cap. \$m	Principal Activities	Change - Quarter	Change - Year	Price 31/03/17
Biotech Capital	BTC	16	Actively seeking new investment opportunities in the life sciences sector.	9%	11%	\$0.125

Capitalisation Total 16

Capitalisation Total - All Indices 95,191

Note: BARD1 Life Sciences (BD1) has been added to the Bioshares Index. The company completed a back-door listing through Eurogold (EUG) in 2016, re-listing in June after raising \$3 million.

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, Viralytics, Opthea, Reproductive Health Science, Innate Immunotherapeutics, Anantara Life Sciences, ResApp, Pharmaxis, Starpharma, Antisense Therapeutics, Dimerix, Cyclopharm, Adalta, Immuron, Medibio, Phylogica

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