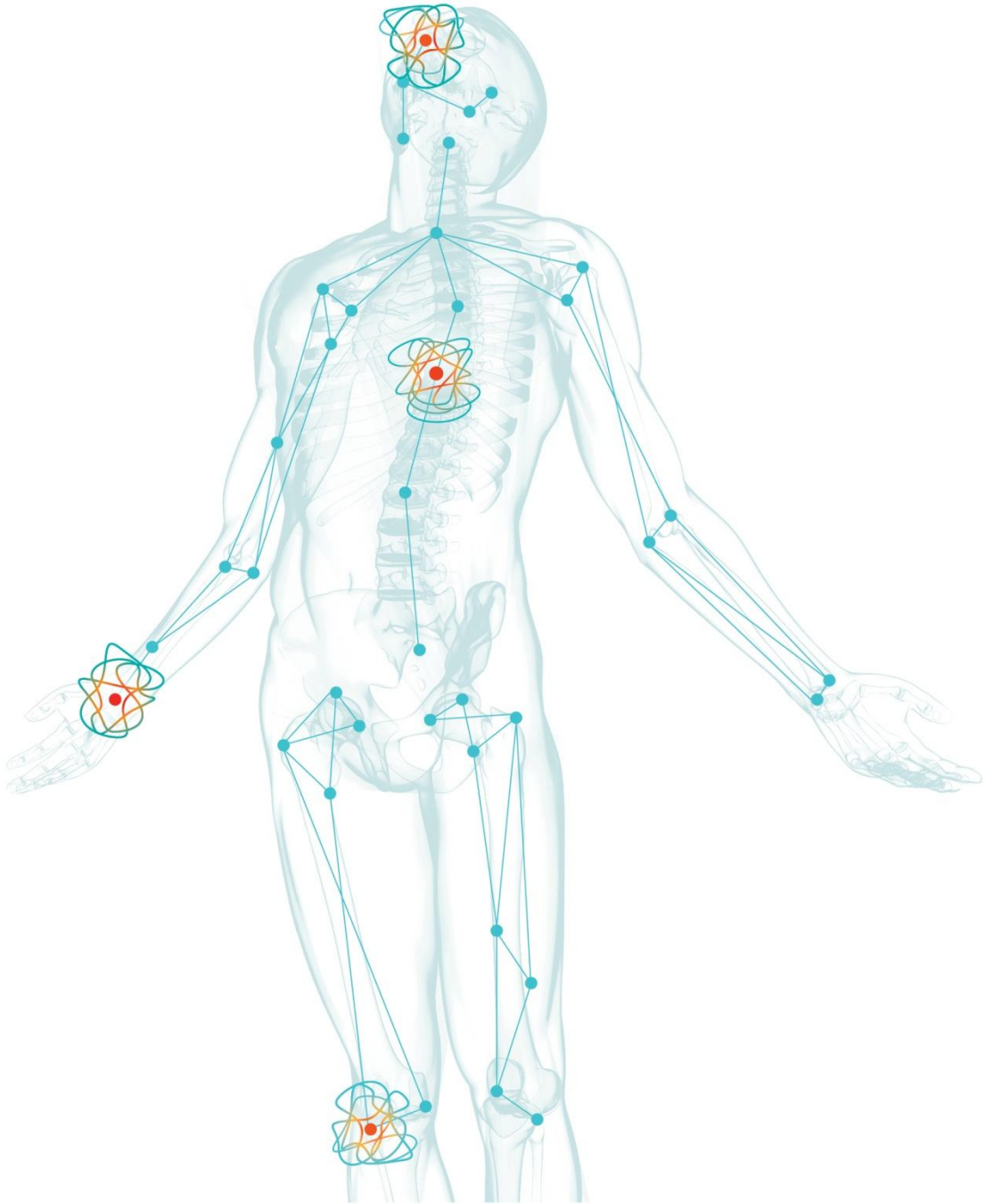
paradigm
BIOPHARMA

Investor Presentation

Paul Rennie, CEO & MD

April 2018



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Corporate Overview

- **Paradigm Biopharmaceuticals Ltd** is an ASX-listed biotechnology company focused on repurposing pentosan polysulfate sodium (PPS), an **FDA-approved drug** that has a **long track record** of safely treating inflammation
- Paradigm is repurposing PPS for a number of applications with a focus on treatment of **orthopaedic and viral arthritic** indications
- Drug repurposing uses the 505(b)(2) pathway - **lower cost, minimises risk** and has accelerated development timelines
- **Several clinical indications** such as Osteoarthritis/Bone Marrow Edema Lesions, Ross River virus and Chikungunya, giving us **"multiple shots on goal"**
- Strategy is to **establish commercial partnerships** with multiple leading pharmaceutical companies

Financial information

Share price (13-April-18)	A$0.33
Number of shares	120.6m
Market capitalisation	**A$39.8m**
Cash (31-Dec-17) – no debt	~A$6.0m
Enterprise value	**A$33.8m**

Top shareholders[1,2]	Shares (m)	%
Paul Rennie (Managing Director)	21.6	17.9%
MJGD Nominees *(technology vendor)*	6.9	5.7%
Other Board and management	7.1	5.9%
Irwin Biotech *(technology vendor)*	6.3	5.2%

Note: 1. Blue shading represents Board and management holdings 2. MJGD Nominees and Irwin Biotech are select vendors of Xosoma, which was acquired by Paradigm prior to listing

Investment Proposition

- **Reduce clinical costs and accelerate commercialisation** by repurposing a pre-approved drug - **505(b)(2)**
- **Very large addressable markets (combined US$37bn+)** - Pentosan Polysulfate Sodium (PPS) is a new, multi-acting treatment for osteoarthritis (associated with bone lesions/bruising), viral arthritis, heart failure and respiratory conditions
- **Several clinical indications:** reduces clinical development risk and gives Paradigm **"multiple shots on goal"**
- **Highly credentialed board and management team** with top tier experience at CSL Limited (CSL.ASX) and Mesoblast Limited (MSB.ASX)
- **Fast-track time to market** through multi-faceted IP strategy and ability to leverage relationships
- **Strong focus on prudent cash management** to enhance shareholder returns
- **Several major clinical trial and development catalysts** expected over the next 12 months
- **High impact partnering opportunities** – Osteoarthritis and viral arthritis have large unmet clinical need for safe treatments

Board and Management

High quality Board and management, with top-tier pharmaceutical experience

- Board and management are renowned leaders in the biopharmaceutical industry, having held senior management positions with top ASX-listed companies, CSL (CSL.ASX) and Mesoblast (MSB.ASX)
- Extensive experience bringing biopharmaceutical products from clinical development to commercialisation
- Small and highly specialised team focused on product development utilising outsourcing effectively

Board and management

Graeme Kaufman – Non-executive Chairman
- Broad experience in development and commercialisation of pharmaceutical drugs, previously CFO at CSL, executive VP of Mesoblast and Chairman of Bionomics (BNO)

Paul Rennie – Managing Director
- Extensive experience in drug development and commercialisation, previously COO & Executive VP, New Product Development of Mesoblast

John Gaffney – Non-executive Director
- 30+ years experience as a lawyer, previously Director of Patrys (PAB.ASX)

Christopher Fullerton – Non-executive Director
- Chartered Accounting and investment banking expertise, previously Non-executive Chairman of Bionomics and Cordlife (now Life Corporation (LFC.ASX))

Dr Ravi Krishnan – Chief Scientific Officer
- Significant experience in experimental pathology and investigating novel compounds with immune modulatory effects and anti-inflammatory properties

Kevin Hollingsworth – CFO & Company Secretary
- Previously CFO and Co-Sec of Mesoblast and Patrys (PAB.ASX)

Drug Repurposing Strategy

Much lower cost, accelerated timeline, lower risk and with higher rates of success

- **Lower cost:** average development cost of ~US$30-50m compared to US$1.3bn for "de novo" development[1]
- **Faster:** FDA 505(b)(2) pathway leveraging previous clinical efforts**,** which accelerates the development timeline
- **Lower risk:** safety already established so less chance of failure (safety issues account for 30% of clinical failures[1])
- **Higher success rates:** 25% chance of successful commercialisation compared to 10% for "de-novo" drugs[1]
- **Repurposed drugs have the same potential** to reach 'blockbuster drug status' as de novo drugs

Standard clinical development[1,2]

10-17 year process

Discovery & pharmacology	Preclinical testing	Phase I clinical trials	Phase II clinical trials	Phase III clinical trials	Regulatory approval
2 – 3 years	5 – 6 years		2 – 6 years		1 – 2 years

Paradigm's drug repurposing timeline

3-5 year process to approval

Often only 1 pivotal Phase II trial Can use RWE open label case studies	1 pivotal Phase III trial for each indication	Regulatory approval
1 year	1 – 2 years	1 – 2 years

Source:
1. Khanaoure A, Chuki P & De Sousa A (2014)
2. Ashurn T & Thor K (2004)

Pentosan Polysulfate Sodium

PPS has a long safety history and is currently being sold in the US and Europe

Pentosan Polysulfate Sodium

- Pentosan polysulfate sodium (PPS) is a semi-synthetic drug manufactured from beech-wood hemicellulose
- PPS has been used in humans for more than 60 years
- The oral formulation is FDA approved and sold under the name Elmiron, by Janssen Pharmaceuticals (Johnson & Johnson), for the treatment of interstitial cystitis (painful bladder syndrome). Also used to treat deep vein thrombosis
- Paradigm has been granted patents to use PPS for new indications

Ideal biological characteristics

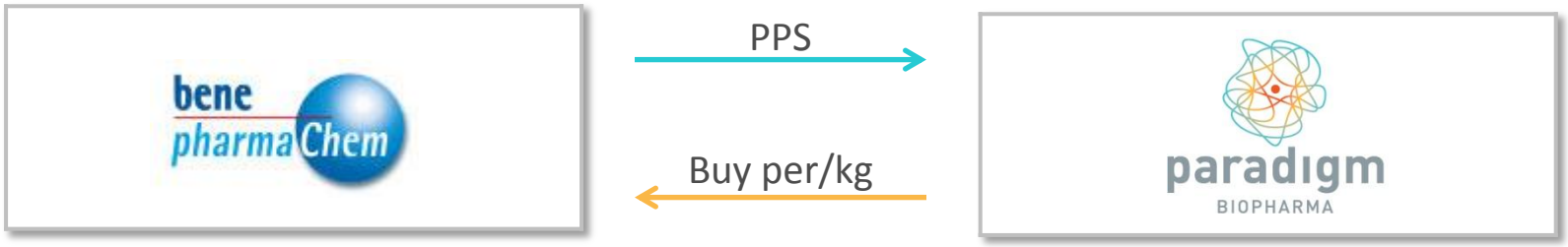
- ✓ Anti-inflammatory
- ✓ Prevents cartilage degeneration
- ✓ Anti-histamine
- ✓ Anti-clotting
- ✓ Prevents necrosis (premature cell death)
- ✓ Non performance enhancing (WADA & ASADA Cleared)

Excellent Safety Profile

- PPS has a well established safety profile with no reported serious adverse events
- Approved by FDA over 30 years ago for oral use, over 100 million injectable doses of PPS have been administered
- PPS is a semi-synthetic, complex carbohydrate, which makes it well tolerated by the human body
- PPS is a weak anti-coagulant compared to Heparin. PPS has $1/15^{th}$ – $1/20^{th}$ the anti-coagulant activity of Heparin. Data on file with US FDA
- The clearance of PPS from the body, as measured by activated partial thromboplastin time (aPTT), is 300 minutes (5 hours).
- Suggested sports physician treatment protocol:
  - Administration at least 48 – 72 hours before any contact sport is played
  - Blood test prior to contact sport to test coagulation parameters are within the normal range
- Paradigm is highly confident that the weak anti-coagulant properties of PPS do not present any notable issues

Pentosan Polysulfate Sodium – Supply & License

Exclusive Supply



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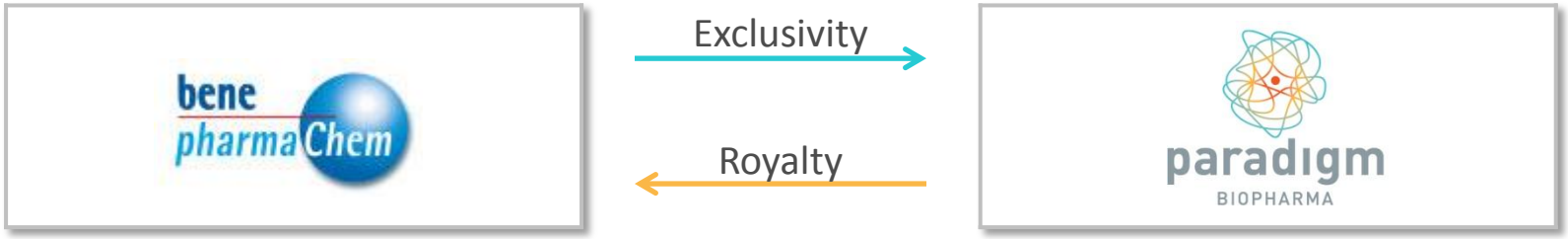


- Paradigm has executed a 20 year exclusive supply agreement with bene PharmaChem Gmbh & Co. KG
- Bene pharmaChem are the original developer of PPS and the only FDA-approved manufacturer
- Agreement grants exclusive supply of only FDA approved PPS for all orthopaedic (inc. alphavirus), respiratory and cardiovascular indications
- Paradigm to pay bene pharmaChem small single digit royalty on commercial sales

IP Protection

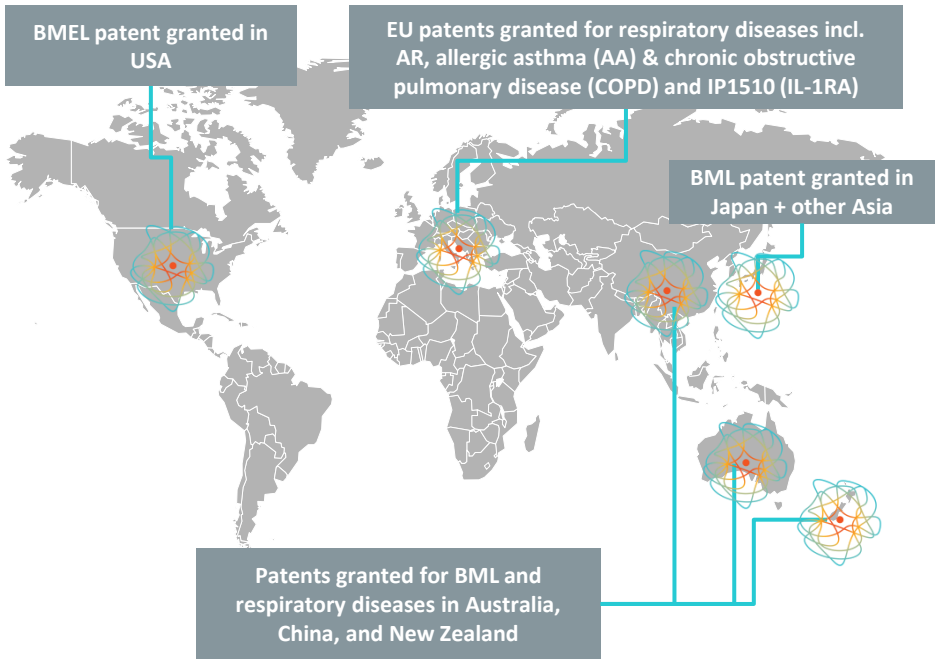
Multi-faceted IP protection increases barriers to entry for potential competitors

Valuable patent portfolio

- Paradigm has patent protection because it is using PPS for new indications
- Minimum life on patents is 2030 and beyond for more recent patents - i.e. 2035
- Patents granted for specific indications
- Established regulatory exclusivity and trademarks
- Patent applications for Ross River virus and Chikungunya virus
- Patent applications for osteoarthritis and concurrent BML
- Global patent for Heart Failure indication
- Assessing additional patent applications

Secure manufacturing and supply

- Exclusive 20 year supply agreement with bene PharmaChem[1]
- bene pharmaChem makes the only FDA-approved form of PPS
- **Manufacturing methods are highly complex and a well kept trade secret**
- Reduces risks associated with manufacturing and supply



1. bene pharmaChem is a private company located in Germany and manufactures the only officially approved and clinically tested medicinal PPS in the USA, Europe and Australia

Broad Product Pipeline

Drug Candidate	Indication(s)	Preclinical	SAS Pilot/Phase 1	Phase 2	Milestones (next 12 months)
Orthopaedic - Bone Marrow Edema/Lesions (Bone Bruising)					
PPS	BME with acute injuries (ACL etc)			~10 ACL Patients	ACL-BME Phase 2a results read out
	BME with Osteoarthritis (OA) - placebo controlled			100 OA patients	50% Recruited - Read out Q4 CY2018
	BME with Osteoarthritis (OA) - RWE Open Label		45 OA patients Open Label/RWE		Data gathered from TGA SAS patients
Viral Arthritis – Alphavirus					
PPS	Ross River Virus (RRv)		30 SAS RRv Patients	24 RRv Patients	70% Recruited - Read out Q3 CY2018
	Chikungunya virus (CHIKV)				Enter Phase 2 + other pilot studies
Respiratory					
PPS	allergic rhinitis (hay fever)		20 Phase 1 safety	40x2 patient crossover	Analyse trial data and reformulate
	Chronic Obstructive Pulmonary Disease (COPD)				Develop formulation & partner
	allergic asthma				Develop formulation & partner
Cardiovascular					
PPS	heart failure				Conduct 24 person placebo controlled Phase 1/2
Inflammation & autoimmune					
Novel Anti IL-1 RA inhibitor peptide	auto-immune disorders (IBD, Crohns' disease, GVHD), oncology, complications from cytotoxic drugs (mucositis) and cancer cachexia		26 patients phase 1/2		Reformulate into oral compound Finalise data pack & partner or progress human clinical trials

Orthopaedic – Bone Marrow Lesions

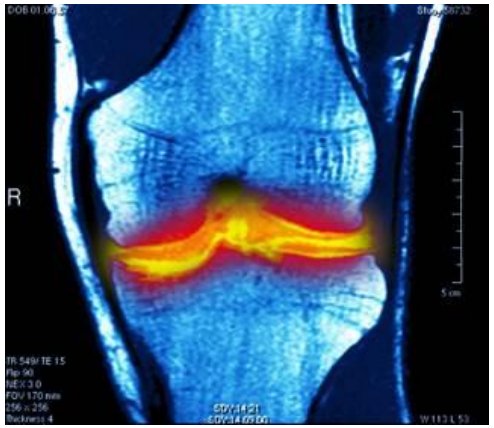
PPS – The first effective treatment for bone marrow lesions

What are bone marrow lesions (BMLs)?

- Bone marrow lesions are the accumulation of interstitial fluid or inflammation within the bone marrow
- Typically occur as a consequence of a direct impact to bone:
  - Post an acute injury such as a ruptured ACL
  - Degenerative osteoarthritis

Consequences of bone marrow lesions

- Bone marrow lesions promote inflammation and degeneration of cartilage, prohibiting recovery and joint health
- Currently no effective treatment for bone marrow lesions



Source - https://www.rheumatologyadvisor.com/osteoarthritis/the-predictive-value-of-bone-marrow-lesions-in-degenerative-joint-disease/article/466050/

Clinical Programs

Osteoarthritis

- Double blinded placebo controlled phase 2b clinical trial
  - **50% recruited – Results due Q4 CY2018**
- **Signs of strong efficacy established**
- **Blockbuster market -** 30 million people in the US alone diagnosed with osteoarthritis
- **No effective treatment –** ineffective NSAIDs and dangerous opioids are typical treatments

Acute Injury

- **Successful phase 2a open label**, established:
  - Primary Endpoint - Safety met
  - Secondary Endpoint - Efficacy met
- Demonstrated ability to **enhance recovery post injury/surgery**
- Currently being **utilised by a number of professional sports clubs (AFL, NRL, A-league)** under the TGA Special Access Scheme, with success.

Acute Injuries – Bone Marrow Lesions

Bone marrow lesions as a result of an acute injury

- BMLs occur as a consequence acute injuries where the bone sustains strong impact, such as a ruptured ACL
- Resolution of the BML, reduces inflammation and inhibits cartilage degeneration, enabling the joint and ligaments to effectively repair

Successful Phase 2 Clinical Trial in BMLs as a result of ACL injury

- The primary endpoint of safety & tolerability was met
- Paradigm was also successful in meeting its secondary endpoint, demonstrating a statistically significant reduction in bone marrow lesion (BML) volume as measured by MRI
- Trial success confirms the Company's hypothesis that Pentosan Polysulfate Sodium (PPS) could be a new treatment for acute joint injuries

Addressable market based on acute traumatic injuries:

1.4 million

knee & ankle injuries associated with bone bruising[1,2,3]

US$1,750

potential price per ZILOSUL® treatment

US$2.5+ billion

ZILOSUL® market in USA

Andrew Walker - Carlton Football Club
200+ game player with severe knee pathologies resolved with PPS



Source:
1. Based on 200k ACL injuries per annum, with 80% being associated with BMEL – Niall D, et al. (2004) and Friedberg R, et al. (2016)
2. Based on 1m meniscal injuries per annum, with 80% assumed as being associated with BMEL – Jones C, et al. (2012)
3. Based on 600k ankle injuries per annum, with 80% assumed as being associated with BMEL – Waterman B, et al. (2010)

Osteoarthritis with Bone Marrow Lesions

Osteoarthritis - A blockbuster indication with no effective treatments

Osteoarthritis and bone marrow lesions

- **BML are commonly associated with OA** and have been **linked to early onset of OA** and joint cartilage degeneration.[1]
- BML sustains inflammation and the release of MMP's and ADAMTS-5 enzymes, causing cartilage degeneration
- Resolution of the BML, **reduces inflammation and promotes joint health**
- Patients treated with PPS have reported **statistically significant improvement in pain and function**
- **Osteoarthritis** is the most common form of arthritis, affecting over **30 million people** in the United States, with over 36 million outpatient visits and 750,000 hospitalisations per year[2]

OA Market Facts:

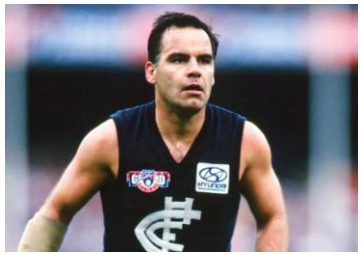
Market of therapeutics to treat OA

~US$5 billion pa Globally[3]

Cost to US Economy

US$128+ billion pa[4]

AFL Legend Greg 'Diesel' Williams diagnosed with OA, experienced significantly improved pain and function scores post PPS treatment



Source:

1. The occurrence and progression of BMLs have been shown to be associated with progression to osteoarthritis and joint pain (Osteoarthritis and Cartilage 2012, 20:1514-1518) and (Rheumatology 2010, 49:2413-9).
2. http://ard.bmj.com/content/annrheumdis/early/2017/07/12/annrheumdis-2017-211396.full.pdf
3. National Institute of Health; Emerging drugs for osteoarthritis; Hunter DJ and Matthews G 16(3): 479–491; 2011 September.
4. *Ibid.*

Osteoarthritis with BML: The Market for ZILOSUL®

ZILOSUL® has the potential to fill the current gap in osteoarthritis treatment options

- There is currently **no effective treatment for osteoarthritis and BMLs** that treats the underlying pathology of the disease.
- **Current therapies treat the symptoms** of osteoarthritis and bone marrow edema lesions but **prolonged use results in undesirable side-effects.** It is widely accepted that NSAIDs and corticosteroids are contraindicated having a detrimental effect on the metabolism of bone and cartilage.
- **Opioid's are widely misused globally as patients form serious addictions whilst mitigating pain.**[1]
- **ZILOSUL® treats the underlying pathology of osteoarthritis** by reducing inflammation, resolving the bone marrow edema lesions and down regulating cartilage degrading enzymes (MMP's and ADAMTS-5).

	paradigm (ZILOSUL®)	NSAID (ibuprofen etc)	Opioid (oxycodone etc)	Corticosteroid / Cortisone	Joint Replacement
Treats the symptoms of OA (pain & function)	✓	✓	✓	✓	✓
Treats underlying pathology	✓				✓
No undesirable side-effects	✓				
Non-addictive	✓	✓		✓	✓
Anti-inflammatory	✓	✓		✓	
Non-Surgical	✓	✓	✓	✓	

1. https://www.drugabuse.gov/news-events/news-releases/2017/07/pain-relief-most-reported-reason-misuse-opioid-pain-relievers

Osteoarthritis with Bone Marrow Lesions

TGA Special Access Scheme – Real World Evidence – 45 patients treated

All patients (median age of 57.6 years - range 31 to 84 years) had pain and failed current standard of care - analgesics, NSAIDs or corticosteroids.

At six weeks after the initiation of PPS treatment:

Pain

- 38 out of 45 patients (84.4%) showed a reduction in pain;

Function

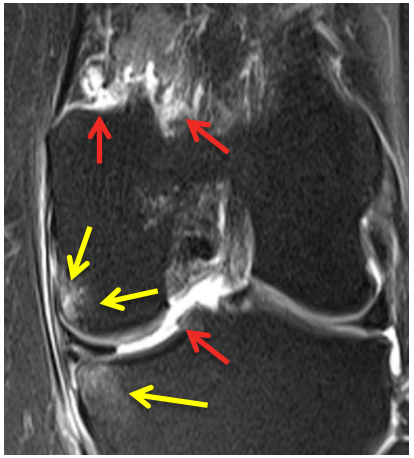
- 38 out 45 patients (84.4%) showed an improvement in knee function;

Patient A MRI – Pre PPS Treatment

Pre treatment Scores

- High NRS Pain Score = **8**
- Lysholm Score: **37 (Poor knee function)**

BME Lesions
Joint Space Effusions



Patient A MRI – Post PPS Treatment

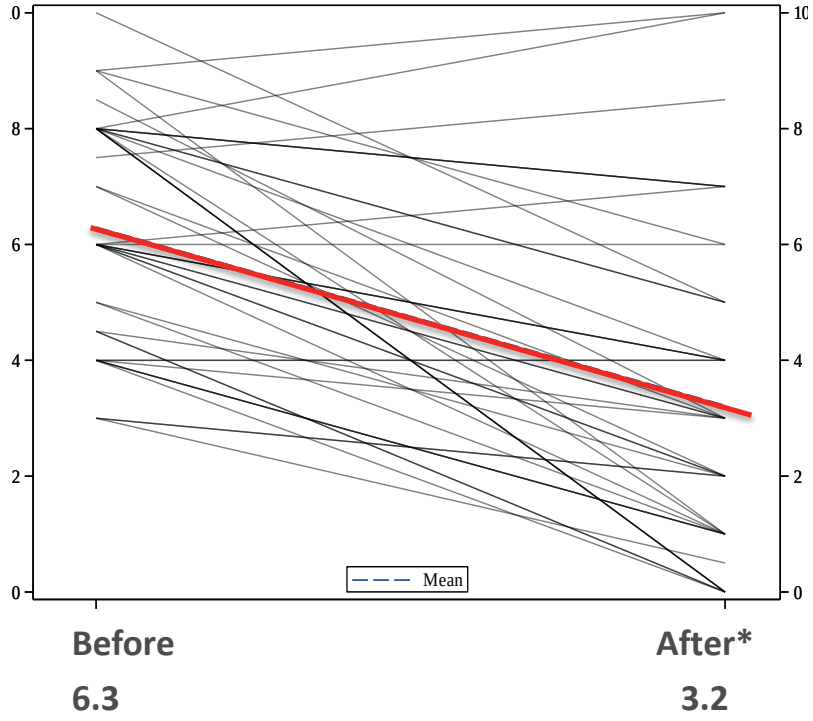
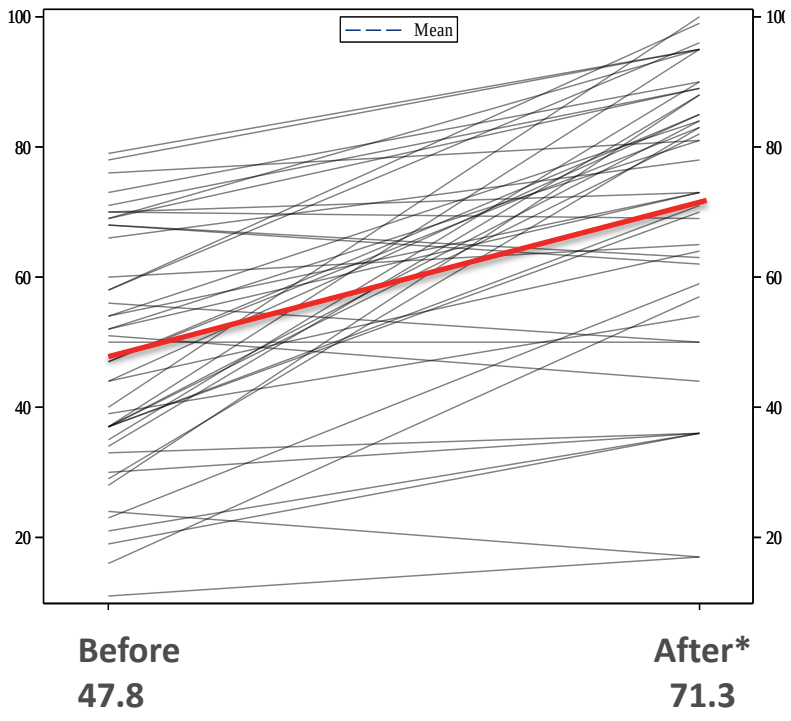


Post Treatment Results

- **Complete resolution** of BME lesions and effusions
- Pain NRS = **0 (pain resolved)**
- Lysholm Score: **65 (Fair knee function)**

OA/BML – 45 Patients treated via TGA SAS

Before and after scores for knee pain (NRS) and knee function (LKS)

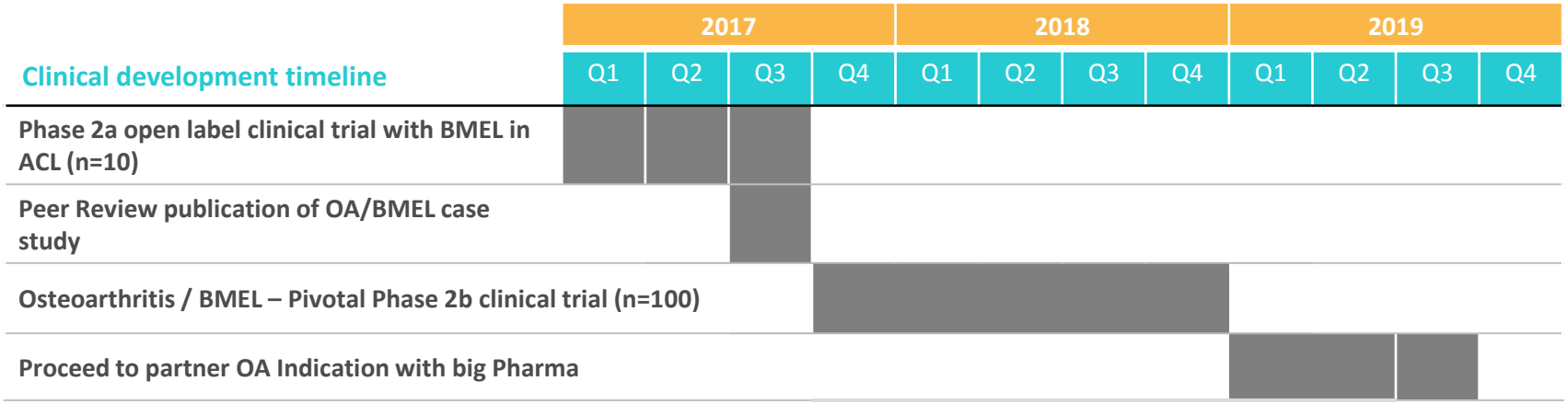
Pain (NRS) Before – After = 3.1 p<0.0001 50% reduction in knee pain	Function (LKS) Before – After = 23.5 p<0.0001 64% improvement in knee function
	

*After = Results six weeks post final treatment, i.e. twelve weeks from first dose

OA with BML: Clinical Timeline

Comprehensive clinical pathway to commercialisation

- **OA/BMEL case study published in peer reviewed scientific journal**
- **Successful completion of the Phase 2a open label clinical trial**
  - Trial demonstrated the safety, tolerability and efficacy of ZILOSUL® in patients with a bone marrow edema lesions from a recent ACL (acute knee) injury
- **147 additional patients treated under the TGA SAS scheme. Very positive clinical signals from BML patients with osteoarthritis (OA)**
- **Over 50% recruited for Phase 2b placebo controlled (100 patient) clinical trial for BML with OA – Results due Q4 CY2018**
- **Plan to undertake pilot studies in BML patients with rheumatoid arthritis (RA)**



Note:
1. Closed label, randomised, double blind, placebo controlled trial expected to commence in Q42017, expected to be completed in 12-18 months after commencement

Viral Arthritis – Alphavirus

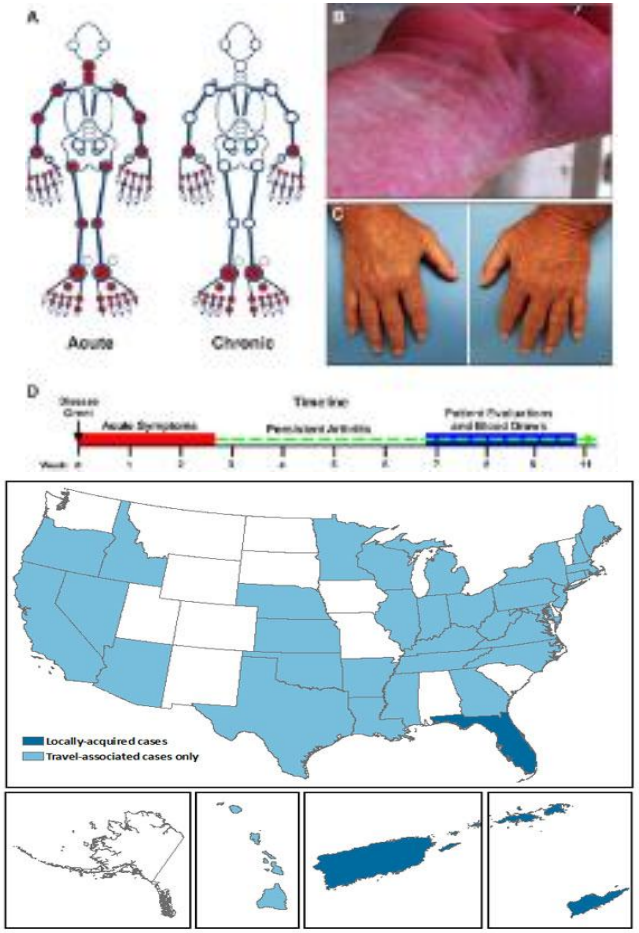
No approved treatment for severely debilitating viral infection

Viral Arthritis

- Alphavirus infections result in the clinical symptoms of joint and muscle pain, fever and joint inflammation.
- Ross River Virus (RRV) and Chikungunya (CHIKV) are mosquito-transmitted arthritogenic alpha viruses that cause epidemics of severe musculoskeletal disease in many countries.
- No effective treatment, with sufferers left incapacitated
- Symptoms can persist for a number of years

Ross River Virus & Chikungunya Virus

- Paradigm acquired the patent from the Institute for Glycomics research at Griffith University.
- The patent claims the use of PPS to treat alphaviruses, including Ross River Virus (RRV) and Chikungunya Virus (CHIKV).
- Potential interest from the **US Department of Defense** to co-develop for treating CHIKV



Chikungunya cases ,USA

Viral Arthritis: Clinical Timeline

Potential to gain Orphan status, resulting in fast-tracked clinical development

- **Pre-clinical studies have been conducted by the Institute of Glycomics at Griffith University. The results suggested that:**
  - PPS significantly alleviated the severity of disease and reduced both the inflammatory response and the loss of articular cartilage;
  - PPS has the potential to treat both acute and chronic symptoms associated with mosquito transmitted alphavirus infections (Ross River virus (RRV) and chikungunya virus (CHIKV);
  - There currently is no effective disease modifying treatment for RRV or CHIKV.
- **Patients with RRV-arthralgia (joint pain) already treated with PPS under the TGA Special Access Scheme** demonstrating tolerability and potential clinical effects
- **Phase 2 Clinical Trial – PPS to treat RRV and CHIKV– Potential for Fast-Track /Breakthrough/Accelerated Approval**
  - Queensland Government have provided a A$300,000 grant for Ross River research
  - Phase 2a, randomised, double-blinded placebo-controlled clinical trial treating RRV induced arthritis and arthralgia **– 70% recruited – Read-out due Q4 CY2018**
  - Phase 2 clinical trial in CHIKV-induced arthritis and arthralgia to be initiated post RRV read-out

Clinical development timeline	2017				2018				2019			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Proof of concept study under SAS (n=30)	Completed CY2016											
Design and Ethics approval for Phase II Trial												
Phase 2 Clinical Trial Ross River (n=24)												
Plan for a Phase 2 Clinical Trial - Chikungunya												

Clinical Pipeline

Paradigm hosts a deep clinical pipeline

	Indication(s)	Clinical Status	Market Size
IL-1RA Peptide	▪ Inflammatory bowel disease ("**IBD**") ▪ Cancer-related cachexia ▪ Ulcerative colitis ▪ Crohn's disease	Safety and efficacy confirmed in Phase 1/2 clinical trial (n:26)	Inflammatory Bowel Disease Medicines predicted to reach **US$9.3 Billion**[1]
Cardiovascular	▪ Heat Failure	Demonstrated beneficial effects in an established preclinical heart failure model	**US$18+ Billion**[2]
Respiratory	▪ Hay Fever ▪ COPD ▪ Allergic Asthma	▪ Pre-clinical safety and efficacy in guinea pig model ▪ Safety confirmed in Phase 1b clinical trial (n:18) ▪ Paradigm to reassess Phase 2b clinical trial (n:40)	**US$11+ Billion**[3]

1. https://www.visiongain.com/Press_Release/932/The-World-Market-For-Inflammatory-Bowel-Disease-Medicines-will-reach-9-3-billion-in-2019
2. Forbes – The best selling drugs since 1996 (2012) 2. *Heart failure: preventing disease and death worldwide,* P.Ponikowski et al (2014) 3. Sales of six leading compounds – Figures between 2014 & 2016 - Statins $13.2bn (Research and Markets - Global Statin Market 2015-2016), Clopidogrel bisulphate $1.8bn, Beta-blockers $1.55bn, Ace inhibitors 0.47bn, Aspirin $0.54bn, Vitamin K antagonist $0.5bn (www.pharmacompass.com)
3. Visiongain: Allergic Rhinitis Drugs Market Forecast 2015-2025

Peer Comparison

Attractive investment given low risk development and large market opportunity

- Paradigm appears undervalued compared to similar stage, drug repurposing peers given its platform for successful development, secure industrial scale manufacturing and the size of its addressable markets

Peer	Ticker and exchange	Market cap (A$m)	Rationale	Clinical stage of key product	Addressable market size
Medical Developments International	MVP.ASX	404	Developing new markets and applications for Penthrox, recent focus on respiratory diseases, significant manufacturing IP	Commercialisation	US$1.5bn+
starpharma	SPL.ASX	407	Commercialising an old technology of synthetic branching polymers (dendrimers), with lead product VivaGel in Phase III trials	Phase III & commercialisation	US$3bn+
AXSOME THERAPEUTICS	AXSM.NASDAQ	77	Developing novel therapies for the management of central nervous system disorders, focusing on treatment of BMEL	Phase III	US$2.5bn+[2]
verona pharma	VRP.LN	290	Focused on commercialising an old compound for respiratory diseases, with dual inhibition of key enzymes	Phase I/II(a)	US$12bn+[3]
paradigm BIOPHARMA	PAR.ASX	40	Focused on the clinical development of PPS as a multi-target treatment for complex conditions, such as BMEL/OA, AV & AR	Multiple Phase II(a)	US$37bn+[4]

Source: Bloomberg, company filings

1. Market data as at 13 April 2018, exchange rates of AUDGBP 0.55 and AUDUSD 0.77
2. Based on BMEL addressable market size, excludes CRPS addressable market due to lack of available information and thus likely understates true market size
3. Only includes the market size for COPD which is US$12b+, excludes market sizes for other respiratory disease indications
4. Includes AR market US$11bn+ and OA/BMEL market US$8bn+ & $0.5bn for viral arthritis ,excludes COPD addressable market size of US$12bn+ and Asthma addressable market size of US$15bn+ and Heart failure Figures between 2014 & 2016 - Statins $13.2bn (Research and Markets - Global Statin Market 2015-2016), Clopidogrel bisulphate $1.8bn, Beta-blockers $1.55bn, Ace inhibitors 0.47bn, Aspirin $0.54bn, Vitamin K antagonist $0.5bn (www.pharmacompass.com)

Global Big Pharma Interest

Recent transactions highlight big pharma interest in BMEL/OA, Heart failure and IBD

Date ↓	Target	Acquirer	Deal value (US$)	Relevance
Jul - 17	Galápagos	SERVIER	**$346m** EU Rights Only	▪ Galapagos licensed GLPG1972, a potential disease-modifying oral therapy for osteoarthritis to Servier ▪ GLPG1972 is a potent and highly selective inhibitor of ADAMTS-5.
Mar-17	Protagonist Therapeutics	Janssen Pharmaceutical Companies of Johnson & Johnson	**$990m**	▪ Protagonist Therapeutics' lead compound PTG-200 is a first-in-class, oral interleukin-23 receptor antagonist for the treatment of Inflammatory Bowel Disease
Nov-16	TissueGene, Inc. Cell Technologies		**$434m**	• TissueGene, Inc. Licensed the rights for its degenerative osteoarthritis drug Invossa to Japan's Mitsubishi Tanabe Pharma
Nov-15	Cardioxyl Pharmaceuticals	Bristol-Myers Squibb	**$1.8Bn (inc $1.5Bn milestones)**	▪ Bristol-Myers Scquibb acquired Cardioxyl to attain the intravenous CXL-1427, which claims to boost heart muscle and vascular function.
May-13	Knee Creations	ZIMMER BIOMET	**Undisclosed**	▪ Zimmer Biomet acquired Knee Creations for its Subchondroplasty procedure, designed to treat BMEL

Source: Bloomberg, company filings

Share Price Catalysts

Upcoming milestones should drive strong shareholder returns

ACL/BMEL **OA/BMEL** *Phase 2 trials*	▪ Additional OA with BML RWE results ▪ Complete Phase 2b placebo controlled OA clinical trial (100 patients) with **trial results Read Out targeted for Q4 CY2018** ▪ Additional high Profile sporting identities (such as Andrew Walker, Carlton) treated with PPS under SAS program
ALPHAVIRUSES *Phase 2 Trials*	▪ Completion of RRv Phase 2a clinical trial (24 patients) – **Results Read Out Q4 CY2018** ▪ Potential to partner with US DoD on CHIKV treatments and trials ▪ Initiation of CHIKV Phase 2a clinical trial
IL-1RA Peptide *Auto-immune, oncology cancer cachexia*	▪ Reformulation into oral administration ▪ Partner with big Pharma ▪ Progress pilot human clinical trials (TBD)
HAY FEVER	▪ Analysis of Phase 2 results and determine reformulation ▪ Explore formulations for COPD and Allergic Asthma ▪ Potential to JV or co-fund future development
CORPORATE OPPORTUNITIES *Potential partners*	▪ Demonstrated interest from major pharmaceuticals companies in treatments for OA, BMEL, Respiratory, Heart Failure and Alpha Virus' & IL-1 RA peptide ▪ Partnership with world-class manufacturers
EXPANSION *Market share*	▪ Expansion of BMEL market into OA and other joint pain indications ▪ Progress and potentially partner IL-1RA peptide ▪ Progress Alphavirus and Heart Failure ▪ Develop new IP and corporate opportunities in new indications

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